EXPANDING THE SCIENCE OF COMPASSION

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EXPANDING THE SCIENCE OF COMPASSION

Topic Editors:
Myriam Mongrain, York University, Canada
Dacher Keltner, University of California, Berkeley, United States
James Kirby, The University of Queensland, Australia

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EDITORIAL
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Editorial: Expanding the Science of Compassion

Myriam Mongrain[1]*, *Dacher Keltner*[2] and *James Kirby*[3]

[1] Department of Psychology, York University, Toronto, ON, Canada, [2] Department of Psychology, University of California, Berkeley, Berkeley, CA, United States, [3] School of Psychology, University of Queensland, St Lucia, QLD, Australia

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Editorial on the Research Topic

Editorial: Expanding the Science of Compassion

This special edition examines the physiological, psychological, and environmental conditions facilitating the experience of compassion. This is timely given the global challenges facing our world and the need for collective action. The barriers that inihibit our capacity for goodness are included in this collection, along with numerous applications to implement a compassionate mindset at the individual collective level. This work is inspired by a "sea change" in evolutionary science (see Wilson, 2020) suggesting that a concious evolution toward a more compassionate world is possible. We bring together reknowned researchers from different disciplines to offer novel theoretical concepts, research methods, results, and applications to help transform our future.

The issue is loosely organized along four main themes: (1) Definition of compassion along with ways of measuring it, (2) Brain-based and peripheral biological systems that support this motivational orientation, (3) Applications, methods, and techniques designed to promote compassion at the individual level, and (4) Strategies to help collectives adopt a compassionate stance toward all its members.

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R. David Hayward, Ascension St. John Hospital, United States

***Correspondence:**
Myriam Mongrain
mongrain@yorku.ca

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DEFINING AND MEASURING COMPASSION

Gilbert provides a comprehensive explanation of the ontogeny and evolutionary history of compassion. He reviews the necessary personal experiences, the competencies, and physiological support systems necessary for compassion to be expressed toward the self and toward others. He offers the following definition of compassion as "*a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it*" (Gilbert, 2017).

Mascaro et al. reiterate the definition of compassion as a "benevolent emotional response toward another who is suffering, coupled with the motivation to alleviate their suffering and promote their well-being." They draw upon an abundant literature across disciplines to provide a coherent rubric of the various ways in which compassion has been measured and tested. They forge important connections between disparate areas of research and provide a thorough overview of the current state of available methods for studying compassion.

BIOLOGICAL CONTRIBUTIONS

In an ambitious paper, Ho et al. offer a brain-based Bayesian inference framework to highlight the information processing pathways involved in "ego preserving biases" that compromise compassionate responding. The juxtaposition of Buddhist concepts onto emerging findings in

neuroscience is a tour-de-force. The authors manage to weave in the operations of large functional systems within the brain that hyjack empathic concern toward another's suffering. The role of mind training to bypass ego-biases in situations of interpersonal conflict are incorporated within a neuro functional model.

Self-soothing in the form of self-reassurance has also been mapped onto the brain. The areas underlying the experience of compassion toward the self are believed to stem from the same motivational system underlying compassion toward others. In their study, Kim et al. show that participants high on trait self-criticism show different patterns of brain activation during a self-reassurance task. Their results demonstrate how difficulties in being kind to oneself can be captured in distinct brain processes. This research adds to the physiological underpinnings of compassionate responding.

Miller et al. demonstrate the role of the peripheral nervous system in the expression of compassion. There is a rich literature connecting compassion to parasympathetic activation, including heart rate variability and vagal tone (Porges, 2017; Stellar and Keltner, 2017). Individual differences in these functions emerge early, and Miller et al. show how vagal flexibility in children helps them orient toward another's distress and help support their ability for calm engagement. They also demonstrate the role of the mother's levels of compassion in predicting altruistic action for those children with vagal flexibility. The findings are in support of a "biopsychosocial" model of prosociality.

In their opinion paper, Clapton and Hiskey propose that martial arts can help provide the training for greater sympathovagal balance. They describe how deliberate and controlled movement in mind-body practices can stimulate the parasympathetic nervous system and produce resilience. The various forms of martial arts are said to preserve relational harmony, in part through behavioral synchrony and a compassionate embodiment of conflict resolution.

The capacity for empathic concern and love toward humanity may also be facilated by an abstract thinking style. Fernández et al. found that following the Parisian terrorist attack in 2015, Spanish participants with a more abstract cognitive style reported greater empathic concern toward the victims up to 2 months following the attack. The authors suggest that abstraction skills may help promote collective reactions of compassion by allowing representations of a better future.

INCREASING COMPASSION TOWARD SELF AND OTHERS

"Compassion Focused Therapy" (CFT; https://doi.org/10.3389/fpsyg.2020.586161) targets physiological processes directly involved in the capacity to engage in supportive way with one's own suffering. This therapy aims at long term changes in one's compassionate response by developing the inner ability to feel safe and supported. Because the tools in CFT are varied and target different systems, Gilbert refers to it as a type of *neuropsychophysiotherapy*, one of its kind being theoretically grounded and supported by research.

Petrocchi et al. applied CFT to a sample of treatment-resistant OCD patients and obtained significant reductions in symptoms. These patients had not previously responded to traditional therapies. The authors suggest that the techniques of CFT may have been instrumental in reducing compulsive compensatory behaviors by activating patients' self-soothing capacities.

Many meditative techniques rely on Buddhist notions about the nature of mind and suffering. Ho et al. propose a compassion meditation technique to cultivate attunement to universal suffering. In this process, the authors provide a compelling argument for the benefits accrued through a re-wiring of the brain that allows detachment from ego-related concerns. Further, meditation practice allows for a glimpse of the true nature of mind which is innately compassionate.

Condon and Makransky present other meditation tools under "Sustainable Compassion Training" (SCT). It consists of a number of incremental steps to help respond to others with unconditional care and discernment for right action. The foundation of this model relies on the development of a secure base activating inner qualities of safety, acceptance and love. Guided meditations in SCT are linked throughout the text of this article, and can be applied immediately.

Transmuting our own pain and empathizing with humanity is a quality of mind that may help maintain compassion. Baguley et al. examined the strategies used by health care professionals to maintain a compassionate stance toward their patients. Empathy and shared humanity was invoked as an important skill deliberately recruited to maintain compassionate responding. Self-care was also invoked as an important strategy to avoid compassion fatigue.

Further techniques in the development of compassion toward self and others comes from an art-based training program described by Bennett-Levy et al.. In their pilot project with Australia's Indigenous participants, the investigators found an improvement in compassion skills directed toward the self and others using visual art projects. The use of imagery may be more effective than traditional verbal instructions used in CFT at least in some populations.

In another application within the higher education curricula, Lundgren and Osika describe ways in which compassion could be injected in supervisor-graduate student relationship. The authors provide a framework to improve compassionate supervisor behaviors in order to foster more creative and productive relationships with students.

Fryburg et al. show evidence for a novel intervention consisting of kindness media. The authors examined the impact of pictures and images depicting kindness and compassion in hospital settings. Compared to the patients exposed to regular programming, those exposed to kindness media reported feeling more relaxed and happy after brief exposure. They were also more likely to donate their earnings from participation in the study than those exposed to regular programming. The authors suggest that witnessing others engage in compassionate action can inspire and lead to more charitable behaviors, and provide an easily implementable intervention to facilate this process.

Benevolence at the workplace is generally beneficial for the benefactor. Andersson et al. found that workers who felt able and

willing to give to co-workers reported lower levels of depression, perceived stress, and emotional exhaustion in the workplace.

INCREASING COMPASSION COLLECTIVELY

Given the benefits accrued from compassionate responding, how could we apply this knowledge to create a more compassionate world? In an empirical study, Mongrain and Shoikhedbrod illustrate how judgment and stigma pre-empt the experience and expression of compassion. Stimatized attitudes and harsh judgments toward vulnerable groups may reflect a more general societal problem. The authors suggest that broad endeavors such as public health campaigns to educate and promote greater understanding may improve empathy and compassionate responding toward marginalized groups.

As illustrated by Weng et al. we can be more inclusive and compassionate in our own research. In their "Intersectional Neuroscience Framework" the authors describe how multiple marginalized communities can be included in contemplative research. They describe individualized neuroscience methods to recognize unique brain patterns associated with internal attention states during a meditative task. In this study, brain patterns associated with attention to the breath, mind-wandering, or self-referential processing could be reliably identified for each meditor. This research presents promising methods for future research in contemplative neuroscience.

In a seminal paper on the evolutionary history of basic human drives, Gilbert describes how the acquisition of resources since the agricultural revolution 10,000 years ago has shifted human beings' fundamental drives. The ability to acquire and store resources has shifted our social mentality from one of caring and sharing (essential to the survival of hunter-gatherers) to one of "controling and holding" onto resources. This has led to the predominance of a competitive orientation in our recent evolution, concerned over the acquisition of personal wealth and power. Gilbert provides compelling arguments for the destructive outcomes of this social mentality and argues that change within our culture is urgently needed. For example, he suggests that shifts in resource distribution and societal institutions are necessary to facilitate cooperation over competition.

In the age of an interconnected world, Day et al. explain how digital technology could be harnessed to promote the greater good. While virtual networks have reduced our capacity for empathy, the authors provide ideas on how to develop technologies tapping into our potential for compassion. For example, virtual assistants could be designed to maximize personal growth. Public ownership of digital platforms could facilitate mutually-beneficial decision-making among its members. There are tremendous opportunities to enhance self-transcendance and minimize greed through the digital world and this article provides directions for future implementations.

In conclusion, this special issue provides the latest advances in our understanding of compassion, its roots, and facilitative conditions as well as its obstruction. The papers are consistent with recent views on "concious evolution" and the possibility that compassion and altruism could evolve through intentional and guided effort to shape individuals and environments. We may be at the dawn of a cultural change and a transformation in the expression of our prosocial nature where behaviors associated with self-transcendance and goodness could be promoted (Wilson, 2020). This collection of papers will hopefully inspire innovation in research and serve to inform future inter-disciplinary efforts to increase compassion in all our human affairs.

AUTHOR CONTRIBUTIONS

The Editorial was written by MM, and was revised by DK and JK. All authors contributed to the article and approved the submitted version.

REFERENCES

Gilbert, P. (2017). "Compassion: definitions and controversies," in *Compassion: Concepts, Research and Applications*, ed P. Gilbert (London: Routledge), 3–30. doi: 10.4324/9781315564296-1

Porges, S. W. (2017). "Vagal pathways: portals to compassion," in *The Oxford Handbook of Compassion Science*, ed E. M. Seppala (New York, NY: Oxford University Press), 189–204.

Stellar, J. E., and Keltner, D. (2017). "Compassion in the autonomic nervous system: the role of the vagus nerve," in *Compassion: Concepts, Research and Applications*, ed P. Gilbert (London: Routledge), 120–134.

Wilson, D. S. (2020). *This View of Life: Completing the Darwinian Revolution*. New York, NY: Vintage Books.

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Sustainable Compassion Training: Integrating Meditation Theory With Psychological Science

Paul Condon[1*†] *and John Makransky*[2*†]

[1] Department of Psychology, Southern Oregon University, Ashland, OR, United States, [2] Department of Theology, Boston College, Chestnut Hill, MA, United States

Meditation programs continue to proliferate in the modern world, with increasing participation from scientists and many others who seek to improve physical, mental, relational, and social flourishing. In developing such programs, the meditation practices have been adapted to meet the needs of modern cultures. However, through that adaptation, important contextual factors of traditional contemplative cultures are often dropped or forgotten. This article presents a system of compassion and mindfulness training, Sustainable Compassion Training (SCT), which is designed to help people cultivate increasingly unconditional, inclusive, and sustainable care for self and others. SCT aims to recover important contextual factors of meditation that flexibly meet the diverse needs of modern secular and religious participants. SCT draws on Tibetan Buddhism in dialogue with caregivers, other contemplative traditions and relevant scientific theories to inform meditative transformation for secular contexts. We provide an overview of SCT meditations that includes both contemplative and scientific theories that draw out important features of them. Each meditation includes novel hypotheses that are generated from this dialogical process. We also provide links to audio-guided meditations.

Keywords: empathy, care, compassion, loving kindness, mindfulness, meditation

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James Kirby,
The University of Queensland, Australia

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Gaelle Desbordes,
Mind & Life Institute, United States
Alicia May Carter,
The University of Queensland, Australia

***Correspondence:**
Paul Condon
condonp@sou.edu
John Makransky
john.makransky@bc.edu

† These authors have contributed equally to this work

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INTRODUCTION

Meditation continues to gain traction in Western medicine, mental health, and among the general public (Clarke et al., 2018). At the same time, many scholars have expressed concerns about the fidelity of modern meditation programs with the contemplative traditions and cultures that inspired those programs (Sharf, 1995; McMahan, 2008; Harrington and Dunne, 2015; Condon, 2019; Thompson, 2020). Of particular concern, most modern meditation programs have filtered out traditional aspects of meditation that have been situated in communal frameworks of support for broad ethical horizons, because such traditional forms were viewed as too devotional or ritualistic. By deleting those communal dimensions of meditation, a uniquely individualistic, self-help orientation to meditation was newly established in the modern world. Yet patterns of practice that have structured traditional forms of devotion and ritual may be crucial for developing mindful awareness, wisdom, and compassion. Through the lens of attachment theory, we assert that devotional and ritual practices prominent throughout religious traditions—including contemplative forms of Buddhism, Christianity, Islam, Judaism, Hinduism, Confucianism,

and many indigenous religions—function to help practitioners develop an unlimited secure base, which they can return to again and again for replenishment, healing, and empowerment (Condon and Makransky, 2020). Through such patterns of practice, these meditators experience themselves and their world as held within the unwavering support of their spiritual benefactors, which empowers them, like their spiritual benefactors, to extend increasingly unconditional, inclusive, and sustainable care to others. We have called this pattern of practice the *relational starting point* for meditation (Condon and Makransky, 2020).

To recover the relational starting point of meditation for secular application in modern contexts, we developed a meditation program called *Sustainable Compassion Training* (SCT)[1]. SCT draws on scientific theories and patterns of contemplative practice from Tibetan Buddhism that are shared with other contemplative traditions, to empower meditative cultivation of increasingly sustaining, unconditional, and inclusive care and compassion (Makransky, 2007, 2011, 2012b, 2019; Lavelle, 2017; Condon and Makransky, 2020; Makransky and Condon, manuscript in preparation). In this article, we present a series of SCT meditation practices and discuss their correlation with theories and findings in modern psychological science. Our aim here is not to validate Buddhist or other religious practices, but rather, to provide a detailed tutorial in an innovative form of contemplative training in compassion, which draws on several major theories of psychology to show how they can newly inform many specific aspects of meditation training for modern people. Scientific theories can be a great support for translating diverse contemplative practices into accessible forms for people who hold modern, scientifically informed worldviews. In addition, dialogue between science and Buddhism can be advanced by inviting in other religious and cultural perspectives (for a similar view, see Thompson, 2020). Here, we provide a description of the theory and practice of the SCT meditations, with links to their audio-guided instructions, to inspire dialogue, hypothesis generation, and research efforts on modern engagement with meditation.

OVERVIEW OF SUSTAINABLE COMPASSION TRAINING

Sustainable Compassion Training is a series of meditation practices that have been adapted from three practice traditions of Tibetan Buddhism: Nyingma, Kagyu, and Geluk, informed by dialogue with psychological science and other religious traditions (Makransky, 2007, 2011, 2012b, 2019; Lavelle, 2017; Roeser et al., 2018; Condon and Makransky, 2020; Makransky and Condon, manuscript in preparation). Although SCT was originally adapted from Buddhism, it has been continuously informed by dialogical encounters with participants who work in many fields of service—including healthcare, mental health, education, business, social work, activism, etc.—who represent a diversity of spiritual traditions and scientific perspectives. SCT has been taught in many settings that regularly include people from three different groups: (1) people who work in caring professions or social activism who seek a sustaining power of care and compassion that can empower their lives and work; (2) modern Buddhists who seek reunification with the non-dual, primordial state of awareness that grounds those caring qualities (i.e., nature of mind); and (3) people from other spiritual and religious traditions who wish to deepen their own spiritualities through experiential encounters with Buddhist meditation practices. An emerging fourth category includes scientists who wish to investigate the effects of meditation training and draw on such practices to generate new hypotheses about the mind and human potential. In any given teaching setting, participants typically include members of at least the first three groups, many of whom occupy more than one of those identities. SCT is framed and presented so as to meet the goals of all those participating groups.

Three different modes of contemplative practice form the basis of SCT: (1) receptive mode; (2) deepening mode; and (3) inclusive mode. Each mode includes a set of meditation practices that inform the practices of the other two modes. The receptive mode helps practitioners find new access to hidden qualities of love, compassion, inner safety, acceptance, and wisdom. The deepening mode helps them settle into the source of those qualities in the depth of their awareness—with increasing relaxation, inner peace and spaciousness that is healing and freeing in mind and body. The inclusive mode helps them come from that depth of awareness to respond to others in their deep dignity and potential, with more replenishing, unconditional and expansive powers of care, compassion and discernment for action. On the basis of those three modes of practice, further meditations for cultivating empathy and compassion are introduced, which are designed to help generate compassionate solidarity with others in a sustainable and inclusive way that can avoid empathic distress, compassion fatigue, exhaustion, and burnout (see **Figure 1**).

There are four key features of SCT that distinguish it from other modern meditation-training programs[2]. First, SCT meets the varied goals of the four groups of participants noted above by constructing an *open secular space* (Makransky, 2012b; Lavelle, 2016). An open secular space explicitly invites practitioners to draw on their own worldviews and religious or scientific backgrounds to inform their meditation practice. SCT accomplishes this by inviting participants to find their own unique way of establishing the relational pattern of practice noted above. This contrasts with the *closed secular space* of many modern secular meditation programs, which avoid discussion of spirituality and religion in favor of creating a singular, scientific framework that everyone must agree to (Gleig, 2019). Of critical import, an open secular space allows practitioners to engage more deeply with the meditation practice than is possible in a closed secular space, because participants are invited to map the pattern of SCT into their own particular worldview, whether religious, scientific or both. For people of diverse religions, the pattern of SCT can map directly into their own religious framework. For

[1] SCT has also been called "Innate Compassion Training" (e.g., Makransky, 2011).

[2] For a discussion of SCT in comparison with other meditation programs, see Lavelle (2017).

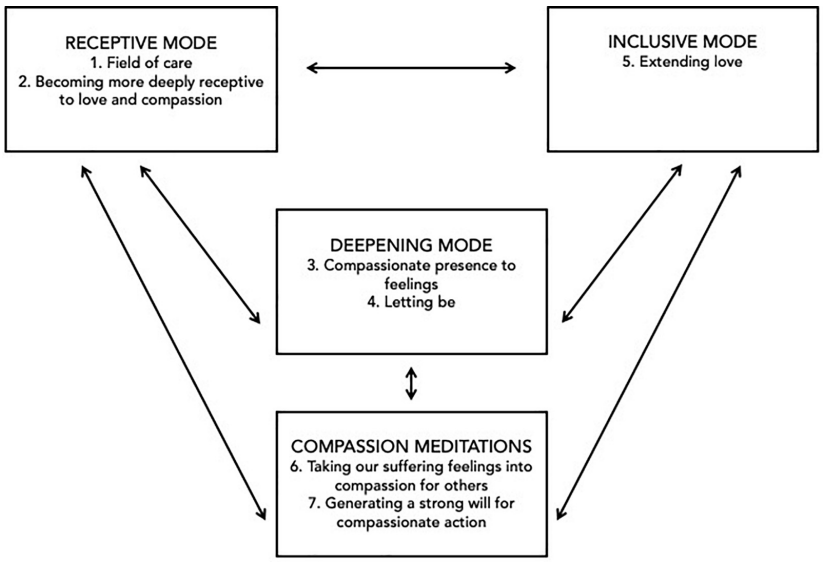


FIGURE 1 | Sustainable Compassion Training Meditations.

non-religious people, the pattern of SCT can map onto scientific frameworks for understanding the relational development of care, as in attachment theory, social baseline theory, and related perspectives (Condon and Makransky, 2020).

The second distinctive feature of SCT is its explicit emphasis on the relational starting point of meditation noted above (Condon and Makransky, 2020). SCT begins not with *self-care* or *extending care*, but with *receiving care* by constructing a relational field in which one is held in the unconditional love of caring connection, benefactors, and/or ancestors. This relational field serves as an outer secure base that evokes the inner secure base of caring capacities that the practitioner needs to extend care reliably to others. This relational starting point of training, by establishing a secure base from which to extend care, mirrors the pattern of emotional development in attachment theory (Cassidy, 2016; Shaver et al., 2016). This pattern of practice also aligns with Social Baseline Theory (Beckes and Coan, 2011; Coan and Sbarra, 2015), which suggests that the presence of supportive others enhances emotion regulatory capacities. The relational pattern of SCT also accords with theories of enactive cognition, which suggest that cognitive capacities are embedded in larger cultural and social contexts (Thompson, 2017). SCT aligns with enactive cognition by embedding its participants in communities of practice that support them in the inevitable challenges they face when attempting to cultivate more unconditional and inclusive compassion for self and others. Practitioners within practice communities can scaffold on mature practitioners who have experienced and overcome similar challenges.

Third, SCT draws on Dzogchen and Mahamudra traditions of Tibetan Buddhism to provide ways for practitioners, empowered by their outer and inner secure base, to settle into the depth of their awareness. This is the deepening mode of SCT, and is accomplished by becoming compassionately present to all feelings and thoughts as a basis for settling into increasingly non-dual states of awareness. These traditions of Tibetan Buddhism, together with Zen traditions of East Asia, suggest that the primordial state of our awareness is a non-dual unity of pervasive openness, pure cognizance, and compassionate capacity[3]. From an attachment theory perspective, we view this kind of awareness as an unlimited secure base (Condon and Makransky, 2020), since it is the primordial source of inexhaustible love and compassion (Makransky, 2007, pp. 33–68; Thondup, 1996; Rinpoche, 2012, pp. 41–80; Varela, 1999, pp. 65–75). This dimension of awareness can function as the ultimate holding environment (Winnicott, 1960; Hoffman, 2015) by providing the unconditional spaciousness and warmth in which patterns of difficult feeling and thought can deeply relax, heal, and release. In accord with this view of primordial awareness, SCT adopts the perspective that caring capacities are an innate feature of the human mind (rather than a skill that must be created). This perspective aligns with some evolutionary perspectives on care and compassion, which suggest they are an innate feature of the human mind that contributed to the survival and flourishing of the human species (Hrdy, 2009; Goetz et al., 2010; de Waal and Preston, 2017; Gilbert, 2019; Marsh, 2019; Tomasello, 2019).

The fourth distinctive feature of SCT is the theoretical view that liberation is available within suffering. This perspective draws on the Mahayana Buddhist position that all emotions are constructed and therefore empty at their core. Liberation occurs with the experiential insight (*vipaśyanā*) of the emptiness of emotions, and the unity of that emptiness with awareness. In this view, "destructive" emotions are distorted expressions of the non-dual awareness that precedes them. Freedom from the so-called destructive emotions, such as greed, hatred, and delusion, is

[3]Some empirical studies have explored the neural correlates of adept practitioners who have stabilized in such a state of awareness (e.g., Fucci et al., 2018; Schoenberg et al., 2018).

available within the emotions themselves (Ray, 2002, pp. 91–107). This view corresponds with the Theory of Constructed Emotion, which suggests that emotions have no underlying essence (Barrett, 2017). That view can empower the practitioner to be with suffering in an unconditional, spacious way that provides the holding environment for difficult emotions to relax, unwind and release by themselves, i.e., to self-liberate. The self-liberation of emotions appears distinct from meditation programs that foreground self-compassion, which focus on bringing kindness to one's emotions, rather than simply allowing them to free themselves by revealing their emptiness from within[4].

In the following sections we describe each mode of SCT in turn. Each mode includes one or two meditations. We present practical instructions for doing each meditation along with scientific theories and findings that help draw out important features of the meditations and inform them. Each meditation includes novel hypotheses that are generated from this dialogical process.

RECEPTIVE MODE

The receptive mode of SCT draws on patterns of devotional practice found in Tibetan Buddhism and other contemplative practice cultures and translates them into newly accessible forms for modern people of diverse backgrounds. Those patterns of practice are mirrored in scientific research findings on attachment priming. In such research, participants are asked to visualize a supportive person, or simply think of concepts like "love," "care," "safety." (Gillath et al., 2005; Mikulincer and Shaver, 2005; Gillath and Karantzas, 2019). Hundreds of studies have shown that such priming can temporarily increase a felt sense of security, even for people with predominantly insecure attachment histories. Most importantly, attachment priming temporarily causes people to offer help to others, have more patience listening to others' difficult emotions, and have less bias (Mikulincer and Shaver, 2015). This research suggests that attachment priming can be integrated with meditation to recover the relational starting point of contemplative cultures (Condon and Makransky, 2020).

Meditation 1: Field of Care

A core practice of SCT involves establishing a *field of care*, by identifying and reinhabiting a moment of caring connection that makes one happy to recall, or by bringing to mind an inspiring benefactor or deeply meaningful spiritual figure(s)[5]. To do this, practitioners are provided with examples of diverse examples of caring moments and benefactors, and invited to fill in the content of the meditation in the way that feels most connecting and uplifting for that person. This can be done with a moment from any time in the practitioner's life when another person was seeing her in her deep worth, was happy to be with her, offered support, listened to her, or wished her well. Or the practice can be engaged by imagining the presence of a benefactor to whom the practitioner feels grateful, or spiritual figure(s) from that practitioner's own tradition who are inspiring to her. The practice can also be engaged by calling to mind a moment with a pet or a moment in a special place, perhaps in nature, where the practitioner felt deeply well, safe, and at home. Finally, the practice can be carried out by calling to mind a moment of care between others that the practitioner witnessed and that brought joy to her, similar to the concept of moral elevation (Schnall et al., 2010)[6]. The important element is that the field of care evoked by the practitioner genuinely brings joy to or feels uplifting to her, which signifies that it is already providing access to loving qualities from her fundamental awareness. After settling more and more fully into the felt sense of those loving qualities—such as deep acceptance, warmth, being seen as worthy, love, inner safety, joy, etc.—the practitioner is instructed to release the visualization of the field of care, and to relax her mind directly into that felt sense of love, warmth and acceptance. This can help the mind to relax deeply, release its images and mental frameworks, and fall gently, completely open like space. We refer to this final portion of the meditation as the "releasing phase," which supports deepening trust and unification with the spacious source of the caring qualities in one's fundamental awareness, from which further such qualities can emerge (for this purpose, all SCT meditations end with the releasing phase)[7]. A guided meditation can be accessed here.

An important feature of receptive mode practices is their consistency with current perspectives on grounded and situated cognition (Barsalou, 2008, 2016). According to theories of grounded cognition, when we recall a memory from our life, it is re-enacted in multiple systems of the brain: motor, visual, kinesthetic, affective, and so forth. During the receptive mode of practice, when practitioners reinhabit a caring moment from their past as happening now, visualizing and simulating its felt sense of security, they are experiencing that moment as fully embodied experience, with all the qualities of care, love, warmth, acceptance, peace, and well-being that come with that.

Following the first receptive mode meditation, it is helpful to name the caring qualities that were experienced during the meditation. By naming felt qualities, such as love, warmth, acceptance, ease, tenderness, safety, feeling seen, gratitude, inner freedom, openness, peace, feeling at home, joy, restfulness, etc., practitioners begin to cultivate an increasing awareness of, and receptivity to, a full spectrum of their innate capacities of care. The capacity to name a full spectrum of caring qualities is analogous to the concept of emotion granularity in affective

[4]Learning to experience feelings in a safe and liberating way does not mean that one must accept the oppressive structures that evoke those feelings. Instead, the practice can give the practitioner more equanimity, courage, discernment, and care with which to challenge those structures (Manuel, 2015; Rogers, 2015; Owens, 2020).

[5]The field of care practice is adapted from Tibetan Buddhist practices of refuge and guru yoga (Thondup, 1996, pp. 165–173; Rinpoche, 1996, pp. 29–36, 73–86; Rinpoche, 2009, 146–149). The adaptations presented here make this pattern of practice accessible for a wider public to find a simple, direct entry into the heart of this pattern of practice, and for Buddhists or other spiritual practitioners to help enhance their practice.

[6]An additional way to construct a field of care in SCT is to call to mind a moment when the practitioner herself offered care to another. This may be the best starting point for some people who initially have difficulty receiving care. Nevertheless, we hypothesize that moments of receiving care will eventually also need to be engaged for this practice to reach its maximal effect (Condon and Makransky, 2020).

[7]The meaning of the term "fundamental awareness" will be further discussed in the next section on the deepening mode of SCT.

science, in which labeling emotions with increasing precision and specificity leads to a richer emotional life characterized by greater well-being, discernment, and flexibility around emotional responding (Barrett et al., 2001; Quoidbach et al., 2014; Kashdan et al., 2015; Grossmann et al., 2019). We hypothesize that increasing granularity for caring qualities should lead to an increasing ease with which to notice, access and draw upon such qualities.

Meditation 2: Becoming More Deeply Receptive to Love and Compassion

Although receptive mode meditations can provide immediate access to inner capacities for care and a felt sense of security (i.e., an inner secure base), this style of meditation can also provoke reactive tendencies associated with relationships from the past. According to attachment theory, each person has a general attachment orientation, but also a hierarchy of attachment representations accumulated from a lifetime of interactions with people in various contexts (Collins and Read, 1994; Shaver et al., 2019). These interactions form the basis for *internal working models,* which include procedural knowledge and script-like expectations for how it is to be in relation with others (Bretherton and Munholland, 2016; Waters and Roisman, 2019). In many cases, these models operate outside of conscious awareness and can include a diversity of implicit messages, including feelings of shame or self-criticism, e.g., "I am not worthy of love" or "If others really knew me, they would not care about me." Another common working model reinforces a care giving mentality, that dismisses the need for oneself to receive support, such as "I should only focus on caring for others." Any moment of caring intimacy can re-activate these internal models. For this reason, SCT expands on Meditation 1 by explicitly noticing internal working models and incorporating them into the receptive mode of practice in Meditation 2.

To integrate internal working models into the receptive mode, SCT also borrows from a modern form of psychotherapy, called Internal Family Systems (IFS; Schwartz and Sweezy, 2020). IFS asserts a model of the mind in which people have a multitude of self-representations or "parts of self"—analogous to an array of attachment representations and internal working models in attachment theory. The theory of IFS asserts that these self-representations emerged early in one's life and took on survival strategies for controlling one's environment. From an attachment theory lens, these self-representations function as internal working models that lead people to believe that sources of care and love are external and therefore must be controlled. In the case of avoidant attachment scripts, for example, a given internal working model that replays a familiar protective strategy, such as "If I am receptive to care, I will get hurt by others." These protective strategies can interfere with the receptive mode of practice by shutting down the practitioner's receptivity to the loving qualities of his own fundamental awareness. However, SCT challenges those beliefs by pointing to the actual source of one's caring qualities and capacities: the spaciousness, warmth, simplicity, and clarity available in the ground of one's experience—in one's fundamental, non-dual awareness. Tibetan scholars and teachers refer to this fundamental awareness as the primordial ground of experience or "the nature of mind" (Makransky, 2007, pp. 33–68; Thondup, 1996; Rinpoche, 2012, pp. 41–80; Varela, 1999, pp. 65–75)[8]. Receptive mode meditations help cultivate an increasing receptivity to, and trust in, caring qualities and their source in one's fundamental awareness, which undercuts the attachment scripts that assume the source of those qualities lies only in the external world, in other people.

In the second receptive mode meditation, practitioners begin by calling to mind a caring moment or a benefactor as in Meditation 1 to *access* caring qualities from one's awareness, now with the additional instruction to *notice* any difficulties with the meditation that arise within it and to let the sense of self that is having that difficulty and its feelings be *included* within the compassionate space of those caring qualities. In this way, a space of deep acceptance, care and compassion is provided for all the difficult reactions and feelings that are generated by one's attachment scripts and triggered by the meditation. That space of care and acceptance allows all such feelings and reactions to relax deeply, settle, and heal in their own time. Any difficulty experienced within the meditation is no longer a distraction, but becomes material to be taken into the process of deepening in practice. As with the first meditation, this meditation concludes with the releasing phase, in which the practitioner releases the visualization and conceptual frameworks, allowing patterns of thought and feeling to unwind and release within the openness, clarity, and warmth of her fundamental awareness. A guided meditation can be accessed here.

Four key hypotheses emerge from Meditation 2. First, the loving qualities experienced when recalling a caring moment or benefactor are enhanced to greater levels of unconditionality through the instruction of the practice. The caring moment or benefactor may be *relatively* unconditional, but the qualities of care that the field of care visualization evokes can become stronger and more unconditional through the instruction to incorporate all self-representations (all "parts") and feelings that arise into that field of care. Second, by including self-representations within the field of care, the mind learns that it does not have to be identified with any one sense of self. By letting each sense of self be embraced by caring qualities, one's innate capacities for care and compassion are freed from the restrictive lens of any one self-representation. Instead, the practitioner's identity shifts from any given self-representation to his larger awareness that holds that self-representation in care and compassion (similar to the hypothesized function of mindfulness to transform self-understanding; Hölzel et al., 2011; Desbordes, 2019). Third, by letting all senses of self and feelings be deeply accepted within the field of care, they can begin to relax, settle, heal and release. Finally, by learning to include any self-representation within a field of care, the practitioner is already learning to extend greater unconditionality to others. We hypothesize that a person's strengthening ability to let his own self-representations and difficult emotions be held in compassion can strengthen his ability to hold others and their

[8]These terms for the deep nature of conscious experience will be further discussed in the next section on deepening mode.

difficult emotions in care and compassion without contributing to compassion fatigue and burnout.

These hypotheses garner support from research on the benefits of cultivating granularity for emotion states. Just as practitioners can cultivate granularity for loving qualities by naming them, so too they can cultivate granularity for various parts of self, i.e., self-representations, with their corresponding attachment scripts. Several empirical findings show that naming feelings with emotion labels can help people become less identified with emotions. Labeling emotionally evocative images, for example, reduces emotional reactivity (Lieberman et al., 2007). Similarly, granularity is associated with greater emotional stability (Hill and Updegraff, 2012; Pond et al., 2012), and less reactivity to social rejection (Kashdan et al., 2014).

Emotional granularity also helps one's judgments of others become immune from incidental emotion. Incidental emotion refers to a common empirical finding that emotions from one context carry over to other contexts in ways that inappropriately influence subsequent perceptions, judgments, and behavior (Petty et al., 2001). For example, emotional reactions to disgusting images sometimes distort one's moral judgments of others in a different context (Cameron et al., 2013). Because cultivating emotional granularity supports the ability to dis-identify from emotions, judgments of others become immune from incidental emotion (Cameron et al., 2013). This research suggests that cultivating granularity with senses of self while holding them in a space of acceptance and compassion could support one's ability to dis-identify or "unblend" from those self-representations, and thereby become more unconditionally present to oneself and to others (Schwartz and Sweezy, 2020).

DEEPENING MODE

Receptive mode practices activate innate capacities of care and compassion, by establishing an outer and inner secure base of loving qualities, and by shifting one's identity from one self-representation to a fuller, more expansive awareness that can hold any sense of self in care. Deepening mode practices of SCT help practitioners increasingly settle into the source of those caring qualities—the utter openness, clarity, and compassionate capacity to be found in the depth of their fundamental awareness (for empirical investigations of non-dual awareness, see Fucci et al., 2018; Schoenberg et al., 2018). According to Dzogchen, Mahamudra, and Zen traditions, this underlying, expansive fundamental awareness is one's most natural state of being prior to social conditioning. It includes the backdrop of pervasive openness and awareness that is always present behind the narrow focus of one's conscious attention.

Meditation 3: Compassionate Presence to Feelings

Intense, stressful aspects of daily life trigger many difficult feelings. People often seek to avoid such feelings by trying to suppress, ignore or distract themselves from them. But when people seek to avoid or suppress feelings, over time, those feelings ironically increase (Wegner et al., 1993; Wegner, 1997), yielding greater sympathetic nervous system reactivity (Gross and Levenson, 1993), which manifests as physical and emotional tightness, including heightened blood pressure, vasoconstriction, and avoidance motivation (Mendes et al., 2003; Mauss and Gross, 2004). In turn, suppression also disrupts interpersonal communication and relationship quality (Butler et al., 2003; Richards et al., 2003). With repetition over time, these physiological and psychological effects of emotional suppression could lead to negative health consequences, including loneliness, hypertension, and coronary artery disease (Uchino et al., 2007; Appleton and Kubzansky, 2014). The consequent tendencies of inner stress and tightness make it difficult to open to the qualities cultivated in all SCT practices—qualities of openness, kindness, compassion, equanimity, and wisdom. One cannot relax and settle more fully into the source of those positive qualities in awareness when one's mind and body are so caught up in habitual reactions of aversion to feelings. Such stress and tightness also make it difficult to be more fully present to other people in an open-hearted way. These tendencies are exacerbated by many of the systems that shape all of our emotional lives, including our families, communities, educational institutions, and professional environments. Each such kind of community often conveys and reinforces regulation strategies to suppress, avoid, deny, or distract ourselves from emotional feelings (von Scheve, 2012; Thompson, 2014; Menakem, 2017; Brackett, 2019).

All such difficulties with emotional suppression and avoidance suggest a need for innovative practices to process feelings and emotions in a deeply healing way. The first deepening mode meditation, called compassionate presence to feelings[9], provides a healing, relaxing and releasing way for feelings that arise in one's life and work to process themselves. This offers a life-giving alternative to the systemic tendency to suppress or distract ourselves from difficult feelings, while further evoking our underlying capacities of care and compassion.

In this meditation, the practitioner learns how to welcome her feelings into a compassionate space where they can relax, settle in their own time, and as needed, heal in their own natural way. "Feelings" here refers to the pleasant, unpleasant, and neutral feeling tones that accompany our physical and mental experiences and to all the emotions with which they are associated. This kind of meditation shows practitioners that they do not have to avoid or suppress their feelings and reactions or habitually act them out. Instead, the practitioner becomes safely aware of feelings in a gentle, deeply allowing way that gives them all the space they need to relax, settle, and find their own place—ultimately a place of inner healing and releasing. Because of their constructed nature, emotional feelings can release and heal in that way if they have the space and freedom to do so. This view builds on constructivist theories of the mind in modern psychology and neuroscience.

The Theory of Constructed Emotion (Barrett, 2017) points to the underlying emptiness of all emotions: emotions are constructed from domain-general capacities (e.g., attention, perception, conceptualization, interoception) in relation to

[9]This practice has been adapted from the "Handshake practice" taught by Tsoknyi Rinpoche (Rinpoche, 2012, pp 146–153).

social conditioning without any underlying essence. Although emotions have a relative, social reality, they do not have an ultimate, substantial reality (Barrett, 2012). SCT adds to the Theory of Constructed Emotion by establishing a "holding environment" (i.e., Winnicott, 1960; see also Hoffman, 2015) in which emotions can self-release. By providing a space in which emotions are not elaborated on, ruminated about, or responded to, the process of constructing an emotion can relax and unwind within the space of compassionate awareness, revealing the underlying emptiness and healing property available right within the emotion. This view from the Dzogchen and Mahamudra traditions aligns with research on mindfulness and emotional reactivity, which shows that acceptance is a key ingredient of mindfulness meditation (Lindsay and Creswell, 2017; Lindsay et al., 2018) and allied therapies that relieve stress (Hayes, 2002; Robins et al., 2004).

In this SCT practice of compassionate presence to feelings, the practitioner learns to be more at home with her emotional feelings, even difficult emotions, and they feel safer with her, since they are not being rejected, denied or avoided. This transforms her way of being with others, since her ability to be present to her own feelings safely, with openness and compassion, is what enables her to be present to other people and their feelings in the same way. It is important to highlight that this practice differs from self-compassion: the intention is not to bring extraneous kindness to emotions, but rather, to simply allow them to be, with a space of deep acceptance that lets them free themselves by revealing their emptiness from within. Nothing extra is applied to the emotion.

This meditation has four aspects: (1) notice the feeling within whatever state of mind or body is occurring; (2) allow the feeling to have all the space it needs to find its own place; (3) rest with or within the feeling; (4) then just let everything be, with spaciousness. In the meditation, the practitioner is instructed to become aware first of a physical sensation, then of an emotional feeling by sensing how it feels within one's body—not just thinking about it in an analytical, disembodied way. The practitioner is guided to become aware of any such physical or emotional feeling in a fully allowing way, gently welcoming it in a spacious, accepting way that lets it settle in its own way. Then, if another physical or emotional feeling replaces the first feeling, the practitioner becomes aware of that sensation in the same deeply allowing, spacious way. A guided meditation can be accessed here.

Several key hypotheses emerge from this compassionate presence to feelings meditation. First, there can be a healing power to this meditation. For a practitioner to be with all of her physical and emotional feelings in such an unconditional way helps her mind and body to relax deeply, unclench, and begin to heal from within. Second, this practice provides the compassionate holding environment that emotions need to reveal their empty nature and further positive qualities of awareness that emerge from that. In compassionate presence practice, emotional feelings are provided a safe space to open into underlying feelings and eventually into the empty core of the feelings, where a deep sense of relief, warmth, inner safety and well-being can be experienced. This profound core of comfort and security, found in the empty essence of feelings, has been called "essence of love," an aspect of fundamental awareness that provides a secure base from which naturally to love and care for others (Rinpoche, 2012, p. 61). Third, this practice can empower inner steadiness and courage: the process of letting feelings open and heal from within generates equanimity toward feelings and the situations that evoke them. There is a growing awareness that the practitioner does not need to be afraid of the feelings that others trigger in her, which gives her the courage to work with challenging people and circumstances. Fourth, this practice can facilitate compassionate presence to others: the power to be with her own feelings with such compassion and steadiness becomes a power to be with others and their feelings in the same way. Fifth, in the ways noted above, compassionate presence meditation further establishes the core of security that is needed to extend care and compassion to many others in a more reliable, inclusive and unconditional way. This is possible as the practitioner becomes more unconditional and steadfast with regard to her own feelings.

A final key lesson of this meditation is its relevance to each of the other SCT meditations. All of the meditations in SCT introduce a new way of being that deviates from what a practitioner has been used to. This deviation from familiar ways of being—for example, challenging an attachment script that has dismissed all caring moments—gives rise to various emotional feelings and reactions. In this way, all SCT meditations generate the material for compassionate presence to feelings. Whenever any difficulty occurs, the feeling associated with that reaction can prompt the practitioner to do the compassionate presence meditation. And that practice, in turn, accustoms practitioners to become compassionately present to feelings as they arise throughout their days, when not in formal meditation.

Meditation 4: Letting Be

Each of the prior SCT meditations help practitioners access capacities for care, acceptance, inner safety and compassion from their fundamental awareness that can embrace all perceptions, thoughts, and feelings. In the releasing phase of all those meditations practitioners let the spacious experience of those loving qualities help the mind feel safe enough to relax its grip on contracted frameworks of self and world and relax into the spacious ground of those qualities—a pervasive openness, clarity, and simplicity of awareness beyond all narrow frameworks of mind. In the releasing phase of every SCT meditation, in essence, practitioners settle back into the spaciousness and simplicity of awareness that is always available in the background of their experience.

According to the non-dual perspectives of Dzogchen, Mahamudra, and Zen, there has always been a background of spaciousness in all that we are experiencing, though generally not conscious. The reader may remember a moment when that pervasive background of awareness dawned, perhaps when resting after a long hike while gazing upon a vast sunset sky, or when deeply relaxed and looking panoramically upon the sky over the ocean. In such a moment, a sense of utter openness, simplicity, peace, and clarity may dawn—a totally open, pervasive quality of awareness that was always available in the background

but is now brought forward by the panoramic quality of the sky. That is a momentary experience of the pervasive openness and clarity that is always available in the background of experience, but had been hidden by usual habits of thought and reaction.

The next meditation of "letting be" in body, breath, and mind helps the practitioner settle directly into that tranquil, stable background of pervasive openness, simplicity and purity of fundamental awareness. In this meditation, the practitioner is guided to let his awareness settle naturally within the felt experience of body, breath, and mind in sequence, while noticing any feeling of tension, or holding on, within them. Starting with the body, he allows bodily awareness to settle naturally, while letting any sense of holding on within the body relax and settle. The instructions do not suggest he actively try to make anything happen. Instead, they specify a way to let the body draw awareness naturally into increasing unity with itself, as if letting the body do the meditating, while allowing any bodily tension to unwind and settle in its own time, by letting all be. The same process is then carried out with the "letting be" of the breath. In the "letting be" of mind, the practitioner is instructed to notice any grasping within the mind to any mental framework or pattern of thought, and to let that feeling of holding on relax deep within. This gives the mind permission to release its grip on its mental schema and open into the spaciousness available in the background of its awareness, beyond grasping to any framework of thought. The practitioner learns to let that unity of openness and pure cognizance draw his awareness into oneness with it, as if letting it do the meditating. A guided meditation for the three "letting bes" of body, breath and mind can be accessed here.

The first two "letting be-s" draw on the natural power of body and breath to bring the practitioner increasingly into unity with his somatic experience. The third "letting be" of mind helps the practitioner settle into the basic openness, clarity, and simplicity of his fundamental awareness, letting it draw him into increasing unity with it. This third letting be of mind enters the practitioner into a meditative state referred to in Tibetan Buddhist traditions as "tranquil abiding without support" ("tranquil abiding" translates the Sanskrit term *shamatha*). Here the practitioner is not focusing on a particular object or support—like a sound, image, thought or feeling, but settling directly into the basic openness and pure cognizance of his fundamental awareness, no matter what he is perceiving in the foreground. That backdrop of openness and pure cognizance is inherently stable, even though his sense perceptions in the foreground may be shifting and changing. In tranquil abiding without support, the mind learns to settle into the stability of that cognizant background, naturally wide open and radiant.

By learning in that way to abide in the stable backdrop of cognizance and openness, one gains further access to many positive qualities of fundamental awareness: steadiness of mind, stability of attention, inner peace, equanimity, ease of being, joy, with fuller presence to self and others. When the mind is at rest in its stable background of cognizance and openness, it is not caught up in shifting patterns of self-focused reaction, so there is a natural readiness to share, to care, to empathize with, and to love (Rinpoche, 2003, pp. 55–58).

With support of meditation teachers and a community that practices deeply in this direction, a practitioner may also go beyond tranquil abiding as it was described above. When a practitioner is tranquilly abiding on the naturally spacious backdrop of awareness, the experience of subject-object duality is much attenuated, since the mind is resting in itself. But there remains a subtle, subconscious framework of duality—a sense of someone meditating on something, with a little effort to continue to abide in that way. With further progress of practice supported by mature practice community, one's mind can reach a point that it may open into a more fully non-dual glimpse of its essential nature experienced as a total unity of emptiness, clarity and compassionate capacity—beyond all frames of reference, beyond all dualistic construction, beyond all effort or doing[10]. In that moment, the mind reverts to its most natural, primordial state (Tibetan *nay lug*), which is experienced as a unity of space and pure cognizance that is unimpeded, pervasive, self-cognizant, and self-manifesting. Patterns of thought, feeling and reaction naturally release or "self-liberate" (Tibetan *rang drol*) when this fully non-dual depth of awareness dawns. This non-dual unity of space and pure cognizance provides deepest freedom from identification with self-clinging patterns of thought and reaction, which frees up the innate compassionate capacities of one's awareness to unfold with greater ease, spontaneity, and inclusiveness. If this thoroughly non-dual recognition of the empty nature of mind dawns, it is typically very brief before dualistic structures of conceptuality and self-representation again draw the mind into identification with them. The training then becomes the instruction to reconnect again with that non-dual recognition in little moments, many times (Rinpoche T, 1998).

Tranquil abiding without support, as described above, provides a stable inner secure base for people in all groups of interest in SCT, including those in service roles and professions who need a secure core of care and awareness from which to become a reliably caring presence to others. The more fully non-dual recognition of the empty nature of mind is often what Buddhists are seeking in SCT—to reunify with their Buddha nature in support of their paths of awakening. This direction of practice through the Letting be meditation into tranquil abiding and non-dual awareness draws from Tibetan Dzogchen and Mahamudra traditions, and can help practitioners in other spiritual traditions explore analogously deep levels of mental settling, centeredness, and inner freedom to love that are part of their own traditions.

INCLUSIVE MODE

Research in social, cognitive, and developmental psychology reveals the readiness with which the mind engages in categorization that reduces others to a stereotype or limiting judgment. We use the term "reductive impressions" to highlight the pervasiveness of these judgments and the barrier they pose to sustainable and inclusive compassion (Condon and Makransky,

[10]Tibetan and Zen Buddhist traditions refer to this empty, non-dual essence of awareness as the deep "nature of mind," or "Buddha Nature" (Rinpoche T, 1998).

2020). Reductive impressions are a well-known barrier to extending care beyond one's narrowly identified in-group (Zaki and Cikara, 2015), but reductive impressions also interfere with care for close others. Whenever one loses contact with an inner core of security, appraisals of threat in any context can foster hostile or unfavorable impressions of any person, including close others. A primary purpose of the receptive mode and the deepening mode meditations is to empower and strengthen one's inner core of security and the corresponding ability to recognize and relate to the fuller humanity in all others (Condon and Makransky, 2020). The inclusive mode meditations aim to make the practitioner more fully conscious of reductive impressions and learn to relate to others beyond those impressions.

There are three features of the earlier meditations that prepare the practitioner in inclusive mode meditation to extend more unconditional, inclusive, and sustainable care. First, when the mind is completely identified with one protective self-representation, perceptions of others are automatically reductive, and one's capacities for care and compassion become impeded. For example, in a moment when one's mind is completely identified with a self-representation that is focused on managing things, other people in that moment are reduced just to objects of management. Or if one's mind is completely identified with a self-representation that is angry at another person, the other is perceived in that moment as just an object of anger, as just bad. This is analogous to research on affective realism, in which affective states bias how a person perceives others (Siegel et al., 2018; Wormwood et al., 2019). Second, when the mind unblends from a given self-representation, by holding that sense of self in compassionate awareness (as in Meditation 2 above in receptive mode), one's perception of others starts to open, so that others can be sensed in more of their humanity and potential—e.g., sensing them now not just as objects of management or anger, but as fuller human beings who have deep dignity, potential and want to be well and happy just like oneself. Finally, with this opening of perception, one's capacities of care, love, and compassion become less impeded, so that one can be more compassionately present and responsive to others (Schwartz, 2001, pp. 35–50).

Meditation 5: Extending Love

To begin the inclusive mode meditation of extending love, the practitioner starts in the receptive mode by accessing caring qualities and energies (as in Meditations 1 and 2 above). She then lets the flow of those energies extend to others, helping her to commune with them—to sense them beyond reductive impressions in their fuller life, dignity, and potential while wishing them deeply well. We use the term "communing" to connote a *preverbal sense of closeness* to another, sensing the other as a subject, a whole life and fuller person beyond superficial impressions and reductive judgments, possessed of great worth and potential. [11] Communing with others in this way is a kind of "implicit relational knowing," which refers to non-verbalized forms of communication and affective experiences in relationships (Lyons-Ruth et al., 1998). Both the receptive and inclusive mode meditations construct implicit relational knowing to inform one's ability to commune with others in a preverbal, affective, embodied manner. Our use of "communing" also corresponds with what the philosopher Martin Buber called I-Thou, rather than I-it—relating to another in their fuller humanity and unconditional worth, rather than as an instrumental means to an end or as an object of dehumanization (Buber, 1970).

In meditation, the practitioner first reinhabits a field of care, through a caring moment or benefactor, and settles into its felt sense of love and care. While continuing to receive the caring energy from their field of care, the practitioner allows that energy to come through her now to whoever is nearby or whoever the practitioner thinks of, infusing their whole being with that loving energy. The practitioner is instructed to let this flow of energy help her commune with others in their deep dignity and worth, to sense others beyond reductive impressions, in their full life experience and potential, while wishing them deeply well. When ready, the practitioner can let the caring energy come through her more broadly to everyone nearby or in widening circles. If the practice becomes too effortful or rigid at any stage, the practitioner can return to the receptive mode (analogous to returning to a secure base as needed for support). The meditation concludes, like all SCT meditations, with a releasing phase that helps the mind relax into the openness, clarity and warmth of its fundamental awareness. A guided meditation can be accessed here.

Three key hypotheses emerge from Meditation 5. First, this meditation helps practitioners experience themselves as an extension of the field of care in which they are held. In essence, the practitioner learns to hold others as she is held and to see others as she is seen in their deep worth and potential. By repeatedly practicing the inclusive mode in daily life, whoever is nearby or comes to mind is included in the practice, which thereby becomes increasingly all-inclusive in a natural way. Second, within this practice, if there is difficulty seeing another person as more than a reductive impression, the mind is identified with a self-representation that is only seeing the other through the lens of that self-representation. When the practitioner notices that, she can settle back into the receptive mode (her secure base), and bring compassionate awareness to that self-representation. When that sense of self begins to feel safer and more at ease, the lens on the other person can open, to sense the other in their fuller life and dignity. This practice introduces a new degree of freedom to choose whether to continue to relate to familiar, often socially conditioned, reductive impressions of others, or to the actual persons beyond those impressions.

The process of unblending from self-representations and reunifying with the openness and clarity of non-dual awareness in the releasing phase can help the practitioner to sense more possibilities in each situation beyond any one lens upon it, with greater space in the mind for innovation, creative responsiveness, and humor (i.e., skillful means, Pye, 2004; Rinpoche, 2012, pp. 211–228). The practitioner can also find greater freedom to take up various roles or self-representations as needed, without being so fully identified with any one of them. In this way, there is greater space and flexibility in the mind to be who or what is needed in the situation.

[11] We thank Lama Willa Miller for this insightful understanding of communing in the context of this practice.

The loving qualities evoked within the receptive and inclusive mode meditations help the mind to trust and settle into the source of those qualities in one's fundamental awareness, which is a unity of spaciousness, clarity, and loving capacity. As the mind settles into that expansive awareness in the releasing phase of each meditation and in deepening mode, its patterns of thought and reaction can increasingly unclench and release, which lets the energies and attitudes of love and compassion emerge more freely. In this way, a virtuous cycle of loving power and spacious awareness can increasingly unfold (Makransky, 2007, pp. 87–90; Condon et al., 2019; Thondup, 2015). To promote this synergy of loving capacity and spacious awareness within its three modes of meditation, SCT training encourages ongoing practice of each mode to empower each of the other modes.

Finally, in our view, authentic love and compassion have the discernment to affirm people in their deep dignity while also confronting their harmful behaviors. This set of practices does not involve accepting anyone's destructive ways of thinking or acting. Instead, it puts the practitioner more fully in touch with others' humanity and essential dignity. By learning to connect to that dignity and potential in them, the practitioner can challenge people's harmful ways of thinking and action on behalf of their fuller potential, on their behalf, not only on behalf of others whom their actions may harm (cf. Keller and Pfattheicher, 2013).

GENERATING EMPATHY AND COMPASSION FOR ACTION

In SCT, we define compassion as a caring concern for beings that empathizes with them in their suffering and wants to take action to alleviate it. Our definition of compassion includes affective empathy for others' suffering. This contrasts with a recent claim that compassion which bypasses affective empathy would be more effective and sustainable than compassion with affective empathy (Bloom, 2016). But suppressing affective empathic feelings can lead to ineffective care by making the caregiver less sensitive to others' felt experience (Sloman et al., 2005; Staton et al., 2007; Haque and Waytz, 2012). Suppressing affective empathy can also lead to negative health and social consequences for the caregiver (Meier et al., 2001). At the same time, however, it must be acknowledged that empathy, as ordinarily experienced, does carry risks of empathic distress, compassion fatigue, and burnout (Williams, 1989; West et al., 2006; Zaki, 2019, pp. 94–118).

Empathic distress occurs when people empathize with others who are suffering and one's attention turns inward upon oneself, so one gets caught up in the pain of one's own empathy (Batson et al., 1983; Klimecki et al., 2014). Compassion fatigue occurs when the caring motivation for others shuts down, often because of repeated experience of empathic distress, secondary trauma, or limited efficacy in supporting others (Figley and Figley, 2017). These risks yield a paradox between empathy and compassion: empathy supports effective care for those in need in its sensitivity to what they feel, but can cause burnout for the caregiver. On the other hand, compassion without empathy can reduce the effectiveness of one's work, and risks personal negative effects stemming from emotional suppression.

To cultivate effective, empathetically informed care, while avoiding empathic distress, SCT proposes that people can make a conscious choice to feel empathy for others in a way that informs and energizes compassion rather than in a way that devolves into empathic distress. This view aligns with motivated choice theories of empathy (Cameron and Payne, 2011; Zaki, 2014, 2019), which assert that empathy is not a limited resource, but rather through a conscious choice, people can feel empathy and expand the scope of their care (Schumann et al., 2014; Cameron et al., 2019). In SCT, we adopt and expand this perspective with the additional resource of the relational starting point, which provides the outer and inner secure base needed to direct one's empathy for suffering others into compassion rather than empathic distress.

The addition of the relational starting point to support empathic choice aligns with social baseline theory (SBT; Beckes and Coan, 2011; Coan and Sbarra, 2015), which suggests that people serve as a bioenergetic resource that supports emotion regulation for each other. The mere presence of supportive others can reduce one's reactivity to threat (Coan et al., 2006). The energetic resources made available by others are not limited to their physical presence; reduced threat reactivity can also occur by imagining supportive others as illustrated by research on attachment priming (Mikulincer and Shaver, 2015). A relational starting point of meditation provides the energetic resource and secure base needed to transform the pain of empathy for others who are suffering into empathic concern for them rather than self-involved empathic distress.

An additional concept from health and social psychology, called "reappraisal," informs SCT compassion meditations. The biopsychosocial (BPS) theory of stress suggests that threat and challenge are two different physiological responses to stress (Blascovich, 2013). *Challenge* is characterized by heightened sympathetic activity, a more efficient cardiovascular profile (e.g., vasodilation in arteries), and stronger approach motivations. *Threat* is characterized by heightened sympathetic activity, HPA, a less efficient cardiovascular profile (e.g., vasoconstriction in arteries), and avoidance motivations (i.e., avoiding challenges, giving up, preparing for defeat). When stress is *reappraised* as helpful, rather than harmful, people experience a physiological *challenge* response rather than a *threat* response, which improves performance and well-being (Jamieson et al., 2016; Borman et al., 2019). Reappraisal is an effective strategy for making use of the physiological energy of stress.

SCT extends the application of *reappraisal* to one's own suffering and pain of empathy when encountering others' suffering. First, the practitioner can reappraise his own layers of suffering not as *isolating* himself from the world, but rather as *a source of connection* with all others who share similar layers of suffering. In this way, he learns to experience even his most painful feelings not just as an awful experience but as a precious resource for generating expansive compassion for many beings. Second, in the same meditative process, the practitioner transforms the pain of empathy for suffering beings into an energy of compassion for them. This is a form of reappraisal,

akin to reappraising stress as a helpful energy for responding to challenges in the environment (Jamieson et al., 2012).

In this section, we present two meditations adapted from Tibetan Buddhism that employ this application of reappraisal. Within both meditations, the practitioner is guided to make a conscious choice to reappraise the pain of his empathy in such a way as to energize and inform his compassion for many others, instead of getting caught up in empathic distress.

Meditation 6: Taking Our Suffering Feelings Into Compassion for Others

The first compassion meditation in SCT assumes that the practitioner's own experiences with suffering can serve as a source of empathic resonance with others' suffering, which then motivates compassionate responsiveness and action. The establishment of a secure base in meditation practice empowers the practitioner to become more fully conscious of layers of suffering in herself and others, so such suffering can serve as an energetic and informational resource rather than as a cause of empathic distress, fatigue, and burnout. The receptive and deepening mode meditations above help establish and deepen one's secure base in the protective qualities of love, compassion, and spacious awareness, so one can feel safe enough to permit layers of their own suffering to become more conscious. This reveals similar hidden layers of suffering in everyone else, informing and strengthening one's empathy and compassion for them.

In Meditation 6, the practitioner consciously allows herself to experience difficult kinds of emotional feeling that she may have previously sought to avoid or suppress, motivated by the altruistic intention to employ them as a fuel for compassion, while supported by her inner secure base of spacious love and compassion (see **Table 1** for a list of difficult situations and associated feelings). The practitioner can explore many such feelings as she repeats the meditation, letting repeated daily practice evoke her own list of further difficult emotions to explore. This meditation supports increasing granularity for difficult emotions and suffering feelings, which can inform increasing discernment of others' analogous kinds of emotion and feeling (Israelashvili et al., 2019).

In the meditation, the practitioner begins with the receptive mode by calling to mind and reinhabiting her field of care. While continuing to resonate with a felt sense of care, the practitioner brings to mind a difficult feeling that many others share, like those in the list above, and takes time to experience what it is like to have that feeling, through her own experience of it. To facilitate this exploration, the meditation instructions ask the practitioner to contemplate the following questions: "How does it feel in your heart and mind? How does it feel in your body? What other feelings come up in association with that feeling? How does the whole world look and feel from within this feeling?" After exploring in this way, the practitioner is reminded that many other people experience feelings like this in their own ways, and is guided to sense through her experience how others feel. Then, the practitioner recalls that her whole being is held in unconditional love and compassion from her field of care, and allows all of her suffering feelings to be embraced in that care. In doing so, the practitioner also imagines she is accepting the same powers of love and compassion into everyone else's analogous feelings, by allowing the caring energy to extend through herself to them all while wishing them deeply well and free of their sufferings. As with prior SCT meditations, the meditation concludes with the releasing phase, allowing all patterns of thought and feeling to unwind within the utter spaciousness, clarity, and warmth of fundamental awareness. A guided meditation can be accessed here[12].

Several hypotheses emerge from this practice. First, people often get overwhelmed by suffering when it feels like it comprises their whole reality, but this practice prevents that, by helping people experience suffering feelings as encompassed in a larger awareness of compassionate openness, acceptance and warmth, where all such feelings can deeply relax, settle, and heal. Secondly, with that secure base in place, the practitioner can learn to experience her own painful feelings not as isolating her from others but as *connecting* her to others—as a power for compassionate solidarity with them all. The practitioner can increasingly sense everyone around her as possessed of hidden layers of stress and suffering analogous to her own. Thirdly,

[12]This meditation is adapted from Tibetan *lojong* practices, which are likewise supported by refuge in an unlimited secure base (Rinpoche, 2006; Makransky, 2007; Lewis, 2018; Hur, 2019).

TABLE 1 | In Meditation 6, the practitioner is instructed to examine the list below and select one such situation and feeling to explore in the meditation.

- Become conscious of a feeling of physical pain anywhere, or of anxiety that you feel about your body or your health.
- Recall a feeling of not being seen, or of being looked down upon.
- Recall a feeling of strong anger from being betrayed or hurt by what someone did.
- Recall a feeling of intense longing, incompleteness, or addiction.
- Recall a feeling of failure, hopelessness, or despair: "I'm hopeless, unimprovable."
- Recall a feeling of grief at the loss of a loved one; or grief at the loss of anything such as a job, a relationship, a way of life.
- Recall a feeling of anxiety over meeting all of your obligations and responsibilities, or of attaining enough security for yourself or your family.
- Recall a moment when you were at your *worst*, saying or doing something that makes you ashamed to recall. What feelings come up when recalling that moment?
- Recall feeling lonely, abandoned, or cut off.
- Recall a feeling of fear for a loved one in their vulnerability or mortality.
- Bring to mind fears you have of severe illness, accident, violence, or injury.
- Bring to mind any fears you may feel at your own impending death.

by sensing hidden layers in all others, including strangers and disliked others, the practice can further break down biases that impede more inclusive and unconditional love and compassion. It can also empower people to be less self-protective, and more ready to listen deeply to others whose culturally, socially, racially, ethnically, or religiously embedded experiences differ from their own. Finally, although this meditative way of accessing capacities of empathy and compassion profoundly supports one's empathy for others, it is not complete. To more specifically educate empathy, people need to gain perspectives from others (Eyal et al., 2018) through various ways of getting to know each other: connecting with, opening new spaces for people to find their voices, communal activity and activism, literature, film, theater, etc. (Mar and Oatley, 2008; Mar, 2011).

Meditation 7: Generating a Strong Will of Compassion for Action

Meditation 6 above revealed suffering layers of the human condition that a practitioner shares with many others, reframed one's own experience of suffering into a basis of compassion for others, and broke down reductive impressions of others by sensing them all as harboring hidden layers of distress and suffering like oneself. Meditation 7, in turn, helps the practitioner become more fully present and responsive to others' suffering without being overwhelmed by empathic distress or thinking that he has to turn away. Instead, the practitioner can experience his deepening awareness of others' suffering as a fuel of empathy and compassion that makes him more fully present to them while generating a strong motivation for caring action. Two key purposes, then, of Meditation 7 are: (1) to develop skill at channeling empathy into compassion instead of empathic distress and (2) to bring out a strong will of compassion for action.

As with the inclusive mode meditation and Meditation 6 above, the practitioner begins with the receptive mode by reinhabiting his field of care. While continuing to resonate with a felt sense of care as a secure base, he then brings to mind a person or group whose suffering deeply touches his heart, while sensing the suffering that they must be experiencing. The practitioner is guided in generating empathy for the others' suffering by asking: How must it feel for them in heart, mind, and body? What other feelings may be arising for them? The practitioner is encouraged to take time to deepen his affective and cognitive empathy in this way. At the same time, the practitioner is explicitly told to avoid getting stuck in the pain of this empathy. Rather, he makes a conscious choice to let the power of this empathy become an intense energy and attitude of compassion that wishes others free of all the pain and suffering that impedes their wellbeing and happiness. The practitioner lets this wish and energy of compassion radiate powerfully from his heart to that person or group, infusing their whole being and environment in its radiant power, wishing them deeply well and free of the causes of their distress and suffering, each in their own best way. After some time, the compassionate wish and energy is extended more expansively to all beings who experience the various sufferings of living and dying, infusing them and their environment in the same radiant power of compassion, wishing them well and free. The meditation concludes with the releasing phase, in which the compassion evoked by the meditation helps the practitioner relax deeply into the openness, clarity and warmth of his fundamental awareness, where all patterns of thought and feeling are permitted to unwind and release. A guided meditation can be accessed here[13].

Several key hypotheses emerge from Meditation 7. First, as noted, empathic distress occurs when a person's attention turns inward on himself, so he gets caught up in his own feelings of pain from empathizing with others in their suffering. In contrast, the power of love and compassion in this meditation directs one's empathic attention compassionately outward toward others, so the practitioner does not internalize the suffering as empathic distress. Second, a further protection from empathic distress includes the wisdom that has been cultivated in all prior meditations of SCT—the awareness that suffering is never the only reality here, but is embraced in a larger reality of openness, warmth and care in which it can transform and deeply heal or release. Finally, the instruction of Meditation 7 also points to a direction of creative responsiveness for action, by turning one's attention to causes of distress and suffering, encouraging the practitioner to deepen his learning and response to such causes.

THE CONTINUING NEED TO RECONNECT WITH A SECURE BASE IN BOTH SCT AND ATTACHMENT THEORY

Throughout SCT in all facets above, it is not the case that the practitioner leaves behind the receptive mode. The field of care becomes the starting point for all of the inclusive mode and compassion meditations. One never leaves behind the receptive mode—one will need to come back to her secure base recurrently throughout all aspects of the training, to deal with many challenges that arise for anyone learning to become so unconditional toward all one's feelings and to all other beings, both in their worthiness to be loved and in their layers of suffering. Whenever difficulties arise in any practice or in any aspect of one's life, receptive mode practices can be re-engaged to reestablish the secure base necessary to proceed.

This enduring connection with receptive mode practice in SCT parallels a lifespan perspective on security within attachment theory. According to attachment theory, one description of security is *autonomy within relatedness*, suggesting that one feels the support from which to explore and navigate the world on one's own with the confidence that, if one becomes distressed, there is a secure base to return to (e.g., Powell et al., 2013). A core of security includes a strong felt sense of basic safety, comfort with, and curiosity about the world, together with the trust and vulnerability to return the sources of security as needed. Young children are dependent on attachment figures, and gradually,

[13]This practice draws upon meditations on all realms of suffering in Tibetan cosmologies, which are likewise supported by refuge in an unlimited secure base (see Rinpoche P, 1998; Makransky, 2012a).

responsive and sensitive caregivers encourage the children's autonomy. But even so called "secure" adults can have traces of insecurity from diverse relationship contexts, and thus are never fully and always "secure." They will always continue to depend on support from others. In that way, people with security are able comfortably to navigate back and forth between autonomy and relatedness[14]. This pathway to security parallels that of SCT. Receptive mode practices lead to increasing realization of an unlimited secure base in one's fundamental awareness and its caring qualities. But the receptive mode practices are never dropped, even among highly advanced meditators in traditional Tibetan culture. In this way, receptive mode practices help the practitioner respond to challenges that arise both in her ongoing practice and in all the challenging circumstances of life.

CONCLUSION

The seven meditations of SCT reviewed in this article are designed to give access to innate capacities of love, compassion, equanimity and discernment from the depth of one's fundamental awareness, capacities that support increasingly unconditional, inclusive, and sustainable care for self and others. This power of care and compassion is sustainable because it draws from an inner secure base of loving qualities and spacious awareness, evoked by a relational field of care, that the practitioner can repeatedly access as needed for replenishment and support. This pattern of practice mirrors both the basic framework for cultivating all-inclusive love and compassion found in many of the world's spiritual traditions and the kinds of patterns of human emotional development that are described in attachment and social baseline theories. While our perspective needs further empirical investigation, our hypotheses are informed by the deep philosophical and contemplative experiences of long-standing lineages and their intersection with a vast array of theories from modern psychological science, spanning affective, cognitive, social, health, and developmental psychology. SCT meditations and the dialogical approach within this article may be fruitful ground for empirical investigation and ongoing innovations within contemplative practice for modern cultures.

[14] We thank Kent Hoffman for sharing his perspective on the meaning of security within attachment theory (Hoffman, personal communication, July 2019).

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REFERENCES

Appleton, A. A., and Kubzansky, L. D. (2014). "Emotion regulation and cardiovascular disease risk," in *Handbook of Emotion Regulation*, 2nd Edn, ed. J. J. Gross (New York, NY: Guilford Press), 596–612.

Barrett, L. F. (2012). Emotions are real. *Emotion* 12, 413–429. doi: 10.1037/a0027555

Barrett, L. F. (2017). *How Emotions are Made: The Secret Life of the Brain*. New York, NY: Houghton Mifflin.

Barrett, L. F., Gross, J., Christensen, T. C., and Benvenuto, M. (2001). Knowing what you're feeling and knowing what to do about it: mapping the relation between emotion differentiation and emotion regulation. *Cogn. Emot.* 15, 713–724. doi: 10.1080/02699930143000239

Barsalou, L. W. (2008). Grounded cognition. *Annu. Rev. Psychol.* 59, 617–645.

Barsalou, L. W. (2016). Situated conceptualization offers a theoretical account of social priming. *Curr. Opin. Psychol.* 12, 6–11. doi: 10.1016/j.copsyc.2016.04.009

Batson, C. D., O'Quin, K., Fultz, J., Vanderplas, M., and Isen, A. M. (1983). Influence of self-reported distress and empathy on egoistic versus altruistic motivation to help. *J. Pers. Soc. Psychol.* 45, 706–718. doi: 10.1037/0022-3514.45.3.706

Beckes, L., and Coan, J. A. (2011). Social baseline theory: the role of social proximity in emotion and economy of action. *Soc. Pers. Psychol. Compass* 5, 976–988. doi: 10.1111/j.1751-9004.2011.00400.x

Blascovich, J. (2013). "The biopsychosocial model of challenge and threat: reflections, theoretical ubiquity, and new directions," in *Neuroscience of Prejudice and Intergroup Relations*, eds B. Derks, D. Scheepers, and N. Ellemers (New York, NY: Psychology Press), 229–242.

Bloom, P. (2016). *Against Empathy: The Case for Rational Compassion*. New York City, NY: HarperCollins.

Borman, G. D., Rozek, C. S., Pyne, J., and Hanselman, P. (2019). Reappraising academic and social adversity improves middle school students' academic achievement, behavior, and well-being. *Proc. Natl. Acad. Sci. U.S.A.* 116, 16286–16291. doi: 10.1073/pnas.182031 7116

Brackett, M. (2019). *Permission to Feel: Unlocking the Power of Emotions to Help Our Kids, Ourselves, and Our Society Thrive*. New York City, NY: Celadon Books.

Bretherton, I., and Munholland, K. A. (2016). "The internal working model construct in light of contemporary neuroimaging research," in *Handbook of Attachment: Theory, Research, and Clinical Applications*, 3rd Edn, eds J. Cassidy and P. R. Shaver (New York, NY: Guilford Press), 63–88.

Buber, M. (1970). *I and Thou (W. Kaufman, Trans.)*. New York, NY: Charles Scribner's Sons.

Butler, E. A., Egloff, B., Wlhelm, F. H., Smith, N. C., Erickson, E. A., and Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion* 3, 48–67. doi: 10.1037/1528-3542.3.1.48

Cameron, C. D., Hutcherson, C. A., Ferguson, A. M., Scheffer, J. A., Hadjiandreou, E., and Inzlicht, M. (2019). Empathy is hard work: people choose to avoid empathy because of its cognitive costs. *J. Exper. Psychol. Gen.* 148, 962–976. doi: 10.1037/xge0000595

Cameron, C. D., and Payne, B. K. (2011). Escaping affect: how motivated emotion regulation creates insensitivity to mass suffering. *J. Pers. Soc. Psychol.* 100, 1–15. doi: 10.1037/a0021643

Cameron, C. D., Payne, B. K., and Doris, J. M. (2013). Morality in high definition: emotion differentiation calibrates the influence of incidental disgust on moral judgments. *J. Exper. Soc. Psychol.* 49, 719–725. doi: 10.1016/j.jesp.2013.02.014

Cassidy, J. (2016). "The nature of the child's ties," in *Handbook of Attachment: Theory, Research, and Clinical Applications, 3rd Edn.*, eds J. Cassidy and P. R. Shaver (New York, NY: Guilford Press), 3–24.

Clarke, T. C., Barnes, P. M., Black, L. I., Stussman, B. J., and Nahin, R. L. (2018). Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and over. *NCHS Data Brief* 25, 1–8.

Coan, J. A., and Sbarra, D. A. (2015). Social baseline theory: the social regulation of risk and effort. *Curr. Opin. Psychol.* 1, 87–91. doi: 10.1016/j.copsyc.2014.12.021

Coan, J. A., Schaefer, H. S., and Davidson, R. J. (2006). Lending a hand: social regulation of the neural response to threat. *Psychol. Sci.* 17, 1032–1039. doi: 10.1111/j.1467-9280.2006.01832.x

Collins, N. L., and Read, S. J. (1994). "Cognitive representations of attachment: The structure and function of working models," in *Advances in Personal Relationships, Vol. 5. Attachment Processes in Adulthood*, eds K. Bartholomew and D. Perlman (London, England: Jessica Kingsley Publishers), 53–90.

Condon, P. (2019). Meditation in context: factors that facilitate prosocial behavior. *Curr. Opin. Psychol.* 28, 15–19. doi: 10.1016/j.copsyc.2018.09.011

Condon, P., Dunne, J., and Wilson-Mendenhall, C. (2019). Wisdom and compassion: a new perspective on the science of relationships. *J. Moral Educ.* 48, 98–108. doi: 10.1080/03057240.2018.1439828

Condon, P., and Makransky, J. (2020). Recovering the relational starting point of compassion training: a foundation for sustainable and inclusive care. *Perspect. Psychol. Sci.* doi: 10.1177/1745691620922200. [Epub ahead of print].

de Waal, F. B. M., and Preston, S. D. (2017). Mammalian empathy: behavioural manifestations and neural basis. *Nat. Rev. Neurosci.* 18, 498–509. doi: 10.1038/nrn.2017.72

Desbordes, G. (2019). Self-related processing in mindfulness-based interventions. *Curr. Opin. Psychol.* 28, 312–316. doi: 10.1016/j.copsyc.2019.07.002

Eyal, T., Steffel, M., and Epley, N. (2018). Perspective mistaking: accurately understanding the mind of another requires getting perspective, not taking perspective. *J. Pers. Soc. Psychol.* 114, 547–571. doi: 10.1037/pspa0000115

Figley, C. R., and Figley, K. R. (2017). "Compassion fatigue resilience," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. S. Thomas, S. L. Brown, M. C. Worline, C. D. Cameron, and J. R. Doty (Oxford: Oxford University Press), doi: 10.1093/oxfordhb/9780190464684.013.28

Fucci, E., Abdoun, O., Caclin, A., Francis, A., Dunne, J. D., Ricard, M., et al. (2018). Differential effects of non-dual and focused attention meditations on the formation of automatic perceptual habits in expert practitioners. *Neuropsychologia* 119, 92–100. doi: 10.1016/j.neuropsychologia.2018.07.025

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gillath, O., and Karantzas, G. (2019). Attachment security priming: a systematic review. *Curr. Opin. Psychol.* 25, 86–95. doi: 10.1016/j.copsyc.2018.03.001

Gillath, O., Shaver, P. R., and Mikulincer, M. (2005). "An attachment-theoretical approach to compassion and altruism," in *Compassion: Conceptualizations, Research, and Use in Psychotherapy*, ed. P. Gilbert (New York, NY: Routledge).

Gleig, A. (2019). *American Dharma: Buddhism Beyond Modernity*. New Haven, CT: Yale University Press.

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Gross, J. J., and Levenson, R. W. (1993). Emotional suppression: physiology, self-report, and expressive behavior. *J. Pers. Soc. Psychol.* 64, 970–986. doi: 10.1037/0022-3514.64.6.970

Grossmann, I., Oakes, H., and Santos, H. C. (2019). Wise reasoning benefits from emodiversity, irrespective of emotional intensity. *J. Exper. Psychol. Gen.* 148, 805–823. doi: 10.1037/xge0000543

Haque, O. S., and Waytz, A. (2012). Dehumanization in medicine: causes. Solutions, and functions. *Perspect. Psychol. Sci.* 7, 176–186. doi: 10.1177/1745691611429706

Harrington, A., and Dunne, J. D. (2015). When mindfulness is therapy: ethical qualms, historical perspectives. *Am. Psychol.* 70, 621–631. doi: 10.1037/a0039460

Hayes, S. C. (2002). Buddhism and acceptance and commitment therapy. *Cogn. Behav. Pract.* 9, 58–66. doi: 10.1016/s1077-7229(02)80041-4

Hill, C. L. M., and Updegraff, J. A. (2012). Mindfulness and its relationship to emotional regulation. *Emotion* 12, 81–90. doi: 10.1037/a0026355

Hoffman, K. (2015). Taking refuge in the family of things. *Arrow* 2, 1–30.

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., and Ott, U. (2011). How does mindfulness meditation work? proposing mechanisms of action from a conceptual and neural perspective. *Perspect. Psychol. Sci.* 6, 537–559. doi: 10.1177/1745691611419671

Hrdy, S. B. (2009). *Mothers and Others: The Evolutionary Origins of Mutual Understanding*. Cambridge, MA: Harvard University Press.

Hur, W. J. (2019). *Corporeality in Contemplation: A Comparative Study of Edith Stein and Tibetan Buddhist Lojong*. Newton, MA: Boston College.

Israelashvili, J., Oosterwijk, S., Sauter, D., and Fischer, A. (2019). Knowing me, knowing you: emotion differentiation in oneself is associated with recognition of others' emotions. *Cogn. Emot.* 33, 1461–1471. doi: 10.1080/02699931.2019.1577221

Jamieson, J. P., Nock, M. K., and Mendes, W. B. (2012). Mind over matter: reappraising arousal improves cardiovascular and cognitive responses to stress. *J. Exper. Psychol. Gen.* 141, 417–422. doi: 10.1037/a0025719

Jamieson, J. P., Peters, B. J., Greenwood, E. J., and Altose, A. J. (2016). Reappraising stress arousal improves performance and reduces evaluation anxiety in classroom exam situations. *Soc. Psycholo. Pers. Sci.* 7, 579–587. doi: 10.1177/1948550616644656

Kashdan, T. B., Barrett, L. F., and McKnight, P. E. (2015). Unpacking emotion differentiation: transforming unpleasant experience by perceiving distinctions in negativity. *Curr. Direct. Psychol. Sci.* 24, 10–16. doi: 10.1177/0963721414550708

Kashdan, T. B., DeWall, C. N., Masten, C. L. Jr., Powell, C., Combs, D., and Farmer, A. S. (2014). Who is most vulnerable to social rejection? the toxic combination of low self-esteem and lack of negative emotion differentiation on neural responses to rejection. *PLoS One* 9:e90651. doi: 10.1371/journal.pone.0090651

Keller, J., and Pfattheicher, S. (2013). The compassion-hostility paradox: the interplay of vigilant, prevention-focused self-regulation, compassion, and hostility. *Pers. Soc. Psychol. Bull.* 39, 1518–1529. doi: 10.1177/0146167213499024

Klimecki, O. M., Leiberg, S., Ricard, M., and Singer, T. (2014). Differential pattern of functional brain plasticity after compassion and empathy training. *Soc. Cogn. Affect. Neurosci.* 9, 873–879. doi: 10.1093/scan/nst060

Lavelle, B. D. (2016). "Against one method: contemplation in context," in *Handbook of Mindfulness: Culture, Context, and Social Engagement*, eds R. E. Purser, D. Forbes, and A. Burke (Cham: Springer International Publishing), 233–242. doi: 10.1007/978-3-319-44019-4_16

Lavelle, B. D. (2017). "Compassion in context: tracing the buddhist roots of secular, compassion-based contemplative programs," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppala, E. Simon-Thomas, S. L. Brown, M. C. Worline, C. D. Cameron, and J. R. Doty (New York, NY: Oxford University Press), 17–25.

Lewis, S. E. (2018). Resilience, agency, and everyday lojong in the tibetan diaspora. *Contemp. Buddhism* 19, 342–361. doi: 10.1080/14639947.2018.1480153

Lieberman, M. D., Eisenberger, N. I., Crockett, M. J., Tom, S. M., Pfeifer, J. H., and Way, B. M. (2007). Putting feelings into words. *Psychol. Sci.* 18, 421–428. doi: 10.1111/j.1467-9280.2007.01916.x

Lindsay, E. K., and Creswell, J. D. (2017). Mechanisms of mindfulness training: monitor and acceptance theory (MAT). *Clin. Psychol. Rev.* 51, 48–59. doi: 10.1016/j.cpr.2016.10.011

Lindsay, E. K., Young, S., Smyth, J. M., Brown, K. W., and Creswell, J. D. (2018). Acceptance lowers stress reactivity: dismantling mindfulness training in a randomized controlled trial. *Psychoneuroendocrinology* 87, 63–73. doi: 10.1016/j.psyneuen.2017.09.015

Lyons-Ruth, K., Bruschweiler-Stern, N., Harrison, A. M., Morgan, A. C., Nahum, J. P., Sander, L., et al. (1998). Implicit relational knowing: its role in development and psychoanalytic treatment. *Infant Ment. Health J.* 19, 282–289. doi: 10.1002/(sici)1097-0355(199823)19:3<282::aid-imhj3>3.0.co;2-o

Makransky, J. (2007). *Awakening Through Love*. Somerville, MA: Wisdom Publications.

Makransky, J. (2011). "Compassion beyond fatigue: Contemplative training for people who serve others," in *Meditation and the Classroom: Contemplative Pedagogy for Religious Studies*, eds J. Simmer-Brown and F. Grace (Albany, NY: SUNY Press), 85–94.

Makransky, J. (2012a). "Compassion in buddhist psychology," in *Wisdom and compassion in Psychotherapy: Deepening Mindfulness in Clinical Practice*, eds C. K. Germer and R. D. Siegel (New York, NY: Guilford Press), 61–74.

Makransky, J. (2012b). *How Contemporary Buddhist Practice Meets the Secular World in its Search for a Deeper Grounding for Service and Social Action*. Los Angeles: Dharma Worldwide.

Makransky, J. (2019). "Contrasting tsongkhapa and longchenpa: buddhist diversity as a resource for comparative theology," in *New Paths for Interreligious*

Theology: Perry Schmidt-Leukel's Fractal Interpretation of Religious Diversity, eds A. Race and P. Knitter (Maryknowll, NY: Orbis Books), 115–129.

Manuel, Z. E. (2015). *The Way of Tenderness: Awakening Through Race, Sexuality, and Gender*. Somerville, MA: Wisdom Publications.

Mar, R. A. (2011). The neural bases of social cognition and story comprehension. *Annu. Rev. Psychol.* 62, 103–134. doi: 10.1146/annurev-psych-120709-145406

Mar, R. A., and Oatley, K. (2008). The function of fiction is the abstraction and simulation of social experience. *Perspect. Psychol. Sci.* 3, 173–192. doi: 10.1111/j.1745-6924.2008.00073.x

Marsh, A. A. (2019). The caring continuum: evolved hormonal and proximal mechanisms explain prosocial and antisocial extremes. *Annu. Rev. Psychol.* 70, 347–371. doi: 10.1146/annurev-psych-010418-103010

Mauss, I. B., and Gross, J. J. (2004). "Emotion suppression and cardiovascular disease: Is hiding feelings bad for your heart?," in *Emotional Expression And Health: Advances in Theory, Assessment and Clinical Applications*, eds I. Nyklíèek, L. Temoshok, and A. Vingerhoets (New York, NY: Brunner-Routledge), 61–81.

McMahan, D. L. (2008). *The Making of Buddhist Modernism*. New York, NY: Oxford University Press.

Meier, D. E., Back, A. L., and Morrison, R. S. (2001). The inner life of physicians and care of the seriously Ill. *JAMA* 286, 3007–3014.

Menakem, R. (2017). *My Grandmother's Hands: Racialized Trauma and the Pathway To Mending Our Hearts and Bodies*. Las Vegas, NV: Central Recovery Press.

Mendes, W. B., Reis, H. T., Seery, M. D., and Blascovich, J. (2003). Cardiovascular correlates of emotional expression and suppression: do content and gender context matter? *J. Pers. Soc. Psychol.* 84, 771–792. doi: 10.1037/0022-3514.84.4.771

Mikulincer, M., and Shaver, P. R. (2005). Attachment security, compassion, and altruism. *Curr. Direct. Psychol. Sci.* 14, 34–38. doi: 10.1111/j.0963-7214.2005.00330.x

Mikulincer, M., and Shaver, P. R. (2015). "Boosting attachment security in adulthood: the "broaden-and-build" effects of security-enhancing mental representations and interpersonal contexts," in *Attachment Theory and Research: New Directions and Emerging Themes*, eds J. A. Simpson and W. S. Rholes (New York, NY: Guilford), 124–144.

Owens, L. R. (2020). *Love and Rage: The Path of Liberation Through Anger*. Berkeley, CA: North Atlantic Books.

Petty, R. E., DeSteno, D., and Rucker, D. D. (2001). "The role of affect in attitude change," in *Handbook of Affect and Social Cognition*, ed. J. P. Forgas (Mahwah, NJ: Lawrence Erlbaum Associates Publishers), 212–233.

Pond, R. S. Jr., Kashdan, T. B., DeWall, C. N., Savostyanova, A., Lambert, N. M., and Fincham, F. D. (2012). Emotion differentiation moderates aggressive tendencies in angry people: a daily diary analysis. *Emotion* 12, 326–337. doi: 10.1037/a0025762

Powell, B., Cooper, G., Hoffman, K., and Marvin, B. (2013). *The Circle of Security Intervention: Enhancing Attachment in Early Parent-Child Relationships*. New York, NY: Guilford Publications.

Pye, M. (2004). *Skilful Means: A Concept in Mahayana Buddhism*. London: Routledge.

Quoidbach, J., Gruber, J., Mikolajczak, M., Kogan, A., Kotsou, I., and Norton, M. I. (2014). Emodiversity and the emotional ecosystem. *J. Exper. Psychol. Gen.* 143, 2057–2066. doi: 10.1037/a0038025

Ray, R. A. (2002). *Secret of the Vajra World: The Tantric Buddhism of Tibet*. Boulder, CO: Shambhala Publications.

Richards, J. M., Butler, E. A., and Gross, J. J. (2003). Emotion regulation in romantic relationships: the cognitive consequences of concealing feelings. *J. Soc. Pers. Relationsh.* 20, 599–620. doi: 10.1177/02654075030205002

Rinpoche, D. K. (1996). *The Excellent Path to Enlightenment*. Ithaca, NY: Snow Lion.

Rinpoche, D. K. (2006). *Enlightened Courage: An Explanation of the Seven Point Mind Training*. Ithaca, NY: Snow Lion Publications.

Rinpoche, P. (1998). *Words of My Perfect Teacher: A Complete Translation of a Classical Introduction To Tibetan Buddhism*. New Delhi: Vistaar Publications.

Rinpoche, S. (2009). *The Tibetan Book of Living and Dying: The Spiritual Classic & International Bestseller: Revised and Updated Edition*. Broadway New York City, NY: Harper Collins.

Rinpoche, T. (1998). *Carefree Dignity: Discourses on Training in the Nature of Mind*. Kathmandu: Rangjung Yeshe Publications.

Rinpoche, T. (2003). *Fearless Simplicity: The Dzogchen Way of Living Freely in a Complex World*. Kathmandu: Rangjung Yeshe Publications.

Rinpoche, T. (2012). *Open Heart, Open Mind*. New York, NY: Harmony Books.

Robins, C. J., Schmidt, H. III, and Linehan, M. M. (2004). "Dialectical behavior therapy: synthesizing radical acceptance with skillful means," in *Mindfulness and Acceptance: Expanding the Cognitive-Behavioral Tradition*, eds S. C. Hayes, V. M. Follette, and M. M. Linehan (New York, NY: Guilford Press), 30–44.

Roeser, R. W., Colaianne, B. A., and Greenberg, M. A. (2018). Compassion and human development: current approaches and future directions. *Res. Hum. Dev.* 15, 238–251. doi: 10.1080/15427609.2018.1495002

Rogers, F. (2015). *Practicing Compassion*. Nashville, TN: Fresh Air Books.

Schnall, S., Roper, J., and Fessler, D. M. T. (2010). Elevation leads to altruistic behavior. *Psychol. Sci.* 21, 315–320. doi: 10.1177/0956797609359882

Schoenberg, P. L. A., Ruf, A., Churchill, J., Brown, D. P., and Brewer, J. A. (2018). Mapping complex mind states: EEG neural substrates of meditative unified compassionate awareness. *Consciousn. Cogn.* 57, 41–53. doi: 10.1016/j.concog.2017.11.003

Schumann, K., Zaki, J., and Dweck, C. S. (2014). Addressing the empathy deficit: beliefs about the malleability of empathy predict effortful responses when empathy is challenging. *J. Pers. Soc. Psychol.* 107, 475–493. doi: 10.1037/a0036738

Schwartz, R. C. (2001). *Introduction to the Internal Family Systems Model*. London: Trailheads Publications.

Schwartz, R. C., and Sweezy, M. (2020). *Internal Family Systems Therapy*, 2nd Edn, New York, NY: Guilford Publications.

Sharf, R. (1995). Buddhist modernism and the rhetoric of meditative experience. *Numen* 42, 228–283. doi: 10.1163/1568527952598549

Shaver, P. R., Mikulincer, M., and Cassidy, J. (2019). Attachment, caregiving in couple relationships, and prosocial behavior in the wider world. *Curr. Opin. Psychol.* 25, 16–20. doi: 10.1016/j.copsyc.2018.02.009

Shaver, P. R., Mikulincer, M., Gross, J. T., Stern, J. A., and Cassidy, J. A. (2016). "A lifespan perspective on attachment and care for others: Empathy, altruism, and prosocial behavior," in *Handbook of Attachment: Theory, Research, and Clinical Applications, 3rd Edn.*, eds J. Cassidy and P. R. Shaver (New York, NY: Guilford Press), 878–916.

Siegel, E. H., Wormwood, J. B., Quigley, K. S., and Barrett, L. F. (2018). Seeing what you feel: affect drives visual perception of structurally neutral faces. *Psychol. Sci.* 29, 496–503. doi: 10.1177/0956797617741718

Sloman, R., Rosen, G., Rom, M., and Shir, Y. (2005). Nurses' assessment of pain in surgical patients. *J. Adv. Nurs.* 52, 125–132. doi: 10.1111/j.1365-2648.2005.03573.x

Staton, L. J., Panda, M., Chen, I., Genao, I., Kurz, J., Pasanen, M., et al. (2007). When race matters: disagreement in pain perception between patients and their physicians in primary care. *J. Natl. Med. Assoc.* 99, 532–538.

Thompson, E. (2017). "Looping effects and the cognitive science of mindfulness meditation," in *Meditation, Buddhism, and Science*, eds D. L. McMahan and E. Braun (New York, NY: Oxford University Press), 47–61.

Thompson, E. (2020). *Why I Am Not a Buddhist*. London: Yale University Press.

Thompson, R. A. (2014). "Socialization of emotion and emotion regulation in the family," in *Handbook of Emotion Regulation*, 2nd Edn, ed. Y. Gross (New York, NY: Guilford Press), 173–186.

Thondup, T. (1996). *The Healing Power of Mind*. Boston, MA: Shambhala Publications.

Thondup, T. (2015). *The Heart of Unconditional Love: A Powerful New Approach to Loving-Kindness Meditation*. Boulder, CO: Shambhala Publications.

Tomasello, M. (2019). *Becoming Human: A Theory of Ontogeny*. Cambridge, MA: Harvard University Press.

Uchino, B. N., Smith, T. W., Holt-Lunstad, J., Campo, R., and Reblin, M. (2007). "Stress and illness," in *Handbook of Psychophysiology*, 3rd Edn, eds J. T. Cacioppo, L. G. Tassinary, and G. G. Berntson (New York, NY: Cambridge University Press), 608–632.

Varela, F. J. (1999). *Ethical Know-How: Action, Wisdom, and Cognition*. Stanford, CA: Stanford University Press.

von Scheve, C. (2012). Emotion regulation and emotion work: two sides of the same coin? *Front. Psychol.* 3:496. doi: 10.3389/fpsyg.2012.00496

Waters, T. E., and Roisman, G. I. (2019). The secure base script concept: an overview. *Curr. Opin. Psychol.* 25, 162–166. doi: 10.1016/j.copsyc.2018.08.002

Wegner, D. M. (1997). When the antidote is the poison: ironic mental control processes. *Psychol. Sci.* 8, 148–150. doi: 10.1111/j.1467-9280.1997.tb00399.x

Wegner, D. M., Erber, R., and Zanakos, S. (1993). Ironic processes in the mental control of mood and mood-related thought. *J. Pers. Soc. Psychol.* 65, 1093–1104. doi: 10.1037/0022-3514.65.6.1093

West, C. P., Huschka, M. M., Novotny, P. J., Sloan, J. A., Kolars, J. C., Habermann, T. M., et al. (2006). Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA* 296, 1071–1078.

Williams, C. A. (1989). Empathy and burnout in male and female helping professionals. *Res. Nurs. Health* 12, 169–178. doi: 10.1002/nur.4770120307

Winnicott, D. W. (1960). The theory of the parent-infant relationship. *Intern. J. Psychoanaly.* 41, 585–595.

Wormwood, J. B., Siegel, E. H., Kopec, J., Quigley, K. S., and Barrett, L. F. (2019). You are what I feel: a test of the affective realism hypothesis. *Emotion* 19, 788–798. doi: 10.1037/emo0000484

Zaki, J. (2014). Empathy: a motivated account. *Psychol. Bull.* 140, 1608–1647. doi: 10.1037/a0037679

Zaki, J. (2019). *The War for Kindness: Building Empathy in a Fractured World*. New York, NY: Crown.

Zaki, J., and Cikara, M. (2015). Addressing empathic failures. *Curr. Direct. Psychol. Sci.* 24:78. doi: 10.1177/0963721415599978

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Neural and Self-Report Markers of Reassurance: A Generalized Additive Modelling Approach

Jeffrey J. Kim[1,2]*, *Trent Henderson*[3], *Talitha Best*[4], *Ross Cunnington*[1] and *James N. Kirby*[1]

[1] Compassionate Mind Research Group, School of Psychology, The University of Queensland, Brisbane, QLD, Australia, [2] The Centre for Advanced Imaging, The University of Queensland, Brisbane, QLD, Australia, [3] Orbisant Analytics, Brisbane, QLD, Australia, [4] School of Health, Medical and Applied Sciences, Central Queensland University, Brisbane, QLD, Australia

Research has shown that engaging in self-reassurance, a compassionately motivated cognitive relating style, can down-regulate neural markers of threat and pain. Whilst important, the relationship between neural and self-report markers of reassurance are largely unknown. Here we analyzed previously published fMRI data which measured neural responses when participants engaged in self-reassurance toward a mistake, setback, or failure. Within the present paper, we identified correlations between regions of interest extracted during self-reassurance with fMRI and self-report data. Using generalized additive modelling, we show that participants with greater inadequate forms of self-criticism exhibited greater neural activation within the medial prefrontal cortex (MPFC) and anterior insula (AI). Furthermore, a relationship between greater fears of expressing compassion to the self and neural activation within the MPFC returned non-significant after correction for multiple comparisons. No significant relationships were observed between brain activation and hated and reassuring forms of self-criticism. Our results identify preliminary evidence for neural activity during self-reassurance as correlated with self-report markers, and we outline a method for modelling neural and self-report data which can be applied to future studies in compassion science, particularly with a clinical sample.

Keywords: compassion, fMRI, self-report, modelling, reassurance, criticism

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***Correspondence:**
Jeffrey J. Kim
Jeffrey.kim@uqconnect.edu.au

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INTRODUCTION

Self-reassurance is a way of being compassionate to one's own suffering, and has been operationalized as a way to be soothing, encouraging, and supportive to oneself in the face of setbacks (1–3). In contrast, self-criticism is considered to be a self-relating style embedded in a competitive or "rank-based" motivational system. Studies have consistently found that self-criticism, insecure striving, and fears of receiving compassion from others have all been linked to increased depressive symptoms (4–6). Importantly, this association no longer exists for individuals with higher levels of self-reassurance, suggesting a buffering effect on mental-health *via* self-reassurance (1). According to social mentality theory (7), self-reassurance is a cognitive relating style that stems from the compassionate motivational system. The function of self-reassurance is to soothe and calm

the individual by activating the person's caring/affiliative affect regulation system, also known as the "tend and befriend" or "rest and digest" system (8, 9). Accordingly, the physiological function of self-reassurance is to activate the parasympathetic system in times of perceived threat (2). When locked in a competitive or "rank-based" motivational system, as opposed to a compassionate one, individuals find self-criticism easy and self-reassurance difficult (10, 11).Typically, the function of self-criticism is to correct errors, but it can also serve a function to punish mistakes, and although both significantly predict depressive symptoms, it is the latter which is particularly powerful (3, 12).

Importantly, compassion is a motivation, which involves having a sensitivity to suffering in self and others, with a commitment to try and alleviate and prevent it (13). Cultivating a compassionate motivational system, can enable an individual to cultivate supportive and encouraging abilities and their internal supportive "physiological infrastructure" (e.g., parasympathetic system and the vagus) (14–16) in which the buffering impact of self-reassurance can work, opening the opportunity for the individual in times of distress to be helpful rather than hurtful or harmful (17). Indeed, there are now therapies developed, such as Compassion Focused Therapy (8) aimed at motivational switching to help individuals who struggle with high levels of self-criticism and shame. But how self-reassurance may work on a neural level, and how this may link to self-report data is less well known.

Within the current paper, we report on an fMRI paradigm which has been reported on previously (2, 18). This experiment investigated the neurophysiological correlates of compassionate mind training, and with fMRI, assessed participant's neural responses when generating self-relating styles towards mistakes, setbacks and/or failures. Comparisons between activation patterns for self-critical versus self-reassuring relating styles have been reported elsewhere (2, 19, 20), The aim of the present paper is to explore how regions of the brain activated during self-reassurance may be attenuated by fears of compassion and forms of self-criticism.

METHOD

Experimental Procedure and Participants

As reported previously and reproduced in part due to a CC BY license (2), 40 participants (Mean age = 22 years, SD = .49, 27 female) were invited to engage in either self-reassuring or self-critical thoughts to stimuli which describe a mistake, setback, or failure (stimuli were counterbalanced for an emotional and neutral condition). Pre-testing on 200 participants revealed emotional statements were of sufficient intensity and negative valence as compared with neutral statements. Participants underwent 20 practice trials to test the task before the scanner, and rated the intensity of self-reassurance and self-criticism they felt for each trial *via* button-press on an MRI-compatible fibre-optic button box within the experiment. A relevant University Human Research Ethics committee approved the experimental protocol, and all participants provided written and/or digital informed, voluntary consent, and received remuneration at the value of $60 Australian dollars for participation. Whilst we observed no participant attrition across the combined fMRI experiment and HRV training as reported previously, one participant failed to complete an fMRI session due to feeling anxious during the scan, leaving us with a total number of 40 participants who completed both fMRI and HRV components. fMRI methods, pre-processing, and analysis are reported previously (2), yet regions-of-interest (ROI) extraction is summarized below for clarity:

Group-level analyses were conducted for emotional – neutral stimuli overall. As reported previously (2), brain regions shown to be significant had their anatomical labels identified with the Automated Anatomical Labelling (AAL) toolbox implemented in SPM12. Next, in order to examine correlations between the level of neural activation (i.e. difference in response between emotion verses neutral) and the mindset participants engaged in (i.e. self-criticism versus self-reassurance), we performed additional ROI analyses. For each ROI, we identified peak clusters which showed significantly greater activation overall for emotion vs neutral stimuli, and used these coordinates to extract the average contrast parameter estimates (i.e. levels of activation, Beta weights) with 5 mm radius spheres centered on those peaks for each mindset (i.e., self-criticism and self-reassurance).

Fears of Compassion Scale

We utilized the fears of compassion scale within the present research (5), which has three subscales; measuring fear of compassion for the self (example item, "I fear that if I become more self-compassionate I will become a weak person"), fear of receiving compassion from others (example item, "When people are kind and compassionate towards me I feel anxious or embarrassed"), and fear of compassion for others (example item, "Being compassionate towards people who have done bad things is letting them off the hook."). Our sample comprised an internal consistency of 0.85 for compassion toward the self, 0.90 for compassion to other, and 0.85 for receiving compassion from others.

Forms of Self-Criticism/Self-Reassuring Scale

This 22-item scale assesses participants' thoughts and feelings about themselves during a perceived failure. Two subscales measure forms of self-criticising (inadequate self (e.g., "I think I deserve my self-criticism") and hated self (e.g., "I have become so angry with myself that I want to hurt or injure myself"), and one of reassurance (reassured self, e.g., "I am gentle and supportive with myself.") (21). Our sample comprised an internal consistency of 0.89 for inadequate, 0.70 for hated, and 0.86 for reassuring forms of self-criticism, respectively.

RESULTS

Correlations and GAMs

Previously we reported how activation in a few key regions of the brain (Anterior Cingulate, Amygdala, and Anterior Insula) were

down-regulated when participants engaged in self-reassurance, versus self-criticism (2). Interestingly, activation across numerous regions were shown to not change their activation based on the mindset participants engaged in (Medial Pre-Frontal Cortex, Posterior Cingulate, and Lingual Gyrus). We will continue to use these same ROIs in the present paper for consistency to correlate with self-report measures (fears of compassion to self, forms of self-criticism). All combinations of brain regions and self-report variables have been reported in a table for clarity of measures (**Table 1**).

Our analysis plan proceeds as follows; first, we will explore the relationships (correlations) between all ROIs and self-report measures. Second, we will use GAMs to model the significant relationships. As can be seen in **Table 1** and **Supplementary Figure 1**, an initial correlation analysis revealed relationships with fears of self-compassion and inadequate forms of self-criticism in the MPFC and AI. Furthermore, also shown in **Table 1** and depicted in **Supplementary Figures 2, 3**, non-significant relationships of reassuring and hated forms of criticism with MPFC and AI are reported. To follow-up the significant relationships observed for inadequate forms of criticism and brain responses, three generalized additive models (GAM) were used to test statistically the relationships between explanatory (i.e., self-report) and response variables (brain activation: ROIs). Candidate variables for modelling with GAMs were selected after inspection of correlations (**Table 1**) and scatterplots (**Supplementary Figures 1–3**) revealed relationships which would benefit from the smoothing functions implemented under GAMS. Indeed, GAMS are similar to General Linear Model (GLMs), however in GAMs, smooth functions for each covariate are added (22, 23) in circumstances where traditional linear models are insufficient. Basis functions in GAMs are summed (connected) using spline interpolation, typically with a polynomial (22, 23). A benefit of GAMS is the provision of model evidence: here, GAMS can go beyond correlations to examine how well a model may fit data which is not strictly linear, and can contribute p-values, as well as R2 and deviance explained (similar to unadjusted R2, when the link function is Gaussian). As can be seen in **Figure 1** and **Tables 2**, **3**, GAMS can appropriately model the neural and self-report data. However, note that upon multiple comparison correction (0.05/3 = 0.016), the relationship between MPFC activation and Fears of Expressing Compassion to the Self returned non-significant. We also conducted GAMs on hated and reassuring forms of criticism, however hated forms violated a degrees of freedom assumption (possible due to a floor effect in a non-clinical sample), and reassuring forms returned a non-significant GAM (**Supplementary Tables 1, 2**).

DISCUSSION

Within the present research we explored relationships between neural markers of self-reassurance and fears of compassion and forms of self-criticism. Using the ROIs outlined in the previous paper (2), we used GAMs to fit the extent of neural activation within each ROI from self-report markers of self-reassurance's inhibitors (fears of compassion and forms of self-criticism). An initial correlation matrix followed-up with GAMs revealed significant relationships between neural markers of self-reassurance during fMRI and fears of compassion and forms of self-criticism (**Figure 1**). Specifically, participants with greater fears of expressing compassion toward the self, have greater neural activation within the MPFC when engaging in self-reassurance (**Figure 1A**) (however, a correction for multiple comparisons returned non-significant). In addition, participants with greater inadequate forms of self-criticism were shown to have greater neural activation within the MPFC and AI (**Figures 1B, C**).

Implications of Results

First, the MPFC is a node in the default-mode network, which is involved with mentalizing and self-referential thoughts (24). Previous work has linked alterations in DMN function within major depression, particularly through increased functional connectivity of these regions with other neural networks such as the salience network and central executive (attention) networks (25–28). Indeed, that we observed both increased MPFC (**Figure 1B**) as well as AI response (**Figure 1C**) may imply that inadequate forms of self-criticism is an index of functional co-activation of these regions. Accordingly, from the DMN and depression literature described above, it is possible that we are identifying within a healthy control sample a subset of participants who might be tending towards depressive-like rumination, as indexed from greater self-report inadequate forms of criticism. However, future work with a larger sample, and with a between participants approach (i.e., clinically depressed versus healthy controls), would need to test this theory *a priori* with a measure of functional connectivity of these brain regions (MPFC, AI).

Second, the AI is a node within the salience network, responsible in-part for processing salient negative events within the environment. This region has been reported extensively within the empathy and compassion neuroscience literature to date (29–31). What is interesting, however, is that greater activation of this region during engagement in self-reassurance, can be indexed from greater levels of inadequate forms of self-criticism. What this self-report scale measures is the degree to which an individual feels inadequate and inferior, and therefore their self-criticism is used to correct and improve the self, in order to try harder, to achieve goals and to maintain certain standards (32, 33). Accordingly this relationship might indicate that participants with greater scores on this self-report scale might actually be "beating themselves up", importantly, "for their perceived own good" for the imagined mistakes, setbacks or failures so that they prevent them happening again (34), as may be seen in the increase in activation of the AI. However, whilst inferring mental states from fMRI data as 'reverse inference' has been criticized (35), future work with an MVPA machine-learning approach might be able to decode the mind-states of participants when engaged in this paradigm (35–37).

TABLE 1 | Correlations between brain ROIs during self-reassurance and self-report markers.

Variable		Forms: Inadequate	Forms: Hated	Forms: Reassuring	Fears: Respond	Fears: Express to Self	Fears: Express to Other	ACC Response	AI Response	Amygdala Response	Lingual Gyrus (Visual Cortex) Response	MPFC Response	PCC Response
1. Forms: Inadequate	Pearson's r	—											
	p-value	—											
2. Forms: Hated	Pearson's r	**0.679*** **	—										
	p-value	**<.001**	—										
3. Forms: Reassuring	Pearson's r	**-0.486****	**-0.632*****	—									
	p-value	**0.001**	**<.001**	—									
4. Fears: Respond	Pearson's r	0.137	0.274	-0.298	—								
	p-value	0.412	0.097	0.069	—								
5. Fears: Express to Self	Pearson's r	0.258	0.205	-0.262	**0.674*****	—							
	p-value	0.118	0.217	0.112	**<.001**	—							
6. Fears: Express to Other	Pearson's r	-0.006	0.15	0.04	0.197	0.005	—						
	p-value	0.97	0.368	0.813	0.236	0.976	—						
7. ACC Response	Pearson's r	0.208	0.206	-0.184	0.151	0.096	0.236	—					
	p-value	0.198	0.201	0.257	0.367	0.566	0.154	—					
8. AI Response	Pearson's r	**0.362***	0.267	-0.025	0.092	0.313	0.057	**0.465****	—				
	p-value	**0.022**	0.095	0.878	0.581	0.056	0.734	**0.003**	—				
9. Amygdala Response	Pearson's r	0.179	0.092	-0.157	-0.013	0.095	-0.037	**0.592*****	**0.379***	—			
	p-value	0.27	0.572	0.335	0.936	0.569	0.827	**<.001**	**0.016**	—			
10. Lingual Gyrus (Visual Cortex) Response	Pearson's r	0.11	0.234	0.073	0.165	0.182	0.117	**0.454****	**0.475****	**0.426****	—		
	p-value	0.498	0.146	0.657	0.324	0.273	0.483	**0.003**	**0.002**	**0.006**	—		
11. MPFC Response	Pearson's r	**0.379***	0.15	-0.278	0.155	**0.363***	-0.035	0.218	**0.433****	0.189	0.109	—	
	p-value	**0.016**	0.356	0.083	0.353	**0.025**	0.834	0.177	**0.005**	0.242	0.503	—	
12. PCC Response	Pearson's r	**0.329***	0.108	-0.201	0.101	0.212	0.079	0.29	**0.581*****	0.308	0.011	**0.649*****	—
	p-value	**0.038**	0.509	0.214	0.545	0.202	0.639	0.07	**<.001**	0.053	0.945	**<.001**	—

*Bold text indicates a significant relationship. *p < .05, **p < .01, ***p < .001.*

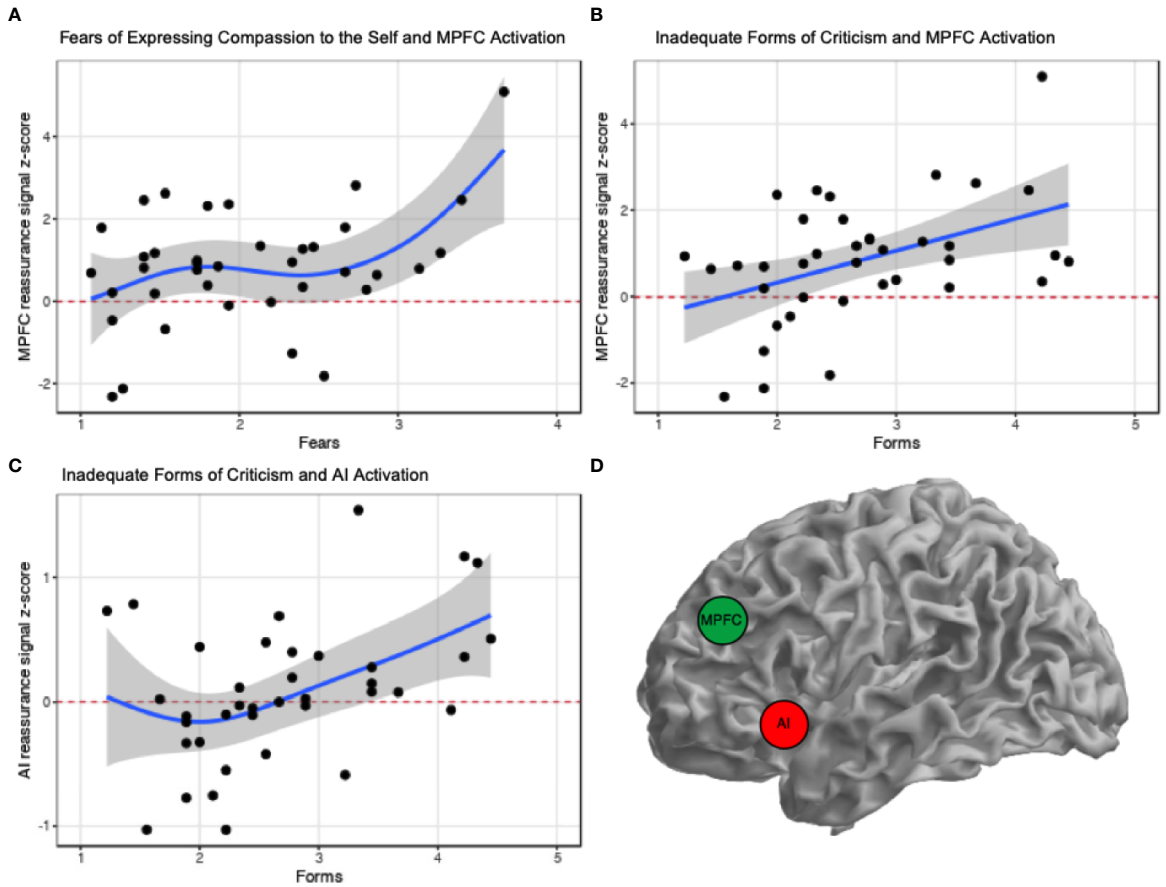


FIGURE 1 | GAM results of significant correlations. **(A)** MPFC ~ Fears: Smooth function for fears of expressing compassion to self significantly predicts MPFC reassurance signal. **(B)** MPFC ~ Forms: Smooth function for inadequate forms of criticism significantly predicts MPFC reassurance signal. **(C)** AI ~ Forms: Smooth function for inadequate forms of criticism significantly predicts AI reassurance signal. **(D)** Rough spatial location of MPFC (2 46 36) and Left AI (–26 10 –14) ROIs. Coordinates reported in MNI-space.

TABLE 2 | Model comparison and significance of GAMS for each self-report variable and ROI.

Model	edf	ref.edf	*F*	*p*
MPFC ~ Fears	3.21	3.99	3.24	*p* = .023
MPFC ~ Forms	1.00	1.00	8.87	*p* = .005
AI ~ Forms	3.58	4.42	3.35	*p* = .018

Tilde (~) indicates the regression of Y-variable (brain variable) on X-variable (self-report score). Edf indicates estimated degrees of freedom. Ref.edf indicates reference degrees of freedom. p indicates frequentist statistical thresholded. Note that upon multiple comparison correction (0.05/3 = 0.016), the relationship between MPFC activation and Fears of Expressing Compassion to the Self returned non-significant.

Limitations and Future Directions

That we did not find significant relationships between hated and reassuring forms of self-criticism and brain markers are also interesting. As can be seen in **Supplementary Figures 2, 3**, the correlation between reassuring and hated forms of criticism and brain activation was non-significant. However, inspection of the scatterplots of these scales revealed a floor effect for hated forms, and a ceiling effect for reassuring forms. That we found these results can speak to aspects of our sample, namely, within a healthy population is that our sample tended toward greater self-reassuring, and less hated forms of self-criticism, which has also been found previously (12). Indeed, non-clinical samples have been shown to rate the hated-self subscale at floor (12). Yet it is curious how inadequate forms of self-criticism was associated with neural responses when engaged in self-reassurance. Future work perhaps with a clinically depressed sample to examine self-reassurance in comparison to a healthy control sample, might reveal a relationship between hated forms of criticism and brain activity when using the GAM method.

A possible candidate for the links between self-reassurance and inadequate self-criticism might be at the core of each self-relating style is it aims to regulate in order to correct behaviour and prevent bad things happening in the future. Some have drawn parallels to an inner dominant-subordinate relationship, which is developed to ensure one stays focused and does not become arrogant and disliked by others (38). However, when it comes to self-hatred criticism, this is a relating style that aims to destroy or eliminate. Some have argued it is an internal relating style that regards oneself

TABLE 3 | Deviance and variance explained of GAM models.

Model	*n*	Deviance explained	GCV	Scale estimate	Adj. R^2
MPFC ~ Fears	38	31.0%	1.73	1.54	0.24
MPFC ~ Forms	38	19.8%	1.77	1.68	0.18
AI ~ Forms	38	33.3%	0.27	0.24	0.26

Tilde (~) indicates the regression of Y-variable (brain variable) on X-variable (self-report score). Deviance explained is comparable to unadjusted R2. GCV is the minimized generalized cross-validation score of the fitted GAM—an indicator of the smoothness function. Scale estimate is the value of Φ (Phi) estimated during model fitting. Adjusted R2 is the unbiased estimate of the population R2, or variance explained by the model.

as an enemy or an out-group. In this instance submissiveness and appeasement (a result of inadequate self-criticism) may not work at mitigating the attack (38). Rather the self-hatred attack aims to remove the "toxin". Indeed, self-hatred and wanting to remove aspects of the self has been found in those who self-harm (38).

An extension of our results would be to conduct an fMRI paradigm which measures neural responses to self-hatred, as well as self-reassurance, generated toward aspects of the self that are liked versus disliked. Indeed, it would be fascinating to run this experiment in populations such as those with high self-hatred to aspects of self, such as body dysmorphia, body-weight shame, or even in populations of eating disorders (39–42) and to examine if interventions such as Compassion Focused Therapy, particularly designed to work with these populations (40, 43) may help attenuate these neural responses. Specifically, we propose that the same neural mechanisms which code for "neural pain" differently for in-groups and out-groups, may likewise by stimulated when considering aspects of the self that are hated. For example, research has examined the effects of neural responses to pain, particularly within the Anterior Cingulate Cortex (ACC), when viewing videos of one's own race versus another race in suffering (44). Whilst a typical neural bias toward processing own versus other race was evident, activation to other race's pain within the ACC significantly increased upon greater levels of physical contact with the outgroup, thereby tuning one's own ACC to respond to the other group's pain as if they were an ingroup (44). We hypothesize that a clinical sample with high self-report hatred to aspects of the self, would replicate this effect of suppressing neural empathy for pain toward outgroups, to the exact parts of the self that they hate, wish to get rid of, destroy, and expel (34). Critically, we also suggest that a Compassion Focussed Therapy intervention (45) would help to reduce this neural suppression, and allow processing of what was once hated as now something to incorporate as "ingroup"—as part of the self.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The University of Queensland Health and Behavioural Sciences, Low & Negligible Risk Ethics Sub-Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JJK, RC and JNK conceived and designed the initial experiment. JJK and TH conducted data analyses. JJK, TB, TH and JNK wrote the paper.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2020.566141/full#supplementary-material

REFERENCES

1. Petrocchi N, Dentale F, Gilbert P. Self-reassurance, not self-esteem, serves as a buffer between self-criticism and depressive symptoms. *Psychol Psychother Theory Res Pract* (2019) 92(3):394–406. doi: 10.1111/papt.12186
2. Kim J, Parker S, Doty J, Cunnington R, Gilbert P, Kirby J. Neurophysiological and behavioural markers of compassion. *Sci Rep* (2020) 10(1):6789. doi: 10.1038/s41598-020-63846-3
3. Gilbert P, Clarke M, Hempel S, Miles JNV, Irons C. Criticizing and reassuring oneself: An exploration of forms, styles and reasons in female students. *Br J Clin Psychol* (2004) 43(1):31–50. doi: 10.1348/014466504772812959
4. Zuroff DC, Fournier MA, Moskowitz DS. Depression, Perceived Inferiority, and Interpersonal Behavior: Evidence for the Involuntary Defeat Strategy. *J Soc Clin Psychol* (2007) 26(7):751–78. doi: 10.1521/jscp.2007.26.7.751
5. Gilbert P, Mcewan K, Matos M, Rivis A. Fears of compassion: Development of three self-report measures. *Psychol Psychother Theory Res Pract* (2011) 2011:239–55. doi: 10.1348/147608310X526511
6. Kirby JN, Day J, Sagar V. The 'Flow' of compassion: A meta-analysis of the fears of compassion scales and psychological functioning. *Clin Psychol Rev* (2019) 70:26–39. doi: 10.1016/j.cpr.2019.03.001
7. Gilbert P. Compassion as a social mentality. In: Gilbert P, editor. *Compassion: Concepts, Research and Applications*. UK: Taylor & Francis (2017). p. 31–8.
8. Gilbert P. The origins and nature of compassion focused therapy. *Br J Clin Psychol* (2014) 53(1):6–41. doi: 10.1111/bjc.12043

9. Sue Carter C, Inbal Ben-Ami Bartal and ECP. The Roots of Compassion: An Evolutionary and Neurobiological Perspective. In: Seppälä EM, Simon-Thomas E, Brown SL, Worline MC, Cameron CD, Doty JR, editors. *The Oxford Handbook of Compassion Science*. New York, NY: Oxford University Press (2017).
10. Basran J, Pires C, Matos M, McEwan K, Gilbert P. Styles of leadership, fears of compassion, and competing to avoid inferiority. *Front Psychol* (2019) 9:10–4. doi: 10.3389/fpsyg.2018.02460
11. Kim JJ, Gerrish R, Gilbert P, Kirby JN. Stressed, depressed, and rank obsessed: Individual differences in compassion and neuroticism predispose towards rank-based depressive symptomatology. *Psychol Psychother Theory Res Pract* (2020) 1–24. doi: 10.1111/papt.12270
12. Halamová J, Kanovský M, Gilbert P, Troop NA, Zuroff DC, Hermanto N, et al. The Factor Structure of the Forms of Self-Criticising/Attacking & Self-Reassuring Scale in Thirteen Distinct Populations. *J Psychopathol Behav Assess* (2018) 40(4):736–51. doi: 10.1007/s10862-018-9686-2
13. Catarino F, Gilbert P, McEwan K, Baião R. Compassion Motivations: Distinguishing Submissive Compassion From Genuine Compassion and its Association With Shame, Submissive Behavior, Depression, Anxiety and Stress. *J Soc Clin Psychol* (2014) 33(5):399–412. doi: 10.1521/jscp.2014.33.5.399
14. Wagner N, Waller R. Leveraging parasympathetic nervous system activity to study risk for psychopathology: The special case of callous-unemotional traits. *Neurosci Biobehav Rev* (2020) 118:175–85. doi: 10.31234/osf.io/vcfx5
15. Bello MD, Carnevali L, Petrocchi N, Thayer JF, Gilbert P, Ottaviani C. The compassionate vagus: A meta-analysis on the connection between compassion and heart rate variability. *Neurosci Biobehav Rev* (2020) 166:1–10. doi: 10.1016/j.neubiorev.2020.06.016
16. Kim JJ, Parker SL, Henderson T, Kirby JN. Physiological fractals: Visual and statistical evidence across timescales and experimental states. *J R. Soc Interface* (2020) 3(34):1–8. doi: 10.1098/rsif.2020.0334
17. Gilbert P, Kirby JN. Building an integrative science for psychotherapy for the 21st century: Preface and introduction. *Psychol Psychother Theory Res Pract* (2019) 2019:1–13. doi: 10.1111/papt.12225
18. Kim JJ, Kent KM, Cunnington R, Gilbert P, Kirby JN. Attachment styles modulate neural markers of threat and imagery when engaging in self-criticism. *Sci Rep* (2020) 10(13776):1–10. doi: 10.1038/s41598-020-70772-x
19. Longe O, Maratos FA, Gilbert P, Evans G, Volker F, Rockliff H, et al. Having a word with yourself: neural correlates of self-criticism and self-reassurance. *Neuroimage* (2010) 49(2):1849–56. doi: 10.1016/j.neuroimage.2009.09.019
20. Lutz J, Berry MP, Napadow V, Germer C, Pollak S, Gardiner P, et al. Neural activations during self-related processing in patients with chronic pain and effects of a brief self-compassion training – a pilot study. *Psychiatry Res Neuroimag* (2020) 34:111155. doi: 10.1016/j.pscychresns.2020.111155
21. Gilbert P, Clarke M, Hempel S, Miles JNV, Irons C. Criticizing and reassuring oneself: An exploration of forms, styles and reasons in female students. *Br J Clin* (2004) 2004:31–50. doi: 10.1348/014466504772812959
22. Olival KJ, Hosseini PR, Zambrana-Torrelio C, Ross N, Bogich TL, Daszak P. Host and viral traits predict zoonotic spillover from mammals. *Nature* (2017) 546(7660):646–50. doi: 10.1038/nature22975
23. Van den Berge K, de Bézieux HR, Street K, Saelens W, Cannoodt R, Saeys Y, et al. Trajectory-based differential expression analysis for single-cell sequencing data. *Nat Commun* (2020) 11(1):1–13. doi: 10.1038/s41467-020-14766-3
24. Gusnard DA, Akbudak E, Shulman GL, Raichle ME. Medial prefrontal cortex and self-referential mental activity: Relation to a default mode of brain function. *Proc Natl Acad Sci USA* (2001) 98(7):4259–64. doi: 10.1073/pnas.071043098
25. Hamilton JP, Farmer M, Fogelman P, Gotlib IH. Depressive Rumination, the Default-Mode Network, and the Dark Matter of Clinical Neuroscience. *Biol Psychiatry* (2015) 78(4):224–30. doi: 10.1016/j.biopsych.2015.02.020
26. Nejad AB, Fossati P, Lemogne C. Self-referential processing, rumination, and cortical midline structures in major depression. *Front Hum Neurosci* (2013) 7:666(OCT). doi: 10.3389/fnhum.2013.00666
27. Posner J, Cha J, Wang Z, Talati A, Warner V, Gerber A, et al. Increased Default Mode Network Connectivity in Individuals at High Familial Risk for Depression. *Neuropsychopharmacology* (2016) 41(7):1759–67. doi: 10.1038/npp.2015.342
28. Wise T, Marwood L, Perkins AM, Herane-Vives A, Joules R, Lythgoe DJ, et al. Instability of default mode network connectivity in major depression: A two-sample confirmation study. *Transl Psychiatry* (2017) 7(4):e1105–7. doi: 10.1038/tp.2017.40
29. Fan Y, Duncan NW, de Greck M, Northoff G. Is there a core neural network in empathy? An fMRI based quantitative meta-analysis. *Neurosci Biobehav Rev* (2011) 35(3):903–11. doi: 10.1016/j.neubiorev.2010.10.009
30. Zaki J, Wager TD, Singer T, Keysers C, Gazzola V. The Anatomy of Suffering: Understanding the Relationship between Nociceptive and Empathic Pain. *Trends Cognit Sci* (2016) 20(4):249–59. doi: 10.1016/j.tics.2016.02.003
31. Kim JJ, Cunnington R, Kirby JN. The neurophysiological basis of compassion: An fMRI meta-analysis of compassion and its related neural processes. *Neurosci Biobehav Rev* (2020) 108:112–23. doi: 10.1016/j.neubiorev.2019.10.023
32. Duarte J, McEwan K, Barnes C, Gilbert P, Maratos FA. Do therapeutic imagery practices affect physiological and emotional indicators of threat in high self-critics? *Psychol Psychother Theory Res Pract* (2015) 88:270–84. doi: 10.1111/papt.12043
33. Gilbert P, McEwan K, Irons C, Bhundia R, Christie R, Broomhead C, et al. Self-harm in a mixed clinical population: The roles of self-criticism, shame, and social rank. *Br J Clin Psychol* (2010) 49(4):563–76. doi: 10.1348/014466509X479771
34. Castilho P, Pinto-Gouveia J, Duarte J. Two forms of self-criticism mediate differently the shame–psychopathological symptoms link. *Psychol Psychother Theory Res Pract* (2017) 90(1):44–54. doi: 10.1111/papt.12094
35. Poldrack RA. Inferring mental states from neuroimaging data: From reverse inference to large-scale decoding. *Neuron* (2011) 72(5):692–7. doi: 10.1016/j.neuron.2011.11.001
36. King JR, Dehaene S. Characterizing the dynamics of mental representations: The temporal generalization method. *Trends Cognit Sci* (2014) 18(4):203–10. doi: 10.1016/j.tics.2014.01.002
37. Ashar YK, Andrews-hanna JR, Dimidjian S, Wager TD. Empathic Care and Distress: Predictive Brain Markers and Dissociable Brain Systems Article Empathic Care and Distress: Predictive Brain Markers and Dissociable Brain Systems. *Neuron* (2017) 94(6):1263–73.e4. doi: 10.1016/j.neuron.2017.05.014
38. Gilbert P, Baldwin MW, Irons C, Baccus JR, Palmer M. Self-criticism and self-warmth: An imagery study exploring their relation to depression. *J Cognit Psychother*. (2006) 20(2):183–200. doi: 10.1891/jcop.20.2.183
39. Kelly AC, Carter JC. Self-compassion training for binge eating disorder: A pilot randomized controlled trial. *Psychol Psychother Theory Res Pract* (2015) 88(3):285–303. doi: 10.1111/papt.12044
40. Kelly AC, Carter JC, Borairi S. Are improvements in shame and self-compassion early in eating disorders treatment associated with better patient outcomes? *Int J Eat Disord* (2014) 47(1):54–64. doi: 10.1002/eat.22196
41. Kelly AC, Carter JC, Zuroff DC, Borairi S. Self-compassion and fear of self-compassion interact to predict response to eating disorders treatment: A preliminary investigation. *Psychother Res* (2013) 23(3):252–64. doi: 10.1080/10503307.2012.717310
42. Kelly AC, Vimalakanthan K, Carter JC. Understanding the roles of self-esteem, self-compassion, and fear of self-compassion in eating disorder pathology: An examination of female students and eating disorder patients. *Eat Behav* (2014) 15(3):388–91. doi: 10.1016/j.eatbeh.2014.04.008
43. Duarte C, Stubbs J, Pinto-Gouveia J, Matos M, Gale C, Morris L, et al. The Impact of Self-Criticism and Self-Reassurance on Weight-Related Affect and Well-Being in Participants of a Commercial Weight Management Programme. *Obes Facts* (2017) 10(2):65–75. doi: 10.1159/000454834
44. Cao Y, Contreras-Huerta LS, McFadyen J, Cunnington R. Racial bias in neural response to others' pain is reduced with other-race contact. *Cortex* (2015) 70:68–78. doi: 10.1016/j.cortex.2015.02.010
45. Gilbert P. A Brief Outline of the Evolutionary Approach for Compassion Focused Therapy. *EC Psychol Psychiatry* (2017) 3:218–27. https://pdfs.semanticscholar.org/1661/f7202e1c8f844db6c0a0dcfbe957bcfae092.pdf.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPINION
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Radically Embodied Compassion: The Potential Role of Traditional Martial Arts in Compassion Cultivation

Neil Clapton[1]* *and Syd Hiskey*[2]

[1] *Avon and Wiltshire Mental Health Partnership NHS Trust, Swindon, United Kingdom,* [2] *Private Practice, The Oaks Hospital, Colchester, United Kingdom*

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***Correspondence:**
Neil Clapton
claptonneil@gmail.com

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INTRODUCTION

The last few years have seen a growing interest and research into the science of compassion, including exploring how we can best cultivate this important and powerful affiliative/prosocial motivation and its behavioral manifestations in humans (Gilbert, 2019). This has resulted in a proliferation of various compassion cultivation programmes and interventions (Kirby, 2017; Kirby et al., 2017), both for clinical and non-clinical populations. Many of these programmes contain both similarities and differences in regards to the specific mind training practices they draw on to stimulate the proposed neurophysiological processes associated with compassionate motivation and behaviors (Gilbert, 2019; Kim et al., 2020).

Whilst Western science has begun to consider ways of more fully embodying compassion (Loizzo, 2018; Khoury, 2019), it has thus far failed to consider the potentially powerful role of ancient cultural practices such as the traditional martial arts in cultivating compassion. This is despite the fact that the purpose and philosophy of many traditional martial arts is to develop certain virtuous character strengths (Hackney, 2011) in order to become a fearlessly courageously compassionate human being (Kamen, 2017). This opinion paper shall briefly outline the rationale for and extol the potential benefits of the traditional martial arts in entraining compassion at a radically embodied level (Hiskey and Clapton, 2019a), including related research that already supports this theoretical proposition.

MARTIAL ARTS AS RADICALLY EMBODIED COMPASSION

The Nature of Compassion and Its Neurophysiological Correlates and Indicators

Whilst debates remain about the nature of and how to define compassion (Gilbert, 2017; Khoury, 2019), there is growing consensus that compassion is most usefully defined as "a sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it" (Gilbert and Choden, 2013, p. 94). A commonality among evolutionary, motivational and Buddhist psychology is to see compassion as a *motive*, likely rooted in evolved caring and affiliative motivational systems (Gilbert, 2015, 2017, 2019). From this perspective, at the core of compassion is *courage* and *wisdom*, in terms of (1) courageous willingness and emotional strength to turn toward, empathically engage with and tolerate distress; and (2) dedication to learn and develop skills/skillful means to take wise action in alleviating and preventing/halting suffering.

At a neurophysiological level, Polyvagal Theory (Porges, 2007, 2011) proposes that compassion is associated with and dependent on a vagally-mediated physiological state and activation of the parasympathetic nervous system (Porges, 2017; Stellar and Keltner, 2017) that is functionally distinct from empathy and affords feelings of personal *safety*, as a result of simultaneously encompassing the feeling of one's own bodily responses while acknowledging those of the other (Porges, 2017).

Key to compassion then is that it allows one to stay engaged with suffering without becoming overwhelmed or overly distressed by it (Wilson and Takuan, 2012), reducing fear whilst affording and sustaining compassionate responding in difficult and challenging situations (Ashar et al., 2019).

Radically Embodied Compassion as Understood, Cultivated and Entrained by the Traditional Martial Arts

Compassion is a central tenet, ethical intention and motivational force integral to the "Way" of many traditional martial arts, including aikido (Westbrook and Ratti, 1970), taekwondo (Cook, 2006) and karate (Kamen, 2017). Traditional martial arts philosophy and systems are commensurate with the aforementioned conceptualization of compassion, as a motive to empathically confront and take wise skillful action to reduce and prevent suffering of self and others (Ueshiba, 2007). At their core, traditional martial arts are mind-body self-cultivation systems (Sovereign and Walker, 2020) that help develop compassionate and virtuous character strengths such as courage, benevolence, wisdom, temperance and justice (Hackney, 2011, 2013). Seen from this perspective, martial arts can become a vehicle and pathway to reducing suffering, promoting well-being and flourishing at a personal and social level (Hackney, 2013; Sovereign and Walker, 2020).

The neuroscience of embodiment proposes and elucidates the centrality of the body in influencing and shaping motivational, emotional and cognitive processes (Price et al., 2012). Experimental evidence has demonstrated how intentionally-manipulated bodily states, such as dynamic/static body posture and quality/shape of movement, influence physiological responses associated with approach and avoidance motivations, emotional processing and perception (Price et al., 2012; Osypiuk et al., 2018). Such theory and research helps to provide an explanatory framework as to how and why traditional martial arts may be a form of *Radically Embodied Compassion*. Our proposition is that traditional martial arts training involves harnessing and training the *whole* self via a multitude of integrated mind-body practices that stimulate/give rise to compassionate motivation and associated mental states, emotions and behaviors, in the service of halting or reducing suffering.

Existing research already supports the notion that traditional martial arts afford, entrain and stimulate (neurophysiological) processes that are associated with and underpin compassionate motivation and compassionate responding (Kim et al., 2020). Such training aims to develop ease of access to a psychophysiological state characterized by courageous, swift, and precise responsiveness in the face of threats (Faggianelli and Lukoff, 2006). Thus, one can respond skillfully and flexibly from a position of inner centeredness, relative calm and stability (Martin, 2004; Wilson and Takuan, 2012), a state of mind that is reflective of and affords wise courageous compassionate engagement and action (Ueshiba, 2007). For example, rather than flinching or turning away in the face of physical confrontation, one might enact entrained procedures to block and counter it with one's own skillful actions. Recent fMRI research into the effects of mind-body training through *Budo* in Kendo practitioners on the motivation network supports this notion, in that "resting vs. attentionally-driven" switching/change of motivation can be trained and becomes more efficient (Fujiwara et al., 2019), which is indicative of an unmoving/undisturbed/unfettered mind (Wilson and Takuan, 2012) which better affords an appropriate physical response. Research also suggests that martial artists are more endogenously prepared to engage with and respond to uncertainty (Johnstone and Marí-Beffa, 2018) and are more distress tolerant when faced with and despite repeated exposure to threatening situations (Staller et al., 2017), as well-having greater sustained attentional abilities and impulse control (Sánchez-López et al., 2013; Sánchez-Lopez et al., 2016). All of this combines to lead to skillful action that is reasoned, assertive and conflict-ending rather than mindlessly aggressive and designed to excessively hurt another.

The power of martial arts as a mind-body practice and discipline potentially lies in their ability to foster optimal sympathovagal balance that affords flexible and optimal compassionate responding. Similar other mind-body practices such as Tai Chi, Qigong and yoga that pair mindful movement with breathing/breath control exercises have been shown to stimulate the parasympathetic nervous system (Ramos et al., 2017; Sullivan et al., 2018; Walther et al., 2018) and many martial forms/kata have sections that are deliberately practiced in a slow, controlled and meditative way (Rawcliffe, 2003). Paced rhythmic breathing synchronized with rhythmic muscle contraction activates and produces a more resilient parasympathetic response in the face of stress than either alone (Chin and Kales, 2019), both of which are integral to martial arts practice and are often seen in prearranged practice drills (i.e., Kihon), all conducted with respect for oneself and one's partner.

Research into behavioral synchrony is directly relevant to the processes which are stimulated by martial arts training. Group activities where people engage in synchronized movements, expressive gestures and collective rituals such as those found in martial arts training have been shown to enhance compassion for others via processes of shared flow and perceived emotional synchrony (Pizarro et al., 2020). Such collective behavioral synchrony has been proposed to help cultivate and enhance compassion because it likely co-stimulates affiliative and co-operative social mentalities (Friedman, 2016; Gilbert, 2017) that facilitates reciprocal empathic and altruistic responding (Valdesolo and DeSteno, 2011; Pizarro et al., 2020) even when enacting confrontation related (i.e., fight) behavior.

All martial arts involve some form of carefully managed and safe combat (i.e., sparring or Kumite), whereby two or more practitioners are engaged in a dynamic process of antagonistic engagement, skillful responding and co-regulation (Kimmel and Rogler, 2019) that ends in reaffiliation and mutual respect at the end of the encounter/confrontation (e.g., bowing or touching gloves). Importantly, these are dyadic *prosocial* encounters (Rassovsky et al., 2019) that require moving from asynchronous to synchronous interactions and states. Such encounters require martial artists to rapidly and flexibly shift between socio-motivational states, otherwise referred to as Locomotion Motivation (Webb et al., 2017), an ability which is crucial in facilitating conflict resolution, post-conflict reconciliation, learning and growth (Webb et al., 2017). Martial arts might be implicitly and explicitly entraining value-driven abilities to stay affiliatively engaged in conflict situations of high relational threat and end such conflicts by reaffiliating, with minimum harm done. Thus, martial artists develop the courage and confidence to face and resolve conflicts non-violently and compassionately, whereby potential suffering is halted and prevented and relational harmony is restored. This is compassionate conflict resolution and transformation (Martin, 2004; Friedman, 2016; Lukoff and Strozzi-Heckler, 2017; Hiskey and Clapton, 2019a).

Sparring also often involves some form of physical touch and contact either via blocking and/or grappling. Such martial arts training has been shown to increase endogenous oxytocin production (Rassovsky et al., 2019), a neuropeptide that plays a central role in regulating mammalian social behaviors by down-regulating threat-based processing and defensive behaviors and up-regulating affiliative and prosocial behaviors associated with compassion. Taken together, traditional martial arts training and practices maybe a particularly powerful way of neurally exercising vagal circuits and pathways of what has been termed the Social Engagement System (Porges, 2017).

Crucially, such compassion and compassionate abilities cultivated and entrained by the martial arts are likely transferable to non-martial situations, through a process which has been termed *somatic metamorphism* (Foster, 2015). This has been described as a mode of deploying the body to make sense of and wisely respond to non-martial challenges such as day-to-day relational conflicts and challenges, supported by first-person accounts of Aikido practitioners' somatic metamorphism in everyday life (Foster, 2015). In this way, martial values of care for ourselves and others generalize from the dojo/training hall to one's broader relational context(s).

Clinical and Non-clinical Applications of Martial Arts-Based Compassion Cultivation

The potential utility of martial arts as a vehicle for cultivating compassion is broad and multifarious. In terms of clinical applications, there is emerging theory that entraining radically embodied compassion in therapists/clinicians via traditional martial arts may afford them greater distress tolerance and compassionate responsiveness in difficult therapeutic encounters such as alliance ruptures (Faggianelli and Lukoff, 2006; Hiskey and Clapton, 2019a,b), where repair of and reaffiliation after such ruptures are central to good therapeutic outcomes (Safran et al., 2002; Eubanks-Carter et al., 2015). Martial arts-augmented personal practice thus has the potential to help develop specific compassionate competencies that not only benefit others but also the self (Twemlow, 2001a,b; Hiskey and Clapton, 2019a,b) by enhancing the flow of compassion (Gilbert et al., 2017), as well as acting as an important form of compassionate self-care for mental health professionals (Gladstone, 2018).

Traditional martial arts training and practices also hold promise as a compassion-focused psychotherapeutic intervention in their own right and/or as an adjunct to other psychotherapies. Early evidence suggests that martial arts training is a potentially powerfully transformative intervention for individuals who have experienced interpersonal trauma (Vargas, 2019), possibly because of martial arts' highly embodied and somatic-based nature that is akin to other somatically-informed psychotherapies that target the amelioration and healing of trauma more directly via the body (Ogden and Fisher, 2015; Van der Kolk, 2015; Loizzo, 2018). Martial arts-informed psychotherapy may also be a more compassionate way to reach and help alleviate the suffering of individuals whom find it extremely difficult to access and benefit from verbal therapies alone, such as people whose traumatic histories and upbringings lead to acting out destructive aggression and a relative inability to mentalize about others or the self (Twemlow et al., 2008).

In terms of cultivating and engendering compassion at a social level, traditional martial arts has much to offer. It has the potential to decrease and prevent the suffering engendered by inevitable interpersonal conflicts that occur in day-to-day life, and promote more prosocial behaviors associated with compassionate motives by embodying and enacting non-violent conflict resolution and facilitated post-conflict reaffiliation (Martin, 2004; Foster, 2015; Friedman, 2016; Lukoff and Strozzi-Heckler, 2017; Hiskey and Clapton, 2019a). A growing body of research and evidence supports the notion that longer-term training in traditional martial arts reduces aggressiveness and increases prosocial behaviors (Blomqvist Mickelsson, 2019). Some of these other compassionate behaviors include the development and expression of prosocial assertiveness and helpful bystanding (Twemlow et al., 2008) as well as respect for others, perseverance, self-confidence, and healthy habits (Chinkov and Holt, 2015).

CONCLUSION

This paper has outlined how the traditional martial arts may be powerful ways of cultivating radically embodied compassion. Western science has thus far largely ignored and neglected the ancient wisdom of the traditional martial arts as vehicles for compassion cultivation and training. Our hope is that this paper will stimulate further research into the underlying mechanisms of martial arts practices and their relationship to

compassion, as well as the further development of martial arts-based psychotherapies and personal practices that help cultivate compassion for all.

AUTHOR CONTRIBUTIONS

NC and SH contributed to this topic and writing equally.

REFERENCES

Ashar, Y. K., Andrews-Hanna, J., Halifax, J., Dimidjian, S., and Wager, T. (2019). Effects of compassion training on brain responses to suffering others. *bioRxiv [Preprint]*. doi: 10.1101/616029

Blomqvist Mickelsson, T. (2019). Modern unexplored martial arts–what can mixed martial arts and Brazilian Jiu-Jitsu do for youth development? *Eur. J. Sport Sci.* 20, 386–393. doi: 10.1080/17461391.2019.1629180

Chin, M. S., and Kales, S. N. (2019). Understanding mind–body disciplines: a pilot study of paced breathing and dynamic muscle contraction on autonomic nervous system reactivity. *Stress Health* 35, 542–548. doi: 10.1002/smi.2887

Chinkov, A. E., and Holt, N. L. (2015). Implicit transfer of life skills through participation in Brazilian Jiu-Jitsu. *J. Appl. Sport Psychol.* 28, 139–153. doi: 10.1080/10413200.2015.1086447

Cook, D. (2006). *Traditional Taekwondo: Core Techniques, History, and Philosophy*. Boston, MA: YMAA Publication Center.

Eubanks-Carter, C., Muran, J. C., and Safran, J. D. (2015). Alliance-focused training. *Psychotherapy* 52:169. doi: 10.1037/a0037596

Faggianelli, P., and Lukoff, D. (2006). Aikido and psychotherapy: a study of psychotherapists who are Aikido practitioners. *J Transperson Psychol.* 38, 159–178.

Foster, D. (2015). Fighters who don't fight: The case of aikido and somatic metaphorism. *Qual. Sociol.* 38, 165–183. doi: 10.1007/s11133-015-9305-4

Friedman, H. L. (2016). Using Aikido and transpersonal psychology concepts as tools for reconciling conflict: focus on Aikido and related martial arts, such as Hapkido. *NeuroQuantology* 14, 213–225. doi: 10.14704/nq.2016.14.2.938

Fujiwara, H., Ueno, T., Yoshimura, S., Kobayashi, K., Miyagi, T., Oishi, N., et al. (2019). Martial arts "Kendo" and the motivation network during attention processing: an fMRI study. *Front. Human Neurosci.* 13:170. doi: 10.3389/fnhum.2019.00170

Gilbert, P. (2015). The evolution and social dynamics of compassion. *Soc. Personal. Psychol. Compass* 9, 239–254. doi: 10.1111/spc3.12176

Gilbert, P. (Ed.). (2017). *Compassion: Concepts, Research and Applications*. London: Routledge.

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., et al. (2017). The development of compassionate engagement and action scales for self and others. *J. Compassion. Health Care* 4:4. doi: 10.1186/s40639-017-0033-3

Gilbert, P., and Choden. (2013). *Mindful Compassion: Using the Power of Mindfulness and Compassion to Transform Our Lives.* London: Constable & Robinson.

Gladstone, J. (2018). *Are Martial Arts an Effective Self-Care Practice for Mental Health Professionals?* (Doctoral dissertation): Antioch University.

Hackney, C. (2011). *Martial Virtues: Lessons in Wisdom, Courage, and Compassion From the World's Greatest Warriors*. North Clarendon, VT: Tuttle Publishing.

Hackney, C. H. (2013). "Martial arts as a pathway to flourishing," in *Positive psychology: Advances in Understanding Adult Motivation*, ed J.D. Sinnott (New York, NY: Springer), 145–158.

Hiskey, S., and Clapton, N. (2019a). The martial arts and embodied distress tolerance in psychological therapy. *Int J Martial Arts* 5:4.

Hiskey, S., and Clapton, N. (2019b). Rolling with the punches: the martial arts as a vehicle for personal and therapist self-development. *Private Pract.* 6–9.

Johnstone, A., and Marí-Beffa, P. (2018). The effects of martial arts training on attentional networks in typical adults. *Front. Psychol.* 9:80. doi: 10.3389/fpsyg.2018.00080

Kamen, R. K. (2017). *Karate: Beneath The Surface: Emotional Content of Kata*. Newyork, NY: Kamen Entertainment Group.

Khoury, B. (2019). Compassion: embodied and embedded. *Mindfulness* 10, 2363–2374. doi: 10.1007/s12671-019-01211-w

Kim, J. J., Cunnington, R., and Kirby, J. N. (2020). The neurophysiological basis of compassion: An fMRI meta-analysis of compassion and its related neural processes. *Neurosci. Biobehav. Rev.* 108, 112–123. doi: 10.1016/j.neubiorev.2019.10.023

Kimmel, M., and Rogler, C. R. (2019). The anatomy of antagonistic coregulation: emergent coordination, path dependency, and the interplay of biomechanic parameters in Aikido. *Human Move. Sci.* 63, 231–253. doi: 10.1016/j.humov.2018.08.008

Kirby, J. N. (2017). Compassion interventions: The programmes, the evidence, and implications for research and practice. *Psychol. Psychotherap.* 90, 432–455. doi: 10.1111/papt.12104

Kirby, J. N., Tellegen, C. L., and Steindl, S. R. (2017). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav. Therap.* 48, 778–792. doi: 10.1016/j.beth.2017.06.003

Loizzo, J. J. (2018). Can embodied contemplative practices accelerate resilience training and trauma recovery? *Front. Human Neurosci.* 12:134. doi: 10.3389/fnhum.2018.00134

Lukoff, D., and Strozzi-Heckler, R. (2017). Aikido: A martial art with mindfulness, somatic, relational, and spiritual benefits for veterans. *Spiritual. Clin. Pract.* 4, 81–91. doi: 10.1037/scp0000134

Martin, P. (2004). Conflict resolution using transactional analysis and aikido. *Transact. Anal. J.* 34, 229–242. doi: 10.1177/036215370403400307

Ogden, P., and Fisher, J. (2015). *Sensorimotor Psychotherapy: Interventions for Trauma and Attachment (Norton Series on Interpersonal Neurobiology)*. New York, NY: WW Norton & Company.

Osypiuk, K., Thompson, E., and Wayne, P. M. (2018). Can Tai Chi and Qigong postures shape our mood? Toward an embodied cognition framework for mind-body research. *Front. Human Neurosci.* 12:174. doi: 10.3389/fnhum.2018.00174

Pizarro, J. J., Basabe, N., Amutio, A., Telletxea, S., Harizmendi, M., and Van Gordon, W. (2020). The mediating role of shared flow and perceived emotional synchrony on compassion for others in a mindful-dancing program. *Mindfulness* 11, 125–139. doi: 10.1007/s12671-019-01200-z

Porges, S. W. (2007). The polyvagal perspective. *Biol. Psychol.* 74, 116–143. doi: 10.1016/j.biopsycho.2006.06.009

Porges, S. W. (2011). *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-Regulation (Norton Series on Interpersonal Neurobiology).* New York, NY: WW Norton & Company.

Porges, S. W. (2017). "Vagal pathways: portals to compassion," in *The Oxford Handbook of Compassion Science*, ed E.M. Seppala (New York: NY, Oxford University Press), 189–204.

Price, T. F., Peterson, C. K., and Harmon-Jones, E. (2012). The emotive neuroscience of embodiment. *Motivat. Emotion* 36, 27–37. doi: 10.1007/s11031-011-9258-1

Ramos, C. C., de França, E., Nobre, T. L., Santana, J. O., Madureira, D., Zocoler, C. A. S., et al. (2017). Qi Gong and heart rate variability: a systematic review. *J. Biosci. Med.* 5, 120–127. doi: 10.4236/jbm.2017.53013

Rassovsky, Y., Harwood, A., Zagoory-Sharon, O., and Feldman, R. (2019). Martial arts increase oxytocin production. *Sci. Rep.* 9:12890. doi: 10.1038/s41598-019-49620-0

Rawcliffe, S. (2003). *Simply Wing Chun Kung Fu*. Ramsbury: The Crowood Press Ltd.

Safran, J. D., Muran, J. C., Samstag, L. W., and Stevens, C. (2002). "Repairing alliance ruptures," in *Psychotherapy Relationships That Work: Therapist Contributions and Responsiveness to Patients,* ed J.C. Norcross (New York, NY: Oxford University Press), 235–254.

Sánchez-López, J., Fernández, T., Silva-Pereyra, J., and Mesa, J. A. M. (2013). Differences between judo, taekwondo and kung-fu athletes in sustained attention and impulse control. *Psychology* 4, 607–612. doi: 10.4236/psych.2013.47086

Sánchez-Lopez, J., Silva-Pereyra, J., and Fernández, T. (2016). Sustained attention in skilled and novice martial arts athletes: a study of event-related potentials and current sources. *PeerJ* 4:e1614. doi: 10.7717/peerj.1614

Sovereign, G., and Walker, B. R. (2020). Mind, body and wellbeing: reinforcement sensitivity theory and self-cultivation systems as wellbeing influencers. *J. Happiness Studies*, 1–20. doi: 10.1007/s10902-019-00216-5

Staller, M. S., Zaiser, B., Körner, S., and Cole, J. C. (2017). Threat-related attentional biases in police officers and martial artists: investigating potential differences using the E-Stroop and dot probe task. *Sage Open* 7:2158244017712776. doi: 10.1177/2158244017712776

Stellar, J. E., and Keltner, D. (2017). "Compassion in the autonomic nervous system: the role of the vagus nerve," in *Compassion: Concepts, Research and Applications*, ed P. Gilbert (London: Routledge), 120–134.

Sullivan, M. B., Erb, M., Schmalzl, L., Moonaz, S., Noggle Taylor, J., and Porges, S. W. (2018). Yoga therapy and polyvagal theory: the convergence of traditional wisdom and contemporary neuroscience for self-regulation and resilience. *Front. Human Neurosci.* 12:67. doi: 10.3389/fnhum.2018.00067

Twemlow, S. W. (2001a). Training psychotherapists in attributes of "mind" from Zen and psychoanalytic perspectives, part I: Core principles, emptiness, impermanence, and paradox. *Am. J. Psychother.* 55, 1–21. doi: 10.1176/appi.psychotherapy.2001.55.1.1

Twemlow, S. W. (2001b). Training psychotherapists in attributes of "mind" from Zen and psychoanalytic perspectives, part II: attention, here and now, nonattachment, and compassion. *Am. J. Psychothe.* 55, 22–39. doi: 10.1176/appi.psychotherapy.2001.55.1.22

Twemlow, S. W., Sacco, F. C., and Fonagy, P. (2008). Embodying the mind: Movement as a container for destructive aggression. *Am. J. Psychother.* 62, 1–33. doi: 10.1176/appi.psychotherapy.2008.62.1.1

Ueshiba, M. (2007). *The Art of Peace (Translated and Edited by John Stevens)*. Boston: Shambhala.

Valdesolo, P., and DeSteno, D. (2011). Synchrony and the social tuning of compassion. *Emotion* 11, 262–266. doi: 10.1037/a0021302

Van der Kolk, B. A. (2015). *The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma*. Penguin Books.

Vargas, A. G. (2019). *Psychological Effects of Training in Martial Arts After Interpersonal Trauma*. (Doctoral dissertation): Walden University.

Walther, A., Lacker, T. J., and Ehlert, U. (2018). Everybody was Kung-Fu fighting—The beneficial effects of Tai Chi Qigong and self-defense Kung-Fu training on psychological and endocrine health in middle aged and older men. *Complement. Therap. Med.* 36, 68–72. doi: 10.1016/j.ctim.2017.11.021

Webb, C. E., Coleman, P. T., Rossignac-Milon, M., Tomasulo, S. J., and Higgins, E. T. (2017). Moving on or digging deeper: Regulatory mode and interpersonal conflict resolution. *J. Personal. Soc. Psychol.* 112, 621–641. doi: 10.1037/pspp0000131

Westbrook, A., and Ratti, O. (1970). *Aikido and the Dynamic Sphere: An Illustrated Introduction*. North Clarendon, VT: Tuttle Publishing.

Wilson, W. S., and Takuan, S. (2012). *The Unfettered Mind: Writings From a Zen Master to a Master Swordsman.* Boston: Shambhala Publications.

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REVIEW
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Ways of Knowing Compassion: How Do We Come to Know, Understand, and Measure Compassion When We See It?

Jennifer S. Mascaro[1], Marianne P. Florian[2], Marcia J. Ash[3], Patricia K. Palmer[4], Tyralynn Frazier[5], Paul Condon[6] and Charles Raison[7]*

[1] Department of Family and Preventive Medicine, Emory University School of Medicine, Atlanta, GA, United States, [2] Graduate Division of Religion, Emory University, Atlanta, GA, United States, [3] Department of Behavioral, Social, and Health Education Sciences, Rollins School of Public Health, Emory University, Atlanta, GA, United States, [4] Department of Spiritual Health, Woodruff Health Sciences Center, Emory University, Atlanta, GA, United States, [5] Center for Contemplative Science and Compassion-Based Ethics, Emory University, Atlanta, GA, United States, [6] Department of Psychology, Southern Oregon University, Ashland, OR, United States, [7] School of Human Ecology, University of Wisconsin–Madison, Madison, WI, United States

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James Kirby, The University of Queensland, Australia

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***Correspondence:**
Jennifer S. Mascaro
jmascar@emory.edu

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Over the last decade, empirical research on compassion has burgeoned in the biomedical, clinical, translational, and foundational sciences. Increasingly sophisticated understandings and measures of compassion continue to emerge from the abundance of multidisciplinary and cross-disciplinary studies. Naturally, the diversity of research methods and theoretical frameworks employed presents a significant challenge to consensus and synthesis of this knowledge. To bring the empirical findings of separate and sometimes siloed disciplines into conversation with one another requires an examination of their disparate assumptions about what compassion is and how it can be known. Here, we present an integrated theoretical review of methodologies used in the empirical study of compassion. Our goal is to highlight the distinguishing features of each of these ways of knowing compassion, as well as the strengths and limitations of applying them to specific research questions. We hope this will provide useful tools for selecting methods that are tailored to explicit objectives (methods matching), taking advantage of methodological complementarity across disciplines (methods mixing), and incorporating the empirical study of compassion into fields in which it may be missing.

Keywords: compassion, empathy, altruism, methods, phenomenology, compassion meditation

INTRODUCTION

The last decade has seen a substantial increase in the empirical study of compassion. Programs of research investigate the phylogenetic continuity and evolutionary history of compassion (Goetz et al., 2010; Preston and Hofelich, 2012; Gilbert and Mascaro, 2017; Marsh, 2019), the physiological systems supporting compassion (Gilbert, 2014a; Kemper et al., 2015; Wang et al., 2019), and the impact of compassion on psychological and physical health (Galante et al., 2014; Neff et al., 2016). Along with this more foundational research, applied and translational studies examine the role and

optimal manifestation of compassion in healthcare and educational settings, and test the efficacy of interventions and training programs aimed at expanding compassion toward self and others in a variety of contexts (McCaffrey and McConnell, 2015; Bibeau et al., 2016; Sinclair et al., 2016b; van Berkhout and Malouff, 2016; Luberto et al., 2018). Each of these domains of research has advanced in large part due to the development of measurement tools for identifying, describing, and quantifying compassion, as well as for empirically evaluating theoretical models of compassion. While this abundance of multidisciplinary and cross-disciplinary research has advanced what is known about compassion, the diversity of methods, assumptions, and theoretical frameworks makes it challenging to draw conclusions across studies and/or to incorporate compassion research into new fields, especially fields in which *compassion* may already be partially or implicitly operationalized.

While not without contention, large bodies of literature have generally cohered around a definition of *compassion* as a benevolent emotional response toward another who is suffering, coupled with the motivation to alleviate their suffering and promote their well-being (Dalai Lama, 2002; Goetz et al., 2010; Halifax, 2012; Klimecki et al., 2013; Post et al., 2014; Singer and Klimecki, 2014; Strauss et al., 2016; Sinclair et al., 2017c; Gilbert, 2019). From this starting point, we will survey research conducted on compassion and related constructs that share or resemble some or all of the basic criteria that characterize compassion. These are (1) an awareness of another's suffering, (2) a benevolent emotional or affective response, and (3) the motivation to help or act (Strauss et al., 2016).

This theoretical review of empirical methods used to study compassion has the broad aim of promoting communication, collaboration, and convergence across disciplines. Our goal as a team of interdisciplinary scholars trained in foundational and applied areas of public health (K.P., M.A., and T.F.), social psychology (P.C.), biological anthropology (J.M. and T.F.), psychiatry (C.R.), and religious studies (M.F.) is twofold. First, we provide an integrated and interdisciplinary theoretical review of methods currently used in the empirical study of compassion. Second, we examine the strengths and limitations of applying them to specific research questions. We hope this will provide useful tools for selecting methods that are tailored to explicit objectives (*methods matching*), taking advantage of methodological complementarity across disciplines (*methods mixing*), and incorporating the empirical study of compassion into fields in which it may be absent or non-operationalized (*methods missing*) (for an overview of key terminology used in this article, see glossary in **Table 1**).

Within the scope of this review, we have deliberately set aside a number of worthwhile goals. First, we do not intend to critique alternate definitions or ways of operationalizing compassion. Constructive critiques are ongoing to refine and validate the construct of compassion, but this is not our project (Singer and Klimecki, 2014; Gu et al., 2017). Neither do we intend to privilege any empirical method or set of methods over others. For our purposes here, the suitability of a method is principally driven by research objectives. In addition, while many studies helpfully review and evaluate the impact of compassion (Eisenberg et al., 2010; Perrone-McGovern et al., 2014), these are too numerous and wide-ranging to adequately evaluate here. Moreover, this will not be a systematic or meta-analytic review of any one method. Our goal, instead, is to forge connections between disparate areas of compassion research in order to generate an overview of the current state of available methods for studying compassion. Lastly, we do not seek to prescribe directions for future research. Rather, we will conclude with recommendations for selecting and combining methods to advance understandings of compassion and maximize knowledge transfer across domains.

BACKGROUND

Research indicates that compassion has immediate health benefits for both the giver and receiver (Fogarty et al., 1999; Steffen and Masters, 2005; Galante et al., 2014), positively impacts relationship outcomes (Neff and Beretvas, 2013; Perrone-McGovern et al., 2014), and improves resilience in the context of adversity threat (Cosley et al., 2010; Neff and McGehee, 2010; Lim and DeSteno, 2016; Presnell, 2018). In medical care, compassion is linked with improved patient satisfaction, compliance, and clinical outcomes (Patel et al., 2019). In the workplace, compassion is associated with improved employee resilience and retention, as well as overall organizational health (Kanov et al., 2004; Spreitzer et al., 2013). In educational settings, compassion is associated with emotional well-being among children and adolescents (Neff and Pittman, 2010; Roeser and Eccles, 2015), and cultivating compassion during adolescence may lay the foundation for well-being during this sensitive period of social development and beyond (Játiva and Cerezo, 2014; Roeser and Pinela, 2014; Bach and Guse, 2015). Compassion also stands at the center of some third-wave psychotherapeutic interventions, which emphasize the relationship between thoughts and emotions (Gilbert, 2010, 2014b; Hayes and Hofmann, 2017). For example, compassion-focused therapy is an evolutionarily and neurophysiologically informed approach to psychotherapy that aims to improve mental health by understanding and promoting a compassionate motivational system (Gilbert, 2014b).

In many contexts, compassion is thought to be trainable either as a skill in itself or as an emergent gestalt of underlying skills that can be cultivated (Kanov et al., 2004; Klimecki et al., 2014). Motivated by this assumption, evidence-based training programs have proliferated for cultivating compassion for social and emotional health (Pace et al., 2009; Germer and Neff, 2013; Jazaieri et al., 2013; Roeser et al., 2018; Schuling et al., 2018; Borden, 2019; Condon and Makransky, 2020). Compassion has also emerged as a core value and "active ingredient" of diverse helping professions and professional environments, especially in medical care. At least 25 interventions have been developed to cultivate compassionate nursing care (McCaffrey and McConnell, 2015; Blomberg et al., 2016), and compassion training has become a more explicit goal of medical training and practice and is a key component of the American Medical Association's first principle of medical ethics (Shih et al., 2013; American Medical Association, 2016; Rao and Kemper, 2017). In addition, in 2013, the Centers

TABLE 1 | A glossary of terms and their associated definitions used in this paper.

Compassion	– A benevolent emotional response toward another who is suffering, coupled with the motivation to alleviate their suffering and promote their well-being.
Consilience	– The convergence of evidence from independent sources and methods of measurement to support one coherent conclusion; connecting concepts, models, and principles from different disciplines to promote the formation of a unified and comprehensive theory.
Convergence	– When two separate processes produce similar results; unifying distinct technologies or bodies of knowledge and practice. In many ways the study of compassion is convergent because many separate disciplines have developed theories and methods for studying compassion or similar constructs, however, we also advocate deliberate effort to promote the unification of these somewhat siloed lines of inquiry.
Empirical perspective	– A basic structure inherent in all ways of knowing, which refers to the position[ality] or point-of-view of the informant reporting on compassionate phenomena, relative to the person or entity that is generating, experiencing, and/or enacting compassion.
First-person perspective	– A subjective or self-referential perspective, which illuminates a perceiver's feeling/perception of their own compassion as it manifests to the self.
Second-person perspective	– An interpersonal perspective regarding indicators of another person's compassion as it is directed toward the perceiver during an interaction.
Third-person perspective	– An objectifying perspective that sheds light on compassion data that as perceived by persons who are not involved in the compassionate experience or encounter being assessed.
Frame of reference	– An underlying, often shared set of assumptions, or conceptual relations that (at least partially) governs how empirical phenomena are perceived, categorized, and evaluated or how forms of evidence impact reasoned argument. Theoretical frames of reference may be context-specific and are subject to revision to increase their accuracy or broaden their applicability.
Heuristic features	– Key features that assist in the process of sorting various ways of knowing compassion into meaningful groups that can then be evaluated, combined, and/or applied to answer research questions.
Method	– A way of pursuing knowledge; an orderly, systematic procedure for obtaining data supporting or contradicting a claim.
Methods-mapping	– Formalizing correspondences between theoretical and methodological concepts in one research domain with one or more related concepts in another domain; this work proceeds on the presumption that shared or related meanings connect the concepts being mapped.
Methods-matching	– Selecting a method that allows the researcher to draw the most direct inferences based on the correspondence between (1) the data a method produces and (2) the specific question being addressed.
Methods-missing	– Addressing a compassion research question without using methods intended to assess compassion and/or without operationalizing the outcome as compassion.
Methods-mixing	– Coordinating different research methods by combining or juxtaposing them, in order to respond to research questions more completely, directly, and precisely.
Ways of knowing compassion	– Empirical methods and corresponding evidence that indicate compassionate affect and motivation may be present when an individual or group perceives suffering.

for Medicare and Medicaid Services implemented a value-based purchasing system that tied hospital reimbursement to patient satisfaction surveys, making patient-rated compassion critical to healthcare systems' bottom line (Centers for Medicare and Medicaid Services (CMS), HHS, 2011).

While this breadth and depth of research on compassion and compassion training has arguably advanced scientific understanding and improved clinical, educational, and professional outcomes, there are several inherent issues complicating the study of compassion. First, because compassion includes both an affective and motivational component, there is a lack of consensus about how to compare and draw inferences from studies employing disparate units of measurement or levels of analysis. For example, recurring questions arise about relationships between behavioral and physiological observations on the one hand, and indicators of compassionate affect and motivation on the other: Can researchers intuit a compassionate state in the absence of physiological or behavioral data? Can researchers intuit a compassionate state from physiology or behavior *alone*?

Second, prominent models of compassion implicitly or explicitly assume that compassion emerges from discrete competencies, which can, in turn, be differentially facilitated or inhibited (Halifax, 2012; Lown, 2016; Gu et al., 2017). One influential evolutionary account theorizes that compassion is a suite of universal physiological and experiential responses that emerges because of situation-dependent cognitive appraisals. Besides the basic perception that someone is indeed suffering, compassionate responding is facilitated by the following appraisals: (1) the suffering individual is both relevant and of value to oneself; (2) the sufferer does not deserve their suffering; and (3) one is capable of helping (Goetz et al., 2010). The influence of this and similar models has propelled research focused on emotions and skills that may be necessary but incomplete constituents of compassion. Understanding complex interactions among these components requires empirical strategies that can differentiate between them and explore their dynamics.

Third, compassionate responses themselves are context-, experience-, and state-dependent, requiring empirical methods sensitive to factors ranging from bodily states to social and environmental conditions. A large body of theoretical and experimental research indicates that compassion is influenced by the observer's perceptions of the in-group/out-group status of the suffering individual(s) (Cikara et al., 2011; Preston and Ritter, 2013). Such perceptions can depend on psychological resources

(Dyrbye et al., 2019), environment (Kim and Lopez de Leon, 2019), psychological priming (Mikulincer and Shaver, 2001), and training or intervention (Kang et al., 2014). Understanding this broader picture of compassion, including psychological states and traits, relationships, environment, and personal history, is crucial for designing appropriate compassion research and for interpreting and contextualizing any findings.

Fourth, multiple related constructs, including but not limited to altruism, empathy, empathic concern, sympathy, prosociality, and care, overlap with broad understandings of compassion and should be considered part of the body of empirical knowledge about it. Significant obstacles to comparing data on compassion-related constructs arise because of well-documented shifts in how they are operationalized and defined (Batson, 2009; Marsh, 2019). Yet, their conceptual relatedness suggests that mapping—that is, formalizing and conventionalizing how terms in one research domain correspond with one or more terms in another field—could reveal that transdisciplinary findings converge in significant ways. Related, disparate fields of inquiry have distinct sets of methodologies, assumptions, and theoretical frameworks, which we will explore below. All of these inherent challenges invite consideration from those designing, interpreting, and evaluating research on compassion in any discipline.

We understand *ways of knowing compassion* to be any empirical phenomena that signal to an investigator that compassionate affect, motivation, and action are present in an individual or group. This includes signs that a necessary component of or condition for compassion may be present. Such an empirical approach to understanding compassion requires a consilient effort to alternate between vantages that focus on measurable physical, biological, and behavioral changes, and on more holistic vantages that focus on human-level, emergent properties of experience and interaction (Slingerland and Collard (eds), 2012a). Each way of knowing compassion that we describe evinces strengths and limitations. Some are more deeply shaped by the propensities of humans as social beings, including tendencies toward explanatory confabulation, concern for socially desirable self-representation, expectancy bias, memory bias, errors in affective forecasting, and plain old *not knowing*. Through understanding these, we can identify complementarity among different frameworks and methodologies and combine approaches and findings strategically to strengthen evidence and claims.

HEURISTICS

Among the ways of identifying and quantifying compassion, four clusters of features serve as guideposts or heuristics: (1) empirical perspective, (2) state versus trait, (3) quantitative versus qualitative, and (4) ecological validity. **Figure 1** organizes the major methodologies reviewed according to these guiding heuristics.

Empirical Perspective

To examine diverse methods for studying compassion, we will employ a heuristic feature related to the *empirical perspective* or *point of view* reflected in their evidence. That is, if there is a compassionate experience in question, it may be examined from a first-, second-, or third-person perspective. First-person data typically focus on the subjective experience and self-reported assessment of one's own compassion, collected in scale questionnaires, interviews, and focus groups. Studies that rely at least partially on first-person perspectives collect participants' reports on subjective experiences of compassionate feelings and motivations in response to others' suffering. Methodologies rely on data emerging from first-person perspectives, when researchers collect, analyze, and interpret participants' observations as primary evidence of compassion, or when study participants interpret their own experience of compassion as in phenomenological accounts. Second-person data often represent the perspective of the receiver or *in vivo* witness of compassion. Studies that depend on *second-person* evidence assess when and how participants recognize and experience compassion in others, be they companions, peers, caregivers, supervisors, or entire organizations. A third-person perspective, or observational perspective, applies when the experimenter or observer determines the presence, absence, and measurement of compassion, and interprets evidence such as physiological and behavioral observations. In this case, the observer neither experiences nor receives the compassion in question. These three perspectives can be mapped onto the *emic* and *etic* distinctions (Pike, 1967). Here, third-person perspectives emerge from an etic point of view: observations made by persons outside and relatively objective to the compassionate feeling, action, or interaction under study. First- and second-person perspectives arise from the emic point of view, provided by those who have an insider's perspective on the compassion (or lack thereof). Of note, we use this heuristic differently than qualitative researchers, who often refer to the interviewee and interviewer using a first- and second-person distinction (Stelter, 2010).

Each empirical method or way of knowing compassion yields evidence from one or more of these perspectives and can be strategically selected to address the researchers' questions, frameworks, or models of compassion. In other words, those interested in the internal thoughts or emotions surrounding compassion may be correct in prioritizing a first-person perspective. On the other hand, researchers interested in the behavioral aspect of compassion may be better served by informant-reporting and/or third-person measures (discussed below). Complementary first- and second-person measures may together create a more nuanced, accurate understanding of the relationship between internal states and external behavior. Moreover, combining self-report with second- or third-person reporting promises to generate new questions and hypotheses to explain conflicting evidence. In the main sections of this review to follow, we found *empirical perspective* to be a helpful superordinate criterion for organizing and presenting the various ways of knowing compassion.

State Versus Trait

Another heuristic is the familiar psychological distinction between dispositional or trait-level versus momentary or state-level measurement. Many studies employ measures that frame

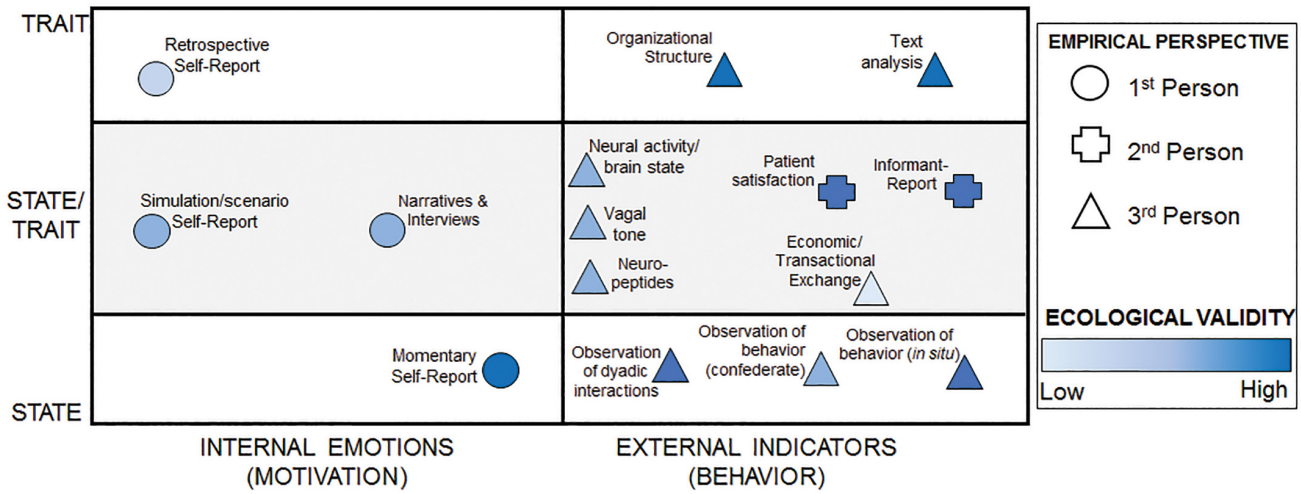


FIGURE 1 | Mapping the ways of knowing compassion. This figure maps the major methodologies reviewed here into theoretical spaces. The shape of the methodology denotes frame of reference. Color represents the extent to which that method has ecological validity. Positioning on the *x*-axis corresponds to the extent to which a method measures internal versus external aspects of compassion. Positioning on the *y*-axis corresponds to whether the methodology is generally used to measure state or trait compassion or is used to measure both. Methods on the line between state and trait can be used to measure both, depending on the specifics of the methodology.

compassion as a fluctuating internal *state*, and self-report is used to query the extent to which a respondent endorses feeling compassion at that point in time. In addition to self-report measures of compassionate states, researchers also detect compassion by observing behavior—including speech—that is best explained by the occurrence of a compassionate state, such as responding to another person's suffering with demonstrable care or help (or expressing the desire to respond). These approaches investigate the relationship between internal processes and/or external circumstances and varying intensities of compassionate affect, motivation, and observable behavior.

Other research methods seek to understand compassion as an enduring individual or psychological *trait*. Traits, unlike states, are relatively stable aspects of a person's way of thinking, feeling, and acting across time and in a broad range of circumstances. Because fluctuating conditions or contexts tend not to dislodge an individual's traits, their origins or causes are, in theory, traceable to more stable and general underlying processes. This is not to say that traits are immutable or hardwired. Indeed, contemplative practices and other ways of priming and cultivating compassion usually presume that repeatedly engendering compassionate states will gradually strengthen the corresponding trait (McCrae and Costa, 1995; Baumert et al., 2017; Goleman and Davidson, 2017). Similarly, in the context of social and emotional education, traits are considered factors that have some level of mutability over child development (Knafo et al., 2008; Bengtsson et al., 2016). This view of traits is informed by Bandura's (1976, 1999) impact on the field of behavioral learning, which posits that traits can be capabilities that are learned. From this perspective, compassion, like other social and emotional capabilities, can be cultivated over the course of child development and with training, an assumption that guides many social and emotional development programs. Some methods reviewed below aim to illuminate dispositional or trait compassion or the extent to which individuals tend to have compassion throughout their life.

Quantitative Versus Qualitative

A third heuristic category that distinguishes ways of knowing compassion is the distinction between *quantitative* and *qualitative* methods. Quantitative data are numeric values that correspond directly or indirectly to measurements and/or observations of compassionate phenomena. Qualitative data, by contrast, describe compassionate phenomena in language or images to be interpreted using non-mathematical methods. While specific features of qualitative data, such as directions of change, intensities, frequencies, etc., can be systematically quantified, doing so rounds out potentially explanatory features and context that do not translate into numeric values (Gavin, 2008; Ruane, 2016). Merging two of the heuristics that we will use here, all three empirical (first-, second-, and third-person) perspectives can be queried using quantitative and qualitative methods.

Ecological Validity

Lastly, ways of knowing compassion generate data that vary in *ecological validity*, meaning that they cannot be uniformly transferred or generalized from controlled settings to real-life contexts outside the research setting. Theoretically, the more closely a study's methods mirror everyday life, the more ecologically valid their evidence will be. Usually, studies with stricter control of variables sacrifice this advantage in favor of precision, replicability, or other strengths. Ecological validity is an especially weighty consideration in light of the social and environmental situatedness of emotions and the

centrality of emotion, in the form of affect and motivation, to our understanding of compassion and how it manifests (Griffiths and Scarantino, 2009).

WAYS OF KNOWING COMPASSION

First-Person Perspective

In this section, we begin our review of ways of knowing compassion with research methods for collecting and analyzing first-person empirical evidence, including quantitative and qualitative approaches to understanding compassionate states and traits.

Quantitative

Self-report measures that use first-person data to quantify compassion are the most common methodological tools researchers use, particularly in the health and psychological sciences (Sinclair et al., 2017c), and are by far the most common outcome measures used in randomized controlled trials to assess the impacts of interventions for increasing compassion and prosociality (Luberto et al., 2018). The majority of self-report measures assess compassion as a dispositional or trait-like quality. One example, the Compassionate Love Scale (Sprecher and Fehr, 2005), rates 21 items reflecting two subscales: compassion toward significant others (example item: "If a person close to me needs help, I would do almost anything I could to help him or her") and compassion toward strangers or humanity more widely (example item: "When I see people I do not know feeling sad, I feel a need to reach out to them").

Self-report measures of the *absence* or *inhibition* of compassion are arguably more developed within the literature than measures of compassion itself. These compassion-negative constructs include empathic distress,[1] burnout, compassion fatigue, and secondary traumatic stress. They indicate conditions in which a potential caregiver fails to experience or exhibit compassion. The implicit and sometimes explicit explanation is that the caregiver's reserves of compassion are depleted and/or displaced by feelings of frustration, emotional isolation, exhaustion, and a decreased sense of accomplishment and meaning (Boyle, 2015). Compassion fatigue has been studied among caregivers and providers who work in stressful environments and who are frequently exposed to suffering and death, including physicians, nurses, first responders, teachers in at-risk school districts, and spiritual caregivers (Roberts et al., 2003; Yoder, 2010; Hotchkiss and Lesher, 2018; Buelher, 2019). In healthcare, the Professional Quality of Life Scale is frequently used to examine the relationship between compassion fatigue, burnout, and secondary traumatic stress among providers (Alkema et al., 2008; Smart et al., 2014; Beaumont et al., 2016). While the construct of compassion fatigue receives frequent attention, critical reviews of this area highlight the need for further research that explicitly addresses the relationship between failures of compassion and compassion itself (Fernando, and Consedine, 2014; Ledoux, 2015; Sinclair et al., 2017b). Measurement will be integral toward this end.

Whether quantifying compassion or its absence, self-report measures have various limitations (Strauss et al., 2016). Many commonly used scale questionnaires are retrospective in nature, meaning they require participants to summarize their experience over an entire day, week, month, or a lifetime (e.g., "How much stress have you felt over the past 2 weeks?"; Conner and Barrett, 2012). These retrospective measures tend to reflect participants' beliefs about themselves rather than their actual behavior, lived experience, or physiological correlates (Mauss and Robinson, 2009). Relatedly, in simulation or hypothetical scenario-based questionnaires, participants may be asked to recall or imagine a helping scenario, rate their sense of compassion, and speculate about whether they would help. Responses in this paradigm are most likely driven by generalizations about the self (e.g., "I am a compassionate person") and about the value of specific emotions and helping behavior (e.g., "Compassion leads to helping, which feels good."). People often underestimate or overestimate how they might feel in a hypothetical circumstance, which is known as a limitation in *affective forecasting* (Wilson and Gilbert, 2003). For instance, physicians' reports of their probable experience of compassion in response to hypothetical vignettes might not resemble their actual interactions with patients. Further complicating matters, the self-reported experience of an emotion does not always match prototypical conceptions of emotional experiences, for example, when fear feels pleasant during a scary movie. This mismatch has been shown to be true of compassion in particular, with study participants reporting that compassion prototypically feels uniformly pleasant yet describing both pleasant and unpleasant experiences of compassion (Condon and Barrett, 2013).

Because of limitations of retrospective self-reports, many researchers rely on momentary measures, often classified as *ecological momentary assessment* or *experience sampling* techniques. These techniques require participants to carry a device, such as a smartphone, and respond to alerts or prompts in the moment throughout their day (e.g., "How much compassion do you feel toward your patients?"). Studies have shown that such measures are more closely associated with real-time physiology and behavior patterns than retrospective self-report measures (Conner and Barrett, 2012). This technique has not been widely applied to the study of compassion; however, one experience sampling study demonstrated that compassion meditation training resulted in reduced momentary reports of mind-wandering and corresponding increases in self-reported caring behaviors (Jazaieri et al., 2016). While findings from momentary assessment have high ecological, convergent, and predictive validity, they are time- and resource-intensive. Moreover, although momentary reports overcome some of the limitations of retrospective reports, they remain subject to social desirability and participant expectations, although likely to a lesser degree.

[1]The Interpersonal Reactivity Index's Empathic concern subscale is well-established and often equated with compassion [Davis, 1983. Measuring Individual-Differences in Empathy—Evidence for a Multidimensional Approach. *Journal of Personality and Social Psychology*, *44*(1), 113–126. <Go to ISI>://A1983PY32000010]. In fact, it includes items related to compassion, warmth, sympathy. The IRI is probably the most frequently used self-report measure in social psychology and closely related fields. It also has an Empathic Distress subscale.

Qualitative

Qualitative, first-person methods based on narratives, interviews, interactions, or focus groups examine the richer contours of compassion. These approaches allow participants to contextualize their responses, appraise significance, and inform researchers about unexpected factors that arise *in situ*. They capture first-person experiences and interpretations, although not exclusively. To analyze the complexity of narratives, dialog, and descriptions requires rigorous planning, often relying on computer-assisted qualitative data analysis software (Lewins and Silver, 2007; Saldaña, 2011, 2016).

Qualitative descriptive (QD) research uses a variety of forms of data, including first-person accounts, to craft a detailed description of a situation or process and suggest further avenues of inquiry (Sandelowski, 2000; Leeman et al., 2007; Kim et al., 2017). This method has been used to investigate experiences and causes of compassion fatigue among nurses (Berg et al., 2016; Fukumori et al., 2018). Often, QD research is an initial step before more controlled and fine-grained experimentation and analysis (Neergaard et al., 2009).

Grounded theory is a more methodologically formal procedure for analyzing qualitative data, which is used in the human, social, and health sciences. It involves time-consuming recursive sifting, categorizing (i.e., coding), and interpretation to discover recurring themes and patterns in participants' responses and interactions (Bryant and Charmaz, 2007). To understand compassion, grounded theorists examine firsthand accounts of participants' perceptions and/or experiences by reviewing and sorting transcribed interviews and interactions to identify themes or patterns that recur throughout a data set and code passages of text exemplifying those themes. They then interpret the prevalence and significance of recurring themes and features (for examples, see Crowther et al., 2013; McPherson et al., 2016; Sinclair et al., 2017a; Tierney et al., 2017; Jain et al., 2019). Many grounded theory accounts focus exclusively on respondents' conceptual understandings of compassion and may not assess any specific occurrence of compassion. Such projects help constitute a way of knowing how compassion is understood by a person or group. In general, grounded theory is best suited to exploratory projects that supplement or pave the way for explanatory studies (Bryant and Charmaz, 2010).

Other qualitative research in the human and social sciences relies on a phenomenological framework for collecting and analyzing first-person data (Dowling, 2007). This approach takes inspiration from the philosophical phenomenological tradition initiated by Edmund Husserl and developed by subsequent phenomenologists interested in developing a rigorous "descriptive psychology" of conscious phenomena such as existence, perception, care, and empathy (Husserl, 1989; Stein, 1989; Fisette, 2018; Zahavi, 2018). From its inception, phenomenology arguably launched the first-person empirical study of compassion-related experiences. Phenomenological method involves systematically altering one's attitude toward one's own perceptions and cognitions, which permits a more rigorous and systematic study of subjective states. By investigating how different phenomena appear to conscious awareness, phenomenologists seek to discover an underlying structure governing consciousness itself.

However, philosophically trained phenomenological researchers are quick to note that the majority of phenomenology-inspired scientific studies depart significantly from foundational methods and questions and are conspicuously unconcerned with investigating the structure of consciousness (Giorgi, 2010; Smith, 2016). Phenomenology-inspired empirical studies of compassion address questions ranging from how participants identify subjective experiences of feeling, receiving, and training in compassion (Pauley and McPherson, 2010), to what compassion "is like for them" to experience, receive, and cultivate (Lawrence and Lee, 2014; Jarvis, 2017). Other studies address similar questions regarding compassion inhibition, fatigue, etc. (Waite et al., 2015; Jack, 2017).

All qualitative first-person evidence has the potential to reveal insights into how compassion is conceived of and experienced firsthand and how conscious, subjective understandings, and attitudes lead to compassionate behavior. For example, qualitative approaches have documented the uniquely rewarding and replenishing feelings that can be associated with compassion, even in the face of suffering, a documented experience of highly trained contemplative practitioners (Dreyfus, 2001). First-person perspectives also reflect human sensitivities to social desirability, usually framed as an evaluative bias, which is the tendency to present oneself in a positive light and potentially underreport socially undesirable thoughts or behaviors. The presence of an interviewer often increases social desirability biases, an effect that can be moderated by the gender and characteristics of the respondent (Krumpal, 2013). Qualitative researchers have given rigorous thought to minimizing social desirability biased responding, especially in interviews about highly evaluative topics (Fisher, 1993; Johnson and Van de Vijver, 2003; Bergen and Labonté, 2020). While subjective, qualitative accounts of compassion draw connections between experiences, interpretations, and acts of compassion, findings are often not intended to be generalizable or transferable to different groups and settings. Still, it is clear that first-person data can reveal otherwise unknowable information about the mental contents of the compassionate (or non-compassionate) individual being studied. In this way, first-person data can also be used to complement second- and third-person empirical perspectives.

Second-Person Perspective

The limitations inherent to first-person reports of such a highly evaluative construct as compassion highlight the importance of verification with other empirical perspectives. Methods examining second-person evidence of compassion, also referred to as *informant reporting*, is one approach for doing so. Examples of informant reports of compassion include teacher reporting on children's compassion, often using a psychometric instrument such as the Prosocial Behavior subscale of the Teacher Social Competence Scale (Harter, 1982). Other informant reports measure compassionate acts within an intimate relationship,

for example, Reis et al. (2014)' 10-item dyadic inventory of compassionate acts.

Informant reporting by medical patients is a common method for assessing healthcare provider compassion (Sinclair et al., 2017c). Scale questionnaires measure general state-level compassion conveyed in a particular clinical encounter. Examples of such tools include the Physician Compassion Questionnaire (Fogarty et al., 1999), the Compassionate Care Assessment Tool (Burnell and Agan, 2013), the Schwartz Center Compassionate Care Scale (Lown et al., 2015), and a new 5-item clinician compassion measure (Roberts et al., 2019). Healthcare provider compassion is also measured by informant reports from colleagues in both allopathic and osteopathic medicine (Evans et al., 2004), as well as clinical psychology (Kaslow et al., 2009).

Some widely used measures of patient satisfaction in healthcare assess general aspects of care that are understood to tangentially reflect patient experiences of compassionate care. The Press Ganey patient satisfaction survey includes items assessing the degree to which hospital staff "addressed your spiritual needs" and "addressed your emotional needs." One study of more than 1.7 million patient responses observed that ratings of how well staff addressed patients' spiritual and emotional needs correlated with three Press Ganey performance areas: (1) staff response to concerns or complaints, (2) staff effort to include patients in treatment decisions, and (3) staff sensitivity to the inconvenience that health problems and hospitalization can cause (Clark et al., 2003). The Consumer Assessment of Healthcare Providers and Systems, a patient satisfaction measure widely used in Medicare and Medicaid value-based purchasing, has versions for hospital (H-CAHPS) and outpatient (CG-CAHPS) contexts (Centers for Medicare and Medicaid Services (CMS), HHS, 2011; Dyer et al., 2012). One cross-sectional study of 269 acute care hospitals in the United States found that hospitals that reward provider compassion and provide compassionate support for their employees have higher H-CAHPS ratings and are more likely to be recommended by patients (McClelland and Vogus, 2014). The H-CAHPS survey has also been used to examine compassion in the context of a hospital chaplain consultation by measuring elements of the interaction commonly understood to comprise compassionate care (Marin et al., 2015).

Qualitative research methods are also used to examine compassion from second-person perspectives. Indeed, this method may be a particularly apt alternative or complement to the measurement of overt or external behavior and its impact (Vazire and Mehl, 2008). In-depth interviews allow participants to report on the importance and meaning of receiving compassion, specifics that could not be anticipated in a survey question and that may not translate into quantitative measurement. In their exemplary study, Sinclair et al. (2016a) interviewed 53 palliative care patients and used grounded theory to analyze their experiences of providers' compassion. They also compared these experiences of compassion with patients' experiences of related constructs, such as *empathy* and *sympathy* (Sinclair et al., 2017a). They found that patients viewed overt behaviors such as demonstrative and grandiose expressions of emotion as emblematic of *sympathy* and reported it as off-putting. In contrast, patients saw subtle behaviors, often falling outside of routine care and tailored to individual needs, as authentically compassionate (Sinclair et al., 2017a). The resultant empirical model of compassion is arguably the most comprehensive in clinical medicine. It identifies provider virtues such as authenticity, tolerance, and honesty as essential ingredients of compassion, and it details how these requisites of compassion are carried out in a clinical relational context.

While these strengths may tempt us to conclude that informant reports are inherently more reliable and powerful than self-reports of compassion, it is important to consider the potential sources of explicit and implicit bias when using second-person compassion data, just as with first-person data. Again, our point is not to discourage the use of any research method, but rather to assist in strategic use of multiple research methods to gain a clearer understanding of compassionate phenomena. First, it is likely that informant reports of compassion are skewed by cultural and class differences, as well as racial and gender biases, similar to those shown to impact informant reporting of other non-compassion behaviors and competencies (for example, in student evaluations, Fan et al., 2019). There is, moreover, some evidence to indicate that such biases may influence perceptions of care received from out-group members. For example, one study found that patient–provider social concordance levels (a measure of the patient and provider's match on race, gender, age, and educational status) were related to patient ratings of satisfaction with their provider's care (Thornton et al., 2011). Therefore, rather than ranking the value of any one perspective on compassion, we believe that matching methods and perspectives to the research questions they are best suited to answer is vital, as we will discuss below.

Third-Person Perspective

A broad array of methods and evidence are used when observing compassion from a third-person point of view. In fact, any quantitative and qualitative data can be studied from a third-person standpoint, even when the evidence itself reflects participants' subjective experiences of extending and receiving compassion. The crucial difference lies in whether data are examined for their insights into the subjective perception, experience, or understanding of compassion, or whether data are being marshaled as intersubjective evidence of compassion itself. In this review, we do not intend to overlook the ways that third-person observers' subjective tendencies influence their findings and conclusions. This undoubtedly influences all research on compassion. However, we distinguish empirical perspectives as third-personal by emphasizing how the object of inquiry is specified, while remaining cognizant that there will be overlap and ambiguity in specific cases. Third-person evidence may include researcher's observations of human-, animal-, and group-level behavior and functioning, as well as measurements of physiological changes from which compassion might be inferred, such as brain states, facial expressions, writings, etc. Human-made products—discourse,

design principles, art, laws, archeological, and other artifacts—can also serve as intersubjective evidence of compassion. In the following section, we discuss several forms of third-person evidence from which a state or disposition of compassion may be inferred.

Compassionate Behavior

A great deal of behavioral research on compassion is conducted using social psychology experimental methodologies. Social psychologists generally view compassion as a prosocial state that is responsive to others' suffering and that motivates costly helping behaviors intended to alleviate suffering, potentially at the expense of oneself. An action or state is *prosocial* to the extent that it is conducive to social bonding and acceptance. While prosocial helping is distinct from compassion, it is understood as an outcome of some compassionate motivational state. As such, costly helping behavior is often used to infer that compassion is present. For this reason, observations of helping behaviors have been instrumental in garnering ecological validity for compassion as a psychological construct that can influence human (and perhaps animal) behavior. Batson et al. (1983) pioneered several paradigms for studying costly helping in which participants observe a *confederate*—an actor posing as a study participant—typically facing a difficult situation, such as receiving electric shocks or experiencing distress over a car crash or academic demands. Importantly, these paradigms are constructed such that self-interested factors such as seeking social recognition and avoiding punishment could not explain the participant's decision to engage in the costly helping behavior. Participants who opt to help are therefore thought to be demonstrating a compassionate state (Batson et al., 1991; Batson, 2009; Goetz et al., 2010).

Confederate paradigms that assess prosocial behavior in real-time settings are perhaps the criterion standard for ecologically valid prosociality research—they overcome limitations of self-reports because of memory and affective forecasting biases and provide direct assessment of actions that alleviate others' suffering in situations that reflect daily life. In this way, researchers can measure prosocial behavior when participants themselves are not aware that they are being observed. At the same time, confederate paradigms can be difficult or inefficient to implement, given that they require careful training of confederates and careful debriefing to assess participant suspicion. Additionally, some research scenarios may skew behaviors in a prosocial direction. For example, a participant might demonstrate compassion for someone receiving shocks or struggling with academic work within a confederate paradigm but may not be able to access or extend compassion as readily in a familiar context. Intriguingly, experiments using confederate scenarios have demonstrated the efficacy of mindfulness and compassion training for enhancing prosocial behaviors, even when situational pressures dampen the impulse to help, such as offering one's seat to a stranger who is using crutches, even when others seated nearby are unresponsive and ostensibly less considerate (Condon et al., 2013).

Other research in social psychology has used both naturalistic and simulated settings to demonstrate positive changes in real-world prosocial behavior after various types of meditation training across different contexts. In one study, mindfulness training was associated with participants' increased willingness to interact with an ostracized individual via Cyberball, a computer-based ball-tossing game, an effect that was mediated by self-reported warmth and compassion (Berry et al., 2018). Compassion training was also associated with reduced amygdala reactivity and more sustained visual attention to scenes of suffering in an experiment using an eye-tracking protocol (Weng et al., 2018). In another experiment, compassion training was associated with greater increase in participants' optimism and willingness to write a letter to a convicted murderer (Koopmann-Holm et al., 2019). Behavioral markers of compassion in naturalistic settings, much like confederate-paradigm studies, can require extra time and resources to capture and evaluate, yet they reveal diverse genres of compassion-evincing behaviors across contexts and populations.

As an alternative to confederate and other behavioral paradigms, researchers often use controlled economic exchanges to examine generosity and cooperation in monetary transactions. Various studies have demonstrated that kindness-oriented meditation programs enhance prosocial behavior in the form of economic donations. Loving–kindness meditation has been shown to enhance prosocial helping in computer-based video games (Leiberg et al., 2011) and in online economic transactions (Weng et al., 2013, 2015). Among preschoolers, a mindfulness-based kindness curriculum resulted in increased peer donations of stickers (Flook et al., 2015). Economic paradigms have also been fruitful in neuroimaging studies that link compassion-related neural processes with prosocial behavior (Leiberg et al., 2011; Weng et al., 2015; Ashar et al., 2016). While behavioral economic measures offer a well-controlled environment for research on prosocial behavior and are widely used for studying influences on human cooperation and moral decision-making, they are often conducted via computer-based interfaces and impose artificial constraints on social exchange. This approach lacks ecological validity with respect to real-time face-to-face social interactions. Results likely reflect distinctive psychological dynamics of exchange relationships that may not apply to the social bonds that occur in close communal relationships (Clark and Mils, 1993). It is unclear to what extent economic generosity extends to common real-world situations involving the suffering of another individual that would purportedly elicit compassion (e.g., an interaction with a student who is struggling or a patient who is sick).

An alternative to experimental behavioral paradigms such as the confederate or behavioral economic approaches described above are naturalistic observational methods that increase ecological validity and reduce evaluative biases. One example is the Electronically Activated Recorder (EAR), an audio recorder that intermittently captures ambient sound throughout a person's daily routine without the person being aware of when it is recording, yielding an acoustic log of the person's day (Mehl, 2017). Previous studies have used the EAR to examine fathers' empathic language and compassionate responses to their child's cries (Mascaro et al., 2017). Another study used the EAR to examine correlations between (1) participants' self-reported mindfulness and (2) language and behavioral

indicators associated with mindfulness (Kaplan et al., 2018). The authors found that self-reported mindfulness was not related to prosocial behavior as assessed by the EAR, highlighting the kind of mismatch that can occur between different empirical perspectives (first- vs. third-person). To our knowledge, few studies have explicitly used the EAR to study compassion *in the wild*, and it remains a methodological tool of relatively high and untapped potential. While naturalistic observations offer high levels of external and ecological validity, they often generate a wealth of data and are time consuming to code and evaluate. In addition, they may be prohibitive in contexts where privacy and confidentiality are at a premium, for example, in clinical contexts.

Compassion in Dyads

Some third-person methods assess compassionate responding by evaluating a dynamic encounter between two or more people, such that the measurement takes into account the interchange between individuals. In the field of family psychology, researchers investigate dyadic behavior between parents and children or between intimate partners. A standard experiment involves having a parent and child collaborate on a difficult task. Researchers code and quantify communication and behavioral indicators that convey warmth (e.g., affection, encouragement, etc.) or that lack warmth (e.g., criticism, eye rolling, etc.) (Miller et al., 2015). Paradigms such as these can be used to couple personal, interpersonal, and physiological correlates with parental compassion (Miller, 2018). For example, Leerkes et al. (2016) examined mothers' physiological arousal and behavior in response to a distressed infant, with a focus on sensitivity (e.g., appropriate calming behavior) and lack thereof (withdrawing). Methods such as this have been used to examine the impact of life history or trauma exposure on maternal caregiving behavior that occurs in the context of a mother–infant dyad (Strathearn et al., 2009). While the behaviors and constructs examined in these studies are often referred to as something other than compassion (e.g., parental warmth), from our perspective there is a great deal of overlap between these concepts and the model of compassion as an affective and motivational response to perceiving another's suffering. We believe these findings will converge with those of related disciplines explicitly studying compassion.

Because compassion contributes to success in clinical encounters, third-person behavioral observations are also used to evaluate and understand compassion in these dyadic encounters. Interactions between patients and providers are either observed or recorded, and those data were analyzed using a variety of approaches (e.g., grounded theory). For example, Suchman et al. (1997) examined transcripts of clinical interactions for patients' emotional expression (direct or implied) and corresponding physician responsiveness. Others have used an ethnographic observational approach and qualitative analysis to examine compassionate communication in hospice, in which the researchers provided a rich description of hospice workers engaging in emotion recognition, relating, and reacting to alleviate patient suffering (Way and Tracy, 2012).

A dyadic approach avoids many of the limitations and biases inherent in the use of self-report questionnaires. It also yields more ecologically valid findings than many behavioral paradigms, and dyadic analysis is a particularly useful tool to understand how compassion unfolds verbally or non-verbally among individuals. However, dyadic approaches are not without limitations. Of primary concern is a lack of agreement regarding the optimal markers or exemplars of compassionate behavior. For example, what constitutes compassion in a provider–patient interaction? Across studies examining patient–provider communication, a diversity of linguistic and performative markers have been coded as compassion (Beck et al., 2002). Common themes included reassurance, active listening, and responsiveness to emotional cues, yet consensus is lacking. Finally, if compassion requires an affective response and motivation to help, as is suggested by most definitions, then all observable behavior, whether occurring in dyads or not, must assess compassionate intentions primarily by inference.

Organizational Compassion

Emergent features of communities and organizations constitute yet another way of knowing compassion. In an influential article, Kanov et al. (2004) define organizational compassion as a collective noticing, feeling, and responding to suffering that promotes healing. They argue that organizational compassion differs from individual-level compassion in that it is collective, sanctioned, promoted, or codified by organizational norms and policies and then coordinated and propagated across individuals. Cameron and others likewise differentiate research investigating the culture and functions of an organization itself ("virtuousness *through* organizations") from studies focused on individuals acting compassionately within an organizational context (i.e., "virtuousness *in* organizations") (Kanov et al., 2004; Dutton et al., 2006; Cameron, 2017). Of the former, empirically tractable factors such as shared values, shared beliefs, norms, practices, leaders' behavior, and the structure and quality of relationships relate to and indicate the emergence of organizational compassion (Lilius et al., 2008; Dutton et al., 2014; Cameron, 2017).

Physiology and Compassion

Detectable changes in the functioning and structures of the body are alternative ways of knowing compassion. In general, this physiological frame of reference rests on the tenet that brain and body systems are shaped by natural selection to engender compassion and related prosocial emotions and skills. A second tenet is that these states are associated with outward compassionate behavior. It follows from these assumptions that physiological assessment helps us understand the body's necessary conditions and likely outcomes of compassion, as well as individual variation. In addition, there is often an implicit or explicit claim that physiological measures, not being subject to self-report biases described above, are inherently more accurate than other measures (Kirby et al., 2017).

The neurophysiological domain advances our ability to describe and quantify the activity of neural systems involved in compassion using neuroimaging assessment tools such as functional magnetic resonance imaging (fMRI) (Kim et al., 2020a), high-density electroencephalography and event-related

potentials, and transcranial direct current stimulation (tDCS) (Petrocchi et al., 2017b). A common method involves inducing the affective components of compassion in participants using emotionally evocative picture or video stimuli of suffering others and comparing this putatively compassionate neural response to that which occurs while viewing neutral stimuli or stimuli thought to elicit other emotions, such as pride (Simon-Thomas et al., 2011; Klimecki et al., 2012). Other studies have examined the relationship between prosocial behavior during an economic game and neural activity elicited by compassion-inducing stimuli (Weng et al., 2013). Still other neurophysiological studies also look for correlations between participants' self-reported state-level compassionate affect and neural activity elicited by a compassion-inducing task (see for example, Marsh et al., 2014; Brethel-Haurwitz et al., 2017). Other studies have examined brain function during the self-directed cultivation of compassion, for example, during compassion meditation (Engström and Söderfeldt, 2010; Schoenberg et al., 2018) or after compassion meditation training (Mascaro et al., 2013a,b). Findings from these assessments are inherently constrained by the relative paucity of ecological validity that can be achieved in a scanner environment, the inferences necessary to link behavior with internal compassionate states, and biases inherent in self-reports. Notably, a recent meta-analysis found some inconsistency in the existing findings on the neural correlates of compassion, especially with respect to the amygdala and midbrain regions important for pain modulation and autonomic function, which may relate to whether the compassion in question was generated as a "top-down" or "bottom-up" process. While there was a high degree of consistency in other brain regions thought to be important for compassion (anterior cingulate cortex, bilateral anterior insula, basal ganglia, and bilateral inferior frontal gyri), this meta-analysis pointed to a relative sameness in the methods used thus far to study compassion in the fMRI scanner. The researchers ultimately advocated increased specification of research targets and additional innovative methods to advance neurophysiological understandings of compassion (Kim et al., 2020a). Future research that combines multimodal physiological assessments will be informative for potentially providing convergent evidence about the bidirectional associations between multiple physiological systems important for compassion (e.g., see Nguyen et al., 2016; Petrocchi et al., 2017b; Kim et al., 2020b). Moreover, future studies combining neuroimaging assessments with behavioral and experience sampling methods will extend the ecological validity, precision, and discriminant validity of existing measures of compassion.

A related physiological methodology focuses on the role of neuropeptides thought to be important modulators of compassion. Oxytocin is a neuropeptide synthesized in the paraventricular and supraoptic nuclei of the hypothalamus and stored and released back into the brain and into peripheral circulation by the pituitary gland. Thus, oxytocin acts as both a hormone and a neuropeptide and has effects on both the brain and the body. Two decades of research have focused attention on the role of oxytocin in parental attachment and bonding, as well as in prosocial emotions, motivations, and behavior more broadly (Bethlehem et al., 2013; Johnson and Young, 2017). For example, Palgi et al. (2014) conducted a double-blind, crossover experiment in which participants self-administered either intranasal oxytocin or a placebo before listening to stories of suffering and writing compassionate responses to the victims in each story. The presence of self-administered oxytocin was associated with more compassionate responses toward women but not toward men. Other groups have examined the relationship between endogenous oxytocin and the amount of compassion participants report receiving or experiencing toward others. For example, endogenous oxytocin levels are positively correlated with the amount of maternal compassion that patients with bipolar disorder report receiving as a child (Ebert et al., 2018).

Other researchers have examined the possibility that autonomic responses to suffering, and their downstream impact on heart rate and breathing, can serve as a bodily signal of compassion. Porges' polyvagal theory posits that, in the face of another's suffering, an initial fight–flight response has to be down-regulated via myelinated vagal efferent pathways of the parasympathetic nervous system. Vagal tone, as the activation of these pathways is sometimes called, impacts cardiac function and the hypothalamic–pituitary–adrenal axis to support "spontaneous social engagement" in the face of distress by dampening other, less prosocial responses (Porges, 2007). Early research in this area highlighted the measurement of heart rate variability (HRV) as an indicator of parasympathetic activity. HRV is a measurement of the beat-to-beat changes in cardiac output, and early thought was that the ratio of high-frequency (HF) to low-frequency (LF) HRV reflects the intrinsic balance between parasympathetic and sympathetic activity. However, more recently, researchers have called into question whether the ratio of HF HRV to LF HRV is an accurate metric for the ratio between sympathetic and parasympathetic activity and identified alternate calculations of vagal tone as a more accurate reflection of the underlying physiology (Heathers, 2014). HF HRV and the root mean-square of successive differences have both been used in recent research as a measure of autonomic control of the heart, mediated by the vagus nerve (Matos et al., 2017; Petrocchi et al., 2017a; Kim et al., 2020b).

As recent critiques have improved the rigor of research using HRV as an index of vagal tone (Heathers et al., 2015), accumulating evidence supports the measurement of HRV for understanding and evaluating compassion. Researchers have found that HRV relates to the experience of compassion and predicted compassionate behavior (Stellar et al., 2015). Others have found that compassionate responses appear to rely on the parasympathetic nervous system to modulate the emotional response to suffering, as indexed by HRV (Rockliff et al., 2008). Still others have found that training in compassion meditation or engaging with compassion-focused therapy improves HRV, either during a resting state (Matos et al., 2017; Kim et al., 2020c), in response to stressful stimuli or a task (Petrocchi et al., 2017a; Ceccarelli et al., 2019), or during compassion training itself (Kim et al., 2020b). While not explicitly investigating compassion, another recent study used tDCS applied near the left anterior insula and found that stimulation increased both self-reported soothing positive affect and HF HRV. This innovative

methodological approach links a brain region hypothesized to be important for compassion and empathy to both compassion-related affect and changes in HRV (Petrocchi et al., 2017b). Based on these findings, some have argued that HRV should be included as a primary outcome measure when assessing and training compassion (Kirby et al., 2017), and recent meta-analytic evidence supports this approach (Di Bello et al., 2020).

Other researchers have used the Facial Action Coding System (FACS) to quantify the spontaneous expression of compassionate affect elicited by video stimuli (Baránková et al., 2019). One of the first uses of this methodology emerged in a study of adults and children whose facial movements were documented as they watched a compassion-inducing video (Eisenberg et al., 1989). Researchers found that movements indicating "concerned attention" or "sympathy-directed toward another" correlated with later helping behavior. Compassionate facial movements included lowered and/or furrowed eyebrows, lowered upper eyelids, and sometimes raised lower eyelids, facing forward, and relaxation of the lower face and jaw. Another group used FACS to evaluate physiognomic responses to video stimuli of human suffering to determine whether responses were impacted by a 3-month meditation retreat (Rosenberg et al., 2015). They found that the intensive meditation training increased facial displays of sadness and decreased displays of rejection (operationalized as anger, contempt, or disgust). Of note, a recent theoretical article by Barrett et al. (2019) is skeptical of facial indicators of emotion, arguing that people do not express emotions with enough consistency or specificity to allow for the kinds of inferences made from FACS assessment. Moreover, even among prominent emotion scientists who endorse the theory that a core set of emotions has discrete biological bases—often referred to as "basic emotions"—a large majority (80%) do not believe compassion to be a discrete emotion (Ekman, 2016).

Compassion in Text

Other methodologies are used to qualitatively mine textual content for elements of compassion. Some researchers have used qualitative analysis of content from online platforms such as Facebook or Twitter to look at compassionate language and activity within a Facebook support group (Pounds et al., 2018) or by soliciting Twitter users to describe instances of organizational compassion toward healthcare staff (Clyne et al., 2018). As with non-virtual interactions, online communities can be analyzed at the individual or dyadic (and beyond) level, which has the potential to reveal the dynamic nature of the digitally mediated expression and reception of compassion (Sun, 2019). Others have conducted archival text analysis, for example, analyzing first- and second-century medical writing for evidence of physician compassion (Porter, 2016), or used exegetical and hermeneutic approaches to sacred texts to derive doctrinal or personal positions on compassion (See for example Sears, 1998; McCaffrey et al., 2012; Gibson, 2015; Ṭāhir ul-Qādrī, 2015). While textual analysis has many of the strengths of the third-person perspective, one must consider the source of the text, which in some cases may be self-reported or informant-reported and therefore subject to the limitations of those methodologies.

SUMMARY AND CONCLUSION

In this review, we have surveyed a variety of indicators and measures that have been used to define and study compassion. Examining these methodologies in the context of one another is vital to making compassion research more accurate, reliable, and transferable. It is also key for increasing knowledge transfer across the range of academic disciplines and other fields of compassion inquiry. Compassion is a multifaceted, intersubjective object of inquiry, glimpsed from a variety of separate viewpoints, each of which contributes to the unity of knowledge about compassion. We end with three summary points:

Method Matching

First, we find it evident from this review that the method(s) chosen to evaluate compassion should be theory-grounded and guided by specific research hypotheses. There may be times when first-person self-report measures are the best choice; however, those should be privileged only when the person's internal states are most crucial to the hypothesis being tested and with recognition of the limitations of this methodology. Similarly, it stands to reason that other hypotheses will require methods that tap other perspectives and frames of reference. For example, identifying facilitators and inhibitors of helping behaviors directed toward strangers would be most directly inferred from third-person (i.e., behavior-based) evidence rather than self-report.

We also suggest that more thought is warranted on the use of state measures of compassion when testing hypotheses about trait compassion. Behavioral and confederate paradigms are frequently used to measure changes in *trait* compassion, for example, after a compassion-training intervention. The underlying rationale is that one's augmented compassionate trait makes it more likely that they will enter into a compassionate state, such that measuring the likelihood of a compassionate response tells us something about trait compassion. The relationship between trait and state compassion is of great interest to many, and more methodological sensitivity toward this issue will be important toward advancing the field of compassion science.

Method Missing

In addition, our review process showed that certain research areas that target compassion would benefit from measurement techniques that are more fine-grained and that explicitly assess compassion. Some K–12 education programs explicitly target compassion cultivation as a broader focus, yet the majority of the effectiveness studies that provide the evidence base for such programs do not assess changes in compassion as a primary outcome being measured (Jones et al., 2017). This lack of explicit measurement makes it difficult to meaningfully evaluate whether compassion-based interventions targeting K–12 students actually promote the development of compassion.

Given the demonstrated impact of compassion cultivation on resilience in adulthood (Bach and Guse, 2015; Bluth et al., 2016), education research explicitly assessing compassion in childhood and adolescence is well-warranted. Relatedly, the field of social and emotional education development could greatly benefit from interdisciplinary collaborations to create such measures.

It is also clear that there is a lack of clarity about how to measure compassion at the level of organizations and communities. Do the three core components of compassion—awareness of suffering, an affective response, and a motivation to help—also hold for organizations and communities? If so, what do "awareness" and "affective response" look like at the community or organizational level, and how can it be measured?

We have made the claim here that discipline-specific constructs such as *parental warmth* share a conceptual relatedness with compassion, such that cross-disciplinary sharing may reveal convergences. While this idea has in part motivated the current review, we view this claim as an empirical question for future research. Thus arise questions such as "What does the construct of parental warmth share with compassion for those who are unrelated?" We acknowledge that questions like these are not new (e.g., see Swain et al., 2012), but we contend that they will be informed by increased sharing of methods across disciplines. Of note, given the problematic history of the conflation of terms and constructs across disciplines, such work will require care and precision so as not to cause further confusion.

Method Mixing

A key point that emerges from this review is the importance of strategic method mixing for studies of compassion. The multiple frames of reference we have discussed can be combined to create a more accurate understanding of the relationship between *internal* emotions, goals, and perceptions on the one hand, and *external* behavior on the other. There are valuable exemplars of method mixing already in the literature. For example, Sinclair et al. (2017a, 2018) used second-person qualitative evidence to understand the perspective of patients receiving compassion and then conducted a follow-up study to understand healthcare providers' first-person experiences offering compassion. We are optimistic that future research across disciplines will continue to utilize method-mixing approaches; however, it is important to note that at times the results of such method mixing may contradict one another. In fact, this may be important in its own right. The resulting ambivalence can be addressed by enhanced research methods that combine and cross-reference multiple ways of knowing, such as correlating individuals' self-report scale measures with their behavior, with informant reports, or by using neurophenomenological experimental designs. For example, within intimate couples, first- and second-person reporting could be combined to reveal discrepancies between the way compassion was intended and the way it was received. It is exactly this type of method mixing that has been called for in compassion neuroimaging studies, where researchers have argued that including measurements of both motivation and action in research on the physiology of compassion will be crucial toward establishing links between neurobiology, emotion, and behavior outside the laboratory (Kim et al., 2020b).

Moreover, method mixing could advance consensus within controversial areas such as *self-compassion* and *compassion fatigue* research. We believe combinations of first-, second-, and third-person compassion measures would help solidify our understanding of how compassion for self relates to compassion for others (López et al., 2018). In clinical research, method mixing can inform how obstacles to provider compassion relate to compassion failures and in so doing will provide a more nuanced landscape for identifying organizational solutions and interventions. Progress here will move the field beyond vague and abstract notions of compassion fatigue resulting from a depleted compassion reservoir and toward a richer understanding of the contexts and resources that foster sustainable compassion. Increasing the versatility and eclecticism of compassion research is of critical importance to comprehensive and interdisciplinary examinations of diverse ways of knowing compassion.

Limitations

Our intent in this review was to summarize the current state of methodologies that are used to understand and quantify compassion across widely varying fields of inquiry. No doubt we bring our own disciplinary biases to this work, but throughout we have used this space to bridge disparate fields. These biases may have led us to overlook important methods that could have further enhanced this review. Moreover, while we defined *compassion* in accordance with our own disciplines, there are nuanced differences in how compassion is operationalized that will influence the methods chosen to study it. Because of issues of feasibility, while we attempt to incorporate disparate fields of compassion research, we were unable to review all areas to the same degree as the literature from psychology, religion, and contemplative science, with which we are most familiar.

Conclusion

We contend that a better understanding of ways of knowing compassion is a type of consilience that at its best can improve research design, unify knowledge, and bridge disciplines for the benefit of all investigators interested in compassion (Wilson, 1999; Slingerland and Collard, 2012b). Future research will advance our knowledge by innovating novel ways of combining the measurement of multiple indicators of compassion. Ultimately, research designs that link the affective, cognitive, and motivational components of compassion with compassionate behavior will be of benefit to the many clinical, education, organizational, and interpersonal domains in which compassion is so critical to positive outcomes.

AUTHOR CONTRIBUTIONS

JM, MF, MA, PP, TF, and PC conceived of the manuscript and wrote significant sections. All authors provided critical and substantive feedback and critical revisions for important intellectual content.

REFERENCES

Alkema, K., Linton, J. M., and Davies, R. (2008). A study of the relationship between self-care, compassion satisfaction, compassion fatigue, and burnout among hospice professionals. *J. Soc. Work End-of-Life Palliat. Care* 4, 101–119. doi: 10.1080/15524250802353934

American Medical Association (2016). *AMA Code of Medical Ethics: Principles of Medical Ethics*. Available online at: https://www.ama-assn.org/sites/ama-assn.org/files/corp/media-browser/principles-of-medical-ethics.pdf (accessed October 4, 2019).

Ashar, Y. K., Andrews-Hanna, J. R., Yarkoni, T., Sills, J., Halifax, J., Dimidjian, S., et al. (2016). Effects of compassion meditation on a psychological model of charitable donation. *Emotion* 16, 691–705. doi: 10.1037/emo0000119

Bach, J. M., and Guse, T. (2015). The effect of contemplation and meditation on 'great compassion' on the psychological well-being of adolescents. *J. Posit. Psychol.* 10, 359–369. doi: 10.1080/17439760.2014.965268

Bandura, A. (1976). *Social Learning Theory*, 1st Edn. Upper Saddle River, NJ: Prentice-Hall.

Bandura, A. (1999). "Social cognitive theory of personality," in *Handbook of Personality, Second Edition: Theory and Research*, 2nd Edn, eds L. A. Pervin and O. P. John (New York, NY: Guilford Press), 154–196.

Baránková, M., Halamová, J., Gablíková, M., Kóróniová, J., and Strnádelová, B. (2019). Analysis of spontaneous facial expression of compassion elicited by the video stimulus: facial expression of compassion. *Ceskoslovenska Psychol.* 63, 26–41.

Barrett, L. F., Adolphs, R., Marsella, S., Martinez, A. M., and Pollak, S. D. (2019). Emotional expressions reconsidered: challenges to inferring emotion from human facial movements. *Psychol. Sci. Publ. Inter.* 20, 1–68. doi: 10.1177/1529100619832930

Batson, C., Daniel, Batson, J. G., Slingsby, J. K., Harrell, K. L., Peekna, H. M., et al. (1991). Empathic joy and the empathy-altruism hypothesis. *J. Pers. Soc. Psychol.* 61, 413–426. doi: 10.1037/0022-3514.61.3.413

Batson, C. D. (2009). "These things called empathy: eight related but distinct phenomena," in *The Social Neuroscience of Empathy*, eds E. J. Decety and W. Ickes (Cambridge: The MIT Press), 3–16. doi: 10.7551/mitpress/9780262012973.003.0002

Batson, C. D., O'Quin, K., Fultz, J., Vanderplas, M., and Isen, A. M. (1983). Influence of self-reported distress and empathy on egoistic versus altruistic motivation to help. *J. Pers. Soc. Psychol.* 45, 706–718. doi: 10.1037/0022-3514.45.3.706

Baumert, A., Schmitt, M., Perugini, M., Johnson, W., Blum, G., Borkenau, P., et al. (2017). Integrating personality structure, personality process, and personality development. *Eur. J. Pers.* 31, 503–528. doi: 10.1002/per.2115

Beaumont, E., Durkin, M., Hollins Martin, C. J., and Carson, J. (2016). Measuring relationships between self-compassion, compassion fatigue, burnout and well-being in student counsellors and student cognitive behavioural psychotherapists: a quantitative survey. *Counsel. Psychother. Res.* 16, 15–23. doi: 10.1002/capr.12054

Beck, R. S., Daughtridge, R., and Sloane, P. D. (2002). Physician-patient communication in the primary care office: a systematic review. *J. Am. Board Fam. Pract.* 15, 25–38.

Bengtsson, H., Söderström, M., and Terjestam, Y. (2016). The structure and development of dispositional compassion in early adolescence. *J. Early Adolesc.* 36, 840–873. doi: 10.1177/0272431615594461

Berg, G. M., Harshbarger, J. L., Ahlers-Schmidt, C. R., and Lippoldt, D. (2016). Exposing compassion fatigue and burnout syndrome in a trauma team: a qualitative study. *J. Trauma Nurs.* 23, 3–10. doi: 10.1097/JTN.0000000000000172

Bergen, N., and Labonté, R. (2020). "Everything is perfect, and we have no problems": detecting and limiting social desirability bias in qualitative research. *Qual. Health Res.* 30, 783–792. doi: 10.1177/1049732319889354

Berry, D. R., Cairo, A. H., Goodman, R. J., Quaglia, J. T., Green, J. D., and Brown, K. W. (2018). Mindfulness increases prosocial responses toward ostracized strangers through empathic concern. *J. Exp. Psychol. Gen.* 147, 93–112. doi: 10.1037/xge0000392

Bethlehem, R. A., van Honk, J., Auyeung, B., and Baron-Cohen, S. (2013). Oxytocin, brain physiology, and functional connectivity: a review of intranasal oxytocin fMRI studies. *Psychoneuroendocrinology* 38, 962–974. doi: 10.1016/j.psyneuen.2012.10.011

Bibeau, M., Dionne, F., and Leblanc, J. (2016). Can compassion meditation contribute to the development of psychotherapists' empathy? A review. *Mindfulness* 7, 255–263. doi: 10.1007/s12671-015-0439-y

Blomberg, K., Griffiths, P., Wengström, Y., May, C., and Bridges, J. (2016). Interventions for compassionate nursing care: a systematic review. *Int. J. Nurs. Stud.* 62, 137–155. doi: 10.1016/j.ijnurstu.2016.07.009

Bluth, K., Roberson, P. N., Gaylord, S. A., Faurot, K. R., Grewen, K. M., Arzon, S., et al. (2016). Does self-compassion protect adolescents from stress? *J. Child Fam. Stud.* 25, 1098–1109. doi: 10.1007/s10826-015-0307-3

Borden, L. (2019). Social, emotional, and ethical learning: a curriculum that educates the heart and mind. *J. Youth Dev.* 14, 217–221. doi: 10.5195/jyd.2019.851

Boyle, D. A. (2015). Compassion fatigue: the cost of caring. *Nursing* 45:48. doi: 10.1097/01.NURSE.0000461857.48809.a1

Brethel-Haurwitz, K. M., O'Connell, K., Cardinale, E. M., Stoianova, M., Stoycos, S. A., Lozier, L. M., et al. (2017). Amygdala–midbrain connectivity indicates a role for the mammalian parental care system in human altruism. *Proc. R. Soc. B Biol. Sci.* 284, 20171731. doi: 10.1098/rspb.2017.1731

Bryant, A., and Charmaz, K. (2007). "Introduction: grounded theory: methods and practices," in *The SAGE Handbook of Grounded Theory*, eds A. Bryant and K. Charmaz (Thousand Oaks, CA: SAGE), 1–28. doi: 10.1007/978-981-10-2779-6_84-1

Bryant, A., and Charmaz, K. J. (2010). "Grounded theory in historical perspective: an epistemological account," in *Handbook of Grounded Theory*, eds A. Bryant and K. Charmaz (Thousand Oaks, CA: SAGE), 31–57. doi: 10.4135/9781848607941.n1

Buelher, M. (2019). *Grade Level Effect on Compassion Fatigue of Teachers in At-Risk School Districts*. San Diego, CA: Northcentral University.

Burnell, L., and Agan, D. L. (2013). Compassionate care: can it be defined and measured? The development of the compassionate care assessment tool. *Int. J. Car. Sci.* 6, 180–187.

Cameron, K. S. (2017). "Organizational compassion: manifestations through organizations," in *Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, C. D. Cameron, and J. R. Doty (Oxford: Oxford University Press), 421–434.

Ceccarelli, L., Giuliano, R. J., Glazebrook, C., and Strachan, S. (2019). Self-compassion and psycho-physiological recovery from recalled sport failure. *Front. Psychol.* 10:1564. doi: 10.3389/fpsyg.2019.01564

Centers for Medicare and Medicaid Services (CMS), HHS (2011). Medicare program; hospital inpatient. (value)-based purchasing program. Final rule. *Federal Reg.* 76, 26490–26547.

Cikara, M., Bruneau, E. G., and Saxe, R. R. (2011). Us and them: intergroup failures of empathy. *Curr. Direct. Psychol. Sci.* 20, 149–153. doi: 10.1177/0963721411408713

Clark, M. S., and Mils, J. (1993). The difference between communal and exchange relationships: what it is and is not. *Pers. Soc. Psychol. Bull.* 19, 684–691. doi: 10.1177/0146167293196003

Clark, P. A., Drain, M., and Malone, M. P. (2003). Addressing patients' emotional and spiritual needs. *Joint Commiss. J. Qual. Saf.* 29, 659–670. doi: 10.1016/S1549-3741(03)29078-X

Clyne, W., Pezaro, S., Deeny, K., and Kneafsey, R. (2018). Using social media to generate and collect primary data: the# ShowsWorkplaceCompassion Twitter research campaign. *JMIR Publ. Health Surveill.* 4:e41. doi: 10.2196/publichealth.7686

Condon, P., and Barrett, F. L. (2013). Conceptualizing and experiencing compassion. *Emotion* 13, 817–821. doi: 10.1037/a0033747

Condon, P., Desbordes, G., Miller, W. B., and DeSteno, D. (2013). Meditation increases compassionate responses to suffering. *Psychol. Sci.* 24, 2125–2127. doi: 10.1177/0956797613485603

Condon, P., and Makransky, J. (2020). Recovering the relational starting point of compassion training: a foundation for sustainable and inclusive care. *Perspectives on Psychological Science* doi: 10.1177/1745691620922200

Conner, T. S., and Barrett, L. F. (2012). Trends in ambulatory self-report: the role of momentary experience in psychosomatic medicine. *Psychosom. Med.* 74, 327–337. doi: 10.1097/PSY.0b013e3182546f18

Cosley, B. J., McCoy, S. K., Saslow, L. R., and Epel, E. S. (2010). Is compassion for others stress buffering? Consequences of compassion and social support for physiological reactivity to stress. *J. Exp. Soc. Psychol.* 46, 816–823. doi: 10.1016/j.jesp.2010.04.008

Crowther, J., Wilson, K. C. M., Horton, S., and Lloyd-Williams, M. (2013). Compassion in healthcare—lessons from a qualitative study of the end of life care of people with dementia. *J. R. Soc. Med.* 106, 492–497. doi: 10.1177/0141076813503593

Dalai Lama (2002). *An Open Heart: Practicing Compassion in Everyday Life*. Hachette UK.

Davis, M. H. (1983). Measuring individual-differences in empathy - evidence for a multidimensional approach. *J. Pers. Soc. Psychol.* 44, 113–126. doi: 10.1037/0022-3514.44.1.113

Di Bello, M., Carnevali, L., Petrocchi, N., Thayer, J. F., Gilbert, P., Ottaviani, C. J. N., et al. (2020). The compassionate vagus: a meta-analysis on the connection between compassion and heart rate variability. *Neurosci. Biobehav. Rev.* 116, 21–30. doi: 10.1016/j.neubiorev.2020.06.016

Dowling, M. (2007). From Husserl to van Manen. A review of different phenomenological approaches. *Int. J. Nurs. Stud.* 44, 131–142. doi: 10.1016/j.ijnurstu.2005.11.026

Dreyfus, G. (2001). "Is compassion an emotion? A cross-cultural exploration of mental typologies," in *Visions of Compassion Western Scientists and Tibetan Buddhists Examine Human Nature*, eds R. J. Davidson and A. Harrington (Oxford: Oxford University Press), 31–45. doi: 10.1093/acprof:oso/9780195130430.003.0003

Dutton, J. E., Workman, K. M., and Hardin, A. E. (2014). Compassion at work. *Annu. Rev. Organ. Psychol. Organiz. Behav.* 1, 277–304. doi: 10.1146/annurev-orgpsych-031413-091221

Dutton, J. E., Worline, M. C., Frost, P. J., and Lilius, J. (2006). Explaining compassion organizing. *Admin. Sci. Q.* 51, 59–96. doi: 10.2189/asqu.51.1.59

Dyer, N., Sorra, J. S., Smith, S. A., Cleary, P., and Hays, R. (2012). Psychometric properties of the consumer assessment of healthcare providers and systems (CAHPS®) clinician and group adult visit survey. *Med. Care* 50, S28–S34. doi: 10.1097/MLR.0b013e31826cbc0d

Dyrbye, L., Herrin, J., West, C. P., Wittlin, N. M., Dovidio, J. F., Hardeman, R., et al. (2019). Association of racial bias with burnout among resident physicians. *JAMA Netw. Open* 2:e197457. doi: 10.1001/jamanetworkopen.2019.7457

Ebert, A., Edel, M.-A., Gilbert, P., and Brüne, M. (2018). Endogenous oxytocin is associated with the experience of compassion and recalled upbringing in borderline personality disorder. *Depress. Anx.* 35, 50–57. doi: 10.1002/da.22683

Eisenberg, N., Eggum, N. D., and Giunta, L. D. (2010). Empathy-related responding: associations with prosocial behavior, aggression, and intergroup relations. *Soc. Issues Policy Rev.* 4, 143–180. doi: 10.1111/j.1751-2409.2010.01020.x

Eisenberg, N., Fabes, R. A., Miller, P. A., Fultz, J., Shell, R., Mathy, R. M., et al. (1989). Relation of sympathy and personal distress to prosocial behavior: a multimethod study. *J. Pers. Soc. Psychol.* 57:55. doi: 10.1037/0022-3514.57.1.55

Ekman, P. (2016). What scientists who study emotion agree about. *Perspect. Psychol. Sci.* 11, 31–34. doi: 10.1177/1745691615596992

Engström, M., and Söderfeldt, B. (2010). Brain activation during compassion meditation: a case study. *J. Altern. Compl. Med.* 16, 597–599. doi: 10.1089/acm.2009.0309

Evans, R., Elwyn, G., and Edwards, A. (2004). Review of instruments for peer assessment of physicians. *BMJ* 328:1240. doi: 10.1136/bmj.328.7450.1240

Fan, Y., Shepherd, L. J., Slavich, E., Waters, D., Stone, M., Abel, R., et al. (2019). Gender and cultural bias in student evaluations: why representation matters. *PLoS One* 14:e0209749. doi: 10.1371/journal.pone.0209749

Fernando, A. T. III, and Consedine, N. S. (2014). Beyond compassion fatigue: the transactional model of physician compassion. *J. Pain Sympt. Manag.* 48, 289–298. doi: 10.1016/j.jpainsymman.2013.09.014

Fisette, D. (2018). "Phenomenology and descriptive psychology: Brentano, Stumpf, Husserl," in *The Oxford Handbook of the History of Phenomenology*, ed. D. Zahavi (Oxford: Oxford University Press), 89–103.

Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. *J. Consum. Res.* 20, 303–315. doi: 10.1086/209351

Flook, L., Goldberg, S. B., Pinger, L., and Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Dev. Psychol.* 51, 44–51. doi: 10.1037/a0038256

Fogarty, L. A., Curbow, B. A., Wingard, J. R., McDonnell, K., and Somerfield, M. R. (1999). Can 40 seconds of compassion reduce patient anxiety? *J. Clin. Oncol.* 17, 371–371. doi: 10.1200/jco.1999.17.1.371

Fukumori, T., Miyazaki, A., Takaba, C., Taniguchi, S., and Asai, M. (2018). Cognitive reactions of nurses exposed to cancer patients' traumatic experiences: a qualitative study to identify triggers of the onset of compassion fatigue. *Psycho Oncol.* 27, 620–625. doi: 10.1002/pon.4555

Galante, J., Galante, I., Bekkers, M.-J., and Gallacher, J. (2014). Effect of kindness-based meditation on health and well-being: a systematic review and meta-analysis. *J. Consult. Clin. Psychol.* 82, 1101–1114. doi: 10.1037/a0037249

Gavin, H. (2008). *Understanding Research Methods and Statistics in Psychology*. Thousand Oaks, CA: SAGE Publications Ltd.

Germer, C., and Neff, K. D. (2013). "Mindful self-compassion training program," in *Compassion—Bridging Practice and Science*, 1st Edn, (Leipzig: Max-Planck Institute), 364–396.

Gibson, A. (2015). Meanings and applications of compassion in teaching: a practical review of the bible and educational literature. *Christ. Educ. J. Res. Educ. Min.* 12, 8–25. doi: 10.1177/073989131501200102

Gilbert, P. (2010). *Compassion Focused Therapy: Distinctive Features*. New York, NY: Routledge.

Gilbert, P. (2014a). "Attachment theory and compassion-focused therapy for depression," in *Attachment Theory in Adult Mental Health: A Guide to Clinical Practice*, eds A. N. Danquah and K. Berry (New York, NY: Routledge), 35–47.

Gilbert, P. (2014b). The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbert, P., and Mascaro, J. (2017). "Compassion fears, blocks and resistances: an evolutionary investigation," in *The Oxford Handbook of Compassion Science*, ed. E. M. Seppälä (Oxford University Press), 35.

Giorgi, A. (2010). Phenomenology and the practice of science. *Exist. Anal. J. Soc. Exist. Anal.* 21, 3–22.

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Goleman, D., and Davidson, R. J. (2017). *Altered Traits: Science Reveals How Meditation Changes Your Mind, Brain, and Body*. New York, NY: Penguin Publishing Group.

Griffiths, P., and Scarantino, A. (2009). "Emotions in the wild: the situated perspective on emotions," in *The Cambridge Handbook of Situated Cognition* 1st Edn, eds P. Robbins and M. Aydede (Cambridge: Cambridge University Press), 437–453. doi: 10.1017/cbo9780511816826.023

Gu, J., Cavanagh, K., Baer, R., and Strauss, C. (2017). An empirical examination of the factor structure of compassion. *PLoS One* 12:e0172471. doi: 10.1371/journal.pone.0172471

Halifax, J. (2012). A heuristic model of enactive compassion. *Curr. Opin. Support. Palliat. Care* 6, 228–235. doi: 10.1097/spc.0b013e3283530fbe

Harter, S. (1982). The perceived competence scale for children. *Child Dev.* 53, 87–97. doi: 10.2307/1129640

Hayes, S. C., and Hofmann, S. G. (2017). The third wave of cognitive behavioral therapy and the rise of process-based care. *World Psychiatry* 16, 245–246. doi: 10.1002/wps.20442

Heathers, J. A. (2014). Everything Hertz: methodological issues in short-term frequency-domain HRV. *Front. Physiol.* 5:177. doi: 10.3389/fphys.2014.00177

Heathers, J. A., Brown, N. J., Coyne, J. C., and Friedman, H. L. (2015). The elusory upward spiral: a reanalysis of Kok et al.(2013). *Psychol. Sci.* 26, 1140–1143. doi: 10.1177/0956797615572908

Hotchkiss, J. T., and Lesher, R. (2018). Factors predicting burnout among chaplains: compassion satisfaction, organizational factors, and the mediators of mindful self-care and secondary traumatic stress. *J. Past. Care Counsel.* 72, 86–98. doi: 10.1177/1542305018780655

Husserl, E. (1989). *Studies in the Phenomenology of Constitution*. Trans. R. Rojcewicz and A. Schuwer Vol. 2, (Alphen aan den Rijn: Kluwer Academic).

Jack, K. (2017). The meaning of compassion fatigue to student nurses: an interpretive phenomenological study. *J. Compass. Health Care* 4, 1–8. doi: 10.1186/s40639-017-0031-5

Jain, A., Tabatabai, R., Vo, A., and Riddell, J. (2019). "I Have Nothing Else to Give": a qualitative exploration of emergency medicine residents' perceptions of burnout and compassion fatigue. *West. J. Emerg. Med. Orange* 20

Jarvis, S. K. (2017). *The Journey to Self-Compassion: A Phenomenological Exploration of Women's Lived Experience and Personal Meaning Making of Learning Self-Compassion*. Ph D Thesis. Available online at: http://summit.sfu.ca/item/17672 (accessed October 12, 2019).

Játiva, R., and Cerezo, M. A. (2014). The mediating role of self-compassion in the relationship between victimization and psychological maladjustment in a sample of adolescents. *Child Abuse Neglect* 38, 1180–1190. doi: 10.1016/j.chiabu.2014.04.005

Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., et al. (2013). Enhancing compassion: a randomized controlled trial of a compassion cultivation training program. *J. Happ. Stud.* 14, 1113–1126. doi: 10.1007/s10902-012-9373-z

Jazaieri, H., Lee, I. A., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., et al. (2016). A wandering mind is a less caring mind: daily experience sampling during compassion meditation training. *J. Posit. Psychol.* 11, 37–50. doi: 10.1080/17439760.2015.1025418

Johnson, T. P., and Van de Vijver, F. J. (2003). Social desirability in cross-cultural research. *Cross Cult. Surv. Methods* 325, 195–204.

Johnson, Z. V., and Young, L. J. (2017). Oxytocin and vasopressin neural networks: implications for social behavioral diversity and translational neuroscience. *Neurosci. Biobehav. Rev.* 76, 87–98. doi: 10.1016/j.neubiorev.2017.01.034

Jones, S. M., Brush, K., Bailey, R., Brion-Meisels, G., McIntyre, J., Kahn, J., et al. (2017). *Navigating SEL From the Inside Out: Looking Inside and Across 25 Leading SEL Programs: A Practical Resource for Schools and OST Providers (Elementary School Focus)*. New York, NY: The Wallace Foundation.

Kang, Y., Gray, J. R., and Dovidio, J. F. (2014). The nondiscriminating heart: lovingkindness meditation training decreases implicit intergroup bias. *J. Exp. Psychol.* 143, 1306–1313. doi: 10.1037/a0034150

Kanov, J. M., Maitlis, S., Worline, M. C., Dutton, J. E., Frost, P. J., and Lilius, J. M. (2004). Compassion in organizational life. *Am. Behav. Sci.* 47, 808–827. doi: 10.1177/0002764203260211

Kaplan, D. M., Raison, C. L., Milek, A., Tackman, A. M., Pace, T. W. W., and Mehl, M. R. (2018). Dispositional mindfulness in daily life: a naturalistic observation study. *PLoS One* 13:e0206029. doi: 10.1371/journal.pone.0206029

Kaslow, N. J., Grus, C. L., Campbell, L. F., Fouad, N. A., Hatcher, R. L., and Rodolfa, E. R. (2009). Competency assessment toolkit for professional psychology. *Train. Educ. Profess. Psychol.* 3:S27.

Kemper, K. J., Powell, D., Helms, C. C., and Kim-Shapiro, D. B. (2015). Loving-kindness meditation's effects on nitric oxide and perceived well-being: a pilot study in experienced and inexperienced meditators. *Explore* 11, 32–39. doi: 10.1016/j.explore.2014.10.002

Kim, H., Sefcik, J. S., and Bradway, C. (2017). Characteristics of qualitative descriptive studies: a systematic review. *Res. Nurs. Health* 40, 23–42. doi: 10.1002/nur.21768

Kim, J. J., Cunnington, R., and Kirby, J. N. (2020a). The neurophysiological basis of compassion: an fMRI meta-analysis of compassion and its related neural processes. *Neurosci. Biobehav. Rev.* 108, 112–123. doi: 10.1016/j.neubiorev.2019.10.023

Kim, J. J., Parker, S. L., Doty, J. R., Cunnington, R., Gilbert, P., and Kirby, J. N. (2020b). Neurophysiological and behavioural markers of compassion. *Sci. Rep.* 10, 1–9.

Kim, J. J., Parker, S. L., Henderson, T., and Kirby, J. N. (2020c). Physiological fractals: visual and statistical evidence across timescales and experimental states. *J. R. Soc. Interf.* 17:20200334. doi: 10.1098/rsif.2020.0334

Kim, S. H., and Lopez de Leon, F. L. (2019). In-group and out-group biases in the marketplace: a field experiment during the World Cup. *Oxford Econ. Pap.* 71, 528–547. doi: 10.1093/oep/gpy054

Kirby, J. J., Doty, J. R., Petrocchi, N., and Gilbert, P. (2017). The current and future role of heart rate variability for assessing and training compassion. *Front. Public Health* 5:40. doi: 10.3389/fpubh.2017.00040

Klimecki, O. M., Leiberg, S., Lamm, C., and Singer, T. (2012). Functional neural plasticity and associated changes in positive affect after compassion training. *Cereb. Cortex* 23, 1552–1561. doi: 10.1093/cercor/bhs142

Klimecki, O. M., Leiberg, S., Ricard, M., and Singer, T. (2014). Differential pattern of functional brain plasticity after compassion and empathy training. *Soc. Cogn. Affect. Neurosci.* 9, 873–879. doi: 10.1093/scan/nst060

Klimecki, O. M., Ricard, M., and Singer, T. (2013). "Empathy versus compassion: lessons from 1st and 3rd person methods," in *Compassion—Bridging Practice and Science*, 1st Edn, eds T. Singer and M. Bolz (Saarbrücken: Satzweiss Print Web Software GmbH), 272–285.

Knafo, A., Zahn-Waxler, C., Van Hulle, C., Robinson, J. L., and Rhee, S. H. (2008). The developmental origins of a disposition toward empathy: genetic and environmental contributions. *Emotion* 8, 737–752. doi: 10.1037/a0014179

Koopmann-Holm, B., Sze, J., Jinpa, T., and Tsai, J. L. (2019). Compassion meditation increases optimism towards a transgressor. *Cogn. Emot.* 34, 1028–1035. doi: 10.1080/02699931.2019.1703648

Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Qual. Quan.* 47, 2025–2047. doi: 10.1007/s11135-011-9640-9

Lawrence, V. A., and Lee, D. (2014). An exploration of people's experiences of compassion-focused therapy for trauma, using interpretative phenomenological analysis. *Clin. Psychol. Psychother.* 21, 495–507. doi: 10.1002/cpp.1854

Ledoux, K. (2015). Understanding compassion fatigue: understanding compassion. *J. Adv. Nurs.* 71, 2041–2050. doi: 10.1111/jan.12686

Leeman, J., Baernholdt, M., and Sandelowski, M. (2007). Developing a theory-based taxonomy of methods for implementing change in practice. *J. Adv. Nurs.* 58, 191–200. doi: 10.1111/j.1365-2648.2006.04207.x

Leerkes, E. M., Su, J., Calkins, S. D., Supple, A. J., and O'Brien, M. (2016). Pathways by which mothers' physiological arousal and regulation while caregiving predict sensitivity to infant distress. *J. Fam. Psychol.* 30, 769–779. doi: 10.1037/fam0000185

Leiberg, S., Klimecki, O., and Singer, T. (2011). Short-term compassion training increases prosocial behavior in a newly developed prosocial game. *PLoS One* 6:e17798. doi: 10.1371/journal.pone.0017798

Lewins, A., and Silver, C. (2007). *Using Software in Qualitative Research: A Step-by-Step Guide*. Thousands Oak, CA: SAGE.

Lilius, J. M., Worline, M. C., Maitlis, S., Kanov, J., Dutton, J. E., and Frost, P. (2008). The contours and consequences of compassion at work. *J. Organ. Behav.* 29, 193–218. doi: 10.1002/job.508

Lim, D., and DeSteno, D. (2016). Suffering and compassion: the links among adverse life experiences, empathy, compassion, and prosocial behavior. *Emotion* 16, 175–182. doi: 10.1037/emo0000144

López, A., Sanderman, R., Ranchor, A. V., and Schroevers, M. J. (2018). Compassion for others and self-compassion: levels, correlates, and relationship with psychological well-being. *Mindfulness* 9, 325–331. doi: 10.1007/s12671-017-0777-z

Lown, B. A. (2016). A social neuroscience-informed model for teaching and practising compassion in health care. *Med. Educ.* 50, 332–342. doi: 10.1111/medu.12926

Lown, B. A., Muncer, S. J., and Chadwick, R. (2015). Can compassionate healthcare be measured? The Schwartz Center Compassionate Care ScaleTM. *Pat. Educ. Counsel.* 98, 1005–1010. doi: 10.1016/j.pec.2015.03.019

Luberto, C. M., Shinday, N., Song, R., Philpotts, L. L., Park, E. R., Fricchione, G. L., et al. (2018). A systematic review and meta-analysis of the effects of meditation on empathy, compassion, and prosocial behaviors. *Mindfulness* 9, 708–724. doi: 10.1007/s12671-017-0841-8

Marin, D. B., Sharma, V., Sosunov, E., Egorova, N., Goldstein, R., and Handzo, G. F. (2015). Relationship between chaplain visits and patient satisfaction. *J. Health Care Chaplaincy* 21, 14–24. doi: 10.1080/08854726.2014.981417

Marsh, A. A. (2019). The caring continuum: evolved hormonal and proximal mechanisms explain prosocial and antisocial extremes. *Annu. Rev. Psychol.* 70, 347–371. doi: 10.1146/annurev-psych-010418-103010

Marsh, A. A., Stoycos, S. A., Brethel-Haurwitz, K. M., Robinson, P., VanMeter, J. W., and Cardinale, E. M. (2014). Neural and cognitive characteristics of extraordinary altruists. *Proc. Natl. Acad. Sci. U.S.A.* 111, 15036–15041. doi: 10.1073/pnas.1408440111

Mascaro, J. S., Rentscher, K. E., Hackett, P. D., Mehl, M. R., and Rilling, J. K. (2017). Child gender influences paternal behavior, language, and brain function. *Behav. Neurosci.* 131, 262–273. doi: 10.1037/bne0000199

Mascaro, J. S., Rilling, J. K., Negi, L. T., and Raison, C. L. (2013a). Compassion meditation enhances empathic accuracy and related neural activity. *Soc. Cogn. Affect. Neurosci.* 8, 48–55. doi: 10.1093/scan/nss095

Mascaro, J. S., Rilling, J. K., Negi, L. T., and Raison, C. L. (2013b). Pre-existing brain function predicts subsequent practice of mindfulness and compassion meditation. *Neuroimage* 69, 35–42. doi: 10.1016/j.neuroimage.2012.12.021

Matos, M., Duarte, C., Duarte, J., Pinto-Gouveia, J., Petrocchi, N., Basran, J., et al. (2017). Psychological and physiological effects of compassionate mind training: a pilot randomised controlled study. *Mindfulness* 8, 1699–1712. doi: 10.1007/s12671-017-0745-7

Mauss, I. B., and Robinson, M. D. (2009). Measures of emotion: a review. *Cogn. Emot.* 23, 209–237. doi: 10.1080/02699930802204677

McCaffrey, G., and McConnell, S. (2015). Compassion: a critical review of peer-reviewed nursing literature. *J. Clin. Nurs.* 24, 3006–3015. doi: 10.1111/jocn.12924

McCaffrey, G., Raffin-Bouchal, S., and Moules, N. J. (2012). Buddhist thought and nursing: a hermeneutic exploration: buddhist thought and nursing. *Nurs. Philos.* 13, 87–97. doi: 10.1111/j.1466-769X.2011.00502.x

McClelland, L. E., and Vogus, T. J. (2014). Compassion practices and HCAHPS: does rewarding and supporting workplace compassion influence patient perceptions? *Health Serv. Res.* 49, 1670–1683. doi: 10.1111/1475-6773.12186

McCrae, R. R., and Costa, P. T. (1995). Trait explanations in personality psychology. *Eur. J. Pers.* 9, 231–252. doi: 10.1002/per.2410090402

McPherson, S., Hiskey, S., and Alderson, Z. (2016). Distress in working on dementia wards – a threat to compassionate care: a grounded theory study. *Int. J. Nurs. Stud.* 53, 95–104. doi: 10.1016/j.ijnurstu.2015.08.013

Mehl, M. R. (2017). The Electronically Activated Recorder (EAR): a method for the naturalistic observation of daily social behavior. *Curr. Direct. Psychol. Sci.* 26, 184–190. doi: 10.1177/0963721416680611

Mikulincer, M., and Shaver, P. R. (2001). Attachment theory and intergroup bias: evidence that priming the secure base schema attenuates negative reactions to out-groups. *J. Pers. Soc. Psychol.* 81, 97–115. doi: 10.1037/0022-3514.81.1.97

Miller, J. G. (2018). Physiological mechanisms of prosociality. *Curr. Opin. Psychol.* 20, 50–54. doi: 10.1016/j.copsyc.2017.08.018

Miller, J. G., Kahle, S., Lopez, M., and Hastings, P. D. (2015). Compassionate love buffers stress-reactive mothers from fight-or-flight parenting. *Dev. Psychol.* 51, 36–43. doi: 10.1037/a0038236

Neergaard, M. A., Olesen, F., Andersen, R. S., and Sondergaard, J. (2009). Qualitative description – the poor cousin of health research? *BMC Med. Res. Methodol.* 9:1–5. doi: 10.1186/1471-2288-9-52

Neff, K., Seppälä, E., Brown, K. W., and Leary, M. R. (2016). "Compassion, well-being, and the hypo-egoic self," in *The Oxford Handbook of Hypo-egoic Phenomena*, eds K. W. Brown and M. Leary (Oxford: Oxford University Press), 1–23. doi: 10.1111/j.1751-9004.2010.00330.x

Neff, K. D., and Beretvas, S. N. (2013). The role of self-compassion in romantic relationships. *Self Ident.* 12, 78–98. doi: 10.1080/15298868.2011.639548

Neff, K. D., and McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self Ident.* 9, 225–240. doi: 10.1080/15298860902979307

Neff, K. D., and Pittman, M. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self Ident.* 9, 225–240. doi: 10.1080/15298860902979307

Nguyen, V. T., Breakspear, M., Hu, X., and Guo, C. C. J. N. (2016). The integration of the internal and external milieu in the insula during dynamic emotional experiences. *NeuroImage* 124, 455–463. doi: 10.1016/j.neuroimage.2015.08.078

Pace, T. W. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., et al. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology* 34, 87–98. doi: 10.1016/j.psyneuen.2008.08.011

Palgi, S., Klein, E., and Shamay-Tsoory, S. G. (2014). Intranasal administration of oxytocin increases compassion toward women. *Soc. Cogn. Affect. Neurosci.* 10, 311–317. doi: 10.1093/scan/nsu040

Patel, S., Pelletier-Bui, A., Smith, S., Roberts, M. B., Kilgannon, H., Trzeciak, S., et al. (2019). Curricula for empathy and compassion training in medical education: a systematic review. *PLoS One* 14:e0221412. doi: 10.1371/journal.pone.0221412

Pauley, G., and McPherson, S. (2010). The experience and meaning of compassion and self-compassion for individuals with depression or anxiety. *Psychol. Psychother. Theory Res. Pract.* 83, 129–143. doi: 10.1348/147608309X471000

Perrone-McGovern, K. M., Oliveira-Silva, P., Simon-Dack, S., Lefdahl-Davis, E., Adams, D., McConnell, J., et al. (2014). Effects of empathy and conflict resolution strategies on psychophysiological arousal and satisfaction in romantic relationships. *Appl. Psychophysiol. Biofeedback* 39, 19–25. doi: 10.1007/s10484-013-9237-2

Petrocchi, N., Ottaviani, C., and Couyoumdjian, A. (2017a). Compassion at the mirror: exposure to a mirror increases the efficacy of a self-compassion manipulation in enhancing soothing positive affect and heart rate variability. *J. Posit. Psychol.* 12, 525–536. doi: 10.1080/17439760.2016.1209544

Petrocchi, N., Piccirillo, G., Fiorucci, C., Moscucci, F., Di Iorio, C., Mastropietri, F., et al. (2017b). Transcranial direct current stimulation enhances soothing positive affect and vagal tone. *Neuropsychologia* 96, 256–261. doi: 10.1016/j.neuropsychologia.2017.01.028

Pike, K. L. (1967). *Etic and Emic Standpoints for the Description of Behavior*. The Hague: Mouton & Co.

Porges, S. W. (2007). The polyvagal perspective. *Biol. Psychol.* 74, 116–143. doi: 10.1016/j.biopsycho.2006.06.009

Porter, A. J. (2016). "10 compassion in Soranus' gynecology and Caelius Aurelianus' on chronic diseases," in *Homo Patiens-Approaches to the Patient in the Ancient World*, ed. G. Petridou and C. Thumiger (Leiden: Brill), 285–303. doi: 10.1163/9789004305564_012

Post, S. G., Ng, L. E., Fischel, J. E., Bennett, M., Bily, L., Chandran, L., et al. (2014). Routine, empathic and compassionate patient care: definitions, development, obstacles, education and beneficiaries. *J. Eval. Clin. Pract.* 20, 872–880. doi: 10.1111/jep.12243

Pounds, G., Hunt, D., and Koteyko, N. (2018). Expression of empathy in a facebook-based diabetes support group. *Disc. Context Media* 25, 34–43. doi: 10.1016/j.dcm.2018.01.008

Presnell, D. (2018). Preventing and treating trauma, building resiliency: the movement toward compassionate schools in Watauga County, North Carolina. *N. C. Med. J.* 79, 113–114. doi: 10.18043/ncm.79.2.113

Preston, J. L., and Ritter, R. S. (2013). Different effects of religion and god on prosociality with the ingroup and outgroup. *Pers. Soc. Psychol. Bull.* 39, 1471–1483. doi: 10.1177/0146167213499937

Preston, S. D., and Hofelich, A. J. (2012). The many faces of empathy: parsing empathic phenomena through a proximate, dynamic-systems view of representing the other in the self. *Emot. Rev.* 4, 24–33. doi: 10.1177/1754073911421378

Rao, N., and Kemper, K. J. (2017). Online training in specific meditation practices improves gratitude, well-being, self-compassion, and confidence in providing compassionate care among health professionals. *J. Evid. Based Compl. Altern. Med.* 22, 237–241. doi: 10.1177/2156587216642102

Reis, H. T., Maniaci, M. R., and Rogge, R. D. (2014). The expression of compassionate love in everyday compassionate acts. *J. Soc. Pers. Relationsh.* 31, 651–676. doi: 10.1177/0265407513507214

Roberts, B. W., Roberts, M. B., Yao, J., Bosire, J., Mazzarelli, A., and Trzeciak, S. (2019). Development and validation of a tool to measure patient assessment of clinical compassion. *Jama Netw. Open* 2:e193976. doi: 10.1001/jamanetworkopen.2019.3976

Roberts, S. B., Flannelly, K. J., Weaver, A. J., and Figley, C. R. (2003). Compassion fatigue among chaplains, clergy, and other respondents after September 11th. *J. Nerv. Ment. Dis.* 191, 756–758. doi: 10.1097/01.nmd.0000095129.50042.30

Rockliff, H., Gilbert, P., McEwan, K., Lightman, S., and Glover, D. (2008). A pilot exploration of heart rate variability and salivary cortisol responses to compassion-focused imagery. *Clin. Neuropsychiatry J. Treat. Eval.* 5, 132–139.

Roeser, R. W., Colaianne, B. A., and Greenberg, M. A. (2018). Compassion and human development: current approaches and future directions. *Res. Hum. Dev.* 15, 238–251. doi: 10.1080/15427609.2018.1495002

Roeser, R. W., and Eccles, J. S. (2015). Mindfulness and compassion in human development: introduction to the special section. *Dev. Psychol.* 51, 1–6. doi: 10.1037/a0038453

Roeser, R. W., and Pinela, C. (2014). Mindfulness and compassion training in adolescence: a developmental contemplative science perspective. *New Direct. Youth Dev.* 142, 9–30. doi: 10.1002/yd.20094

Rosenberg, E. L., Zanesco, A. P., King, B. G., Aichele, S. R., Jacobs, T. L., Bridwell, D. A., et al. (2015). Intensive meditation training influences emotional responses to suffering. *Emotion* 15:775. doi: 10.1037/emo0000080

Ruane, J. M. (2016). *Introducing Social Research Methods: Essentials for Getting the Edge*. Hoboken, NJ: John Wiley and Sons.

Saldaña, J. (2011). *Fundamentals of Qualitative Research*. Oxford: Oxford University Press.

Saldaña, J. (2016). *The Coding Manual for Qualitative Researchers*, 3rd Edn. Thousands Oaks, CA: SAGE.

Sandelowski, M. (2000). Whatever happened to qualitative description? *Res. Nurs. Health* 23, 334–340. doi: 10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G

Schoenberg, P. L., Ruf, A., Churchill, J., Brown, D. P., and Brewer, J. A. (2018). Mapping complex mind states: EEG neural substrates of meditative unified compassionate awareness. *Conscious. Cogn.* 57, 41–53. doi: 10.1016/j.concog.2017.11.003

Schuling, R., Huijbers, M., Jansen, H., Metzemaekers, R., Den Brink, E. V., Koster, F., et al. (2018). The co-creation and feasibility of a compassion training as a follow-up to mindfulness-based cognitive therapy in patients with recurrent depression. *Mindfulness* 9, 412–422. doi: 10.1007/s12671-017-0783-1

Sears, D. (1998). *Compassion for Humanity in the Jewish Tradition*. Lanham, MD: Jason Aronson.

Shih, C.-Y., Hu, W.-Y., Lee, L.-T., Yao, C.-A., Chen, C.-Y., and Chiu, T.-Y. (2013). Effect of a compassion-focused training program in palliative care education for medical students. *Am. J. Hospice Palliat. Med.* 30, 114–120. doi: 10.1177/1049909112445463

Simon-Thomas, E. R., Godzik, J., Castle, E., Antonenko, O., Ponz, A., Kogan, A., et al. (2011). An fMRI study of caring vs self-focus during induced compassion and pride. *Soc. Cogn. Affect. Neurosci.* 7, 635–648. doi: 10.1093/scan/nsr045

Sinclair, S., Beamer, K., Hack, T. F., McClement, S., Raffin Bouchal, S., Chochinov, H. M., et al. (2017a). Sympathy, empathy, and compassion: a grounded theory study of palliative care patients' understandings, experiences, and preferences. *Palliat. Med.* 31, 437–447. doi: 10.1177/0269216316663499

Sinclair, S., Raffin-Bouchal, S., Venturato, L., Mijovic-Kondejewski, J., and Smith-MacDonald, L. (2017b). Compassion fatigue: a meta-narrative review of the healthcare literature. *Int. J. Nurs. Stud.* 69, 9–24. doi: 10.1016/j.ijnurstu.2017.01.003

Sinclair, S., Russell, L. B., Hack, T. F., Kondejewski, J., and Sawatzky, R. (2017c). Measuring compassion in healthcare: a comprehensive and critical review. *Patient Patient Center. Outcomes Res.* 10, 389–405. doi: 10.1007/s40271-016-0209-5

Sinclair, S., Hack, T. F., Raffin-Bouchal, S., McClement, S., Stajduhar, K., Singh, P., et al. (2018). What are healthcare providers' understandings and experiences of compassion? The healthcare compassion model: a grounded theory study of healthcare providers in Canada. *BMJ Open* 8, e019701. doi: 10.1136/bmjopen-2017-019701

Sinclair, S., McClement, S., Raffin-Bouchal, S., Hack, T. F., Hagen, N. A., McConnell, S., et al. (2016a). Compassion in health care: an empirical model. *J. Pain Sympt. Manag.* 51, 193–203.

Sinclair, S., Norris, J. M., McConnell, S. J., Chochinov, H. M., Hack, T. F., Hagen, N. A., et al. (2016b). Compassion: a scoping review of the healthcare literature. *BMC Palliat. Care* 15:6. doi: 10.1186/s12904-016-0080-0

Singer, T., and Klimecki, O. M. (2014). Empathy and compassion. *Curr. Biol.* 24, R875–R878. doi: 10.1016/j.cub.2014.06.054

Slingerland, E. G., and Collard, M. (eds) (2012a). *Creating Consilience: Integrating the Sciences and the Humanities*. Oxford: Oxford University Press.

Slingerland, E., and Collard, M. (2012b). "Introduction: creating consilience: toward a new wave," in *Creating Consilience: Integrating the Sciences and the Humanities*, eds E. G. Slingerland and M. Collard (Oxford: Oxford University Press), 3–42.

Smart, D., English, A., James, J., Wilson, M., Daratha, K. B., Childers, B., et al. (2014). Compassion fatigue and satisfaction: a cross-sectional survey among US healthcare workers. *Nurs. Health Sci.* 16, 3–10. doi: 10.1111/nhs.12068

Smith, D. W. (2016). "Phenomenology," in *The Stanford Encyclopedia of Philosophy (Winter 2016)*, ed. E. N. Zalta (Stanford, CA: Metaphysics Research Lab).

Sprecher, S., and Fehr, B. (2005). Compassionate love for close others and humanity. *J. Soc. Pers. Relationsh.* 22, 629–651. doi: 10.1177/0265407505056439

Spreitzer, G. M., Cameron, K. S., Lilius, J. M., Kanov, J., Dutton, J. E., Worline, M. C., et al. (2013). "Compassion revealed: what we know about compassion at work (and where we need to know more)," in *The Oxford Handbook of Positive Organizational Scholarship*, eds G. M. Spreitzer and K. S. Cameron (Oxford: Oxford University Press), 273–288.

Steffen, P. R., and Masters, K. S. (2005). Does compassion mediate the intrinsic religion-health relationship? *Ann. Behav. Med.* 30, 217–224. doi: 10.1207/s15324796abm3003_6

Stein, E. (1989). *On the Problem of Empathy*. Trans. W. Stein 3rd Edn, (Washington, DC: ICS Publications).

Stellar, J. E., Cohen, A., Oveis, C., and Keltner, D. (2015). Affective and physiological responses to the suffering of others: compassion and vagal activity. *J. Pers. Soc. Psychol.* 108:572. doi: 10.1037/pspi0000010

Stelter, R. (2010). Experience-based, body-anchored qualitative research interviewing. *Qual. Health Res.* 20, 859–867. doi: 10.1177/1049732310364624

Strathearn, L., Fonagy, P., Amico, J., and Montague, P. R. (2009). Adult atachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology* 34:2655. doi: 10.1038/npp.2009.103

Strauss, C., Lever Taylor, B., Gu, J., Kuyken, W., Baer, R., Jones, F., et al. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clin. Psychol. Rev.* 47, 15–27. doi: 10.1016/j.cpr.2016.05.004

Suchman, A. L., Markakis, K., Beckman, H. B., and Frankel, R. (1997). A model of empathic communication in the medical interview. *Jama* 277, 678–682. doi: 10.1001/jama.1997.03540320082047

Sun, Y. (2019). How conversational ties are formed in an online community: a social network analysis of a tweet chat group. *Inform. Commun. Soc.* 23, 1463–1480. doi: 10.1080/1369118x.2019.1581242

Swain, J. E., Konrath, S., Brown, S. L., Finegood, E. D., Akce, L. B., Dayton, C. J., et al. (2012). Parenting and beyond: common neurocircuits underlying parental and altruistic caregiving. *Parenting* 12, 115–123. doi: 10.1080/15295192.2012.680409

Thornton, R. L. J., Powe, N. R., Roter, D., and Cooper, L. A. (2011). Patient–physician social concordance, medical visit communication and patients' perceptions of health care quality. *Pat. Educ. Counsel.* 85, e201–e208. doi: 10.1016/j.pec.2011.07.015

Tierney, S., Seers, K., Tutton, E., and Reeve, J. (2017). Enabling the flow of compassionate care: a grounded theory study. *BMC Health Serv. Res.* 17:1–12. doi: 10.1186/s12913-017-2120-8

Ṯāhir ul-Qādrī, M. (2015). *Islam on Mercy and Compassion*. Lahore: Minhaj-ul-Quran International.

van Berkhout, E. T., and Malouff, J. M. (2016). The efficacy of empathy training: a meta-analysis of randomized controlled trials. *J. Counsel. Psychol.* 63, 32–41.

Vazire, S., and Mehl, M. R. (2008). Knowing me, knowing you: the accuracy and unique predictive validity of self-ratings and other-ratings of daily behavior. *J. Pers. Soc. Psychol.* 95:1202. doi: 10.1037/a0013314

Waite, F., Knight, M. T. D., and Lee, D. (2015). Self-compassion and self-criticism in recovery in psychosis: an interpretative phenomenological analysis study. *J. Clin. Psychol.* 71, 1201–1217. doi: 10.1002/jclp.22211

Wang, Y., Fan, L., Zhu, Y., Yang, J., Wang, C., Gu, L., et al. (2019). Neurogenetic mechanisms of self-compassionate mindfulness: the role of oxytocin-receptor genes. *Mindfulness* 10, 1792–1802. doi: 10.1007/s12671-019-01141-7

Way, D., and Tracy, S. J. (2012). Conceptualizing compassion as recognizing, relating and (re)acting: a qualitative study of compassionate communication at hospice. *Commun. Monogr.* 79, 292–315. doi: 10.1080/03637751.2012.697630

Weng, H. Y., Fox, A. S., Hessenthaler, H. C., Stodola, D. E., and Davidson, R. J. (2015). The role of compassion in altruistic helping and punishment behavior. *PLoS One* 10:e0143794. doi: 10.1371/journal.pone.0143794

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychol. Sci.* 24, 1171–1180. doi: 10.1177/0956797612469537

Weng, H. Y., Lapate, R. C., Stodola, D. E., Rogers, G. M., and Davidson, R. J. (2018). Visual attention to suffering after compassion training is associated with decreased amygdala responses. *Front. Psychol.* 9:771. doi: 10.3389/fpsyg.2018.00771

Wilson, E. O. (1999). *Consilience: The Unity of Knowledge*, Vol. 31. New York, NY: Vintag.

Wilson, T. D., and Gilbert, D. T. (2003). "Affective forecasting," in *Advances in Experimental Social Psychology*, Vol. 35, ed. M. P. Zanna (San Diego, CA: Elsevier Academic Press), 345–411.

Yoder, E. A. (2010). Compassion fatigue in nurses. *Appl. Nurs. Res.* 23, 191–197. doi: 10.1016/j.apnr.2008.09.003

Zahavi, D. (2018). "Intersubjectivity, sociality, community: the contribution of the early phenomenologists," in *The Oxford Handbook of the History of Phenomenology*, ed. D. Zahavi (Oxford: Oxford University Press), 734–752.

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The Development of Generosity From 4 to 6 Years: Examining Stability and the Biopsychosocial Contributions of Children's Vagal Flexibility and Mothers' Compassion

*Jonas G. Miller[1], Sarah Kahle[2], Natalie R. Troxel[3] and Paul D. Hastings[3]**

[1]Department of Psychiatry and Behavioral Sciences, Stanford University, Stanford, CA, United States, [2]Department of Psychiatry and Behavioral Sciences, University of California, Davis, Sacramento, CA, United States, [3]Department of Psychology, University of California, Davis, Davis, CA, United States

Individual differences in children's prosocial behaviors, including their willingness to give up something of value for the benefit of others, are rooted in physiological and environmental processes. In a sample of 4-year-old children, we previously found evidence that flexible changes in respiratory sinus arrhythmia (RSA) were linked to donation behavior, and that these physiological patterns may support greater sensitivity to the positive effects of compassionate parenting on donation behavior. The current study focused on a follow-up assessment of these children at age 6. First, we examined the stability of individual differences in donation behavior and related parasympathetic nervous system (PNS) activity from age 4 to 6. Second, we examined associations between donation behavior and RSA at 6 years. Third, we examined whether the association between children's RSA and donation behavior at age 6 varied depending on mothers' compassionate love. We found low to modest stability in donation behavior and RSA reactivity from age 4 to 6. These findings provide preliminary evidence that stable individual differences in altruism, as reflected by generosity, and in some aspects of parasympathetic functioning during opportunities to be prosocial, emerge in childhood. In addition, we found that some of the same associations between donation behavior, RSA, and compassionate love that we previously observed in children at 4 years of age continued to be evident 2 years later at age 6. Greater decreases in RSA when given the opportunity to donate were associated with children donating more of their own resources which, in turn, were associated with greater RSA recovery after the task. Lastly, mothers' compassionate love was positively associated with donation behavior in children who demonstrated stronger decreases in RSA during the task; compassionate parenting and RSA reactivity may serve as external and internal supports for prosociality that build on each other. Taken together, these findings contribute to the perspectives that individual differences in altruistic behaviors are intrinsically linked to healthy vagal flexibility, and that biopsychosocial approaches provide a useful framework for examining and understanding the environmental and physiological processes underlying these individual differences.

Keywords: altruism, childhood, compassion, polyvagal theory, vagal regulation

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****Correspondence:***
Paul D. Hastings
pdhastings@ucdavis.edu

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INTRODUCTION

Young children vary in their propensity for prosocial behaviors, including altruistic actions that require sacrificing something of personal value for the benefit of others. Engaging in prosocial behaviors may confer a number of benefits for young children, including positive emotions (Aknin et al., 2018), healthy friendships (Clark and Ladd, 2000), and protection against the development of early behavioral problems (Hastings et al., 2000). Children who are more prosocial than their peers in early childhood are likely to remain relatively more prosocial later in childhood (Grusec et al., 2011). Nevertheless, this longitudinal stability of individual differences appears to be modest (Eisenberg et al., 2015; Schachner et al., 2018) and could vary for different types of prosocial behaviors. In particular, few studies have considered whether individual differences in children's donation behavior are stable over time. Determining the stability of donation behaviors in childhood is important for assessing whether efforts to promote early generosity could plausibly have longer-term implications for proneness to altruism later in life.

Physiological regulation of emotion likely supports children's engagement in and subsequent development of prosocial behaviors (Porges, 1998; Hastings and Miller, 2014). Parasympathetic regulation of cardiovascular activity *via* the myelinated vagus nerve may facilitate social engagement and affective behaviors (Porges, 2011). Decreasing parasympathetic nervous system (PNS) activity in response to challenge can increase cardiovascular activity in support of adaptive orienting and coping, whereas increasing or maintaining PNS activity in safe social contexts may help downregulate stress response systems in favor of a calm, soothed physiological state (Porges, 2011). Given that attention, emotion regulation, and social engagement are all considered important for empathy and prosocial behavior, PNS functioning [as assessed by measures of heart rate variability such as respiratory sinus arrhythmia (RSA)] has garnered significant interest as a physiological correlate of children's prosociality (Eisenberg et al., 1991; Hastings et al., 2000; Miller et al., 2016, 2017; Acland et al., 2019). For example, Miller et al. (2016) found that young children demonstrated initial decreases followed by increases in PNS activity in response to an empathy induction video, potentially reflecting initial orientation to others' distress followed by calm social engagement. Children who demonstrated stronger decreases and increases in PNS activity were more likely to report feeling empathic sadness during the video and were more likely to demonstrate prosocial behaviors 2 years later. In addition to this research on PNS regulation and individual differences in prosociality, some studies imply that the act of helping others in and of itself may also be a behavioral strategy for regulating emotion and physiology (Miller et al., 2015; Inagaki and Eisenberger, 2016; Raposa et al., 2016). For example, in a study of adults, Inagaki and Eisenberger (2016) found experimental evidence that participating in a prosocial task resulted in decreased sympathetic nervous system activation in response to a standardized social stress test. Thus, helping others may downregulate stress response systems.

We combined these research perspectives in a previous study with preschool-age children involving a situation in which they could choose to donate earned resources to other children in need (Miller et al., 2015). We found that greater PNS activation (i.e., higher RSA) while listening to an examiner describe the opportunity to donate, potentially indicating calm attentiveness (Porges, 2007; Hastings et al., 2008), was associated with subsequently making greater donations. When given the opportunity to act, decreasing PNS activity (i.e., decreasing RSA), potentially reflecting allocation of energy to orient upon and engage with a task (Calkins, 1997), was associated with donating more. Giving away more earned resources, in turn, was related to stronger PNS recovery as evidenced by RSA increases after donating was completed. Taken together, these findings suggest both that physiological regulation is important for mobilization of prosocial action and that prosocial behavior itself may buffer against prolonged physiological activation. The observed changes in the associations between RSA and donation behavior also suggested that vagal flexibility – the ability to increase and decrease PNS activity as conditions change (Miller et al., 2013) – may play a role in supporting young children's prosocial behavior.

Although these findings reinforced research suggesting that vagal flexibility is involved in children's prosociality (Hastings and Miller, 2014; Miller et al., 2016; Miller, 2018), there are still significant gaps in our understanding of the development of such associations. For example, it is unclear whether the links between vagal flexibility and children's donation behavior observed in Miller et al. (2015) are specific to the preschool-age period or whether they extend into childhood. In addition, we know little about the longitudinal stability of PNS functioning in prosocial contexts. Although prior longitudinal studies have found modest stability of individual differences in PNS responses to cognitive and negative emotional challenges (Calkins and Keane, 2004; Dollar et al., 2020), to date, researchers have not investigated the stability of physiological regulation specific to opportunities to donate or share with others. Thus, the primary aims of this study were to determine whether the associations between vagal flexibility and generosity observed in preschoolers would be maintained in childhood, and to examine the prospective biobehavioral development of associations between vagal flexibility and generosity over this period.

Young children's prosocial tendencies are not solely a product of individual differences in physiological processes; socialization influences including compassionate caregiving also make important contributions to children's prosocial tendencies (Hastings et al., 2007, 2015; Brownell, 2016). Parents can model prosocial behaviors and empathy (Eisenberg et al., 2006), socialize prosocial values (Kärtner et al., 2010), and express warmth, sensitivity, and responsiveness to their own children's needs (Davidov and Grusec, 2006). Some parents attempt to model generosity to their children which can, in turn, lead to children emulating these behaviors (Ben-Ner et al., 2017). Nevertheless, children may vary in their sensitivity to the effects of different caregiving experiences on their prosocial development (Miller and Hastings, 2016, 2019). Several researchers have posited that individual differences in sensitivity to environmental

influence are rooted in the functioning of neurobiological systems important for regulating arousal, including the PNS (Del Giudice et al., 2011; Ellis et al., 2011). In addition to mobilizing bodily resources in response to environmental stimuli, PNS functioning may play a role in filtering and encoding environmental information (Del Giudice et al., 2011). Thus, PNS functioning may moderate caregiving effects. Few studies, however, have considered biopsychosocial models of prosocial development that examine the joint, interactive contributions of parenting characteristics and children's PNS functioning (Miller and Hastings, 2019). Obradović et al. (2010) found that family adversity was negatively associated with young children's prosocial behaviors (as assessed by self-, mother-, and teacher-report questionnaires) when children showed stronger decreases in PNS activity in response to challenging tasks. Conversely, in a study of maternal emotion socialization strategies and child PNS response to disappointment, Scrimgeour et al. (2016) found that maternal behaviors that emphasized children's focus on their own negative emotions were associated with less mother-reported prosocial development, but only among children who showed weaker decreases in PNS activity in response to disappointment. The findings from Obradović et al. (2010) and Scrimgeour et al. (2016) both suggest that PNS reactivity may represent vulnerability to the adverse effects of negative family environments on prosocial behavior. The findings from these two studies differ, however, in whether this vulnerability is reflected in increased or decreased PNS reactivity. Other studies have found evidence that PNS functioning indicates susceptibility to environmental influence on prosocial behavior rather than just vulnerability to adverse experiences. For example, a recent study of college students found that self-reported peer and parental attachments were positively associated with self-reported prosocial tendencies among participants with lower RSA during a resting baseline task (Zhang et al., 2020). Individuals with lower resting RSA reported the highest and lowest levels of prosocial behaviors under conditions of high and low attachment security, respectively.

These studies are important contributions to biopsychosocial models of prosocial development, but there are several limitations that are also worth noting (Miller and Hastings, 2019). First, studies have not focused on compassionate caregiving practices that are posited to be important for healthy parent-child relationships implicated in children's own prosocial development (Grusec et al., 2000; Mikulincer and Shaver, 2005; Hastings et al., 2015). Second, prior studies have primarily focused on children's PNS activity at rest or in response to challenging or stressful contexts rather than tasks that provide children with opportunities to experience prosocial emotions and to engage in prosocial behaviors (e.g., Eisenberg et al., 1991; Miller et al., 2015, 2016; Coulombe et al., 2019). Third, the existing research on biopsychosocial models of prosocial development has relied almost completely on questionnaire measures of prosocial behaviors and development.

We attempted to address these limitations in further analyses (Miller and Hastings, 2016) of the donation behavior of the 4-year-old children described previously (Miller et al., 2015). In these analyses, we focused on warm, positive aspects of caregiving by assessing mothers' compassionate love, or their cognitions, attitudes, emotions, and behaviors reflecting a deep sense of love and selfless concern for their child and others (Underwood, 2009). Specifically, we examined whether the association of mothers' reported compassionate love and the size of children's donations depended on the children's RSA while the examiner explained the donation task and while donating. Indeed, at 4 years, more maternal compassionate love predicted greater generosity only for children who demonstrated more vagal flexibility during the altruistic donation task, as reflected in higher RSA during the explanation phase and lower RSA during the active donation phase of the task. Thus, vagal flexibility and compassionate caregiving may serve as sources of children's prosociality that build on each other. A third aim of the current study was to test whether these findings, observed in preschoolers, would be replicated at a follow-up assessment in childhood.

Here, we report on analyses of the sample of 4-year-old children described in Miller et al. (2015, 2016) who were subsequently invited back to the laboratory 2 years later at 6 years of age. Our first aim was to examine stability of individual differences in donation behavior and vagal flexibility from 4 to 6 years, hypothesizing that both behavior and physiology would evidence significant stability. Second, we examined concurrent associations between RSA and donation behavior at 6 years, hypothesizing that we would replicate the biobehavioral associations observed when children were 4 years old. Third, we examined whether the interactive effect of mothers' compassionate love and children's RSA predicted donation behavior, hypothesizing that the links between maternal compassionate love and donation behavior would be stronger for children who showed greater vagal flexibility.

MATERIALS AND METHODS

Participants

The study included 74 preschool-age children at Time 1 (mean age = 4.09 years, *SD* = 0.12; 40 girls, 34 boys). Children were predominantly White (74%) and from middle to upper-middle class families (mean annual family income range = $75,000–$90,000; overall annual income range = $15,000–$30,000 to >$120,000). Children with serious cognitive or physical challenges that might interfere with their ability to understand or complete procedures were excluded from the study. A follow-up assessment took place 2 years later and included 54 mother-child dyads for the current analyses (mean child age = 6.18 years, *SD* = 0.21; 26 boys, 28 girls).

Procedure

Children were tested in our laboratory using a similar protocol at both time points. Many of the study procedures have been published in Miller et al. (2015). We repeat them here for the sake of reader convenience. After arriving at our laboratory, children played with an examiner for 10 min. During this time, the examiner explained to children that they would be earning tokens over the course of a visit that could be traded

in for a prize at the end. Approximately 15 min later, electrodes were attached to the child's torso to obtain electrocardiograph (ECG) data. After completing a variety of activities over the course of the lab visit, each child gradually earned 20 prize tokens, which were kept for the child in a token box. Just before the end of the visit, the children were presented with an opportunity to donate their prize tokens.

Measures

Donation Behavior at Time 1 and Time 2

At both time points, we administered a donation task (Grusec and Redler, 1980; Miller et al., 2015) at the end of the lab visit before children received their prize. As described in Miller et al. (2015), at Time 1, children were given an opportunity to donate their prize token to anonymous sick children (fictitious), so that the sick children could also get prizes even though they were unable to come into the lab. At Time 2, children were given an opportunity to donate their prize tokens to anonymous children (fictitious) experiencing hardships. At both time points, the task was divided into three phases.

Instruction Phase

The examiner sat with the children at a table. Children were told that they had earned 20 prize tokens, enough to get a great prize. The examiner then said that they had another job working with children who were unable to come into the lab to earn prizes. The examiner explained to the child that if they wanted to, they could donate some, none, or all of their tokens by moving tokens from their own box to a separate box for the other children. To check that children understood the task, the examiner asked children to point to their own box and the box for the other children. Children were then given a bell to ring when they were done, and the examiner left the room.

Decision Phase

The children were left alone to decide whether and how much to donate by taking tokens out of their own box and placing them into the box for the other children. Children rang the bell when they were done.

Conclusion Phase

The examiner returned to the room, closed the boxes without looking inside them, and put away the task materials. The children were not offered feedback on their behavior during this time.

Respiratory Sinus Arrhythmia at Time 1 and Time 2

Electrodes were attached to children's two lower ribs and on the collarbone to collect ECG data using ambulatory monitors. ECG data were sampled at 500 Hz and were wirelessly transmitted to computers for editing and processing using the Heart Rate Variability software from MindWare Technologies (Gahanna, OH, United States). We computed RSA from the ECG data using spectral analysis. The high-frequency bandpass ranged from 0.24 to 1.04 Hz (Huffman et al., 1998). RSA values were computed in 15-s epochs over the course of the donation task. Previous developmental studies have used similar epoch lengths for computing RSA (Huffman et al., 1998; Miller et al., 2013, 2016). RSA values for each epoch within a phase of the task were averaged together. We computed arithmetic difference scores to represent RSA change from one phase of the donation task to the next (e.g., RSA during decision phase minus RSA during introduction phase). Positive and negative RSA change values represented increases and decreases in RSA, respectively.

Maternal Compassionate Love at Time 2

Mothers completed the compassionate love scale for humanity and the compassionate love scale for close others to report on their compassionate love for strangers (e.g., "I tend to feel compassion for people, even though I do not know them") and for their child (e.g., "I often have tender feelings toward my child when she/he seems to be in need"), respectively (Sprecher and Fehr, 2005). For both measures, mothers rated 21 items on a seven-point scale. We first averaged item-responses within measures; compassionate love scores were correlated across measures (r = 0.34, p = 0.012). We averaged scores across the two scales to form an index of overall compassionate love.

Analyses

We conducted zero-order correlations to examine stability in donation behavior and RSA from 4 to 6 years. We further examined stability of individual differences in a path analysis model that simultaneously included donation behavior, instruction phase RSA, RSA change from instruction to decision, and RSA change from decision to conclusion at age 4 as predictors of these same variables from the age 6 assessment (see **Figure 1**). In a second path analysis model, we tested concurrent associations between donation behavior and RSA at age 6. This model included instruction phase RSA and RSA change from instruction to decision as predictors of donation behavior which, in turn, was modeled as a predictor of RSA change from decision to conclusion (see **Figure 2**). The third analysis examined whether maternal compassionate love and RSA interacted to predict donation behavior. This analysis included a path analysis model testing whether maternal compassionate love interacted with instruction phase RSA and with RSA change from instruction to decision to predict donation behavior. Variables were centered prior to forming interaction terms. Statistically significant interactions were probed further by testing simple slopes at 1 SD above and below the mean of the RSA. Gender was not associated with variables of interest and was not included as a covariate in analyses. All models used maximum likelihood estimation to handle missing data. We estimated robust SEs for model parameters. All path analysis models were conducted using the lavaan package (Rosseel, 2012) in R software (R Core Team, 2017).

RESULTS

Table 1 presents the descriptive statistics and comparisons between Time 1 and Time 2 donation behavior and RSA. On average, children had significantly higher RSA during the instruction

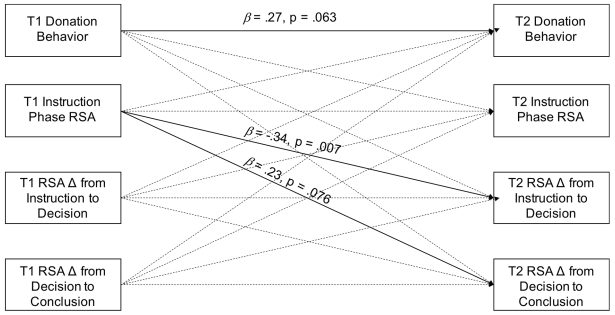


FIGURE 1 | Path model testing of stability of individual differences in donation behavior and RSA from 4 to 6 years of age.

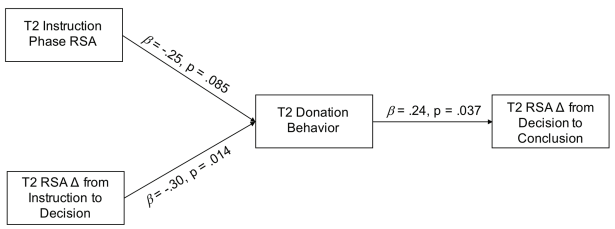


FIGURE 2 | Path model testing cross-sectional associations among donation behavior and RSA at 6 years of age.

phase of the task, and significantly less RSA recovery from the decision to the conclusion phase of the task, at Time 2 compared to Time 1. Children did not show statistically significant differences in donation behavior and RSA change from the instruction to decision phase of the task at Time 1 and Time 2. We also examined zero-order correlations between RSA variables within Time 1 and Time 2. At both time points, higher RSA during the instruction phase was associated with greater RSA suppression to the decision phase of the task ($r = -0.37$, $p = 0.019$ and $r = -0.41$, $p < 0.001$ at Time 1 and Time 2, respectively), and greater RSA suppression to the decision was associated with greater RSA recovery to the conclusion of the task ($r = -0.56$, $p < 0.001$ and $r = -0.49$, $p < 0.001$ at Time 1 and Time 2, respectively). Initial RSA levels at the start of the task were not associated with RSA recovery to the conclusion of the task at either time point (both $p > 0.83$).

Stability of Individual Differences in Donation Behavior and RSA From 4 to 6 Years of Age

Table 1 presents the zero-order correlations testing for stability of individual differences in donation behavior and RSA. There was modest stability in change in RSA from the instruction to decision phase from age 4 to 6 ($r = 0.26$, $p = 0.035$). Children who donated more at age 4 tended to donate more at age 6, but this trend did not reach statistical significance ($r = 0.24$, $p = 0.084$). In addition to stability in RSA during specific phases of the donation task, higher RSA during the instruction phase at 4 years was associated with greater RSA suppression from instruction to decision at 6 years ($r = -0.36$, $p < 0.001$).

Figure 1 presents the path analysis model testing for stability of individual differences in donation behavior and RSA while controlling for all paths from age 4 to 6 variables. Only the association between higher RSA during the instruction phase at 4 years and greater RSA suppression from instruction to decision at 6 years remained statistically significant in the context of controlling for the other variables at age 4 ($\beta = -0.34$, $p = 0.007$). There were, however, trend-level effects of donation behavior at age 4 predicting donation behavior at age 6 ($\beta = 0.27$, $p = 0.063$) and RSA during the instruction phase at age 4 predicting RSA recovery at age 6 ($\beta = 0.23$, $p = 0.076$).

Concurrent Associations Between Donation Behavior and RSA at 6 Years of Age

Figure 2 presents the path analysis testing for concurrent associations between donation behavior and RSA at age 6. Contrary to what we observed at 4 years (Miller et al., 2015), 6-year-old children's RSA during the instruction phase was weakly but not significantly associated with donating behavior ($\beta = -0.25$, $p = 0.085$). Conversely, consistent with our previous findings, greater RSA suppression from instruction to decision was associated with donating more tokens ($\beta = -0.30$, $p = 0.014$), which, in turn, was associated with greater RSA recovery from decision to conclusion ($\beta = 0.24$, $p = 0.037$).

Interactions Involving Maternal Compassionate Love, Child RSA, and Donation Behavior at 6 Years of Age

Table 2 presents the model testing the interactions between child RSA and maternal compassionate love as predictors of donation behavior. Contrary to what we observed at 4 years (Miller and Hastings, 2016), the interaction of compassionate love with child RSA during the instruction phase was not associated with donation behavior ($p = 0.17$). Conversely, and consistent with the earlier observed pattern, the degree to which compassionate love was associated with donation behavior was moderated by RSA suppression from instruction to decision ($\beta = -0.18$, $p = 0.012$). This interaction is presented in **Figure 3**. There was a positive association between maternal compassionate love and donation for children who exhibited greater RSA suppression ($\beta = 0.30$, $p = 0.022$) but not for children who exhibited less RSA suppression ($\beta = -0.14$, $p = 0.259$).

DISCUSSION

There are considerable individual differences in young children's willingness to give up something of value for the benefit of others. Investigating the biobehavioral development of children's donation behavior is important for understanding these individual differences. We found modest stability in donation behavior and specific components of vagal regulation from age 4 to 6.

TABLE 1 | Descriptive statistics, mean comparisons, and zero-order correlations from Time 1 to Time 2.

	Time 1		Time 2		Mean comparison		Correlation	
	Mean	***SD***	**Mean**	***SD***	***t*-value**	***p* value**	***r***	***p* value**
Tokens given	5.09	6.34	4.10	4.27	1.17	0.249	0.24	0.084
Instruction phase RSA	5.45	1.15	6.44	0.97	6.05	<0.001	0.21	0.246
RSA change from instruction to decision phase	−0.00	0.95	−0.07	0.72	0.82	0.418	0.26	0.035
RSA change from decision to conclusion phase	0.54	0.74	−0.14	0.79	4.24	<0.001	0.14	0.295

RSA, respiratory sinus arrhythmia.

TABLE 2 | Regression model testing interactions between maternal compassionate love and child RSA concurrently predicting donation behavior at age 6.

	B	***SE***	***β***	***p***
T2 Instruction phase RSA	−1.22	0.61	−0.28	0.044
T2 RSA change from instruction to decision phase	−1.25	0.75	−0.21	0.092
T2 maternal compassionate love	0.32	0.60	0.05	0.591
T2 instruction RSA × compassionate love	1.10	0.79	0.14	0.165
T2 RSA change from instruction to decision × compassionate love	−1.95	0.77	−0.18	0.019

SE, standard error; T2, Time 2; RSA, respiratory sinus arrhythmia.

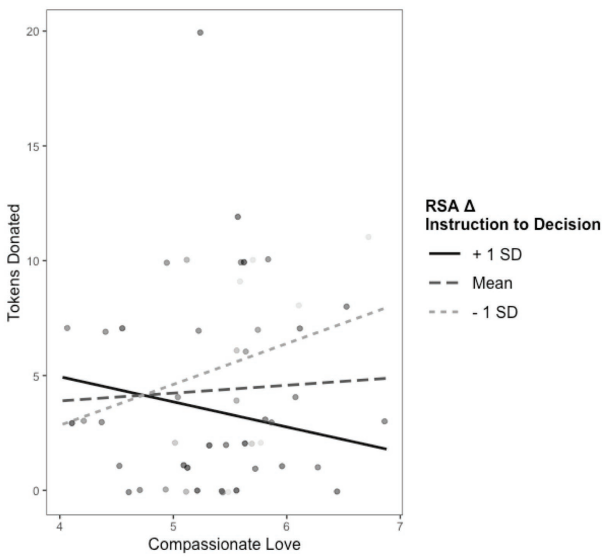


FIGURE 3 | Interaction between maternal compassionate love and RSA change from instruction to decision predicting donation behavior. +1 SD on RSA Δ Instruction to Decision represents increases in RSA from the instruction to decision phase. −1 SD on RSA Δ Instruction to Decision represents stronger decreases in RSA from the instruction to decision phase (i.e., greater RSA suppression).

It should be noted, however, that the longitudinal stability of donation behavior was a borderline effect. In addition to assessing the stability of individual differences in donation behavior and physiology, we examined whether we would observe at 6 years our prior findings with preschool-age children suggesting that vagal flexibility is directly associated with donating more to others (Miller et al., 2015), and that children who demonstrate greater vagal flexibility are even more generous when their mothers report higher levels of compassionate love (Miller and Hastings, 2016). Indeed, some of the same associations between donation behavior, RSA, and compassionate love observed at 4 years continued to be evident 2 years later. Taken together, the current findings contribute to the field's growing understanding of the biopsychosocial bases of early prosocial development.

To our knowledge, these analyses are among the first to test and provide preliminary evidence for modest stability in individual differences in generosity and related parasympathetic regulation over the course of early childhood. Children who donated more tokens at 4 years also tended to donate more at 6 years, which is consistent with previous studies of other kinds of prosocial behaviors suggesting the emergence of a prosocial disposition in childhood (Eisenberg et al., 2015; Schachner et al., 2018). Anonymous prosocial actions like donating to unfamiliar children may not be as stable from preschool-age to early childhood as is the case for some other forms of prosocial behavior like providing help directly to an individual (Miller et al., 2016), but further research with larger samples is necessary to confirm this finding.

Our study also assessed the stability of PNS functioning, during different phases of the donation task, across time. When examining longitudinal stability using zero-order correlations, we found that children who demonstrated greater RSA suppression from the instruction to the decision phase at 4 years were likely to continue demonstrating this pattern at 6 years. This finding extends previous studies showing that individual differences in PNS responses to cognitive and emotional challenges are modestly stable over time (Calkins and Keane, 2004; Dollar et al., 2020); RSA suppression when presented with an opportunity to act and give to others in need may be a stable individual-difference variable. Conversely, RSA levels during the instruction phase and RSA recovery from the decision to conclusion phases of the task were not stable across time (i.e., not associated from age 4 to 6). It has been noted previously that the stability of RSA may depend on the context in which it is measured (El-Sheikh, 2005). Children's RSA in the initial

stages of learning about others in need of help, and RSA recovery following the conclusion of an opportunity to take prosocial action, may reflect physiological processes at the time of measurement rather than trait-like parasympathetic responding. For example, it is possible that the introduction and conclusions phases of the task elicited different emotions or similar emotions but to different degrees, from children when they were age 4 vs. 6 due to children's maturation at the second time point. Conversely, the physiological task demands during the decision phase may have been more consistent across assessments. To our knowledge, this is one of the first longitudinal studies of stability of RSA recovery; in separate analyses of this sample of children, we also failed to see longitudinal stability of RSA recovery from frustration (Kahle et al., 2018, under review). Given the potential importance of autonomic recovery processes for children's emotion and self-regulation (Obradović and Finch, 2017; Kahle et al., 2018; Rudd and Yates, 2018), more research is warranted that considers the stability of RSA recovery across different kinds of tasks.

Our most robust longitudinal association was not an aspect of direct stability. Rather, it was between higher RSA during the instructions phase at 4 years and greater RSA suppression from instruction to decision at 6 years. This association was evident in both the zero-order correlation analysis and path analysis and in cross-sectional analyses at both age 4 and 6. Polyvagal theory (Porges, 2011) posits that higher RSA during safe contexts (e.g., at rest) may indicate capacity for releasing the vagal brake (i.e., RSA suppression) in response to challenge. To our knowledge, the current study is the first to demonstrate that higher RSA in contexts that call for calm social engagement may represent capacity for RSA suppression in response to an opportunity to take prosocial action. RSA suppression from the passive context of the instruction phase of the task to the active context of the decision phase likely supported the mobilization of resources for engaging in the physical act of donating tokens, potentially without the need for engaging the metabolically demanding sympathetic nervous system (Porges, 2011). Consistent with this formulation, we found here that RSA suppression was associated with donating more tokens. The PNS may be part of a social engagement system that is important for positive other-oriented emotions and behaviors (Porges, 2011). Some young children appear to understand and appropriately regulate biobehavioral processes in a prosocial context even in the absence of directly observable cues for helping, such as another person's expression of suffering or request for help.

Studying this sample at age 4, we previously found that vagal flexibility was associated with children's donation behavior (Miller et al., 2015). Specifically, higher RSA during the initial instruction phase of the task and greater RSA suppression from the instruction to decision phase, were associated with children donating more tokens, which in turn was associated with greater RSA recovery in the conclusion of the task. The current analyses of the associations among RSA and donation behavior at age 6 replicate all but the first part of the pattern we observed at age 4. Although initial RSA levels during the instruction phase did not predict donation behavior at 6 years, greater RSA suppression continued to predict donating more tokens at 6 years, and donating more tokens predicted greater subsequent RSA recovery. Greater parasympathetic influence during the conclusion phase of the task may support perceptions of safety (conscious or unconscious) and the experience of calmness in a non-challenging context (Thayer and Lane, 2009; Porges, 2011). Other studies have also found that toddlers show decreased autonomic arousal after helping others (Hepach et al., 2012) and that prosocial behavior in adults leads to diminished sympathetic nervous system reactivity to stress (Inagaki and Eisenberger, 2016). The current findings add to this growing body of research suggesting that prosocial behaviors may be intrinsically effective for soothing one's own arousal (Miller, 2018). Autonomic states underlying perceptions of safety could be one path by which prosocial behaviors confer health benefits across different ages, including childhood. RSA recovery following generous behaviors may also serve as a physiological reinforcement of helping others; some positive emotion states are associated with increased RSA (Kreibig, 2010). Further research, however, is necessary to determine whether RSA recovery supports positive emotions that have been shown promote and reward children's prosocial behaviors (Aknin et al., 2018).

We did not find evidence for the hypothesized link between higher RSA levels during the initial instructions phase of the task and donating more tokens, which we observed when the children were younger (Miller et al., 2015). In fact, the association was in the opposite direction of what we previously observed (negative instead of positive), albeit not at a statistically significant level. When first learning about an opportunity to donate to other children, greater parasympathetic activation at age 4 may support calm social engagement, allowing for the experience of prosocial emotions such as compassion (Stellar et al., 2015). By age 6, children may have been more readily able to understand the task, such that parasympathetic support for calm attentiveness was less necessary, and withdrawal of parasympathetic influence was initiated sooner in preparation for prosocial action. Another possibility is that at age 6, other physiological processes during the instructions phase of the task could be more important for donation behavior than PNS activity. Further research is needed to understand this inconsistency from age 4 to 6.

We also previously found evidence that vagal flexibility moderates the association between maternal compassionate love and donation behavior. Compassionate love was associated with donating more tokens in preschoolers who demonstrated higher initial RSA and greater RSA suppression to the decision phase of the task (Miller and Hastings, 2016). Conversely, compassionate love was not associated with donation behavior in children who demonstrated less vagal flexibility (i.e., lower initial RSA and less RSA suppression to the decision phase of the task). In the current study, we found partial support for these moderation effects at the follow-up assessment when children were 6 years old. Specifically, we found that maternal compassionate love was positively associated with the number of tokens donated in children who showed greater

RSA suppression during the decision phase of the task. This interaction effect suggests that children who demonstrate increased parasympathetic reactivity (i.e., RSA suppression) in prosocial contexts may be particularly sensitive to the positive effects of warm, supportive caregiving from their mothers. Compassionate mothers likely develop emotionally close relationships with their children while also providing an early example of prosocial orientation toward the needs of others. RSA suppression, in addition to coordinating bodily resources for prosocial action, may play a role in encoding environmental information and thus indicate openness to environmental influence (Del Giudice et al., 2011). Taken together, the current study shows the importance of considering children's biobehavioral coordination as embedded in the socializing context of children's close relationships. Our finding suggests that at age 6, RSA suppression and compassionate parenting may serve as internal and external supports for the capacity to act prosocially that build on each other. This finding is also consistent with the formulation that certain child features represent exclusive susceptibility to the benefits of supportive family environments (Pluess and Belsky, 2013). This finding, however, differs from previous studies suggesting that parasympathetic functioning may buffer or exacerbate negative parenting effects on children's prosocial behavior (Obradović et al., 2010; Scrimgeour et al., 2016). Methodological differences may explain these apparent inconsistencies between our finding and those from previous studies. We considered maternal compassionate love, parasympathetic regulation in a prosocial context, and children's observed donation behavior, whereas prior studies focused on other aspects of the family environment, parasympathetic regulation in non-prosocial contexts, and questionnaire-based measures of prosocial behavior (Obradović et al., 2010; Scrimgeour et al., 2016; Zhang et al., 2020). The differences across study findings also could reflect the nuances of biopsychosocial processes implicated in prosocial development. Increased and decreased parasympathetic reactivity are appropriate in different contexts (Hastings et al., 2008), and different aspects of the caregiving environment may contribute to different aspects of children's social-emotional development (Grusec and Davidov, 2010). It is possible that specific aspects of caregiving have a greater impact on children's general positive social development when matched with specific physiological processes in children. Future research is needed to increase our understanding of the complex coordination of context, experience, and physiology that underlies individual differences in prosocial behavior.

We did not, however, observe an interaction between maternal compassionate love and children's initial RSA levels during the start of the task. One potential explanation for this inconsistency from the earlier analyses at age 4 is that RSA suppression reflects a more stable individual difference variable than initial RSA levels at the start of the task, and this stability could support RSA suppression serving as a moderator of environmental input. Indeed, we observed modest longitudinal stability in RSA reactivity to the decision phase of the task but did not observe significant stability in RSA levels during the instructions phase from age 4 to 6.

There are limitations of our study that should be acknowledged and addressed in future attempt to replicate and extend the findings. First, our small sample size may have limited our ability to detect effects, such as the longitudinal stability of donation behavior, at conventional levels of statistical significance. Second, given our correlational study design, we cannot infer whether RSA suppression plays a causal role in donation behavior or whether donation behavior plays a causal role in RSA recovery. Lastly, we assessed parasympathetic regulation in a donation task, but children's prosocial behaviors are rooted in the coordination of multiple neurobiological systems (Hastings and Miller, 2014; Miller and Hastings, 2019). Future research that incorporates other physiological measures could help to further illuminate the neurobiological bases of children's donation behaviors, and help determine whether there are different neurobiological paths to being more generous (Miller, 2018).

The current study represents an important step forward in biobehavioral research on prosocial development. These findings provide preliminary evidence that individual differences in proneness to generosity, and individual differences in some aspects of parasympathetic functioning during these prosocial situations, are emerging in childhood. Our findings also provide an important partial replication of prior findings with this sample at an earlier assessment (Miller et al., 2015; Miller and Hastings, 2016). Conversely, inconsistencies between our current and past findings may be due to developmental differences between 4- and 6-year-old children's PNS responses to donation opportunities. Taken together, this body of work contributes to the perspectives that individual differences in prosocial behaviors are intrinsically linked to healthy vagal flexibility, and that biopsychosocial approaches provide a useful framework for examining and understanding the environmental and physiological processes underlying these individual differences.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of California, Davis Institutional Review Board. Written informed consent to participate in this study was provided by the participants' legal guardian/ next of kin.

AUTHOR CONTRIBUTIONS

All authors designed the study. JM, SK, and NT collected the data. JM processed and analyzed the data and drafted the manuscript. PH provided critical revisions. All authors contributed to the article and approved the submitted version.

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REFERENCES

Acland, E. L., Colasante, T., and Malti, T. (2019). Respiratory sinus arrhythmia and prosociality in childhood: evidence for a quadratic effect. *Dev. Psychobiol.* 61, 1146–1156. doi: 10.1002/dev.21872

Aknin, L. B., Van de Vondervoort, J. W., and Hamlin, J. K. (2018). Positive feelings reward and promote prosocial behavior. *Curr. Opin. Psychol.* 20, 55–59. doi: 10.1016/j.copsyc.2017.08.017

Ben-Ner, A., List, J. A., Putterman, L., and Samek, A. (2017). Learned generosity? An artefactual field experiment with parents and their children. *J. Econ. Behav. Organ.* 143, 28–44. doi: 10.1016/j.jebo.2017.07.030

Brownell, C. A. (2016). Prosocial behavior in infancy: the role of socialization. *Child Dev. Perspect.* 10, 222–227. doi: 10.1111/cdep.12189

Calkins, S. D. (1997). Cardiac vagal tone indices of temperamental reactivity and behavioral regulation in young children. *Dev. Psychobiol.* 31, 125–135. doi: 10.1002/(sici)1098-2302(199709)31:2<125::aid-dev5>3.0.co;2-m

Calkins, S. D., and Keane, S. P. (2004). Cardiac vagal regulation across the preschool period: stability, continuity, and implications for childhood adjustment. *Dev. Psychobiol.* 45, 101–112. doi: 10.1002/dev.20020

Clark, K. E., and Ladd, G. W. (2000). Connectedness and autonomy support in parent-child relationships: links to children's socioemotional orientation and peer relationships. *Dev. Psychol.* 36, 485–498. doi: 10.1037/0012-1649.36.4.485

Coulombe, B. R., Rudd, K. L., and Yates, T. M. (2019). Children's physiological reactivity in emotion contexts and prosocial behavior. *Brain Behav.* 9:e01380. doi: 10.1002/brb3.1380

Davidov, M., and Grusec, J. E. (2006). Untangling the links of parental responsiveness to distress and warmth to child outcomes. *Child Dev.* 77, 44–58. doi: 10.1111/j.1467-8624.2006.00855.x

Del Giudice, M., Ellis, B. J., and Shirtcliff, E. A. (2011). The adaptive calibration model of stress responsivity. *Neurosci. Biobehav. Rev.* 35, 1562–1592. doi: 10.1016/j.neubiorev.2010.11.007

Dollar, J. M., Calkins, S. D., Berry, N. T., Perry, N. B., Keane, S. P., Shanahan, L., et al. (2020). Developmental patterns of respiratory sinus arrhythmia from toddlerhood to adolescence. *Dev. Psychol.* 56, 783–794. doi: 10.1037/dev0000894

Eisenberg, N., Eggum-Wilkens, N. D., and Spinrad, T. L. (2015). "The development of prosocial behavior" in *The Oxford handbook of prosocial behavior*. eds. D. A. Schroeder and W. G. Graziano (Oxford, UK: Oxford University Press), 114–136.

Eisenberg, N., Fabes, R. A., Schaller, M., Carlo, G., and Miller, P. A. (1991). The relations of parental characteristics and practices to children's vicarious emotional responding. *Child Dev.* 62, 1393–1408. doi: 10.1111/j.1467-8624.1991.tb01613.x

Eisenberg, N., Fabes, R. A., and Spinrad, T. L. (2006). "Prosocial development" in *Handbook of child psychology: Social, emotional, and personality development. 6th Edn. Vol. 3*. eds. W. Damon, R. M. Lerner and N. Esienberg (Hoboken, NJ: John Wiley and Sons, Inc), 646–718.

Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., and van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: an evolutionary—neurodevelopmental theory. *Dev. Psychopathol.* 23, 7–28. doi: 10.1017/S0954579410000611

El-Sheikh, M. (2005). Stability of respiratory sinus arrhythmia in children and young adolescents: a longitudinal examination. *Dev. Psychobiol.* 46, 66–74. doi: 10.1002/dev.20036

Grusec, J. E., and Davidov, M. (2010). Integrating different perspectives on socialization theory and research: a domain-specific approach. *Child Dev.* 81, 687–709. doi: 10.1111/j.1467-8624.2010.01426.x

Grusec, J. E., Goodnow, J. J., and Kuczynski, L. (2000). New directions in analyses of parenting contributions to children's acquisition of values. *Child Dev.* 71, 205–211. doi: 10.1111/1467-8624.00135

Grusec, J. E., Hastings, P. D., and Almas, A. (2011). "Helping and prosocial behavior" in *Handbook of childhood social development. 2nd Edn.* eds. C. Hart and P. Smith (Malden, MA: Wiley-Blackwell), 549–566.

Grusec, J. E., and Redler, E. (1980). Attribution, reinforcement, and altruism: a developmental analysis. *Dev. Psychol.* 16, 525–534. doi: 10.1037/0012-1649.16.5.525

Hastings, P. D., and Miller, J. G. (2014). "Autonomic regulation, polyvagal theory, and children's prosocial development" in *Prosocial development: A multidimensional approach*. eds. L. Padilla-Walker and G. Carlo (New York, NY: Oxford University Press), 112–127.

Hastings, P. D., Miller, J. G., and Troxel, N. R. (2015). "Making good: the socialization of children's prosocial development" in *Handbook of socialization: Theory and research. 2nd Edn.* eds. J. Grusec and P. D. Hastings (New York, NY: The Guilford Press), 637–660.

Hastings, P. D., Nuselovici, J. N., Utendale, W. T., Coutya, J., McShane, K. E., and Sullivan, C. (2008). Applying the polyvagal theory to children's emotion regulation: social context, socialization, and adjustment. *Biol. Psychol.* 79, 299–306. doi: 10.1016/j.biopsycho.2008.07.005

Hastings, P. D., Utendale, W. T., and Sullivan, C. (2007). "The socialization of prosocial development" in *Handbook of socialization: Theory and research*. eds. J. Grusec and P. D. Hastings (New York, NY: The Guilford Press), 638–664.

Hastings, P. D., Zahn-Waxler, C., Robinson, J., Usher, B., and Bridges, D. (2000). The development of concern for others in children with behavior problems. *Dev. Psychol.* 36, 531–546. doi: 10.1037/0012-1649.36.5.531

Hepach, R., Vaish, A., and Tomasello, M. (2012). Young children are intrinsically motivated to see others helped. *Psychol. Sci.* 23, 967–972. doi: 10.1177/0956797612440571

Huffman, L. C., Bryan, Y. E., Carmen, R., del Pedersen, F. A., Doussard-Roosevelt, J. A., and Forges, S. W. (1998). Infant temperament and cardiac vagal tone: assessments at twelve weeks of age. *Child Dev.* 69, 624–635. doi: 10.1111/j.1467-8624.1998.tb06233.x

Inagaki, T. K., and Eisenberger, N. I. (2016). Giving support to others reduces sympathetic nervous system-related responses to stress. *Psychophysiology* 53, 427–435. doi: 10.1111/psyp.12578

Kahle, S., Miller, J. G., Helm, J. L., and Hastings, P. D. (2018). Linking autonomic physiology and emotion regulation in preschoolers: the role of reactivity and recovery. *Dev. Psychobiol.* 60, 775–788. doi: 10.1002/dev.21746

Kärtner, J., Keller, H., and Chaudhary, N. (2010). Cognitive and social influences on early prosocial behavior in two sociocultural contexts. *Dev. Psychol.* 46, 905–914. doi: 10.1037/a0019718

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: a review. *Biol. Psychol.* 84, 394–421. doi: 10.1016/j.biopsycho.2010.03.010

Mikulincer, M., and Shaver, P. R. (2005). Attachment security, compassion, and altruism. *Curr. Dir. Psychol. Sci.* 14, 34–38. doi: 10.1111/j.0963-7214.2005.00330.x

Miller, J. G. (2018). Physiological mechanisms of prosociality. *Curr. Opin. Psychol.* 20, 50–54. doi: 10.1016/j.copsyc.2017.08.018

Miller, J. G., Chocol, C., Nuselovici, J. N., Utendale, W. T., Simard, M., and Hastings, P. D. (2013). Children's dynamic RSA change during anger and its relations with parenting, temperament, and control of aggression. *Biol. Psychol.* 92, 417–425. doi: 10.1016/j.biopsycho.2012.12.005

Miller, J. G., and Hastings, P. D. (2016). "Biopsychosocial models of prosociality: compassionate love, vagal regulation, and children's altruism" in *Contexts for young child flourishing: Evolution, family, and society*. eds. D. Narvaez, J. Braungart-Rieker, L. Miller-Graff, L. Gettler and P. D. Hastings (New York, NY: Oxford University Press), 185–200.

Miller, J. G., and Hastings, P. D. (2019). "Parenting, neurobiology, and prosocial development" in *The Oxford Handbook of parenting and moral development*. eds. D. J. Laible, G. Carlo and L. M. Padilla-Walker (New York, NY: Oxford University Press).

Miller, J. G., Kahle, S., and Hastings, P. D. (2015). Roots and benefits of costly giving: children who are more altruistic have greater autonomic flexibility and less family wealth. *Psychol. Sci.* 26, 1038–1045. doi: 10.1177/0956797615578476

Miller, J. G., Kahle, S., and Hastings, P. D. (2017). Moderate baseline vagal tone predicts greater prosociality in children. *Dev. Psychol.* 53, 274–289. doi: 10.1037/dev0000238

Miller, J. G., Nuselovici, J. N., and Hastings, P. D. (2016). Nonrandom acts of kindness: parasympathetic and subjective empathic responses to sadness predict children's prosociality. *Child Dev.* 87, 1679–1690. doi: 10.1111/cdev.12629

Obradović, J., Bush, N. R., Stamperdahl, J., Adler, N. E., and Boyce, W. T. (2010). Biological sensitivity to context: the interactive effects of stress reactivity and family adversity on socioemotional behavior and school readiness. *Child Dev.* 81, 270–289. doi: 10.1111/j.1467-8624.2009.01394.x

Obradović, J., and Finch, J. E. (2017). Linking executive function skills and physiological challenge response: piecewise growth curve modeling. *Dev. Sci.* 20:e12476. doi: 10.1111/desc.12476

Pluess, M., and Belsky, J. (2013). Vantage sensitivity: individual differences in response to positive experiences. *Psychol. Bull.* 139, 901–916. doi: 10.1037/a0030196

Porges, S. W. (1998). Love: an emergent property of the mammalian autonomic nervous system. *Psychoneuroendocrinology* 23, 837–861. doi: 10.1016/S0306-4530(98)00057-2

Porges, S. W. (2007). The polyvagal perspective. *Biol. Psychol.* 74, 116–143. doi: 10.1016/j.biopsycho.2006.06.009

Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. New York, NY: W W Norton and Co., 347.

Raposa, E. B., Laws, H. B., and Ansell, E. B. (2016). Prosocial behavior mitigates the negative effects of stress in everyday life. *Clin. Psychol. Sci.* 4, 691–698. doi: 10.1177/2167702615611073

R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Available at: https://www.R-project.org

Rosseel, Y. (2012). Lavaan: an R package for structural equation modeling. *J. Stat. Softw.* 48, 1–36. doi: 10.18637/jss.v048.i02

Rudd, K. L., and Yates, T. M. (2018). The implications of sympathetic and parasympathetic regulatory coordination for understanding child adjustment. *Dev. Psychobiol.* 60, 1023–1036. doi: 10.1002/dev.21784

Schachner, A. C. W., Newton, E. K., Thompson, R. A., and Goodman-Wilson, M. (2018). Becoming prosocial: the consistency of individual differences in early prosocial behavior. *Early Child. Res. Q.* 43, 42–51. doi: 10.1016/j.ecresq.2018.01.001

Scrimgeour, M. B., Davis, E. L., and Buss, K. A. (2016). You get what you get and you don't throw a fit!: emotion socialization and child physiology jointly predict early prosocial development. *Dev. Psychol.* 52, 102–116. doi: 10.1037/dev0000071

Sprecher, S., and Fehr, B. (2005). Compassionate love for close others and humanity. *J. Soc. Pers. Relat.* 22, 629–651. doi: 10.1177/0265407505056439

Stellar, J. E., Cohen, A., Oveis, C., and Keltner, D. (2015). Affective and physiological responses to the suffering of others: compassion and vagal activity. *J. Pers. Soc. Psychol.* 108, 572–585. doi: 10.1037/pspi0000010

Thayer, J. F., and Lane, R. D. (2009). Claude Bernard and the heart–brain connection: further elaboration of a model of neurovisceral integration. *Neurosci. Biobehav. Rev.* 33, 81–88. doi: 10.1016/j.neubiorev.2008.08.004

Underwood, L. G. (2009). "Compassionate love: a framework for research" in *The science of compassionate love*. eds. B. Fehr, S. Sprecher and L. G. Underwood (West Sussex, UK: John Wiley and Sons, Ltd.), 1–25.

Zhang, Y., Yang, X., Liu, D., and Wang, Z. (2020). Chinese college students' parental attachment, peer attachment, and prosocial behaviors: the moderating role of respiratory sinus arrhythmia. *Biol. Psychol.* 150:107844. doi: 10.1016/j.biopsycho.2020.107844

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Toward a Compassionate Intersectional Neuroscience: Increasing Diversity and Equity in Contemplative Neuroscience

Helen Y. Weng[1,2,3], Mushim P. Ikeda[4], Jarrod A. Lewis-Peacock[5], Maria T. Chao[1,6], Duana Fullwiley[7], Vierka Goldman[1], Sasha Skinner[1,2], Larissa G. Duncan[8], Adam Gazzaley[2,3] and Frederick M. Hecht[1,6]*

[1] Osher Center for Integrative Medicine, University of California, San Francisco, San Francisco, CA, United States, [2] Neuroscape Center, University of California, San Francisco, San Francisco, CA, United States, [3] Department of Psychiatry and Behavioral Sciences, University of California, San Francisco, San Francisco, CA, United States, [4] East Bay Meditation Center, Oakland, CA, United States, [5] Department of Psychology, University of Texas at Austin, Austin, TX, United States, [6] Division of General Internal Medicine, University of California, San Francisco, San Francisco, CA, United States, [7] Department of Anthropology, Stanford University, Palo Alto, CA, United States, [8] School of Human Ecology and Center for Healthy Minds, University of Wisconsin–Madison, Madison, WI, United States

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***Correspondence:**
Helen Y. Weng
helen.weng@ucsf.edu

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Mindfulness and compassion meditation are thought to cultivate prosocial behavior. However, the lack of diverse representation within both scientific and participant populations in contemplative neuroscience may limit generalizability and translation of prior findings. To address these issues, we propose a research framework called *Intersectional Neuroscience* which adapts research procedures to be more inclusive of under-represented groups. Intersectional Neuroscience builds inclusive processes into research design using two main approaches: 1) community engagement with diverse participants, and 2) individualized multivariate neuroscience methods to accommodate neural diversity. We tested the feasibility of this framework in partnership with a diverse U.S. meditation center (East Bay Meditation Center, Oakland, CA). Using focus group and community feedback, we adapted functional magnetic resonance imaging (fMRI) screening and recruitment procedures to be inclusive of participants from various under-represented groups, including racial and ethnic minorities, gender and sexual minorities, people with disabilities, neuropsychiatric disorders, and/or lower income. Using person-centered screening and study materials, we recruited and scanned 15 diverse meditators (80% racial/ethnic minorities, 53% gender and sexual minorities). The participants completed the EMBODY task – which applies individualized machine learning algorithms to fMRI data – to identify mental states during breath-focused meditation, a basic skill that stabilizes attention to support interoception and compassion. All 15 meditators' unique brain patterns were recognized by machine learning algorithms significantly above chance levels. These individualized brain patterns were used to decode the internal focus of attention throughout a 10-min breath-focused meditation period, specific to each meditator. These data were used to compile individual-level attention profiles during meditation, such as

the percentage time attending to the breath, mind wandering, or engaging in self-referential processing. This study provides feasibility of employing an intersectional neuroscience approach to include diverse participants and develop individualized neural metrics of meditation practice. Through inclusion of more under-represented groups while developing reciprocal partnerships, intersectional neuroscience turns the research process into an embodied form of social action.

Keywords: meditation, interoception, neuroscience, diversity, community engagement, intersectionality, mindfulness, machine learning

INTRODUCTION

Contemplative practices such as mindfulness and compassion meditation hold promise for building more cooperative and multicultural societies, as they may increase prosocial behavior (Leiberg et al., 2011; Condon et al., 2013; Weng et al., 2015; Ashar et al., 2016) and neuroplasticity of networks involved in emotion regulation and empathic concern (Mascaro et al., 2013; Weng et al., 2013; Klimecki et al., 2014). Although contemplative research values cross-cultural dialogues between meditation practitioners, scientists, and other stakeholders to produce the strongest work (Varela et al., 1991), cultural forces within academia may prevent inclusion of people who belong to minority groups, and scientific findings may therefore not represent the wider population (Sue, 1999; Henrich et al., 2010; Hamrick, 2019). Further, physical and mental health inequities exist in the U.S. depending on social identities such as race, gender, sexual orientation, and disability status outcomes (CDC, 2013), and contemplative interventions have the potential to reduce stress associated with these disparities (Woods-Giscombé and Black, 2010) and build multicultural communication skills and communities (Magee, 2019; Yang, 2017). However, within contemplative research, racial and ethnic minorities are under-represented in randomized control trials of mindfulness-based interventions (Waldron et al., 2018) and neuroscience studies of meditation using functional magnetic resonance imaging (fMRI; see **Supplementary Information [SI]** p. 2 and **Supplementary Figure S1**). In addition, racial and ethnic minorities may also belong to other under-represented groups such as sexual and gender minorities and people with disabilities.

Here, we propose an *Intersectional Neuroscience* framework within the context of contemplative neuroscience to address these issues. In this framework, an intersectional lens (Crenshaw, 1991; Cole, 2009; Cho et al., 2013) is applied to neuroscience research procedures and methods, which aims to make the research as diverse and inclusive as possible, particularly for people who belong to multiple marginalized identities (such as women of color). To develop and pilot the feasibility of this framework, we used (1) community engagement with a diverse contemplative community to increase cultural sensitivity of research procedures to various under-represented groups (Wallerstein and Duran, 2010), and (2) individualized multivariate fMRI methods that accommodate neural diversity and produce subject-specific brain maps and statistics (Norman et al., 2006) representing mental states during breath-focused meditation. By adopting and integrating these methods, we aim to embody a more compassionate research framework that includes diverse identities and creates more equitable relationships.

The Intersectional Neuroscience approach is informed by intersectionality, an analytic framework which recognizes that lived experiences include multiple aspects of identity (e.g., race, gender, sexual orientation, disability status), which may simultaneously experience marginalization from multiple systems of power that favor or privilege certain identities over others (Crenshaw, 1991; Cho et al., 2013). Intersectionality frameworks emerged from Critical Race and Feminist studies to understand, for example, the marginalized experiences of Black women which could not be fully characterized through the single framework of race or gender alone (Crenshaw, 1991; Cho et al., 2013). Psychologists are also incorporating intersectional frameworks, recommending inquiries that take intersectional identities and perspectives into account, thereby improving theoretical and empirical methods to understanding social identities and interactions (Cole, 2009).

Community-based participatory research (CBPR) is an ideal methodology with which to implement intersectional principles, as a "transformative research paradigm that bridges the gap between science and practice through community engagement and social action to increase health equity" (Wallerstein and Duran, 2010). CBPR is an overall research approach, which aims to equalize power relationships between academic and community research partners, given historical inequities between scientists and marginalized groups (such as in the Tuskegee experiment; Green et al., 1997). Core principles include genuine partnership and co-learning, applying findings to benefit all partners, and long-term partnership commitments (Israel et al., 1998), which are developed through accountability, cultural humility, and the capacity of academics to reflect on their personal and institutional power (Wallerstein and Duran, 2010). To equalize power differentials, community and academic perspectives are engaged throughout the research process to address cross-cultural understandings of external validity, evidence, language, business as usual within academia, sustainability of interventions, and lack of trust (Wallerstein and Duran, 2010). Similar frameworks are advocated within contemplative neuroscience between scientists and contemplatives (Lutz and Thompson, 2003). Importantly, the research process then becomes bidirectional with continuous communication and sharing of resources and credit, which replaces the *status quo* of one-way transmission of knowledge from researchers to participants (Wallerstein and Duran, 2010).

In this way, the research process becomes a form of *embodied social action*, or a way to embed compassionate behavior into research. These processes result in more effective and sustainable solutions for communities who are empowered to be active partners in the research process and cultivating their health (Wallerstein and Duran, 2010).

To integrate intersectional approaches with neuroscience, we highlight using individualized neuroscientific methods that accommodate neural diversity and can therefore be inclusive of more people. A major barrier to inclusion for many fMRI studies are due to individuals having "non-normal" brain structure and function including left-handers, those with mental health conditions and neurological disorders, and older adults. This is due to the common analytic approach of mathematically normalizing individual brains by warping them to a group template, and then performing standard univariate analyses to find regions that show greater average activity across the whole group (Dumit, 2004; Huettel et al., 2014). This approach assumes that brain structure and function are similar across people, and the resulting data are brain maps that are thought to generalize across the population. Within psychology and neuroscience, idiographic approaches that highlight within-subjects designs are gaining traction in addition to nomothetic approaches (Barlow and Nock, 2009; Poldrack et al., 2015; Smith and Little, 2018). Although group averages are useful, there are important limitations regarding efficiency and flexibility of these designs, such as generality of results (Barlow and Nock, 2009). Further, small-N designs treat the individual as the replication unit by collecting more data within each participant, and can help inform measurement, theories and models, and lack of effective experimental control over error variance (Smith and Little, 2018). Within neuroscience, idiographic personalized neuroscience approaches are gaining traction, using methods such as functional connectivity (Poldrack et al., 2015), multi-voxel pattern analysis (Norman et al., 2006; Haxby et al., 2014), and representational similarity analysis (Kriegeskorte et al., 2008). For instance, in the MyConnectome project, dynamic characteristics of brain connectivity, gene expression, and metabolites are collected and analyzed within one individual over multiple time points (Poldrack et al., 2015).

Multi-voxel pattern analysis (MVPA) is an ideal method to use within an Intersectional Neuroscience framework. MVPA uses machine learning algorithms to (i) identify unique brain patterns for each mental state within each individual, and then (ii) use these brain patterns to estimate the presence of mental states in a separate task (Norman et al., 2006; Haxby et al., 2014), such as whether short or long-term memory is being represented during a working memory task (Lewis-Peacock and Postle, 2008), or empathic care or distress is activated in response to suffering (Ashar et al., 2017). The resulting data are then *estimates of the presence of mental states*, which are information *derived from* but not *reduced to* brain maps alone (Kriegeskorte et al., 2006). This moves the field forward in what information may be gleaned from neural data. By identifying brain maps associated with mental states (and not stopping there as the main dependent variable of interest), information from these brain patterns can be learned using machine learning to make inferences about which mental states are present and how they are functioning (Norman et al., 2006; Haxby et al., 2014). Importantly, MVPA makes no assumptions about brain normativity and can be conducted in native space. By harnessing neural variability as a *strength* to find within-subject patterns, more groups with "non-normal" brains can be included.

Individualized approaches such as MVPA may be well-suited to measure mental states during meditation, which are internal and fluctuating between various states (Hasenkamp et al., 2012; Weng et al., 2017). For example, in breath-focused meditation (a core meditation skill that cultivates stability of attention which supports interoception and compassion), attention is focused on sensations of the breath, until distracted by other internal or external stimuli, and then attention is returned nonjudgmentally to the breath. This practice is simple but not easy. Even in this simple practice, the focus of attention will fluctuate over time between attention to the breath, mind wandering, and engaging in self-referential processing (Hasenkamp et al., 2012; Lutz et al., 2015). In the EMBODY task (**E**valuating **M**ultivariate Maps of **BODY** Awareness), we trained MVPA classifiers with fMRI data to recognize five foci of internal attention states (breath, feet, mind wandering, self-referential processing, sounds), which were directed via audio instructions (Weng et al., 2020). Unique brain patterns for each condition were recognized in 14 out of 16 participants (87.5%, including 8 experienced meditators and 6 novice controls). These brain patterns were then used to decode the presence of mental states during 10 min of breath-focused meditation, which characterized the unique fluctuation of internal attention states for each meditator. To our knowledge, this task was the first to provide brain-derived estimates of attentional focus during meditation at the individual level, such as the percentage time focused on the breath (Weng et al., 2020). Importantly, this individualized multivariate approach is well-suited to studying diverse populations because it allows for individual variability of neural representations of mental states.

In this paper, we develop and pilot the feasibility of an Intersectional Neuroscience framework to study diverse meditators, which is rooted in an inclusive and equitable approach to conducting contemplative neuroscience using multiple methods. First, we partnered with the diverse East Bay Meditation Center (EBMC) in Oakland, CA using community engagement to create study criteria, procedures, and materials that were culturally sensitive to racial and ethnic minorities, sexual and gender minorities, people with disabilities, and people with lower socioeconomic resources. Next, we conducted the EMBODY task, which was designed to accommodate diverse neural structure and function, with an initial sample of 15 diverse EBMC meditators. We tested whether the individualized nature of the EMBODY task would be feasible in this diverse sample, where machine learning classifiers could be used to (i) recognize participant-specific brain patterns relevant to breath-focused meditation (breath attention, mind wandering, self-referential processing), (ii) decode these mental states that uniquely fluctuate during meditation practice for

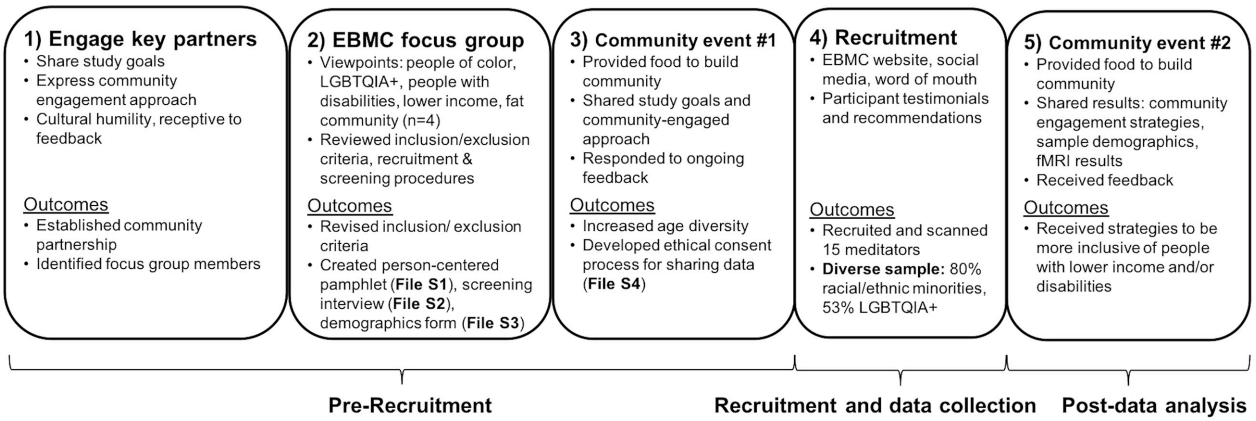


FIGURE 1 | Community engagement steps to increase cultural sensitivity and diversity within fMRI studies. Community engagement with the East Bay Meditation Center (EBMC) was conducted in 5 main steps: (1) engaging key community partners, (2) conducting an EBMC focus group to make study procedures inclusive of people of color, sexual and gender minorities, people with disabilities, and people with lower income, (3) holding a community event at EBMC to share information about the study and receive additional community feedback, (4) recruitment using the EBMC website and social media, and (5) sharing study results at a second community event and receiving additional feedback to improve inclusivity and cultural sensitivity. Steps 1–3 were conducted before study recruitment (∼1 year), Step 4 was conducted during recruitment and data collection (∼2 years), and Step 5 was conducted after data collection and analysis. Main outcomes included revising inclusion/exclusion criteria to be more inclusive, creating person-centered study materials (pamphlet, screening interview, demographics form), developing an ethical consent process for data sharing, and recruiting a diverse sample of EBMC meditators. Key community members received coauthorship on presentations and papers for their work. To conduct community engagement activities, researchers used grant funding to support EBMC for community consultation, space rental, and providing food for events.

each meditator, and (iii) quantify individual-level attention metrics such as the percentage time attending to the breath (Weng et al., 2020).

MATERIALS AND METHODS

Intersectional Neuroscience, Approach 1: Community Engagement to Increase Diversity of Participants

In a review of racial and ethnic demographics in U.S. fMRI studies of meditation (SI p. 2; **Supplementary Figure S1**), we found an under-representation of Black or African Americans, Native Americans or Alaska Natives, Hawaiian or Pacific Islanders, and Hispanic or Latinx people compared to the 2010 U.S. Census. These groups may be under-represented because they have been historically marginalized by scientific communities (Green et al., 1997; Goering et al., 2008). To make our contemplative neuroscience study more diverse and inclusive, we applied CBPR principles (Wallerstein and Duran, 2010) in an academic-community partnership between the University of California San Francisco and the East Bay Meditation Center (EBMC[1]) in Oakland, California. EBMC is considered one of the most diverse contemplative communities in the U.S. (see Footnote 1; 2014 class enrollment included 54% racial/ethnic minorities and 42% LGBTQI+). EBMC was founded on principles of diversity and social action, and provides inclusive contemplative spaces for marginalized groups, such as racial and ethnic minorities, sexual and gender minorities, and people with disabilities (Yang, 2017). EBMC's culture is centered around social justice, where they have Agreements for Multicultural Interaction[2] to guide respectful communication among members who vary in identities and social power, and offer year-long courses such as *Practice in Transformative Action* specifically for social justice activists. Thus, EBMC was an ideal community to partner with in making neuroscience procedures more inclusive of diverse meditators. We applied an intersectional framework to improve the study's inclusivity of people belonging to multiple marginalized identities and received feedback from EBMC in several stages: engaging key community members, conducting a focus group to review neuroscience procedures, holding community events at EBMC to share information about the study, and receiving ongoing community feedback (**Figure 1**).

Engaging Key Community Members

We reached out to two key EBMC community members: Mushim Ikeda, a core teacher and internationally known mindfulness teacher, and Xiaojing Wang, the Programs and Finance Director. We established an initial working relationship through expressing our goals to make our study more inclusive, being open to feedback, and practicing cultural humility (Tervalon and Murray-García, 1998). We directly acknowledged the history of unequal power dynamics between scientists and marginalized groups, and asked for direct feedback if unequal interactions occurred in the study (SI p. 3). Communication was conducted via e-mail, phone, and an in-person meeting in Oakland. Once our team was vetted by the key contacts, they reached out to EBMC members to form a focus group

[1]https://eastbaymeditation.org/

[2]http://www.emergingsf.org/wp-content/uploads/2017/08/EBMC_AgreemntsMulticulturalInteractions15.09.13-copy.pdf

to provide study feedback. Key community partners were paid $40/hour for consultation, and focus group members were paid $30/hour.

Focus Group

The focus group was composed of three EBMC members, representing perspectives from the People of Color sangha (racial and ethnic minorities), the Alphabet Sangha (LGBTQIA+ people), and the Every Body Every Mind sangha (people with disabilities and chronic health conditions). In addition, the key contact Mushim Ikeda (MI) was present to facilitate communication and provide feedback. Perspectives were also given to represent the fat community (Dickins et al., 2011) and people with lower income. Food was provided from a local restaurant to build community, and was clearly labeled to avoid allergic reactions. The Principal Investigator (HYW) provided handouts and went through current standard procedures for recruitment, screening, and conducting fMRI scans. Feedback was given in inclusion/exclusion criteria to make the study more inclusive of under-represented groups, to create person-centered recruitment materials (pamphlet with welcoming language that described study requirements, including MRI information), to assess demographics with language representing lived identities as well as standard reporting categories, and to ensure disability access to the MRI scanner.

Importantly, because the study was using individualized neuroscientific methods, inclusion/exclusion criteria could be revisited including current medical and psychiatric illness, as well as substance use. Changes were made as long as they did not interfere with the main purpose of the experiment: to measure attentional states during breath-focused meditation. By including and responding to perspectives from *multiple marginalized identities*, we are embodying principles of Intersectional Neuroscience by ensuring people who have one or more marginalized identities would have access to the study (such as a person of color who is also queer and has a disability).

Community Events

Two community events were held at EBMC to engage the broader community. The first event was held to share information and receive feedback about the study and to recruit potential participants. The event was advertised through community word of mouth and EBMC social media, and promotion images and language were vetted by MI and the event coordinator. The event was 2 h long, with food provided 30 min before (meat and vegetarian options, listing ingredients for people with food sensitivities), and ∼30 members attended. The event included an introduction (EBMC staff member) and guided meditation (MI), a slide presentation on the community-engaged neuroscience study with diverse EBMC meditators (HYW), and a group discussion of what EBMC members would like scientists to study.

The second community event was held after the neuroscience study was completed ($N = 15$). We shared preliminary results in the diversity of the sample and the neuroscience findings, and received additional feedback on how to make the study more sensitive to people with lower income and people with disabilities (who were still under-represented in our sample).

Recruitment and Screening

Participants were recruited from the community event, EBMC social media postings, and word of mouth through community members. Study team members were trained in culturally sensitive recruitment and screening procedures. Importantly, some EBMC members would check with those who had already participated to see if they had positive experiences with the study team before agreeing to participate. This highlights the importance of having a culturally sensitive team. Participants were phone screened with the revised person-centered interview.

Ongoing Community Collaboration and Feedback

Community and participant feedback were welcomed throughout the study. During the community event, an EBMC member from the People of Color sangha (DF) brought up concerns regarding neuroscience data safety and consent procedures, particularly when using participants' individualized neural signals which could potentially re-identify them. Cultural shifts in scientific practices encourage researchers to openly share partial or full datasets after publication, particularly with "big data" sources such as genetics and neuroimaging data (Lunshof et al., 2008). One key issue in research with marginalized populations is whether data are ethically consented to be used for secondary analyses and shared with other researchers (Goering et al., 2008). In collaboration with DF, we developed a community-engaged ethical consent procedure for participants to consent to sharing different types of data (demographics, survey, fMRI) and to be informed of potential medical issues from the brain scan. We drafted the consent form, sent it to community members for feedback, and received IRB approval.

Summary of Community-Engaged Recruitment, Screening, and fMRI Procedures

Based on community feedback, we updated inclusion/exclusion criteria, recruitment and phone screening procedures, demographics assessment, consent procedures for data sharing, and MRI scan procedures to be more culturally sensitive by being more inclusive and person-centered (**Table 1**). Inclusion/exclusion criteria were made more inclusive in terms of meditation experience requirements ($\geq$5 years of $\geq$90 min weekly practice over the lifetime, taking into account life experiences and financial constraints), age (25 years and older), and typical health criteria (being inclusive of more mental and physical health conditions as long as they did not impact daily functioning or the main process being studied: attention to breath and meditation). In addition, participants were included if they used drugs or alcohol, as long as they were willing to abstain before the fMRI scan. A study pamphlet was created that used person-centered language to describe the study goals and criteria, groups included, fMRI environment, and potential exclusion criteria (**Supplementary File S1**). The pamphlet was distributed at EBMC so potential participants could self-select in or out of the study, and the study was also advertised online using EBMC social media. A phone screening interview was updated to reflect these person-centered changes to procedures and language (**Supplementary File S2**). We updated the demographics questionnaire to assess both

TABLE 1 | Summary of community-engaged changes to fMRI research procedures to improve inclusivity and cultural sensitivity.

Study Procedure	Changes	Rationale
Inclusion/Exclusion Criteria	• Meditation experience: originally 5 consecutive years, with ≥ 2 weeks of silent retreat practice (Weng et al., 2020). Modified to 5 years over the lifetime, with any form of extended practice with teacher guidance (such as a half-day retreat or longer class) • Age: Original range was 25–65 years; modified to 25 years and older • Standard fMRI inclusion/exclusion criteria screen out participants who may have different brain structure and function. Modification: only exclude people who would have difficulty performing the fMRI task, have health conditions that directly impact smooth breathing or ability to focus on daily tasks, or are unwilling to abstain from substances that impact attention before MRI	Allow for breaks in practice due to life events (such as childbirth); silent retreats may require additional financial and time resources Greater age range is more inclusive and feasible with individualized approach Group-normed averaging not required with individualized MVPA, so can include more groups with diverse neural structure and function. Inclusion/exclusion based on fMRI safety, comfort, and ability to do task (pay attention to breath and internal experiences)
Person-centered study pamphlet (Supplementary File S1)	Content of the pamphlet: • Used language that reflected the interests of participants (whether the study would be a good fit for them), not the goals of scientists (whether participants are a good fit for the study) • Explicitly stated the study goals of diversity and inclusivity • Described inclusion criteria (meditation practice and age) and participation requirements (study steps, time, and compensation).	Focus group feedback underscored importance of clearly demonstrating cultural sensitivity and describing the study procedures and inclusion/exclusion criteria in simple language Materials described study using person-centered approach that emphasized the perspective of diverse participants
	• Described the fMRI environment and task using images and simple descriptions • Explained exclusion criteria in a person-centered way ("Who cannot currently participate") and described the rationale for excluding people with conditions that impact attention (schizophrenia and/or bipolar disorder) • Included a map and directions to the study site, public transportation options, and travel resources for people with disabilities	Potential participants were able to self-select in or out based on the main criteria before contacting the study team for a phone screening interview
Phone Screening (Supplementary File S2)	• Revised to use person-centered language to assess safety and comfort in the MRI, medical and psychological functioning, pregnancy status for all genders, current substance use, and potential disabilities that could benefit from accommodations	Assess eligibility and study accommodations in a cultural sensitive way
	• Gender identity and pronouns assessed • Study personnel trained in the person-centered approach and given rationale for changes made based on community feedback	Ensure study personnel used appropriate pronouns throughout the study
Demographics assessment (Supplementary File S3)	• Participants could self-identify using their own language for race, ethnicity, and gender identity (i.e., *"How do you self-identify your gender?"*) • Contextualized and provided scientific terms from which participants could self-select	Represent both personal and scientific perspectives
Informed consent procedure for data sharing and incidental medical findings (Supplementary File S4)	• Developed an additional consent form and procedure for participants to be fully informed of, and consent to, both the benefits and risks associated with sharing their data (demographics, brain, survey) with the scientific community • Participants could indicate whether they wanted to be notified if scientists found a concerning MRI result (while acknowledging this was not a clinical scan) • Participants could choose each type of data they were willing to share from demographics, survey, and brain data. Brain data were described in terms of original raw data and reduced analyzed data, such as individualized brain maps and resulting attention metrics	Ensuring an ethical consent process to share data from under-represented groups, particularly when participants' individualized neural signals which could potentially re-identify them
MRI scan procedures	• Option for participants to have a test MRI visit to assess comfort • Falls prevention training for staff to help participants with mobility issues • Study could accommodate participants who are vision-impaired (auditory instructions used) • To accommodate head shape and size, can use 64- or 20-channel head coil • Study team built relationships with the participants by validating any difficult experiences (e.g., anxiety within the medical environment), made any accommodations requested, and dialogued about EBMC experiences	Cultural sensitivity and skills for those with MRI comfort, movement, and vision issues Individualized MVPA analyses can accommodate differences in equipment Building emotional safety and responsiveness

lived identities (where participants could self-identify) as well as scientific categories (**Supplementary File S3**). We created an informed consent procedure and form for sharing data, where participants were informed of the benefits and risks of sharing data, and could choose which data they were willing to share (**Supplementary File S4**). Finally, MRI procedures were accommodated for comfort and claustrophobia (participants could schedule a 30-min practice session), mobility and vision

TABLE 2 | Self-Identified Participant Characteristics with Corresponding Standardized Reporting Categories.

	Self-Identified characteristics (n)	Corresponding standardized reporting categories	Percent (*n*)
Gender	Cisgender female (1), female (2), woman (2)	Female	33.3 (5)
	Cisgender male (2), cis male (1), male (6)	Male	60.0 (9)
	Queer (1)	Another identity such as transgender, intersex, and/or non-binary genders	6.7 (1)
Pronouns	He/Him/His (8)	Not applicable	53.3 (8)
	She/Her/Hers (5)		33.3 (5)
	They/Them/Theirs (1)		6.7 (1)
	Other: He/Him/They (1)		6.7 (1)
Race	African American (1)	Black or African American	6.7 (1)
	Purepecha, Indigenous (1)	American Indian or Alaska Native	6.7 (1)
	Asian American (1), Pilipino-AM (1), South Asian Indian (1), No response (1)	Asian	26.7 (4)
	White (3)	White	20.0 (3)
	African American, White (1); Black (2); Chicano, Native, White (1); Latinx (1); Latinx/Mixed (1)	Multi-racial*	40 (6)
Ethnicity	Chicano/Native American and White (1); Iranian (1); Latinx, Chicanx, Halfsican, Queer (1); Purepecha (1)	Hispanic or Latino	26.7 (4)
	African American, Scottish (1); Buddhist (1); Gujarati, Indian, South Asian American (1); Jewish, English (1); Korean American (1); Midwestern (1); Pilipino-American (1), No response (4)	Not Hispanic or Latino	73.3 (11)
Sexual Orientation	Lesbian (1), Queer (1), No response (2)	Lesbian/Gay/Homosexual	26.7 (4)
	Bisexual (1), Queer (1)	Bisexual/Pansexual	13.3 (2)
	Heterosexual (4), Infrequent (1), No response (2)	Straight/Heterosexual	46.7 (7)
	Queer (1)	Asexual	6.7 (1)
	Queer (1)	Do Not Wish to Specify	6.7 (1)

*Using the demographics form developed through community engagement, participants reported their self-identified categories representing their lived experiences for gender, pronouns, race, ethnicity, and sexual orientation. In addition, they chose which corresponding standardized category they wanted to be reported in the scientific literature. Asking for both self-identified and standardized categories improves cultural sensitivity of studies by honoring the lived identifies of participants while also providing information for scientific reporting. Standardized reporting categories for race and ethnicity were based on guidelines from the U.S. National Institutes of Health (NIH). *Participants indicated all NIH categories of races that applied. If they chose more than one race, they were included in the multi-racial category.*

issues, and head shape and size (64 or 20-channel head coil used; **Table 1**).

Participant Demographics and Diversity

Participants were 15 adults (mean age = 40.0, SD = 7.0, range 26–72), with at least 5 years of lifetime meditation practice (> = 90 min/weekly, where half of practice is on breath and/or body sensations), and at least a half-day of retreat or class practice. To show the range in lived identities, **Table 2** reports gender identity, pronouns, race, ethnicity, and sexual orientation using both (1) self-identified and (2) corresponding standardized reporting categories chosen by participants. Gender identities included cisgender male (n = 9), cisgender female (n = 5), and another identity (queer, n = 1). Many participants (80%, 12/15) reported being racial minorities, including 6 participants who reported being multi-racial (40%). 36.4% (4/11) of participants reported their ethnicity as Hispanic or Latino (also called "Latinx" to represent all genders). Participants self-identified a wide range of ethnicities beyond the two NIH categories. Note that some participants identified their race as Latinx, even when NIH separates race and ethnicity into separate categories, showing the diversity of lived experiences. Almost half of the sample reported being a sexual minority (46.7%, 7/15), including 4 participants identifying as Lesbian/Gay/Homosexual, 2 participants identifying as Bisexual/Pansexual, and 1 participant identifying as Asexual. Some participants reported being a member of both a racial/ethnic minority and a gender and/or sexual minority, showing that participants with intersectional identities were represented.

In **Table 3**, additional participant demographics are included to characterize aspects of socioeconomic status (education level, employment status, income, and health insurance) and spoken languages. The sample was highly educated, where all 15 participants received a Bachelor's degree or higher. Most participants were working for pay (73.3%, 11/15), and the mean and median income were in the range of $50,000-$59,999. 80% of participants had health insurance. All participants spoke English, and 40% spoke additional languages. In addition, 53% of participants (8/15) reported Buddhism as a religious affiliation. Based on the more inclusive criteria, the study also included participants who reported current mental health issues (20%, 3/15), were currently taking psychiatric medications (13.3%, 2/15), or experienced migraines (6.7%, 1/15). No participants reported having any physical disabilities.

TABLE 3 | Additional participant demographics.

Characteristic	
Age, mean (SD)	40.0 (7.02)
Range	26–52
Education	**Percent (*n*)**
Bachelor's degree	20.0 (3)
Some graduate work	13.3 (2)
Master's degree	53.3 (8)
Doctoral degree	13.3 (2)
Employment status	
Working for pay	73.3 (11)
Unemployed and looking for work	6.7 (1)
Student	13.3 (2)
Income	
$0- $19,999	20.0 (3)
$20,000 - $49,999	26.7 (4)
$50,000 - $99,999	33.3 (5)
Over $100,000	20.0 (3)
Has health insurance	80.0 (12)
Spoken Languages	
English only	53.3 (8)
English and other language(s)	40.0 (6)
No response	6.7 (1)

Additional participant demographics including age, aspects of socioeconomic status (education, employment, income, health insurance), and spoken languages.

Intersectional Neuroscience, Approach 2: Individualized Neuroscience Methods to Accommodate Neural Diversity

EMBODY Task: Individualized Machine Learning to Measure Mental States During Meditation

The EMBODY (**E**valuating **M**ultivariate Maps of **BODY** Awareness) task uses the strengths of individualized multivariate neuroimaging analytic methods (multi-voxel pattern analysis or MVPA; Norman et al., 2006; Haxby et al., 2014) to accommodate structural and functional neural diversity. The EMBODY framework uses MVPA applied to fMRI data to learn and decode mental states during meditation, producing novel individual-level metrics of internal attention during meditation, such as the percentage time attending to the breath (Weng et al., 2020). The EMBODY framework was initially tested in 16 participants, which confirmed the individualized methods were feasible for most participants (87.5%) and all 8 experienced meditators.

Using the same EMBODY fMRI protocol and data analyses as Weng et al. (2020), this brief description highlights how the idiographic approach of the Intersectional Neuroscience framework produces person-specific attention metrics using individualized brain signals. We tested whether the individualized EMBODY task would be feasible in 15 diverse meditators from EBMC. First, we tested whether MVPA classifiers would be able to recognize individualized brain patterns representing internal attention states relevant for breath-focused meditation (Step 1). Next, we used these learned brain patterns to decode or estimate the mental states during the meditation period for each individual, revealing their unique fluctuation of mental states during meditation (Step 2). Finally, these decoded mental states were quantified into individual-level metrics of attention such as percentage time attending to the breath (Step 3). See Weng et al. (2020) for full methodological details, which are briefly reviewed below.

Procedure

Full eligibility was assessed via phone interview (**Supplementary File S2**). Participants were consented, trained in MRI task procedures, and then completed a 2-h MRI protocol. They were paid $75 for participation and $\leq$ $20 for travel. All participants provided written informed consent for study participation and data sharing (approved by the Institutional Review Board of the University of California, San Francisco, Protocol #15-16716).

Step 1: Individualized brain patterns representing internal attention

At a participant-specific level, we first tested whether MVPA classifiers could distinguish between fMRI brain patterns of internal attention relevant for meditation in this diverse sample. In the Internal Attention (IA) task, participants were instructed to change their focus of internal attention to five states, including mental states relevant for breath-focused meditation (attention to breath, mind wandering, and self-referential processing) and two control conditions (attention to feet, and ambient sounds; trials ranged from 16 to 50s; **Figure 2A**). For breath-focus, attention was maintained where they felt the breath most strongly (e.g., nose, throat, chest; see SI p. 4 for full list of breath-related regions). For self-referential processing, participants generated 5 events from the past week, and 5 events that would occur in the next week during the training session. Six blocks were administered from one of four randomized stimulus order sets. See Weng et al. (2020) for full task design and MRI scanning parameters.

To maximize this within-subjects approach, we collected more data within each participant over 6 blocks (2160 brain patterns for classifier training and testing, 432/condition, TR = 1s). Wholebrain MVPA was conducted on pre-processed fMRI data using k-fold cross-validation analysis in native space (penalized logistic regression with L2 regularization and a penalty parameter of 0.01; Weng et al., 2020). Classification accuracy was computed based on the number of correct decisions for each condition (tested against 20% chance levels using a Chi-Square test at the individual level, and with a one-sample *t*-test at the group level). Individuals that showed above-chance accuracy in 2/3 categories for Breath, MW, and Self conditions were used for subsequent analyses including decoding meditation states. Individualized brain patterns representing IA states were computed for each participant using classifier importance maps, which use classifier weight information (thresholded at $\pm$2 SD) to identify which voxels were most important in distinguishing neural patterns of Breath, MW, and Self (McDuff et al., 2009; Weng et al., 2020). To examine how unique vs. common brain patterns were across participants, we computed importance frequency maps, which summed the frequency of participants

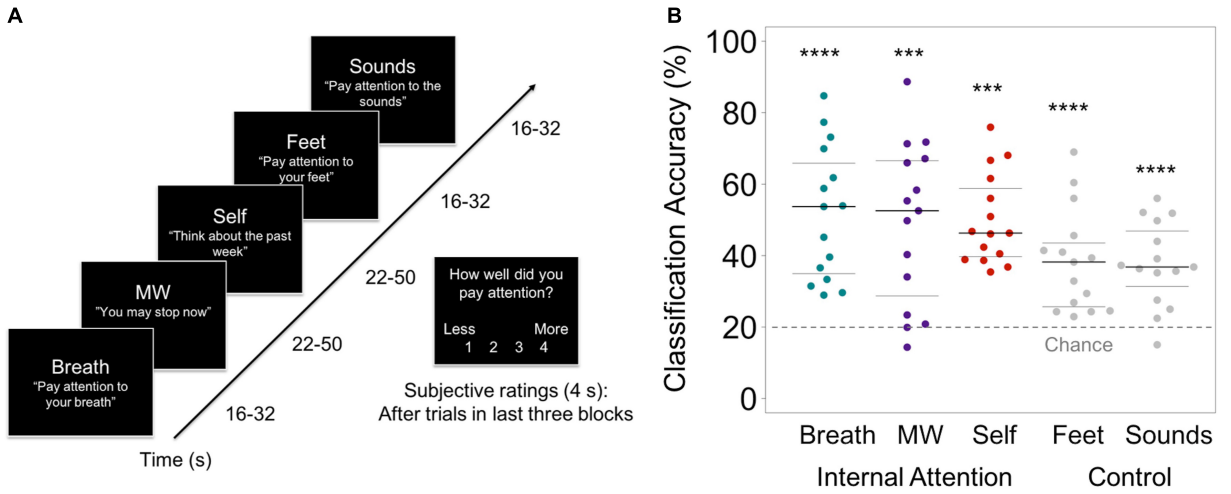


FIGURE 2 | (A) Internal Attention (IA) task. With eyes closed, participants were directed via 2-s auditory instructions to pay attention to five internal mental states for brief time periods (16–50s). The IA task directed attention to three mental states relevant for breath meditation (Breath, MW, and Self), and to two control mental states (attention to the Feet [another area of the body] and ambient MRI Sounds [consistent external distractor]). Example auditory instructions are displayed in quotes. MW was induced by instructing participants to stop paying attention and let their minds attend to whatever they wanted. Conditions were randomized over six IA blocks in four orders, with 72s of data collected from each condition in each block (total 432s/condition). For the last half of IA task trials, subjective ratings of attention were collected after each trial (except MW) using a button box (1 = less, 4 = more). **(B)** From the IA task, the prediction accuracy of the classifier for identifying internal states of attending to the Breath, MW, and Self, and control conditions of attending to the Feet and Sounds. Beeswarm plots present each data point, the median (bold black line), and ± 25th percentile range (gray lines) of the mean prediction accuracy for all data in each condition (n = 432) across all subjects. Statistical significance was determined by a one-sample two-sided t-test against theoretical chance-level for classification of 5 categories (20%, denoted by dashed line). ***$ts_{14s} < 4.98$, $p < 0.001$, ****$ts_{14} > 5.77$, $ps < 0.0001$.

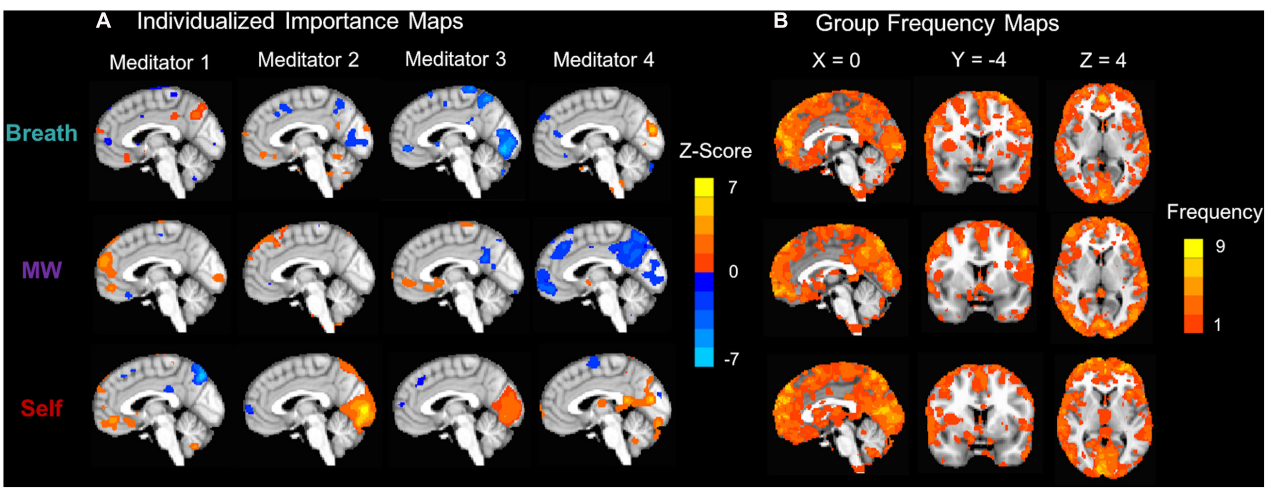


FIGURE 3 | Classifier importance maps representing voxels that accurately distinguish internal mental states. **(A)** Subject-level importance maps showing individualized brain patterns representing voxels that are important for distinguishing neural signatures of attention to the Breath, MW, and Self (X = 0). For each task condition, importance values were computed by multiplying each voxel's classifier weight for predicting the condition and the average activation during the condition (McDuff et al., 2009). The maps were thresholded at ± 2 SD and displayed on the MNI152 template to identify the most important voxels for each participant. Orange importance voxel indicate positive z-scored average activation values, and blue importance voxels indicate negative z-scored average activation values. **(B)** To examine importance voxels at the group level, group importance frequency maps indicate the number of participants for which the voxel accurately distinguished each mental state. All importance voxels were summed, irrespective of average positive or negative z-scored activation. Frequency maps were also computed that independently summed positive (**Supplementary Figure S2A**) and negative (**Supplementary Figure S2B**) z-scored activation voxels, as well as histograms of frequency counts (**Supplementary Figures S2c–e**). Note that the maximum frequency for any importance map was 9/15.

for which each voxel accurately identified each mental state for: all importance voxels (**Figure 3B**), positive, and negative importance voxels (see **Supplementary Figure S2** for frequency maps and histograms).

To further test whether MVPA classifier accuracy of internal attention was meaningful, we associated accuracy with within-subject subjective ratings of attention for half of the trials (*How well did you pay attention?* 1 = least, 2 = less, 3 = more, 4 = most), which were indicated by button box. Ratings were not administered after MW trials where participants were instructed to stop paying attention. Individual correlations were computed using within-subjects Pearson's r, and a group-level correlation was tested with Fisher r-to-Z transformation means tested vs. 0. Note that in this study, the ratings instructions were changed from Weng et al. (2020) to make the task easier for participants, which likely decreased the variability of results (See SI p. 6 for description of ratings instructions). See SI p. 4 and **Supplementary Table S1** for supplementary analyses controlling for respiration and head motion.

Step 2: Individualized decoding of meditation period

By first establishing that MVPA classifiers could reliably distinguish and identify internal attention brain states in Step 1, we could then apply these learned brain patterns to objectively decode (using classifier decisions) the continuous focus of attention using the neural data from a separate 10-min meditation period (600 novel brain patterns). Importantly, this could approach could reveal the fluctuations in attention that are specific to each meditator's practice session.

Step 3: Individual-level attention metrics

We then further analyzed the classifier decisions in Step 3, where we computed novel metrics of attention during meditation, including estimating the percentage time attending to the breath or engaging in mind wandering or self-referential processing, producing novel individual-level attention metrics for each participant. Using classifier decisions, attention metrics were computed for percentage time in each mental state (Breath, MW, Self), number of mental events, mean duration of events, and standard deviation (SD) of events (see Weng et al., 2020 for full details). To preliminarily assess construct validity and inform future research, we characterized the meditation metrics at the group level, and tested whether participants attended longer to breath vs. other mental states during meditation (SI p. 6; **Supplementary Figure S3**). Data were analyzed in SPSS (v. 24), figures were created with R, and brain maps were displayed using AFNI.

RESULTS

Individualized Neuroscience Approach: EMBODY fMRI Task

In our Intersectional Neuroscience framework, we tested whether an individualized approach to fMRI study design and analysis would be feasible in this diverse sample of experienced meditators. We tested whether principles of the EMBODY task (Weng et al., 2020) would be validated in this diverse sample of experienced meditators, which was designed to accommodate diversity in neural structure and function. We tested whether machine learning classifiers could (i) recognize participant-specific brain patterns relevant to breath-focused meditation (breath attention, mind wandering, self-referential processing; Step 1), and (ii) be applied to decode these mental states that uniquely fluctuate during meditation practice for each meditator (Step 2). Finally, these decoded mental states were quantified into individual-level metrics of attention during meditation, such as percentage time attending to the breath (Step 3).

Step 1: Distinguishing individualized neural patterns of internal attention

In alignment with an intersectional neuroscience framework, we used individualized brain pattern classifiers to recognize each participant's internal attention states important for breath-focused meditation based on their unique brain data. This approach accommodates and harnesses diversity in both brain structure and function. Across all participants, each attentional state yielded a distinct neural signature (all classification accuracies > 37% vs. 20% chance for 5 categories, $ts_{14} > 4.96$, $ps < 0.001$; **Figure 2B**). The brain patterns most relevant for breath meditation were distinguished at more than twice chance levels (breath = 51.8%, mind wandering = 48.9%, self-referential processing = 50.1%; $ts_{14} > 4.95$, $ps < 0.001$, Cohen's $ds > 1.28$), whereas the control conditions were distinguished just below twice chance levels (feet = 38.4%, sounds = 37.6%, $ts_{14} > 4.98$, $ps < 0.001$, Cohen's $ds > 1.29$; **Figure 2B**; see **Supplementary Table S2** for classifier confusion matrix). Classifier accuracy was not likely driven by respiration rate or head motion between conditions (SI p. 4). Notably, these accuracies were comparable to the first study of the EMBODY task (Weng et al., 2020), and all *t*-tests from both studies showed large effects sizes above 1.0.

The breath meditation-relevant brain patterns were reliably classified in all 15 experienced meditators (where 100% of participants demonstrated at least 2/3 $ps < 0.001$ for breath, mind wandering, and self-referential processing; **Supplementary Table S3**). All participants were analyzed in subsequent analyses to decode the meditation period. Trial-level classification accuracy was not significantly correlated with subjective ratings of internal attention for all trials (mean $Z = 0.04$, $p = 0.41$) or breath trials only (mean $Z = 0.07$, $p = 0.48$; see SI p. 6 for further discussion).

Distributed Brain Patterns Contributing to Accurate IA Classification

Classifier importance maps identified the voxels most important in distinguishing between the attentional states (McDuff et al., 2009), which were distributed throughout the brain and unique for each participant (**Figure 3B**; **Supplementary Figure S2**). Group-level importance frequency maps showed that most importance voxels predicted classifier accuracy for only 1–2 participants, demonstrating the distributed nature of the patterns. The maximum frequency for any importance voxel was 9/15 or 60% of the sample.

Step 2: Decoding the focus of attention during breath meditation

Individualized brain patterns for each participant were used to decode the focus of attention during 10 min of breath meditation, producing second-by-second decoding of internal attention states of attending to the breath, mind wandering,

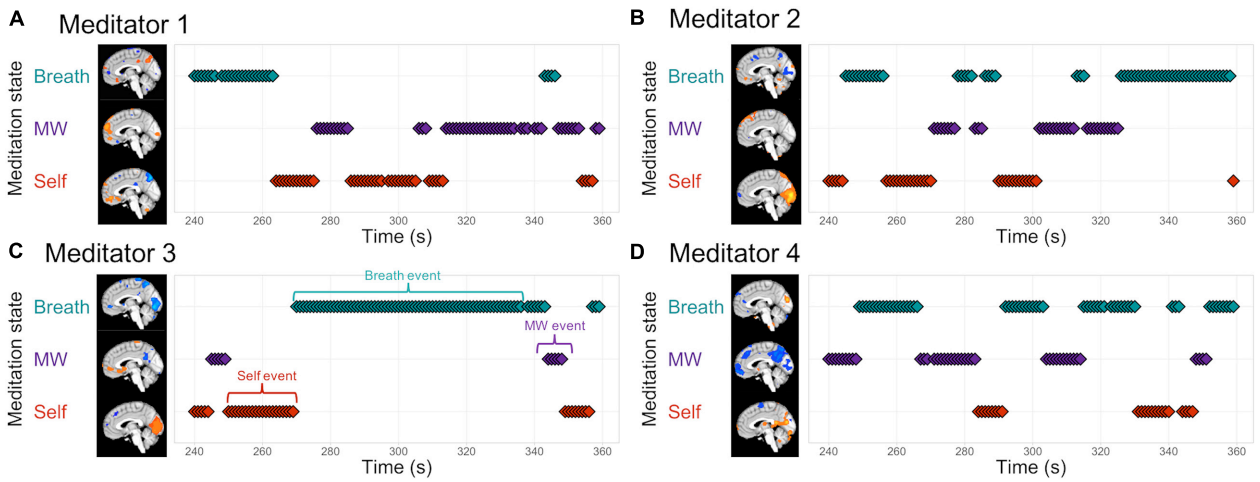


FIGURE 4 | EMBODY Step 2: Decoding the internal focus of attention during breath-focused meditation using individualized brain patterns. Based on each participant's unique brain signatures for Breath, MW, and Self, classifier decisions were made for each time point of fMRI data (TR = 1s), producing a continuous estimate of attention states during breath meditation. The middle of the meditation period is displayed for four meditators **(A–D)**. Mental events were quantified as 3 or more consecutive decisions from the same mental state **(C)**, and were used to compute metrics of attention during meditation in Step 3.

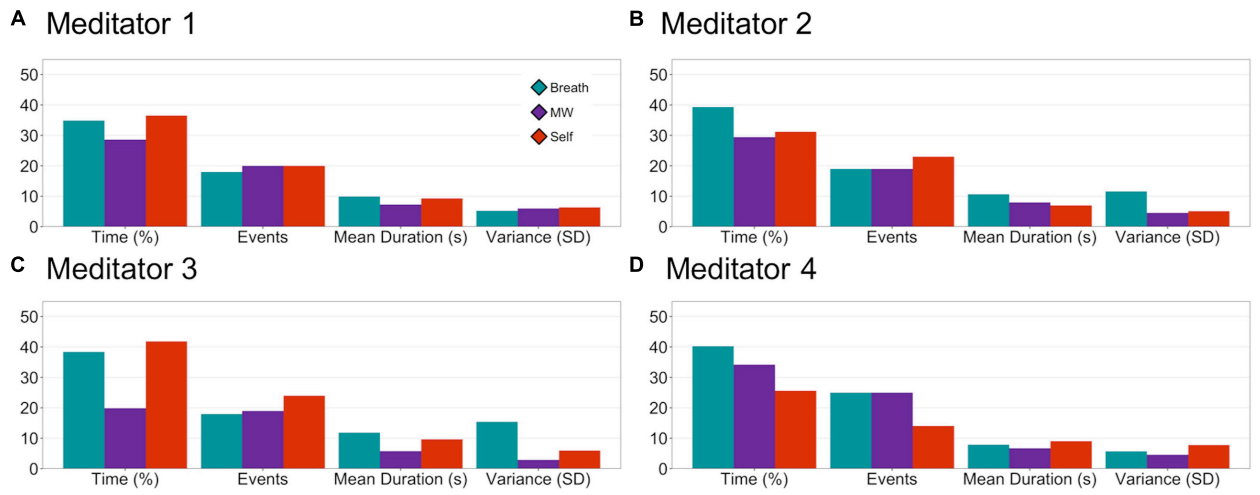


FIGURE 5 | EMBODY Step 3: Individual-level attention profiles during the meditation period. Based on the mental-state estimates during meditation from Step 2, internal attention metrics were quantified for each individual meditator: percentage time spent in each mental state (Breath, MW, or Self), the number of events, mean duration of events (s), and variability (standard deviation or SD) of duration of events **(A–D)**.

or self-referential processing (**Figures 4A–D**). From these data, "mental events" were defined whenever there were 3 or more consecutive time points that were classified as belonging to the same mental state (**Figure 4B**). Note that each participant's meditation session is unique in the durations of and fluctuations between mental states.

Step 3: Quantifying metrics of internal attention during breath meditation

Based on MVPA classification of mental states during meditation from Step 2, we computed novel metrics of attention during meditation for each participant, including *percentage time spent engaged* in each mental state, *number of mental events* (or discrete periods engaged in each mental state), the *duration of each mental event*, and the *variance of the durations* (SD). See **Figure 5** for individual-level plots of attention metrics during the meditation period. This demonstrated the feasibility of producing fine-grained metrics of attention during meditation, such as estimating the interoceptive focus on the breath, that is specific for each individual's meditation practice and based on their unique brain signals. For preliminary characterization of attention metrics at the group level, see SI p. 6, **Supplementary Figure S3**, and **Supplementary Table S4**.

DISCUSSION

We developed an *Intersectional Neuroscience* framework in a study of breath-focused meditation, which applies an intersectional lens to neuroscience research to improve inclusion of diverse participants, particularly those who belong to multiple marginalized identities. Within the context of contemplative neuroscience, we increased diversity of participants through employing 1) community engagement to partner with a diverse meditation community, and 2) individualized multivariate neuroscience methods which preserve and harness neural diversity as a statistical strength. By forming a community partnership with EBMC, we adjusted our research materials and procedures to be more inclusive of racial and ethnic minorities, sexual and gender minorities, people with disabilities, people with lower education and income, older adults, and those with mental health and neurological disorders. These changes were successful in recruiting a more diverse sample for the neuroscience study, where 80% of participants were racial and/or ethnic minorities (75% racial minorities, 26.7% Latinx), and 53.3% identified as LGBTIA+. In addition, some participants identified as both racial and/or ethnic minorities and LGBTQIA+, demonstrating the feasibility of using an intersectional approach to increase inclusion of participants who belong to multiple marginalized identities. Further, we established initial feasibility of using individualized neuroscience methods in this diverse sample, and found that MVPA classifiers in the EMBODY task could recognize unique brain patterns representing internal attention states in every meditator. This individualized brain patterns could then be used to estimate the fluctuating mental states during each meditator's meditation session, and produce individual-level metrics of attention during meditation.

Community engagement involved continuous dialogue between scientists and EBMC members, as well as iterative revision of study materials and procedures. We revised inclusion and exclusion criteria to be as inclusive as possible, used person-centered language from the perspective of participants, and developed an ethical consent process to sharing data. Among the person-centered changes, we adjusted the way we assessed participant demographics by asking for their lived identities *first* and then the standardized reporting categories (for gender identity, race, ethnicity, and sexual orientation). This structure communicates that their personhood and lived experiences are valued foremost, and then standardized reporting categories are assessed for scientific purposes (acknowledging that science operates within a broader cultural context). This way of assessing demographics can be more welcoming and inclusive to a broader range of people, and allow them to indicate identities that may not be included in standard demographic forms, such as transgender or non-binary gender identities. For the purposes of this paper, we reported both lived identities and chosen corresponding standardized reporting categories to show the full range of diversity. We recommend assessing and reporting a broader range of identity demographics (such as sexual orientation and disability status, even if those groups are not the main focus of the study) so that people who belong to under-represented groups can assess whether study findings may generalize to them.

Using community-engaged methods was successful in recruiting a more diverse sample ($N = 15$). Our sample included members of under-represented groups in the neuroscience of meditation (see SI p. 2, **Supplementary Figure S1**), including Black or African Americans (when including multiracial people: $n = 4$ or 26.7%), Native Americans (when including multiracial people: $n = 2$ or 13.3%), and Hispanic or Latinx people ($n = 4$ or 26.7%). Our study also included Asian Americans (4 or 26.7%) and White people (3 or 20%). Further work is needed to be more inclusive of groups not represented such as Hawaiian or Pacific Islanders. Our fMRI demographics review also showed that only two gender identities were included (male, female), and our study included and assessed more gender identities such as transgender, intersex, and/or non-binary genders ($n = 1$ or 6.7%). Overall, the study had greater LGBTQIA+ representation with 53% of participants identifying as a gender or sexual orientation minority (including those identifying as lesbian/gay/homosexual, bisexual/pansexual, and asexual). Although the study was more diverse in some demographics (race/ethnicity, sexuality, and gender identity), it lacked diversity in socioeconomic status and disability status. Community feedback from EBMC included doing outreach at community centers that serve lower-income people, and advertising cash payment and travel reimbursement more clearly. Further outreach may be needed to be more inclusive of people with disabilities, and to those who are not comfortable within an academic medical environment (at least one person chose not to participate for this reason). Our study could be more inclusive of the fat community by using neuroscience modalities that are less restrictive in head and body size, such as electroencephalography. Person-centered recruitment and screening materials developed with EBMC are included in the SI, so that researchers may adapt these materials for their populations of interest (ideally using community engagement and focus groups).

Another way we made our study more inclusive was using individualized multivariate neuroscientific methods, which preserve each person's diversity in brain structure and function. This allowed us to revise inclusion/exclusion criteria to be much more inclusive of groups who are considered to have "non-normal" brains such as individuals with mental health or neurological disorders, those who take psychotropic medications, and older adults. This is particularly important within contemplative neuroscience because people often learn and practice meditation as a non-pharmacological approach to manage mental and/or physical health symptoms. By shifting the main neuroscientific questions to asking which *mental states* are present during meditation (which are estimated by brain patterns), rather than which *brain regions* are being activated averaged across the group, we can harness the power of individual neural diversity to understand what is going on internally during meditation for each participant.

We tested whether principles of the EMBODY task, an fMRI task designed to accommodate and harness neural diversity using individualized machine learning methods, would be validated in this diverse EBMC sample. First, we demonstrated that for all

15 diverse meditators, machine learning classifiers recognized individualized brain patterns representing internal attention states relevant for breath-focused meditation (attention to breath, mind wandering, and self-referential processing). Even with no external changes in visual stimuli (eyes remained closed during the experiment), when meditators were instructed to direct their attention to different internal stimuli, these brain patterns were consistent enough to be recognized by individualized machine learning classifiers. However, compared to the first study of the EMBODY task (Weng et al., 2020), we did not find significant within-subject associations between subjective ratings and classifier accuracy of IA states in this study. Participants in the first study reported difficulty in using all four ratings, so in the current study, we de-emphasized the need for using all ratings, which likely decreased power to detect any associations. In addition, experienced meditators often reported having the highest level of attention for many trials, and may not be aware of more subtle changes in attention that MVPA classifiers may be able to detect. This study was also more inclusive of people who may have varying levels of attention or ability to report on attention, with participants reporting a current mental health issue, taking psychiatric medications, or experiencing migraines. Future research may improve methods for assessing ratings, such as using a dial which would have more variability, and examining whether certain groups that show differences in attention may perform differently in the task.

Brain patterns representing internal attention states of attention to breath, mind wandering, and self-referential processing were unique for each meditator. This was highlighted by group-level frequency data where the majority of importance voxels across the brain contributed to accurate classifier accuracy for only 1–2 participants (**Figure 3B**; **Supplementary Figure S2**). The maximum number of participants that shared a single importance voxel for any mental state was 9 (out of $N = 15$ or 60%). This demonstrated that no importance voxels were shared across the entire sample, which highlights the variability and diversity of neural patterns. However, these findings came from using an initial thresholding procedure to identify importance voxels, and more research is needed to understand the potential sources of variability in neural patterns. For example, when participants focus on the breath, variability in brain patterns may be related to the different locations in the body where attention was placed (e.g., nose, chest, or stomach; see SI p. 4 for list of regions). Accurate classification for different individuals may also be due to physiological factors such as differences in respiration and heart rate. Further, analyzing importance voxels in different ways may yield different results and insights into brain function involved in internal attention. Rather than thresholding to find the most variable and extreme voxels within each participant, a lower threshold range may be chosen ($\pm$1.0 to 2.0 SD) which may identify a larger number of more modestly important voxels. This method may identify more voxels that are common across participants, which can potentially serve as voxels for group-level classifier training. Alternate methods that can quantify the influence of each voxel include bootstrapping methods that selectively remove each voxel and recompute classification, and calculating the univariate effect size of each individual voxel contributing to the overall multivariate result (McArtor et al., 2017).

We also demonstrated the feasibility of using these unique brain patterns to decode or estimate the fluctuating focus of attention during 10 min of breath meditation. This approach made the invisible processes of meditation more visible, and revealed that each meditator experienced a different pattern of fluctuation between mental states of attention to breath, mind wandering, and self-referential processing. These decoded mental states could then be quantified into metrics of internal attention during meditation: percentage time attending, number of events, and mean duration and variability of events. Using these metrics, attention profiles could be computed for each individual, showing the feasibility of using individualized brain patterns to estimate subject-level attention metrics. Participants varied in how their attention fluctuated during meditation, and in the resulting pattern of attention metrics such as percentage time attending to breath, mind wandering, or self-referential processing. This study was designed to estimate mental states during meditation without interfering with the meditation process by requiring subjective or motor responses (Levinson et al., 2014). Future research should further validate the presence of mental states during meditation through validation tasks that compare classifier decisions of mental states with meditator self-report (Hasenkamp et al., 2012), as well as compare attention profiles between meditative vs. non-meditative states (such as resting state) or pre vs. post-meditation training.

These results were mostly consistent with the first EMBODY task study, which was conducted with a less racially and ethnically diverse sample without community engagement methods (Weng et al., 2020). Together, these two studies showed that individualized machine learning classifiers could recognize internal attention states for most participants ($N = 29/31$ or 93.5%), and all experienced meditators studied thus far ($n = 23$). By collecting more data within each participant to identify subject-level effects, which is common for within-subjects study designs (Smith and Little, 2018), each person's brain can be treated as its own unique environment and serve as its own statistical baseline. This approach seems feasible particularly in experienced meditators, who have spent more time attending to internal states, and may therefore have more stable neural patterns that can be recognized by MVPA. Further research is needed to see how feasible the approach is in novice control participants, who are the majority of people included in clinical trials of mindfulness and meditation (MVPA recognized brain patterns in 6/8 or 75% of controls [Weng et al., 2020]). Alongside the individualized approach, group-level classifiers may be built with larger samples to help detect mental states in novice controls, particularly those whose unique signals cannot yet be detected with small samples of data (Haxby et al., 2011; Chen et al., 2017). Both studies also showed that fluctuations of mental states during the 10-min meditation period varied by each meditator, and could be quantified to produce metrics of internal attention during meditation.

Although these metrics are produced using unique brain data, with larger samples they can be combined at the group level

to investigate overall patterns in attention during meditation. This bridges the gap between individualized metrics and group-level data analysis, where attention metrics *derived* from the individual-level brain data are the values being averaged and analyzed at the group level, not the brain patterns themselves. By analyzing metrics at the group level, scientists can begin testing whether attention to breath is greater vs. other states during meditation, whether experienced meditators and novices differ in their attention to breath, and test whether individual difference factors influence attention to breath (such as lifetime meditation practice or trait mindfulness). However, much larger samples are needed to test these questions, and by improving inclusivity of neuroscience research, results from more diverse studies may be more generalizable.

For this particular study, our goal was to make the study as inclusive for diverse participants as possible, while maintaining the scientific purpose of studying breath-focused meditation. We included people from a functional standpoint – as long as they could pay attention to internal experiences and were safe and comfortable in the scanner, they were included. The more inclusive approach suggests the resulting attention metrics may be influenced by various factors such as meditation experience level, mental health conditions, taking psychotropic medications, and socioeconomic status. Future research may investigate differences in attention metrics depending on group status with larger sample sizes. For this study, we demonstrated participants do not need to be excluded based on having different brain structure and function in and of itself, particularly because individualized neuroscience methods decrease the need to find group-averaged results. Any neuroscience method that can be conducted at the individual level in native space may be used within an Intersectional Neuroscience framework, including functional connectivity (Finn et al., 2015; Poldrack et al., 2015) and representational similarity analysis (Kriegeskorte et al., 2006). This suggests that future studies, depending on their specific goals, may be more thoughtful about inclusion and exclusion criteria, with particular attention brought to exclusion of multiple marginalized groups. More inclusive studies will increase generalizability of results and may potentially translate to more groups.

The EMBODY framework may be a feasible approach to harness individual brain variability and produce more fine-grained metrics of how attention is deployed during meditation. This approach may be extended to measure mental states during other types of meditation, such as empathic care and distress (Ashar et al., 2017) during compassion meditation. With better measures of how attention is cultivated via meditation, we may better understand what skills are being learned by each meditator, and how these skills may contribute to improved well-being at individual and population levels. In summary, we have outlined a framework to conduct contemplative neuroscience from an Intersectional Neuroscience perspective, particularly using the methodologies of community engagement and individualized neuroscience techniques. This framework is rooted in the compassionate goal to include and empower under-represented groups, particularly those who belong to multiple marginalized identities. Importantly, this framework is not static and can be updated to include more groups and research methods. The framework thrives from continuous dialogue with the community, and counters the *status quo* in academia where knowledge is transmitted one-way from researchers to the community. We have continuously learned from EBMC how to make the study more diverse and inclusive. Academic communities have also learned how EBMC has built their multicultural community to practice meditation and engage in social action, and have adapted their Agreements for Multicultural Interactions for their own organizations (e.g., UCSF Osher Center for Integrative Medicine, Mind and Life Institute). Researchers have also given back to the EBMC community through paying consultants and participants, holding events at EBMC, and sharing EBMC's culture at academic conferences. This reciprocal exchange of knowledge and resources has the potential to redress power inequities while enhancing inclusivity, quality of scientific methods and findings, and speed and innovation of ideas. This intersectional approach may therefore benefit other fields of psychology and neuroscience, to better understand the groups that are being studied, discover novel insights by actively including them in the research process, and producing more generalizable findings. This framework may also be extended to adopt more principles of community engaged research, where members of the community are included within the research study team, and structural changes are made to improve pipelines in academic research settings (Wallerstein and Duran, 2010). The approach may also benefit from including participants' lived experiences in a systematic way using qualitative interviewing and focus group methods.

Finally, neuroscience may be used as a powerful tool to bring the public's attention to areas of societal inequity, and highlight ways to improve social functioning through interventional studies that examine the capacity for social neuroplasticity (Weng et al., 2013). Neuroplasticity may be better measured using individualized multivariate methods, as each person's unique brain patterns can serve as their own baseline. Individualized approaches may be adopted by more fields of neuroscience to enhance measurement power and increase inclusivity of neuro-diverse participants. To better implement principles of Intersectional Neuroscience, researchers may need to examine their own social identities and privileges, and improve mindful listening and cultural humility skills (Magee, 2019; Yang, 2017). By employing personal reflection and inclusive research methods, the research process has the potential to become an embodied form of compassionate social action that can begin to heal divisions between groups and produce better co-created solutions for well-being and health.

DATA AVAILABILITY STATEMENT

Code for the EMBODY Task, MVPA analysis, and post-processing are available at

https://github.com/HelenWengPhD/embodystudy. MRI data are available from participants who consented to share raw brain data (links at Github page).

ETHICS STATEMENT

The protocol studies involving human participants were reviewed and approved by University of California, San Francisco Institutional Review Board. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

HW, MI, MC, and FH developed community engagement strategy. HW and DF developed the ethical consent process for sharing data. HW and JL-P designed the fMRI task. All authors contributed to the data analytic strategy and interpretation. HW, SS, and VG contributed to data collection, processing, and analysis. HW, JL-P, SS, and VG developed unpublished data analysis tools. HW wrote the manuscript, with contributions from MC and JL-P and comments from all other authors.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2020.573134/full#supplementary-material

REFERENCES

Ashar, Y. K., Andrews-Hanna, J. R., Dimidjian, S., and Wager, T. D. (2017). Empathic Care and Distress: Predictive Brain Markers and Dissociable Brain Systems. *Neuron* 94, 1263–1273.e4. doi: 10.1016/j.neuron.2017.05.014

Ashar, Y. K., Andrews-Hanna, J. R., Yarkoni, T., Sills, J., Halifax, J., Dimidjian, S., et al. (2016). Effects of compassion meditation on a psychological model of charitable donation. *Emotion* 16, 691–705. doi: 10.1037/emo0000119

Barlow, D. H., and Nock, M. K. (2009). Why Can't We Be More Idiographic in Our Research? *Perspect. Psychol. Sci.* 4, 19–21. doi: 10.1111/j.1745-6924.2009.01088.x

CDC (2013). *CDC Health Disparities & Inequalities Report (CHDIR) - Minority Health - CDC (2019)*. Available Online at: https://www.cdc.gov/minorityhealth/CHDIReport.html [accessed on July 30, 2019]

Chen, J., Leong, Y. C., Honey, C. J., Yong, C. H., Norman, K. A., and Hasson, U. (2017). Shared memories reveal shared structure in neural activity across individuals. *Nat. Neurosci.* 20, 115–125. doi: 10.1038/nn.4450

Cho, S., Crenshaw, K. W., and McCall, L. (2013). Toward a Field of Intersectionality Studies: Theory, Applications, and Praxis. *Signs J. Women Cult. Soc.* 38, 785–810. doi: 10.1086/669608

Cole, E. R. (2009). Intersectionality and research in psychology. *Am. Psychol.* 64, 170–180. doi: 10.1037/a0014564

Condon, P., Desbordes, G., Miller, W. B., and DeSteno, D. (2013). Meditation increases compassionate responses to suffering. *Psychol. Sci.* 24, 2125–2127. doi: 10.1177/0956797613485603

Crenshaw, K. (1991). Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color. *Stanford Law Rev.* 43, 1241–1299. doi: 10.2307/1229039

Dickins, M., Thomas, S. L., King, B., Lewis, S., and Holland, K. (2011). The Role of the Fatosphere in Fat Adults' Responses to Obesity Stigma: A Model of Empowerment Without a Focus on Weight Loss. *Qual. Health Res.* 21, 1679–1691. doi: 10.1177/1049732311417728

Dumit, J. (2004). *Picturing Personhood*. Available online at: https://press.princeton.edu/books/paperback/9780691113982/picturing-personhood [accessed on May 5, 2020].

Finn, E. S., Shen, X., Scheinost, D., Rosenberg, M. D., Huang, J., Chun, M. M., et al. (2015). Functional connectome fingerprinting: identifying individuals using patterns of brain connectivity. *Nat. Neurosci.* 18, 1664–1671. doi: 10.1038/nn.4135

Goering, S., Holland, S., and Fryer-Edwards, K. (2008). Genetic Research Practices with Marginalized Communities. *Hastings Cent. Rep.* 38, 43–53. doi: 10.1353/hcr.2008.0027

Green, B. L., Maisiak, R., Wang, M. Q., Britt, M. F., and Ebeling, N. (1997). Participation in Health Education, Health Promotion, and Health Research by African Americans: Effects of the Tuskegee Syphilis Experiment. *J. Health Educ.* 28, 196–201. doi: 10.1080/10556699.1997.10603270

Hamrick, K. (2019). *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2019 | NSF - National Science Foundation*. Available online at: https://ncses.nsf.gov/pubs/nsf19304/digest/field-of-degree-minorities [accessed on July 30, 2019].

Hasenkamp, W., Wilson-Mendenhall, C. D., Duncan, E., and Barsalou, L. W. (2012). Mind wandering and attention during focused meditation: a fine-grained temporal analysis of fluctuating cognitive states. *NeuroImage* 59, 750–760. doi: 10.1016/j.neuroimage.2011.07.008

Haxby, J. V., Connolly, A. C., and Guntupalli, J. S. (2014). Decoding Neural Representational Spaces Using Multivariate Pattern Analysis.

Annu. Rev. Neurosci. 37, 435–456. doi: 10.1146/annurev-neuro-062012-170325

Haxby, J. V., Guntupalli, J. S., Connolly, A. C., Halchenko, Y. O., Conroy, B. R., Gobbini, M. I., et al. (2011). A Common, High-Dimensional Model of the Representational Space in Human Ventral Temporal Cortex. *Neuron* 72, 404–416. doi: 10.1016/j.neuron.2011.08.026

Henrich, J., Heine, S. J., and Norenzayan, A. (2010). The weirdest people in the world? *Behav. Brain Sci.* 33, 61–83. doi: 10.1017/S0140525X0999152X

Huettel, S. A., Song, A. W., and McCarthy, G. (2014). *Functional Magnetic Resonance Imaging, Third Edition. 3rd edition*. Massachusetts, U.S.A: Sinauer Associates Inc.

Israel, B. A., Schulz, A. J., Parker, E. A., and Becker, A. B. (1998). Review Of Community-Based Research: Assessing Partnership Approaches to Improve Public Health. *Annu. Rev. Publ. Health* 19, 173–202. doi: 10.1146/annurev.publhealth.19.1.173

Klimecki, O. M., Leiberg, S., Ricard, M., and Singer, T. (2014). Differential pattern of functional brain plasticity after compassion and empathy training. *Soc. Cogn. Affect. Neurosci.* 9, 873–879. doi: 10.1093/scan/nst060

Kriegeskorte, N., Goebel, R., and Bandettini, P. (2006). Information-based functional brain mapping. *Proc. Natl. Acad. Sci.* 103, 3863–3868. doi: 10.1073/pnas.0600244103

Kriegeskorte, N., Mur, M., and Bandettini, P. (2008). Representational Similarity Analysis - Connecting the Branches of Systems Neuroscience. *Front. Syst. Neurosci.* 2:4. doi: 10.3389/neuro.06.004.2008

Leiberg, S., Klimecki, O., and Singer, T. (2011). Short-Term Compassion Training Increases Prosocial Behavior in a Newly Developed Prosocial Game. *PLoS One* 6:e17798. doi: 10.1371/journal.pone.0017798

Levinson, D. B., Stoll, E. L., Kindy, S. D., Merry, H. L., and Davidson, R. J. (2014). A mind you can count on: validating breath counting as a behavioral measure of mindfulness. *Front. Psychol.* 5:1202. doi: 10.3389/fpsyg.2014.01202

Lewis-Peacock, J. A., and Postle, B. R. (2008). Temporary activation of long-term memory supports working memory. *J. Neurosci. Off. J. Soc. Neurosci.* 28, 8765–8771. doi: 10.1523/JNEUROSCI.1953-08.2008

Lunshof, J. E., Chadwick, R., Vorhaus, D. B., and Church, G. M. (2008). From genetic privacy to open consent. *Nat. Rev. Genet.* 9, 406–411. doi: 10.1038/nrg2360

Lutz, A., Jha, A. P., Dunne, J. D., and Saron, C. D. (2015). Investigating the phenomenological matrix of mindfulness-related practices from a neurocognitive perspective. *Am. Psychol.* 70, 632–658. doi: 10.1037/a0039585

Lutz, A., and Thompson, E. (2003). Neurophenomenology Integrating Subjective Experience and Brain Dynamics in the Neuroscience of Consciousness. *J. Conscious. Stud.* 10, 31–52.

Magee, R. V. (2019). *The Inner Work of Racial Justice: Healing Ourselves and Transforming Our Communities Through Mindfulness*. TarcherPerigee.

Mascaro, J. S., Rilling, J. K., Negi, L. T., and Raison, C. L. (2013). Compassion meditation enhances empathic accuracy and related neural activity. *Soc. Cogn. Affect. Neurosci.* 8, 48–55. doi: 10.1093/scan/nss095

McArtor, D. B., Lubke, G. H., and Bergeman, C. S. (2017). Extending multivariate distance matrix regression with an effect size measure and the asymptotic null distribution of the test statistic. *Psychometrika* 82, 1052–1077. doi: 10.1007/s11336-016-9527-8

McDuff, S. G. R., Frankel, H. C., and Norman, K. A. (2009). Multivoxel Pattern Analysis Reveals Increased Memory Targeting and Reduced Use of Retrieved Details during Single-Agenda Source Monitoring. *J. Neurosci.* 29, 508–516. doi: 10.1523/JNEUROSCI.3587-08.2009

Norman, K. A., Polyn, S. M., Detre, G. J., and Haxby, J. V. (2006). Beyond mind-reading: multi-voxel pattern analysis of fMRI data. *Trends Cogn. Sci.* 10, 424–430. doi: 10.1016/j.tics.2006.07.005

Poldrack, R. A., Laumann, T. O., Koyejo, O., Gregory, B., Hover, A., Chen, M.-Y., et al. (2015). Long-term neural and physiological phenotyping of a single human. *Nat. Commun.* 6:8885. doi: 10.1038/ncomms9885

Smith, P. L., and Little, D. R. (2018). Small is beautiful: In defense of the small-N design. *Psychon. Bull. Rev.* 25, 2083–2101. doi: 10.3758/s13423-018-1451-8

Sue, S. (1999). Science, ethnicity, and bias: Where have we gone wrong? *Am. Psychol.* 54, 1070–1077. doi: 10.1037/0003-066X.54.12.1070

Tervalon, M., and Murray-García, J. (1998). Cultural Humility Versus Cultural Competence: A Critical Distinction in Defining Physician Training Outcomes in Multicultural Education. *J. Health Care Poor Underserv.* 9, 117–125. doi: 10.1353/hpu.2010.0233

Varela, F. J., Rosch, E., and Thompson, E. (1991). *The Embodied Mind* | . Cambridge: The MIT Press.

Waldron, E. M., Hong, S., Moskowitz, J. T., and Burnett-Zeigler, I. (2018). A Systematic Review of the Demographic Characteristics of Participants in US-Based Randomized Controlled Trials of Mindfulness-Based Interventions. *Mindfulness* 9, 1671–1692. doi: 10.1007/s12671-018-0920-5

Wallerstein, N., and Duran, B. (2010). Community-Based Participatory Research Contributions to Intervention Research: The Intersection of Science and Practice to Improve Health Equity. *Am. J. Publ. Health* 100, S40–S46. doi: 10.2105/AJPH.2009.184036

Weng, H. Y., Fox, A. S., Hessenthaler, H. C., Stodola, D. E., and Davidson, R. J. (2015). The Role of Compassion in Altruistic Helping and Punishment Behavior. *PLoS One* 10:e0143794. doi: 10.1371/journal.pone.0143794

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychol. Sci.* 24, 1171–1180. doi: 10.1177/0956797612469537

Weng, H. Y., Lewis-Peacock, J. A., Hecht, F. M., Uncapher, M. R., Ziegler, D., Farb, N. A. S., et al. (2020). Focus on the breath: Brain decoding reveals internal states of attention during meditation. *Front. Hum. Neurosci.* 14:336. doi: 10.3389/fnhum.2020.00336

Weng, H. Y., Schuyler, B., and Davidson, R. J. (2017). The Impact of Compassion Meditation Training on the Brain and Prosocial Behavior. *Oxf. Handb. Compas. Sci.* 10:2017. doi: 10.1093/oxfordhb/9780190464684.013.11

Woods-Giscombé, C. L., and Black, A. R. (2010). Mind-Body Interventions to Reduce Risk for Health Disparities Related to Stress and Strength Among African American Women: The Potential of Mindfulness-Based Stress Reduction, Loving-Kindness, and the NTU Therapeutic Framework. *Compl. Health Pract. Rev.* 15, 115–131. doi: 10.1177/1533210110386776

Yang, L. (2017). *Awakening Together: The Spiritual Practice of Inclusivity and Community - Larry Yang, Jan Willis - Google Books*. Somerville, MA: Wisdom Publications.

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Corrigendum: Toward a Compassionate Intersectional Neuroscience: Increasing Diversity and Equity in Contemplative Neuroscience

Helen Y. Weng[1,2,3]*, *Mushim P. Ikeda*[4], *Jarrod A. Lewis-Peacock*[5], *Maria T. Chao*[1,6], *Duana Fullwiley*[7], *Vierka Goldman*[1], *Sasha Skinner*[1,2], *Larissa G. Duncan*[8], *Adam Gazzaley*[2,3] and *Frederick M. Hecht*[1,6]

[1] Osher Center for Integrative Medicine, University of California, San Francisco, San Francisco, CA, United States, [2] Neuroscape Center, University of California, San Francisco, San Francisco, CA, United States, [3] Department of Psychiatry and Behavioral Sciences, University of California, San Francisco, San Francisco, CA, United States, [4] East Bay Meditation Center, Oakland, CA, United States, [5] Department of Psychology, University of Texas at Austin, Austin, TX, United States, [6] Division of General Internal Medicine, University of California, San Francisco, San Francisco, CA, United States, [7] Department of Anthropology, Stanford University, Palo Alto, CA, United States, [8] School of Human Ecology and Center for Healthy Minds, University of Wisconsin–Madison, Madison, WI, United States

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Edited and reviewed by:
Myriam Mongrain,
York University, Canada

***Correspondence:**
Helen Y. Weng
helen.weng@ucsf.edu

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A Corrigendum on

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In the original article, there was a mistake in **Figure 2** as published. The conditions were labeled incorrectly in **Figure 2B**. The corrected **Figure 2** appears below.

The authors apologize for this error and state that this does not change the scientific conclusions of the article. The original article has been updated.

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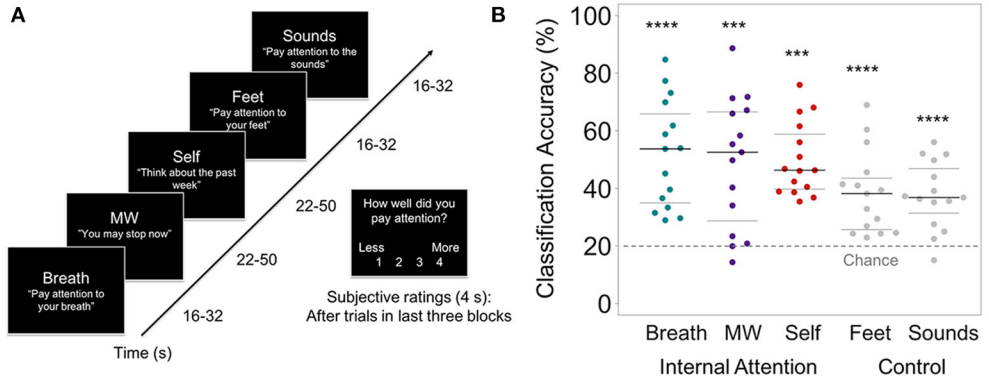


FIGURE 2 | (A) Internal Attention (IA) task. With eyes closed, participants were directed via 2-s auditory instructions to pay attention to five internal mental states for brief time periods (16–50s). The IA task directed attention to three mental states relevant for breath meditation (Breath, MW, and Self), and to two control mental states (attention to the Feet [another area of the body] and ambient MRI Sounds [consistent external distractor]). Example auditory instructions are displayed in quotes. MW was induced by instructing participants to stop paying attention and let their minds attend to whatever they wanted. Conditions were randomized over six IA blocks in four orders, with 72s of data collected from each condition in each block (total 432s/condition). For the last half of IA task trials, subjective ratings of attention were collected after each trial (except MW) using a button box (1 = less, 4 = more). **(B)** From the IA task, the prediction accuracy of the classifier for identifying internal states of attending to the Breath, MW, and Self, and control conditions of attending to the Feet and Sounds. Beeswarm plots present each data point, the median (bold black line), and ± 25th percentile range (gray lines) of the mean prediction accuracy for all data in each condition ($n = 432$) across all subjects. Statistical significance was determined by a one-sample two-sided t-test against theoretical chance-level for classification of 5 categories (20%, denoted by dashed line). $^{***}ts_{14s} < 4.98$, $p < 0.001$, $^{****}ts_{14} > 5.77$, $ps < 0.0001$.

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The Bright Side of Abstraction: Abstractness Promoted More Empathic Concern, a More Positive Emotional Climate, and More Humanity-Esteem After the Paris Terrorist Attacks in 2015

*Itziar Fernández[1], Amparo Caballero[2], Verónica Sevillano[2], Dolores Muñoz[2], Luis Oceja[2] and Pilar Carrera[2]**

[1] Department of Social and Organizational Psychology, Faculty of Psychology, National Distance Education University, Madrid, Spain, [2] Department of Social Psychology and Methodology, Faculty of Psychology, Autonomous University of Madrid, Madrid, Spain

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James Kirby, The University of Queensland, Australia

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Veronica Guadagni, University of Calgary, Canada
Atte Oksanen, Tampere University, Finland

***Correspondence:**
Pilar Carrera
pilar.carrera@uam.es

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Antecedents: Previous research on citizens' reactions after terrorist events has shown that positive reactions can also emerge alongside pain and horror. Positive emotions have been widely associated with an abstract style of thinking. In the context of the Paris terrorist attacks in 2015, we explored Spanish citizens' positive reactions – empathic concern, positive emotional climate, and esteem for humanity – and examined the relationships of these responses with an abstract (vs. concrete) style of thinking.

Method: A longitudinal study was designed involving an online questionnaire that was administered 10 days, 3 weeks, and 2 months after the attacks (N = 253).

Results: Empathic concern and personal distress toward Parisians decreased from the weeks following the attacks to 2 months later, with empathic concern always being more intense than personal distress. Emotional climate was perceived as more hostile than positive, although positive feelings persisted. People reported moderately positive esteem for humanity. Individuals with a more abstract style of thinking reported greater empathic concern, a more positive emotional climate, and more esteem for humanity.

Conclusions: Our results support and extend previous research showing that abstraction enhances people's resilience, even under traumatic circumstances such as those surrounding a terrorist attack.

Keywords: empathic concern, emotional climate, terrorist attack, abstraction, humanity-esteem

INTRODUCTION

Since September 2001 event in New York and Washington DC, a large body of research has addressed how people deal with collective violence, such as terrorist attacks. After the attacks in the United States, Europe suffered the terrible pain caused by terrorists on several occasions: Madrid (2004), London (2005, 2017), Oslo and Utøya (2011), Paris (2015), Berlin, Brussels, Nice (2016), Stockholm, Manchester, Barcelona (2017), and Strasbourg (2018). All of these dramatic events have created countless direct and indirect victims.

After the massacre at the Charlie Hebdo journal office in Paris in January 2015, terror hit Paris again with six simultaneous attacks during November 2015, leaving 130 dead and more than 300 injured. News about these attacks were followed by thousands of people worldwide. The media and social networks allowed people to share information about the terrible damage suffered by the victims; communication that fostered a wave of solidarity and support around the world toward Parisians. Indeed, such social communication promotes emotional reactions in people who are not directly affected by the attacks (i.e., *indirect* or *vicarious victims*). These vicarious victims may also suffer negative emotional consequences (e.g., Pelletier and Drozda-Senkowska, 2016; Luhmann and Bleidorn, 2018) and even major depressive disorders (e.g., Salguero et al., 2011).

Solidarity with France and the French was displayed through hundreds of individual responses and collective demonstrations around the world. Emotional, cognitive, and behavioral reactions after terrorist attacks have been widely studied (e.g., Mehl and Pennebaker, 2003; Conejero and Etxebarría, 2007; Páez et al., 2007; Fernández et al., 2009; McArdle et al., 2012), also in the case of Paris (e.g., Pelletier and Drozda-Senkowska, 2016; Luhmann and Bleidorn, 2018; Garcia and Rimé, 2019). Such previous research shows that the emotions caused by a terrorist event significantly affect not only individuals' psychological reactions but also their social lives in the form of social sharing (Fernández et al., 2009; Garcia and Rimé, 2019) and collective reactions (Páez et al., 2007; McArdle et al., 2012; Pelletier and Drozda-Senkowska, 2016). Negative emotions (fear, anger, sadness, anxiety, and sorrow) are most frequent after terrorist acts (Conejero and Etxebarría, 2007; Bux and Coyne, 2009; Giner-Sorolla and Maitner, 2013). However, longitudinal research has shown that this negative mood declines over time (e.g., Fernández-Dols et al., 2007; Fernández et al., 2009; Pelletier and Drozda-Senkowska, 2016; Luhmann and Bleidorn, 2018).

The consequences of terrorism are not only negative. Citizens are capable of overcoming the drama by developing prosocial behaviors (Pérez-Sales et al., 2005) and positive emotions, such as energy, optimism, strength, pride, or joy (Smith et al., 2001; Fredrickson et al., 2003; Fernández-Dols et al., 2007; Fernández et al., 2009; Vázquez and Hervás, 2010; Pelletier and Drozda-Senkowska, 2016). For example, the general population did not show changes in their benevolent views of the world after March 2004 bombings in Madrid (Ubillos et al., 2005). These positive reactions open the door to encouraging constructive responses after terror events. Positive feelings facilitate creative solutions, providing individuals with an advantage to overcome obstacles and difficulties (Fredrickson, 2013). This cognitive broadening implies taking a more abstract perspective that improves creativity, self-control, well-being, and cooperative problem solving (see for a review, Burgoon et al., 2013).

Victims of traumatic events usually see the world as uncontrollable, threatening, and malevolent (Janoff-Bulman, 1992). However, being able to construe a traumatic situation in a positive way while controlling immediate negative reactions allows people to successfully face the present and focus on the future. Among the several psychological mechanisms that may promote these healthy reactions, we focus on the construal level. Construal level theory (CLT, Liberman and Trope, 1998; Trope and Liberman, 2003) points out that people can subjectively represent or construe events differently depending on their style of thinking or construal level. Mental representations can vary from a concrete style focused on the near situation to an abstract style focused on the distant future (Trope and Liberman, 2003). The personal construal level is a dispositional trait that can be modified by situational cues, such as difficulty of the action (see Vallacher and Wegner, 1989) or psychological distance (see Trope and Liberman, 2003). Differences in how individuals represent a situation have important consequences on their judgments and decisions (Fujita, 2008), and this reasoning can be applied to terrorist acts and their consequences. In this sense, when an individual presents an abstract construal level, she/he mentally represents the events by focusing on future goals; a style of thinking that motivates them to overcome obstacles and difficulties (Vallacher and Wegner, 1989; Liberman and Trope, 1998; Carrera et al., 2017, 2019).

Therefore, if we look at the immediate damage caused by terrorism (concrete style) instead of thinking about the future recovery (abstract style), we are more likely to fall into a negative mood. In contrast, focusing on overcoming difficulties in the future (abstract style) promotes a positive approach that is more beneficial to individuals and society. Indeed, an abstract construal level focused on the distant future has shown to buffer negative events in one's daily life, improving self-esteem and well-being (Updegraff et al., 2010). Regarding terrorist attacks, research has shown that individuals who held higher power positions (e.g., government officials) construed the aftermath of September 2001, more abstractly and positively (Magee et al., 2010). These results support that an abstract construal level leads people to focus less on negative details and reinterpret facts as an opportunity for personal growth.

In the present work, we state that, when faced with such a dramatic event, such as the outburst of a terrorist attack, the disposition to keep an abstract construal level has positive consequences at both the interpersonal and collective levels.

Present Study

Research previously described the influence of terrorist acts on intrapersonal (e.g., mood) and collective feelings (e.g., emotional climate). We extend the study to the interpersonal level by focusing on the vicarious emotions reported when perceiving victims. As main vicarious emotions, Batson (2011) pointed out empathic concern (e.g., feeling moved, compassionate, and warm) and personal distress (e.g., feeling alarmed, worried, and distressed). Empathic concern is an other-oriented emotion in the sense that it involves feeling concerned for the other, whereas personal distress involves feeling distressed by the state of the other (self-oriented emotion). The distinction between *for* and *by* is important in explaining the social motives associated with each vicarious emotion: motivation evoked by empathic concern is altruistic because the ultimate goal is to reduce the other's need, whereas the motivation evoked by personal distress is egoistic because the goal is to reduce one's own aversive arousal (Batson, 2011). These two vicarious emotions are qualitatively distinct, presenting empathic concern a more

positive valence and lower arousal than personal distress (López-Pérez et al., 2014). After the terrorist attacks in 2015, Parisians were prototypical targets of this mixed vicarious emotional experience formed by empathic concern and personal distress. Analyzing the emotion that prevails after a terrorist attack is interesting because empathic concern can be generalized in multiple-victim situations, promoting the helping of each people in need (see Oceja et al., 2017).

Whereas we measure empathic concern and personal distress at the interpersonal level, we evaluate emotional climate (de Rivera and Páez, 2007) and esteem for humanity (Luke and Maio, 2009) at the collective level. The emotional climate refers to the predominant collective emotions generated through the social interaction of group members at a particular time (de Rivera and Páez, 2007). Perceiving the emotional climate as positive after a terrorist attack predicts social support and posttraumatic growth (Basabe et al., 2004; Páez et al., 2007). Esteem for humanity refers to the extent to which individuals perceive humans in general as favorable, desirable, competent, and trustworthy (Luke and Maio, 2009). Humanity-esteem can be altered after experiencing a stimulus that threatens important social values (Luke and Maio, 2009). Terrorist attacks can deeply affect our core assumptions about the benevolence of people and the world (Janoff-Bulman, 1992; Vázquez et al., 2008), and offer a traumatic but challenging opportunity to study this change.

As a novelty, we examine the role played by the abstract construal level on vicarious emotions, collective feelings, and attitudes. The present study followed a longitudinal perspective to explore the temporal changes in Spaniards' emotional reactions toward Parisians after the terrorist attacks of November 2015.

First, we tested whether the intensity of empathic concern and personal distress toward Parisians declined over time as previous research has found when measuring general mood and well-being after acts of terror. Second, we examined whether the link previously observed between abstraction and intrapersonal positive emotions extends to vicarious and collective reactions after the terrorist attacks. We expected that individuals higher in abstraction would report greater empathic concern and a more positive emotional climate and attitude toward humanity. Because previous research on abstraction has not addressed its direct influence on negative reactions, we did not make specific predictions relating abstraction with personal distress and negative emotional climate.

MATERIALS AND METHODS

Participants

The sample comprised 253 psychology students at the National Open University in Spain, who participated in exchange for course credit (196 females; M_{age} = 35.98; SD = 9.30). The study was conducted as part of a survey that included other measures unrelated to the hypotheses raised in the present research. At the beginning of the survey, the participants were randomly assigned to follow one of two different sets of instructions. Some participants (N = 178) wrote about terrorist attacks (main condition) in the first and second sessions (focusing on Paris in the first session and on France and Europe in the second session). The other participants (N = 75) wrote about a personal social event (control condition) in both the first and the second session. In the last session, the participants did not write narratives. Participants were randomized to each type of writing, but the number of participants differed because the control condition was included 3 days later as a result of technical problems. The writing manipulation did not influence the measures (construal level, empathic concern, personal distress, emotional climate and esteem for humanity) reported in this paper (Fs $\leq$ 1.79, ps $>$ 0.05). For this reason, the data were combined.

Procedure

Following the longitudinal approach introduced by Pennebaker and Harber (1993), the participants were asked to complete the scales in three different sessions: Time 1 on approximately November 25, 2015; Time 2 on approximately December 2, 2015; and Time 3 on approximately January 13, 2016. We spent 12 days organizing the data collection after the attacks. The participants were asked to focus on Parisians after the terrorist attacks in November 2015 (when citizens were injured and threatened by terrorism) as they answered the questions on the empathic concern and personal distress scales; these vicarious emotions were measured in all sessions. The emotional climate and esteem for humanity scales were evaluated only in the last session. In the last session, participants also completed a dispositional measure of abstraction and reported their age and sex.

We note that the participants completed the emotional climate scale and esteem for humanity scale after their reporting empathic concern and personal distress toward Parisians after the terrorist attacks. This order was designed to focus participants on the traumatic event that occurred in Paris when reporting their collective feelings and attitudes.

Measures

Empathic Concern and Personal Distress

Two indexes adapted and validated to the Spanish context (Oceja and Jiménez, 2007) from the Empathic Response Questionnaire (ERQ, Batson et al., 1983) were used to measure situational vicarious emotions focused on Parisians after the terrorist attacks. The empathic concern index included the following terms: *warm, tender, moved, compassionate, softhearted,* and *I feel sorry for them* (Cronbach's alphas: $\alpha_{Time\ 1}$ = 0.86; $\alpha_{Time\ 2}$ = 0.90; $\alpha_{Time\ 3}$ = 0.92). The personal distress index included the following terms: *troubled, agitated, distressed, upset, worried,* and *disturbed* (Cronbach's alphas: $\alpha_{Time\ 1}$ = 0.81; $\alpha_{Time\ 2}$ = 0.89; $\alpha_{Time\ 3}$ = 0.88). The participants were asked, "*Right now, knowing about the Paris terrorist attacks, to what extent are your feelings toward Parisians (emotional term)?*" They were asked to rate each item on a Likert-type scale ranging from 1 (*not at all*) to 7 (*very much*). Higher scores indicated higher emotional intensity.

Emotional Climate

The participants' perceptions of positive and negative collective emotions were measured with the emotional climate scale (Páez et al., 1997). The participants reported their agreement with eleven items (e.g., "*The social environment or climate is one of*

hope") on Likert-type scale ranging from 1 (*not at all*) to 5 (*very much*). The positive emotions included *goodness, peace, joy, hope, solidarity, bonanza, and confidence* ($\alpha_{Time\ 3} = 0.80$), and the negative emotions included *fear, hostility, sadness,* and *hate* ($\alpha_{Time\ 3} = 0.76$).

Esteem for Humanity

The humanity-esteem scale (Luke and Maio, 2009; Spanish version by Sevillano and Fiske, 2017) comprises ten items to measure attitudes toward humanity (e.g., "*All in all, I am inclined to regard the human species as a failure*" and "*I feel that human beings do not have much to be proud of*"; $\alpha = 0.84$) using a Likert-type scale from 1 *(strongly disagree*) to 7 (*strongly agree*).

Abstraction as Personal Disposition

The behavior identification form (BIF, Vallacher and Wegner, 1989) is a widely-accepted scale (Burgoon et al., 2013) for measuring personal disposition to represent actions in abstract or concrete terms. Each question asks participants to describe an action (e.g., "locking a door") by choosing an option that represents the behavior abstractly (e.g., "securing the house") or concretely (e.g., "putting a key in a lock"). We used the original BIF scale composed of 25 items ($\alpha = 0.80$). A construal level index was calculated by adding each participant's responses, assigning 0 when the response was concrete and 1 when it was abstract. A higher BIF score represented a greater tendency to identify behaviors at a more abstract level ($Md = 19$; $M = 18.43$; SD = 4.01).

Statistical Analyses

Repeated measures ANOVAs were calculated to test the differences between the different temporal measures of the dependent variables and between positive and negative emotional reactions at each time. We conducted independent samples *t*-tests to compare the means of the dependent variables between male and female participants. Pearson's correlations between the BIF scores and measures were calculated to show their relationships.

To explore the influence of the construal level, we used the BIF scores to classify the participants into two groups based on the median: the abstract group presenting BIF scores $\geq Md$; and the concrete group presenting BIF scores $< Md$. Then, we conducted two-way mixed factorial ANOVA tests and independent samples *t*-tests to compare the means of emotional reactions, emotional climate, and esteem for humanity between concrete and abstract participants.

RESULTS

Intensity of Vicarious Emotional Reactions

First, we tested whether empathic concern and personal distress toward Parisians varied over time. We conducted two repeated measures ANOVA at the three times, one for empathic concern and one for personal distress. We found significant differences between the three temporal measures for empathic concern, $F(2, 504) = 258.38$, $p < 0.001$, $\eta_p^2 = 0.50$, and personal distress, $F(2, 504) = 241.43$, $p < 0.001$, and $\eta_p^2 = 0.49$. All pairwise comparisons, corrected by Bonferroni, were significantly different for empathic concern and personal distress (for all, $p < 0.001$). The intensity of both types of vicarious emotions decreased over time. Empathic concern was higher in session 1, $M_1 = 5.50$ (SD = 1.16), than session 2, $M_2 = 4.88$ (SD = 1.35), and session 3, $M_3 = 4.03$ (SD = 1.46). This was also the case for personal distress: $M_1 = 4.34$ (SD = 1.19); $M_2 = 3.73$ (SD = 1.35); and $M_3 = 2.84$ (SD = 1.20).

TABLE 1 | Descriptive statistics: means (SDs).

Measures and session	Complete sample (*N* = 253)	Female participants (*N* = 196)	Male participants (*N* = 57)
Empathic concern			
First session	5.50 (1.16)	5.56 (1.14)	5.29 (1.19)
Second session	4.88 (1.35)	4.93 (1.30)	4.69 (1.47)
Third session	4.03 (1.46)	4.09 (1.47)	3.82 (1.39)
Personal distress			
First session	4.34 (1.19)	4.30 (1.20)	4.45 (1.16)
Second session	3.73 (1.35)	3.72 (1.35)	3.72 (1.35)
Third session	2.84 (1.20)	2.83 (1.19)	2.85 (1.23)
Emotional climate (third session)			
Positive	2.47 (0.56)	2.49 (0.58)	2.40 (0.47)
Negative	2.77 (0.72)	2.77 (0.74)	2.77 (0.67)
Esteem for humanity (third session)	4.82 (0.86)	4.86 (0.85)	4.64 (0.87)
BIF (third session)	18.43 (4.00)	18.28 (3.83)	18.94 (4.58)

No differences by sex were found. Women and men presented similar scores in all variables, $p > 0.05$.

A within-subject comparison considering both types of vicarious emotions showed that empathic concern was more intense than personal distress over time, $F_{Time\ 1}(1, 252) = 208.27$, $p < 0.001$, $\eta_p^2 = 0.45$; $F_{Time\ 2}(1, 252) = 197.89$, $p < 0.001$, $\eta_p^2 = 0.44$; $F_{Time\ 3}(1, 252) = 297.02$, $p < 0.001$, and $\eta_p^2 = 0.54$.

Although the number of male ($N = 57$) and female ($N = 196$) participants was not equivalent, we calculated the influence of sex on emotional reactions using independent samples *t*-tests. The results showed that men and women reported similar empathic concern and personal distress in each temporal moment ($ps > 0.05$). See the means and standard deviations in **Table 1**.

Emotional Climate and Esteem for Humanity

Two months after the attacks, a within-subject ANOVA showed that the negative emotional climate was perceived to be higher ($M_{Negative} = 2.77$; $SD_{Negative} = 0.72$) than the positive emotional climate ($M_{Positive} = 2.47$; $SD_{Positive} = 0.56$), $F(1, 252) = 19.98$, $p < 0.001$, and $\eta_p^2 = 0.07$. Both dimensions presented a moderate level (on the five-point scale).

Correlations showed the relationships between the variables (see **Table 2**). In the last session, the positive emotional climate was positively related to empathic concern ($r = 0.18$, $p = 0.004$) being uncorrelated with personal distress ($r < 0.03$, $p = 0.63$). The correlations between the negative emotional climate and both types of vicarious emotions were significant: empathic concern ($r = 0.15$, $p = 0.02$) and personal distress ($r = 0.32$, $p < 0.001$).

TABLE 2 | Correlations between abstraction and measures (N = 253).

	Abstraction level (third session)
Empathic concern	
First session	0.18**
Second session	0.21**
Third session	0.22**
Personal distress	
First session	0.04
Second session	0.12
Third session	0.15*
Emotional climate (third session)	
Positive	0.15*
Negative	−0.02
Esteem for humanity (third session)	0.23**

*$p < 0.05$; **$p < 0.01$.

These findings support the links between interpersonal and collective emotions.

Esteem for humanity was moderately positive (M = 4.81; SD = 0.86) and somewhat lower than in other studies (M = 4.97; Sevillano and Fiske, 2017). Those participants holding a positive image of humanity perceived more positive (r = 0.33, $p < 0.001$) and less negative (r = −0.17, p = 0.007) collective emotional reactions than those holding a negative image of humanity. In addition, they showed more empathic concern ($r_{\text{Time 3}}$ = 0.29, $p < 0.001$). This general attitude was not associated with personal distress (see **Table 2**). Thus, the measure of attitude toward humanity shows a stronger link with collective emotions than with interpersonal emotions.

Women and men reported similar emotional climate and esteem for humanity (ps > 0.05; see **Table 1**).

Differences in Vicarious Emotions, Emotional Climate, and Esteem for Humanity by Level of Abstraction

The correlations between abstraction and all other measures were significant but low (see **Table 2**). As expected, abstraction was positively associated with greater empathic concern, a positive emotional climate, and esteem for humanity. Men and women presented similar construal level ($p > 0.05$, see **Table 1**).

The relationships of abstraction with negative reactions (personal distress and a negative emotional climate) were not significant, except for the positive correlation with personal distress in the last session. However, this emotion presented low intensity (M = 2.84; SD = 1.2).

To explore the influence of abstraction on emotional and attitudinal reactions after the terrorist attacks, we split the sample into two groups using the median BIF scores (Md = 19). The abstract group (N_{abst} = 130) showed BIF scores ≥19. The concrete group (N_{conc} = 123) showed BIF scores <19. Because we proposed a clear hypothesis only for positive reactions, we carried out the analysis separately for each affective valence.

A two-way mixed factorial ANOVA on empathic concern with the session as the within-subject factor and the construal level (abstract individuals vs. concrete individuals) as the between-subject factor showed significant main effects for session, F(1.804, 452.71) = 258.93, $p < 0.001$ (Greenhouse–Geisser correction), η_p^2 = 0.51, and construal level, F(1, 251) = 8.55, p = 0.004, η_p^2 = 0.03. The interaction was not significant, $F < 1$, p = 0.39. Regarding the session factor, as already shown, empathic concern decreased over time: $M_{\text{Time 1}}$ = 5.50 (SD = 1.16), $M_{\text{Time 2}}$ = 4.87 (SD = 1.35), $M_{\text{Time 3}}$ = 4.03 (SD = 1.46) [polynomial linear contrast, F(1, 251) = 398.00, $p < 0.001$, η_p^2 = 0.61, see **Figure 1**]. Regarding the construal level factor, empathic concern was higher in abstract (M = 5.01; SD = 1.19) than in concrete individuals (M = 4.58; SD = 1.16) (see **Figure 2**). Independent samples

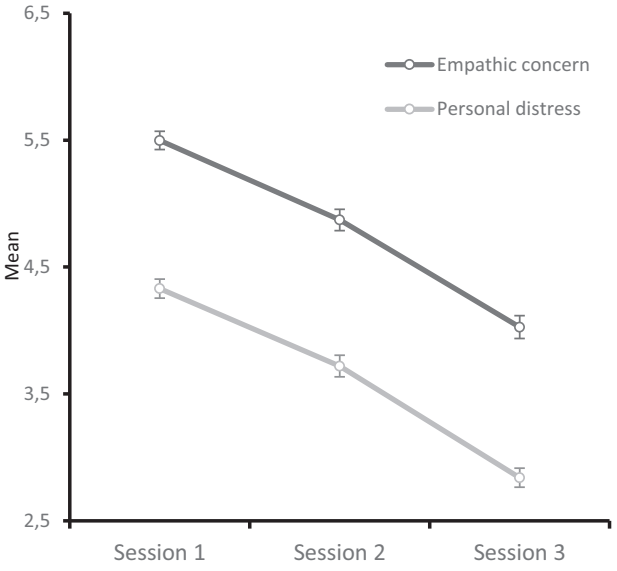


FIGURE 1 | Mean ratings of personal distress and empathic concern through session.

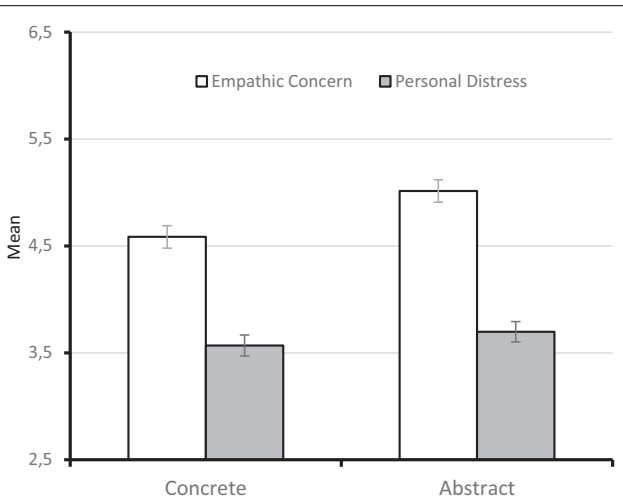


FIGURE 2 | Mean ratings of empathic concern and personal distress for concrete and abstract individuals.

TABLE 3 | Descriptive statistics and construal level: means (SDs).

Measures and session	Abstract group (*N* = 130)	Concrete group (*N* = 123)
Empathic concern		
First session	5.66_a (1.05)	5.33_b (1.24)
Second session	5.09_a (1.30)	4.64_b (1.35)
Third session	4.27_a (1.46)	3.77_b (1.42)
Personal distress		
First session	4.33_a (1.13)	4.34_a (1.26)
Second session	3.80_a (1.28)	3.64_a (1.42)
Third session	2.95_a (1.19)	2.71_a (1.20)
Emotional climate (third session)		
Positive	2.53_a (0.60)	2.40_a (0.50)+
Negative	2.75_a (0.74)	2.79_a (0.70)
Esteem for humanity (third session)	4.97_a (0.81)	4.65_b (0.88)

Means in the same row that do not share the same subscripts differ at $p < 0.05$. +$p = 0.06$.

t-tests showed significant differences in empathic concern in all sessions between abstract and concrete participants, *t*s $\geq$ 2.29 (see **Table 3**).

The same analysis was conducted for personal distress. We found that only the session was significant, $F(1.94, 489.23) = 242.95$ $p < 0.001$ (Greenhouse–Geisser correction), $\eta_p^2 = 0.49$. Personal distress decreased over time: $M_{\text{Time 1}} = 4.34$ (SD = 1.19), $M_{\text{Time 2}} = 3.72$ (SD = 1.35), $M_{\text{Time 3}} = 2.84$ (SD = 1.20) [polynomial linear contrast, $F(1, 251) = 440.52$, $p < 0.001$, $\eta_p^2 = 0.64$, see **Figure 1**]. No other effects were significant. Differences in the personal distress between abstract and concrete individuals were not significant, *t*s $\leq$ 1.56 (see **Table 3**).

We conducted independent samples *t*-tests to explore the influence of the construal level (abstract individuals vs. concrete individuals) on the emotional (positive and negative) climate and esteem for humanity, all of which were measured in the last session after reporting vicarious emotions toward Parisians.

The positive emotional climate was perceived to be higher, although not significantly, among abstract participants, $t(251) = 1.87$, $p = 0.06$ (see **Table 3**). The negative emotional climate was perceived similarly by participants with both construal levels, $t(251) = 0.46$, $p = 0.64$ (see **Table 3**).

Esteem for humanity was greater in the abstract group than in the concrete group, $t(251) = 2.95$, $p = 0.003$ (see **Table 3**).

DISCUSSION

Previous research has shown the confluence of negative and positive reactions to terrorist attacks (see for a review Vázquez et al., 2008). Extensive research based on the broaden-and-build theory of positive emotions (Fredrickson et al., 2003) supports the idea that emotions such as hope, love, or optimism facilitate people's successful confrontation of adversity. Research on emotions related to resilience and coping strategies has been focused mainly on intrapersonal emotions, that is, self-focused emotional reactions felt when people experience negative events (e.g., fear and hope). In the present research, we extended these previous results to the interpersonal level, considering the vicarious emotions of empathic concern and personal distress, and to the collective level, measuring the emotional climate and esteem for humanity. This study examined emotions and attitudes in the frame of construal level theory to test how an abstract construal level promotes stronger positive reactions.

Spanish participants felt empathic concern and personal distress toward Parisians after the terrorist attacks, which are positive and negative emotional reactions involving warmth, tenderness and compassion, and worry and anxiety, respectively. At the collective level, the participants reported a moderately negative (i.e., fear, hostility, and sadness) and positive (i.e., goodness, peace, joy, hope, and solidarity) emotional climate. Specifically, perceptions of an emotional climate of hostility were overall more intense than perceptions of positive emotional climate along the three waves of the survey; however, feelings of hope, solidarity, bonanza, and confidence persisted in the context of the traumatic event. Esteem for humanity was moderate even under the traumatic circumstances of a terrorist attack.

Spaniards were not direct victims, but they were intensely moved by these terrorist acts. Supporting previous research on intrapersonal emotions in the aftermath of terrorist attacks (e.g., Fernández et al., 2009; McArdle et al., 2012; Pelletier and Drozda-Senkowska, 2016; Luhmann and Bleidorn, 2018), our results showed that the intensity of empathic concern and personal distress declined from the following week after the attacks to 2 months later. In the three phases of the survey, both types of vicarious emotions were simultaneously reported, and empathic concern was always more intense than personal distress. The highest intensities during the first session suggest that actions motivated by these vicarious emotions, such as prosocial behaviors, should be more likely during the first weeks after terrorist attacks.

The relationship between empathic concern and negative emotional climate indicates the coexistence of mixed feelings among observers of terrorist attacks. The participants who felt higher compassion and tenderness toward Parisians were as well more concerned about a threat to their society. They felt both moved by the victims and worried and fearful because of the dramatic event. The existence of mixed vicarious emotions sheds some light in the darkness of terrorist violence. This optimistic view is strengthened by the results concerning esteem for humanity. Despite the threat of terror, people reported a positive attitude toward individuals. Esteem for humanity was associated with a more positive and less negative emotional climate and greater empathic concern. These results extend the findings on the coexistence of positive and negative reactions from previous research on intrapersonal emotions to include interpersonal vicarious emotions and collective reactions.

The present study supports the beneficial role of abstractness in the aftermath of the terrorist attacks. Abstraction intensified positive interpersonal and collective reactions (i.e., empathic concern and esteem for humanity) among the observers of Paris attacks in 2015. A higher level of abstraction increased (albeit not significantly) participants' perceptions of the positive

emotional climate. Negative reactions (i.e., personal distress and negative emotional climate) were not affected by the participants' construal level. The results indicate that abstraction has a stronger influence on positive than negative feelings. Thus, focusing on the positive side, abstract people were able to feel more intense empathic concern toward Parisians and maintain a more positive view of humanity than concrete people.

The greater resistance of abstract people's positive emotions and attitudes to being diminished by negative situations favors better adjustment and overcoming of negative events. People with an abstract mindset tend to value reality as a whole, examining global and long-term aspects without surrendering to the current negative circumstances. Abstraction enhances people's resilience, even under circumstances as terrible and traumatic as a terrorist attack.

Study Limitations

As limitations, we note that our participants were psychology students studying at the National Open University in Spain. This university is focused on adult students (M_{age} = 35.98, SD = 9.30) who are usually working and studying simultaneously, a characteristic that makes the results slightly more generalizable to the general population, although their interest in psychology could bias the results. These limitations show the need to replicate the study in the general population. A terrorist attack is a very dramatic event that implies a global threat, indiscriminate damage, and helplessness; other threatening events should be studied to assess the strength of our results (e.g., pandemic). Although we did not find sex differences, the number of women and men was not equivalent in our sample; because of this limitation, this result should be considered with caution. Sex differences is an important variable to test in future studies on emotional reactions. A further limitation of our study is the possible demand effect introduced by questions about Parisians; a baseline should be included in future studies. Finally, given the unpredictability and immediacy of the event and the need to address the effect with the utmost promptness, we did not pre-register the hypotheses before collecting the data.

CONCLUSION

These results have shown the importance of considering the influence of the construal level on vicarious and collective feelings and attitudes when exploring the aftermath of terrorist violence. Our data revealed that the higher the level of abstraction is, the greater empathic concern and esteem for humanity. All these positive reactions are associated with resilience, prosocial behaviors and promotion of social bonds. Regardless of their style of thinking, positive and negative reactions coexisted in all participants, although abstract people seem better equipped to overcome threats and difficulties, even traumatic situations such as a terrorist attack. The present may be threatening, but looking at the future with an abstract style of thinking allows people to face adversities with greater chances of personal and collective success.

To conclude, we note that although the construal level is approached as a personal tendency in this study, it is possible to modify how people represent an event. When circumstances suggest the necessity to induce an abstract style of thinking, different procedures can be used to do so. In natural settings, for example, simple messages framed abstractly (vs. concretely) have been used to successfully change the construal level (White et al., 2011). The opportunity to modify the construal level opens the possibility of promoting more positive reactions when people face terrible situations as a terrorist attack. Future research should explore programs to promote the bright side of abstraction when personal and social circumstances become difficult and negative.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Universidad Autónoma de Madrid Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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REFERENCES

Basabe, N., Páez, D., and Rimé, B. (2004). Efectos y procesos psico-sociales de la participación en manifestaciones después del atentado del 11 de marzo [Psychosocial processes and effects of participation in demonstrations related to March Eleven bombing]. *Ansiedad y Estrés* 10, 247–263

Batson, C. D. (2011). *Altruism in Humans*. Oxford: Oxford University Press.

Batson, C. D., O'Quin, K., Fultz, J., Vanderplas, M., and Isen, A. (1983). Self-reported distress and empathy and egoistic versus altruistic motivation for helping. *J. Personal. Soc. Psychol.* 45, 706–718 doi: 10.1037/0022-3514.45.3.706

Burgoon, E. M., Henderson, M. D., and Markman, A. B. (2013). There are many ways to see the forest for the trees: a tour guide for abstraction. *Perspect. Psychol. Sci.* 8, 501–520. doi: 10.1177/1745691613497964

Bux, S. M., and Coyne, S. M. (2009). The effects of terrorism: the aftermath of the London terror attacks. *J. Appl. Soc. Psychol.* 39, 2936–2966. doi: 10.1111/j.1559-1816.2009.00556.x

Carrera, P., Caballero, A., Fernández, I., and Muñoz, D. (2017). Abstractness leads people to base their behavioral intentions on desired attitudes. *J. Exp. Soc. Psychol.* 70, 27–33. doi: 10.1016/j.jesp.2016.12.004

Carrera, P., Fernández, I. Muñoz, D., and Caballero, A. (2019). Desires matter! Desired attitudes predict behavioural intentions in people who think abstractly: the case of eating products without added salt. *Rev. Psicol. Soc.* 34, 281–306. doi: 10.1080/02134748.2019.1583512

Conejero, S., and Etxebarría, I. (2007). The impact of the Madrid bombing on personal emotions, emotional atmosphere and emotional climate. *J. Soc. Issues* 63, 273–287. doi: 10.1111/j.1540-4560.2007.00508.x

de Rivera, J., and Páez, D. (2007). Emotional climate, human security and cultures of peace. *J. Soc. Issues* 63, 233–253. doi: 10.1111/j.1540-4560.2007.00506.x

Fernández, I., Páez, D., and Pennebaker, J. W. (2009). Comparison of expressive writing after the terrorist attacks of S11 and M11. *Int. J. Clin. Health Psychol.* 9, 89–103

Fernández-Dols, J. M., Carrera, P., Hurtado-de-Mendoza, A., and Oceja, L. (2007). Emotional climate as emotion accessibility: how countries prime emotions. *J. Soc. Issues* 63, 339–352. doi: 10.1111/j.1540-4560.2007.00512.x

Fredrickson, B. L. (2013). "Positive emotions broaden and build," in *Advances in Experimental Social Psychology*, Vol. 47, ed P. Devine and A. Plant (Burlington, NJ: Academic Press), 1–53. doi: 10.1016/b978-0-12-407236-7.00001-2

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., and Larkin, G. R. (2003). What good are positive emotions in crisis? a prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *J. Personal. Soc. Psychol.* 84, 365–376. doi: 10.1037/0022-3514.84.2.365

Fujita, K. R. (2008). Seeing the forest beyond the trees: a construal level approach to self-control. *Soc. Personal. Psychol. Compass* 2, 1475–1496. doi: 10.1111/j.1751-9004.2008.00118.x

Garcia, D., and Rimé, B. (2019). Collective emotions and social resilience in the digital traces after a terrorist attack. *Psychol. Sci.* 30, 617–628. doi: 10.1177/0956797619831964

Giner-Sorolla, R., and Maitner, A. T. (2013). Angry and the unjust, scared of the powerful: emotional responses to terrorist threat. *Personal. Soc. Psychol. Bull.* 39, 1069–1082. doi: 10.1177/0146167213490803

Janoff-Bulman, R. (1992). *Shattered Assumptions: Toward a New Psychology of Trauma*. New York, NY: Free Press.

Liberman, N., and Trope, Y. (1998). The role of feasibility and desirability in near and distant future decisions: a test of temporal distance on level of construal. *J. Pers. Soc. Psychol.* 75, 5–18. doi: 10.1037/0022-3514.75.1.5

López-Pérez, B., Carrera, P., Ambrona, T., and Oceja, L. (2014). Testing the qualitative differences between empathy and personal distress: measuring core affect and self-orientation. *Soc. Sci. J.* 51, 676–680. doi: 10.1016/j.soscij.2014.08.001

Luhmann, M., and Bleidorn, W. (2018). Changes in affect, cognition, and perceived behavioral changes among vicarious victims of the paris terrorist attacks of November 13, 2015. *Soc. Psychol. Personal. Sci.* 9, 214–222. doi: 10.1177/1948550617732818

Luke, M. A., and Maio, G. R. (2009). Oh the humanity! Humanity-esteem and its social importance. *J. Res. Personal.* 43, 586–601. doi: 10.1016/j.jrp.2009.03.001

Magee, J. C., Milliken, F. L., and Lurie, A. R. (2010). Power differences in the construal of a crisis: the immediate aftermath of September 11, 2001. *Personal. Soc. Psychol. Bull.* 36, 354–370. doi: 10.1177/0146167209360418

McArdle, S. C., Rosoff, H., and John, R. S. (2012). The dynamics of evolving beliefs, concers emotions and behavioral avoidance following 9/11: a longitudinal analysis of representative archival samples. *Risk Anal.* 32, 744–761. doi: 10.1111/j.1539-6924.2012.01814.x

Mehl, M. R., and Pennebaker, J. W. (2003). The social dynamics of a cultural upheaval: social interactions surrounding September 11, 2001. *Psychol. Sci.* 14, 579–585. doi: 10.1046/j.0956-7976.2003.psci_1468.x

Oceja, L. V., and Jiménez, I. (2007). Beyond egoism and group identity: empathy for the other and awareness of others in a social dilemma. *Span. J. Psychol.* 10, 369–379. doi: 10.1017/S1138741600006636

Oceja, L. V., Stocks, E., Ambrona, T., López-Pérez, B., and Carrera, P. (2017). Local versus global perceptual scope, empathic concern, and helping preferences in multiple-victim situations. *Span. J. Psychol.* 20:E25. doi: 10.1017/sjp.2017.25

Páez, D., Basabe, N., Ubillos, S., and González-Castro, J. L. (2007). Social sharing, participation in demonstrations, emotional climate, and coping with collective violence after the March 11th Madrid bombings. *J. Soc. Issues* 63, 323–337. doi: 10.1111/j.1540-4560.2007.00511.x

Páez, D., Ruiz, J. I., Gailly, O., Kornblit, A. L., Wiesenfeld, E., and Vidal, C. M. (1997). Clima emocional: su concepto y medición mediante una investigación transcultural. [Emotional climate: its concept and measurement in a cross-cultural research]. *Rev. Psicol. Soc.* 12, 79–98. doi: 10.1174/021347497320892045

Pelletier, P., and Drozda-Senkowska, E. (2016). The charlie hebdo terror attack in paris: follow-up of french citizens' terrorist threat perception and its aftermath. *Int. Rev. Soc. Psychol.* 29, 85–98. doi: 10.5334/irsp.51

Pennebaker, J. W., and Harber, K. D. (1993). A social stage model of collective coping: the loma prieta earthquake and the persian gulf war. *J. Soc. Issues* 49, 125–145. doi: 10.1111/j.1540-4560.1993.tb01184.x

Pérez-Sales, P., Cervellón, P., Vázquez, C., Vidales, D., and Gaborit, M. (2005). Post-traumatic factors and resilience: the role of shelter management and victim's attitudes after the earthquakes in El Salvador (2001). *J. Commun. Appl. Soc. Psychol.* 15, 368–382. doi: 10.1002/casp.827

Salguero, J. M., Fernández-Berrocal, P., Iruarrizaga, I/, Cano-Vindel, A., and Galea, S. (2011). Major depressive disorder following terrorist attacks. A systematic review of prevalence course and correlates. *Psychiatry* 11:96. doi: 10.1186/1471-244X-11-96

Sevillano, V., and Fiske, S. T. (2017). "The Image of humanity. Preliminary results for the Spanish version of the humanity-esteem scale," in *XIV Conference of Environmental Psychology-PSICAMB, June 21-24th*, Évora.

Smith, T. W., Rasinski, K. A., and Toce, M. (2001). *America Rebounds: A National Study of Public Responses to the September 11th Terrorist Attacks—Preliminary Findings*. Chicago, IL: University of Chicago.

Trope, Y., and Liberman, N. (2003). Temporal construal. *Psychol. Rev.* 110, 403–421. doi: 10.1037/0033-295X.110.3.403

Ubillos, S., Mayordomo, S., and Basabe, N. (2005). Percepción de riesgo, reacciones emocionales y el impacto del 11-M [Risk perception, emotional reactions and the impact of March 11th events]. *Rev. Psicol. Soc.* 20, 301–313. doi: 10.1174/021347405774277640

Updegraff, J. A., Emanuel, A. S., Suh, E. M., and Gallagher, K. M. (2010). Sheltering the self from the storm: self-construal abstractness and the stability of self-esteem. *Personal. Soc. Psychol. Bull.* 36, 97–108. doi: 10.1177/0146167209353331

Vallacher, R. R., and Wegner, D. M. (1989). Levels of personal agency: individual variation in action identification. *J. Personal. Soc. Psychol.* 57, 660–671. doi: 10.1037/0022-3514.57.4.660

Vázquez, C., and Hervás, G. (2010). Perceived benefits after terrorist attacks: the role of positive and negative emotions. *J. Posit. Psychol.* 5, 154–163. doi: 10.1080/17439761003630060

Vázquez, C., Pérez-Sales, P., and Hervás, G. (2008). "Positive effects of terrorism and posttraumatic growth: an individual and community perspective," In *Trauma, Recovery, and Growth: Positive Psychological Perspectives on Posttraumatic Stress*, eds A. Linley and S. Joseph (New York, NY: Lawrence Erlbaum Associates), 63–91. doi: 10.1002/9781118269718.ch4

White, K., MacDonnell, R., and Dahl, D. W. (2011). It's the mind-set that matters: the role of construal level and message framing in influencing consumer efficacy and conservation behaviors. *J. Market. Res.* 48, 472–485. doi: 10.1509/jmkr.48.3.472

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Compassion: From Its Evolution to a Psychotherapy

*Paul Gilbert**

Centre for Compassion Research and Training, College of Health and Social Care Research Centre, University of Derby, Derby, United Kingdom

The concept, benefits and recommendations for the cultivation of compassion have been recognized in the contemplative traditions for thousands of years. In the last 30 years or so, the study of compassion has revealed it to have major physiological and psychological effects influencing well-being, addressing mental health difficulties, and promoting prosocial behavior. This paper outlines an evolution informed biopsychosocial, multicomponent model to caring behavior and its derivative "compassion" that underpins newer approaches to psychotherapy. The paper explores the origins of caring motives and the nature and biopsychosocial functions of caring-attachment behavior. These include providing a secure base (sources of protection, validation, encouragement and guidance) and safe haven (source of soothing and comfort) for offspring along with physiological regulating functions, which are also central for compassion focused therapy. Second, it suggests that it is the way recent human cognitive competencies give rise to different types of "mind awareness" and "knowing intentionality" that transform basic caring motives into potentials for compassion. While we can care for our gardens and treasured objects, the concept of compassion is only used for sentient beings who can "suffer." As psychotherapy addresses mental suffering, cultivating the motives and competencies of compassion to self and others can be a central focus for psychotherapy.

Keywords: compassion, psychotherapy, evolution, caring, biopsychosocial

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Reviewed by:
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University of Coimbra, Portugal
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University of Trento, Italy

***Correspondence:**
Paul Gilbert
p.gilbert@derby.ac.uk

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INTRODUCTION AND EVOLUTIONARY OVERVIEW

Background

There is a long history of philosophical and spiritual writings, highlighting the value of compassion as an antidote to suffering and anti-social behavior (Dalai Lama, 1995; Lampert, 2005; Ricard, 2015). However, it has only been in the last 30 years or so that we have seen substantial research on the neurophysiological, psychological, and social dimensions of compassion and compassion training (for reviews see Weng et al., 2013; Gilbert, 2017a; Seppälä et al., 2017; Stevens and Woodruff, 2018; Petrocchi and Cheli, 2019; Singer and Engert, 2019; Di Bello et al., 2020; Kim et al., 2020a). This work has been accompanied by the development of various forms of general compassion training (e.g., Jazaieri et al., 2013; Singer and Engert, 2019; Condon and Makransky, 2020) and cultivating compassion to address personal problems like self-criticism (Neff and Germer, 2017) and mental health issues (Germer and Siegel, 2012; Kirby and Gilbert, 2017). Among the latter, the most well-developed and evidence-based is *mindful self-compassion* of Neff and Germer (2017) to address self-criticism, and also *cognitively-based compassion training*, which combines the elements of cognitive therapy with Buddhist

practices (Mascaro et al., 2017). This paper explores compassion focused therapy (CFT) rooted in an evolution informed, biopsychosocial approach to mental health problems and psychotherapy (Gilbert, 1984, 1992a,b, 1995, 2019). CFT is an integrative, multidisciplinary, process-based therapy that utilizes insights and wisdoms from many of the main schools of psychotherapy (Gilbert, 1989/2016, 2007a,b, 2019; Bell et al., 2020a,b; Fox et al., 2020) with increasing evidence of effectiveness (Craig et al., 2020; Fox et al., 2020). CFT was developed with and for people with mental health difficulties, particularly those who had not responded to other therapies, who had problems with self-criticism, shame, and trauma, often came from difficult backgrounds (Gilbert, 2000, 2010; Gilbert and Choden, 2013) and were fearful and/or distrustful of compassion from others and/or for self (Pauley and McPherson, 2010; Gilbert et al., 2011, 2014; Kirby et al., 2019). This paper is in two main sections. The first is an exploration of the evolution and processes of compassion and some of the key themes that underpin its application in psychotherapy. The second part explores the application of compassion to psychotherapy.

PURSUING COMPASSION

Since there are different approaches to compassion and its application in psychotherapy (Gilbert, 2017b), this section explores the link between the evolution of caring and the emergence of compassion as a human motive and process. When trying to define compassion, we can start by noting that some approaches seek to identify particular core clusters of psychological processes and attributes (often suggested by the contemplative traditions) associated with it. These suggested core processes are then subjected to various forms of factor analysis (Strauss et al., 2016). Using this technique on a number of different approaches and measures, Strauss et al. (2016) concluded that:

> A range of definitions from Buddhist and Western psychological perspectives were considered and five components of compassion were identified: recognition of suffering; understanding its universality; feeling sympathy, empathy, or concern for those who are suffering (which we describe as emotional resonance); tolerating the distress associated with the witnessing of suffering; and motivation to act or acting to alleviate the suffering. Each of these components has been articulated by several published definitions of compassion, although no single existing definition explicitly includes all five of them (p. 25)

While these are a commonly agreed set of processes for compassion, as with all such approaches, what we get out of a factor analysis very much depends on what we put into it. This is similar for the controversies in psychiatric diagnosis, which can use the same techniques with the same potential difficulties. Identifying core processes can help us to share conceptualizations but the exact phenomenon included in a cluster or factor can vary, sometimes quite considerably and in the clinical sciences be unreliable ways of identifying specific syndromes [see for example the controversies on one approach to self-compassion (Muris and Otgaar, 2020; Neff, 2020)]. As with psychiatric diagnosis, we can wonder if these are discrete states, traits, or if they are more fluid? Do we need all of the components for any particular act to be regarded as compassionate? Can compassion take place in the absence of (say) accurate empathy (see below), and is there a role for moral and rational compassion where we override what we actually feel (Loewenstein and Small, 2007)? Additionally, many of these qualities are dimensional – we can (say) have "degrees" of being moved by suffering. These dimensions will be affected by relational qualities such as emotional closeness (liking) versus seeing others as enemies (disliking) and trust. All of these attributes may be present, but a person may not actually follow through and act compassionately (Poulin, 2017). So, although statistical approaches have important roles to play in identifying core ways of "being compassionate," to understand the complex processes of compassion itself requires other approaches too. For a recent major review of these issues (see Mascaro et al., 2020).

The Importance of Understanding How and Why Care-Compassion Evolved

Understanding how and why caring and compassion evolved gives insight into a whole range of biopsychosocial processes (e.g., Gilbert, 1989/2016, 2005a, 2009a, 2017a; Depue and Morrone-Strupinsky, 2005; Goetz et al., 2010; Porges and Furman, 2011; Keltner et al., 2014; Brown and Brown, 2015, 2017; Carter et al., 2017; Porges, 2017; Petrocchi and Cheli, 2019). Recognizing that compassion can be understood as *an evolved strategy*, supporting survival and reproduction, *and* as a basic, personally experienced motivation that can be in conflict with other strategies and motivations (Gilbert, 2000), such as self-focused competitiveness, offers insight into its role in social behavior and mental states. Hence, rather than focusing on a clustering of "symptoms" or suggested "attributes," the evolutionary approach seeks the origins of compassion in the evolution of caring motives and behavior, which then allows for the identification of the phylogenetic journey of the algorithms and physiological systems that make caring-compassion possible (Gilbert, 1989/2016, 2005a; Goetz et al., 2010; Carter et al., 2017; Porges, 2017; Uomini et al., 2020). This paper outlines a hierarchical, evolution informed, biopsychosocial approach to compassion which enables insights into how lack of care-compassion, particularly early in life, can underpin mental health problems and how cultivating compassion can operate as a psychotherapeutic process, and promote prosocial behavior (see also Weng et al., 2013; Seppälä, et al., 2017; Gilbert, 2020a). Evolutionary approaches address two key questions:

First is the study of its phylogeny:

1. Given that compassion is emergent from caring motivation, we can identify the evolutionary challenges of reproduction that gave rise to certain forms of caring for offspring behavior.
2. We can then explore the motives and algorithms that facilitate those parental, investing reproductive strategies and how

they served as a template for other forms of caring and helpful behavior to evolve.
3. The evolution of motives and algorithms require physiological infrastructures to support them. In the case of caring and compassion, candidates include the hormones oxytocin and vasopressin and the methylated part of the parasympathetic nervous system called the vagus nerve and different neurophysiological circuits.
4. Over time, those algorithms recruit and possibly give rise to different types of complex competencies that include ways of reasoning, empathizing, and mindful awareness. Just as these can be recruited to advance any motive, they are utilized in the pursuit of compassion motives.
5. As a social mentality, compassion has a flow in that we can be compassionate to others, be open to the compassion from others and be self-compassionate. For the most part, each flow uses the same psychophysiology competencies.

Second is the study of its ontogeny:

6. Once the basic algorithms with their physiological infrastructures are identified, it is possible to explore how, over the course on an individual's life, these motives and algorithms are stimulated, recruited, and become incorporated into processes such as self-identity. In essence, we are looking at *the phenotype of the motive* and in this case the phenotype of caring to compassion.
7. We can explore how motives like caring can recruit different types of emotion and cognitive competencies to cope with different types of context.
8. Like other motives, caring and compassion have facilitators and inhibitors that can be both external and internal.
9. Understanding these processes means that we can then begin to develop contexts and interventions that are specifically aimed to stimulate different contributing processes to compassion, such as identified physiological systems, cognitive competencies and behavioral training, and practizing certain types of meditation. These create a menu of interventions for people with mental health problems; for example, some clients may need particular help with developing vagal tone, others with becoming more empathic, others with fears and distrust of compassion, and yet others with experiencing caring motivation itself and (maybe) to tone down narcissistic self-focus.
10. By understanding these processes, including how motives can conflict with each other (e.g., for pursuing competitive self-advantage *versus* caring and sharing), we can create compassion focused and guided psychotherapies, education, businesses, and politics.

Strategies and Motives

The basic challenges of life are survival and reproduction, and all living forms have three basic life tasks that give rise to three basic motives: (1) being motivated to avoid harm, injury, and loss; (2) being motivated to secure the resources necessary for survival and reproduction, including sexual access and infant caring; and (3) being able to tone down those motive systems when "resource satisfied" and "safe" to allow "rest and digest" (Gilbert, 1989/2016, 2009a, 2020a; Thayer et al., 2012; Petrocchi and Cheli, 2019; Workman et al., 2020). The bodily functions for rest and digest cannot proceed if the animal is under threat or is energized for resource seeking; thus, indicating co-regulating processes. The ability to downregulate physical activation through rest and digest has long-term impacts on illness vulnerability and mortality (Thayer et al., 2012). These basic life tasks promote what is called *fitness*; that is, success in passing genes for specific traits to subsequent generations. As noted below, different emotions are associated with these different life tasks and motives. Within those broad categories are a range of specific motives; for example, finding food and shelter, or in the social domain, competing with others, forming alliances, mating, and caring for offspring.

Different species evolve different (fitness promoting) strategies and ways of pursuing these motives. Primary motives require the organism to be alerted, orientated to, and respond to, certain kinds of stimuli/signal in specific ways so they can approach resources, but avoid threats and harms (Gilbert, 1989/2016, 1993; Panksepp, 1998). Motives also generate behaviors to *seek out* certain kinds of stimuli/signal. Hence, in order for a motive to operate, it needs *an algorithm* to guide it, to link stimulus and response. There is no point in being stimulus sensitive, interested, and orientated to (for example) food or sex if the animal does not know what to do. Lions are interested in antelopes as a food source, but if they do not have the foggiest idea of how to hunt or kill prey, they will starve. Evolving *algorithms* that enable motives to be enacted, therefore, have to have both elements. They begin as feature detectors that enable animals to identify and pay attention to (take an interest in) different kinds of stimuli in the environment, *and then* respond to those stimuli in appropriate ways. With brains that can learn, exact behaviors may depend on learning, such as lions learning how to hunt and kill and where the prey "hang out." As noted later, the evolution of complex human cognitive competencies has introduced fundamental and profound new ways by which emotions and motives are triggered, pursued, and expressed.

Algorithms can be identified quite simply as stimulus-response dynamics of *if* A *then* do B. Nearly all processes in the universe operate on algorithms that are predetermined and give rise to the laws of physics and chemistry. One's air-conditioning works on an algorithm of *if* the temperature goes above a certain level, then it turns itself on. If it goes below a certain level, it turns itself off. All that it needs is a feature detector (in this case) for temperature that links to the response function of the system. This is essentially the same way physiological systems are built. For example, the immune system operates such that *if* certain foreign agents are detected, *then* immune responses are stimulated. So basically, algorithms are what motives require to operate. Here are some examples:

- *if* a threat (e.g., predator) *then* activate arousal and run. This algorithm requires feature detectors for certain types of threat (this links to the preparedness hypothesis such that we are more likely to develop fears of snakes and spiders than

electricity or cars which will kill more people). Once detected, it will then trigger physiological systems that enable the body to act to defend against the threat. Defenses can be active, as in running away, or inhibitory, as in freezing or depressive collapse.

- *if* food *then* activate approach behavior, salivate, and eat. This algorithm requires feature detectors for certain types of food, including internal awareness (hunger) of the need to eat, linked into physiological systems, such as digest once eaten, the body has systems (a gut) to digest and utilize food.
- *if* sexual opportunity *then* approach and engage in courting behavior and copulate. This algorithm requires feature detectors for certain types of sexual stimuli with physiological systems that prepare sexual organs for action. In some species, triggers are pheromones. For others, it is visual stimuli and sometimes linked to certain times of the year.
- *if* threatened by a more dominant other *then* escape, or if not possible, then display submissive behavior. This algorithm requires feature detectors for certain types of signal indicating a threatening, powerful, dominant other, and physiological systems that will switch on defensive behaviors, such as submissive hunkering down and eye gaze avoidance.

Now, we can come to the reproductive strategies that give rise to particular motives with particular algorithms for caring behavior:

- *if* signal of distress or need *then* engage in trying to alleviate it. This algorithm requires feature detectors for certain types of (distress/need) signals emanating from another (e.g., offspring). This requires identification of the offspring (kin vs. non-kin) and identification of the nature of distress or needs (e.g., rescue if in danger, feed if hungry, and thermoregulate if cold). Prevention can also be built into this to the extent that nesting, for example, will take place out of harm's way (Geary, 2000).

Algorithms can become complex and branch into sets of interconnecting algorithms of "*if* A *then do* B, *but not if* in the presence of C," or "*only if in* the presence of D." What that means is that the system needs a feature detector for "C" and "D," and then those algorithms can interact. Another typical example is *sequenced algorithms*, where there is a menu of options so that if one response does not work, another is triggered. For example, in most stress situations animals will first struggle to overcome a stressor but if that does not work then physiological systems automatically switch into a different response pattern which is often to go into helplessness or shutdown states (Overmier, 2002). Third, as noted below, the evolution of complex cognitive competencies has had profound effects on how these human algorithms, motives, and emotions work (Barrett, 2017; Gilbert, 2019).

Algorithms and Definitions

Before proceeding, we can combine ancient, motive and algorithmic ideas to help define care and compassion (Gilbert, 2017a). In the Mahayana Buddhist tradition (Dalai Lama, 1995) and the evolutionary tradition (Gilbert, 1989/2016, 2005a; Keltner et al., 2014), care and compassion are basic motives. Although CFT has defined care and its derivative "compassion" (see below) in slightly different ways over the years, we now try to stick closely to the basic "stimulus – response" algorithm of caring. Hence, *the stimulus* is some sign of suffering distress or core need that if not met creates suffering, which triggers a motivation and action to try to do something about them. As we will see, this algorithm is very ancient; the provision of care for the purpose of protecting, addressing needs, and supporting flourishing in offspring, can even be detected in fish (McGhee and Bell, 2014). Derived from an exploration of the evolution of caring behavior (Gilbert, 1989/2016, 2005a, 2009a; Goetz et al., 2010; Keltner et al., 2014; Cassidy and Shaver, 2016; Mayseless, 2016; Melis, 2018) consistent with the Mahayana Buddhist tradition (Dalai Lama, 1995), compassion can therefore be defined as a basic algorithm of "*sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it*" (Gilbert, 2014). The intention and focus of care-compassion is clearly different from other motives, such as competitive self-interest, cooperating, or sexuality (Gilbert, 1989/2016). Importantly, however increased sensitivity to suffering by itself can be associated with increased distress and depression (Gilbert et al., 2019). Hence, it is what we do and how we manage these feelings that is crucial.

However each of those motives can be enacted compassionately making compassion a 'higher order' motive. One other element to note is that although compassion tends to be focused on alleviation and prevention of *suffering*, CFT, and indeed other approaches, are broader than that and focus on caring behavior which also has the intent of addressing needs and promoting development and flourishing. This is partly why Choden and I introduced the concept of *prevention*, into the definition because if needs are not addressed, or support for flourishing is not given, then suffering is likely to follow (Gilbert and Choden, 2013). In the Mahayana Buddhist tradition, one of the major antidotes to mental suffering is enlightenment; that is insight into the nature of mind partly because that prevents suffering. So, the actions and training for prevention are implicited in this approach.

Evolution of Different Caring Motives and Algorithms

Identifying the evolved algorithms for caring behavior is difficult. For example, one of the roots for compassion is from parental caring behavior. However, many species demonstrate different aspects of caring behavior. For example, some fish show guarding behavior and will chase off predators. McGhee and Bell (2014) studied three-spined sticklebacks, where fathers provide the care and protection. They note that:

> During the approximately two weeks that fathers provide care, they defend their nest from predators, fan the nest with their pectoral fins to provide fresh oxygen to the embryos and once the embryos hatch, retrieve fry that stray from the nest. During this period, offspring rely on yolk reserves provisioned by their mother prior to fertilization. Fathers do not feed offspring, but there is evidence that offspring antipredator behaviour …., mate preference …. and morphology …. can be sensitive to the effects of fathers (p.2)

They go onto discuss how paternal caring influences traits such as anxiety in offspring that impact their survival and how paternal caring influences the epigenetics of their offspring. Indeed, it is now known that across many different species, the quality of parental caring impacts epigenetics and can attenuate or amplify vulnerabilities to threat sensitivity (Cowan et al., 2016; Kumsta, 2019). What is also crucial here is that there are a number of *different behaviors* that constitute caring which may be regulated through different algorithms and physiological systems. Hence, a "father" fish may be good at (say) rescuing straying offspring, but less good at fanning the nest. As noted later, compassion can also be seen as made up of multiple different sensitivities and behaviors depending on context. People may be good at certain aspects of compassion, but not others.

Care of offspring is not the only source for the evolution of caring. Kessler (2020) explores the evolution of what she calls "health-care," caring for sick individuals, and highlights that many species care for their sick and injured. Kessler refers to the work of Frank et al. (2018), who noted that termite hunting ants (*Megaponera Analis*) are prone to injury such as losing legs, but are often carried back to the nest by nest mates, where their chances of recovery are 80% compared to 10% of those who are not. Once healed, these ants can return to the group tasks. Kessler also highlights a range of evolved caring behaviors (e.g., grooming) whose function appears to be parasite and infection control. It is common that solutions that work in one species can independently evolve in other species. This is true for caring (Spikins, 2015, 2017; Uomini et al., 2020).

Identifying *specific* motives to *care for the sick* is interesting on two fronts. First, at times, this appears to be a specific type of caring and compassion, where individuals can be very motivated to care for the sick or those in danger, but not invest so much in their own families or close relationships. They spend more time in the hospital on duty or working for charities; public and social rather than intimate forms of caring (Gilbert, 1989/2016). To put this another way, some individuals may be specifically sensitive to signals of "sickness or danger" in others, or "committed to a cause" if there is a "danger to the physical body," but less care and compassion orientated or competent when it is mental states or intimate relating.

Another "life challenge" that may have supported the evolution of caring and compassion is the degree to which certain traits are attractive to others and make individuals desirable as mates and allies (Goetz et al., 2010). It has been known for a while that females prefer altruistic over non-altruistic males, particularly for long term partners and to some degree "heroism" that could be used to protect (Margana et al., 2019). When it comes to forming friendships and reciprocal relationships that can be mutually beneficial, signals of caring, altruism, and trustworthiness also play a key role. Hence, evolving traits for caring is also evolving traits that have beneficial effects on one's potential to be chosen as a sexual mate or cooperative ally (Goetz et al., 2010). Note, too, that context can play a big role for what and to whom we are compassionate. For example, in groups of fighting men, individuals who are fearful and somewhat avoidant maybe shamed and shunned, whereas fearfulness and avoidance is a central focus for compassionate psychotherapy. In general then, caring has evolved from different selective pressures with different feature detectors that distinguish different types of distress and need signals requiring different types of intervention (e.g., rescue, comfort, or feed).

Altruism, Sacrifice, and Compassion

Another evolutionary angle on the origins of compassion is through the concept of altruism. The evolution of altruism is typically seen to be driven by two processes: (1) kin-based, where caring behavior has a payoff for one's genetic representation in the next generation and (2) reciprocal, where helping behavior will result in being helped in the future (Buss, 2015; Colqhoun et al., 2020). In a review, Preston (2013) offered the following definitions for altruism, which are very close to the concept of compassion.

> Altruistic responding is defined as any form of helping that applies when the giver is motivated to assist a specific target after perceiving their distress or need "….." Altruistic responding implies an active behavioural response initiated by the perception of need, which is differentiated from cooperative, diffuse, or unintentional forms of altruism that likely derive from other evolutionary and mechanistic origins… Altruistic responding further narrows these classifications to only include cases where the motivation to respond is fomented by direct or indirect perception of the other's distress or need… This excludes cases that emerged later in time or include diverse processes, such as cooperation or helping influenced by strategic goals, social norms, display rules, or mate signaling (p. 1307; italics added).

For Preston (2013), the origins of altruistic responding are in the evolution of detecting and responding to (retrieving/rescuing) distress calls in infants – coming to their aid. Like CFT, she identifies passive and active forms of caring. Passive forms are providing soothing and comforting, whereas active forms are specific behaviors designed to rescue or alleviate distress in infants and require motor activation. Unlike compassion, this definition of altruism excludes the concepts of sharing or acts that focus on the flourishing and well-being of others or "general caring." Helping people that does not have a cost or can actually benefit oneself in the long term is questionable as to how altruistic-compassionate it is (Colqhoun et al., 2020; Miller et al., 2020). Clearly, the ultimate benefit of kin-caring is the flourishing of one's genes in the next generation, sometimes called *inclusive fitness*. Given that helping behavior is energy expensive, then one would predict far more of it will be given to kin relations and immediate reciprocating others than distal strangers. For the most part, this is exactly what the research demonstrates, that we lavish huge resources on our own children and kin even though we know many other thousands of children around the world will die every day as a result of lack of food, clean water, and simple vaccinations (Colqhoun et al., 2020). And, we are highly focused on our own groups even to the

point of physiologically responding to pain differently if it is a member of one's own group or a different group (Hein et al., 2010). Importantly, Richins et al. (2019) suggested that this empathy inhibition can occur if groups are in competition, but is less noted if they are not. This is an important finding because it indicates that one motive system, such as competitiveness, can change a range of processes such as empathic engagement.

Undoubtedly, humans are prepared to make sacrifices of their own lives to save others, and even strangers, as witnessed in many situations of the rescue services or medical staff working on viral infections around the world including of course Ebola and COVID-19. It is not entirely clear, however, when that kind of altruistic behavior evolved (Kessler, 2020). Nor is it clear when we develop the capacity to make sacrifices of giving up our own resources at a cost to ourselves. For example, although helpful behavior has been observed repeatedly in young children, most research has been when there has been no cost to them for helping. Green et al. (2018) investigated how helpful young children would be if there were a cost. They found that children would help a hand puppet achieve a goal of completing a task (e.g., puzzle) if there was no cost to them, but helping fell significantly when they had to give up something to help the puppet. Even when the puppet made appeals and was clearly distressed, the child still would not give up their own resources or rewards to help the distressed puppet; and even sometimes when they were clearly distressed at their own refusing to help behavior (Kirby personal communication). In a different paradigm, Miller et al., 2020 did find that four to six year olds were prepared to give up things important to them to help others and this was related to heart rate variability and also the child's experience of maternal care and love. In other words, children growing up in loving and caring households are more likely to care and share with others.

Social Mentalities and Caring

Co-evolution is the way species evolve because of their interactions. For example, prey will evolve attributes (camouflage and escape speed) that enable them to escape predators. This drives predators to become better camouflage detectors and faster pursuers. Cleaner fish evolve in relationship to bigger fish; viruses and bacteria evolve ways to exploit the defenses of hosts. *Social* co-evolution, however, is different because of its focus on communication and social signaling as information flows between one or more individuals that have direct physiological impacts (Gilbert 2017c). For example, if infants evolve motives and competencies for distress calling, but parents do not evolve the motives and competencies to notice (be stimulus sensitive and "interested") and respond in specific ways, evolution cannot progress along that dimension. Equally, if mothers evolved capacities for caring and soothing, but infants do not evolve capacities to be receptive and physiologically influenced by those signals, then again, evolution cannot proceed. Hence the relationship (e.g., kin vs. non-kin; friend vs. enemy) triggers the algorithm. Change the relationship and a signal of distress may not activate caring behavior (Mascaro et al., 2020). The quality and type of the relationship textures the processing of social signals. Hence, we can distinguish between non-social motives that do not require the evolution of complex social signaling processing and those that do. Avoiding heights or water (if one cannot swim) and finding food and building shelters are not social. Motives for competing, sex, and caring can *only be successful where there is a contributing (not always willing) partner* forming interpersonal, reciprocally dynamic dances. Hence, social mentalities are role focused, recruit different algorithms, physiological systems and cognitive competencies to engage in *different interpersonal dances* in the co-creation of different roles (Gilbert, 1989/2016, 2005b, 2017c, 2020a; Hermanto et al., 2017; Mullen and O'Reilly, 2018; Brasini et al., 2020).

The co-evolution of the motives and competencies for forming *many* different types of social role (e.g., dominant-subordinate, sexual, caring, and sharing) has profoundly influenced the evolution of multiple physiological and structural processes. Lockwood et al. (2020) reviewed considerable evidence looking at the specificity of social behaviors and brain function which is very supportive of social mentality theory. In the case of caring, researchers have drawn attention to adaptations to the central and autonomic nervous systems that facilitated the co-evolution of care providing and care-seeking forms of relating (Gilbert, 1989/2016, 2005a; Porges, 2007, 2017; Thayer et al., 2012; Brown and Brown, 2015, 2017; Carter et al., 2017). Not only has the evolution of caring behavior brought modifications to the central (Depue and Morrone-Strupinsky, 2005) and autonomic nervous system (Porges, 2017), for another example of the importance of specificities of processes underpinning social mentalities, consider Carter et al. (2009) discussing the evolution of the middle ear:

> the middle ear permits detection of high-frequency airborne sounds (i.e., sounds in the frequency of human voice). Even when the acoustic environment is dominated by low-frequency sounds, the development of the mammalian middle ear also was critical in the evolutionary history of sociality because it allowed the mother to eat, nurse and listen to conspecific vocalisations at the same time (p.172).

In essence then, the middle ear in humans was driven (partly) by co-evolution for caring, rooted in social communication, and provided one essential competency for the evolution of speech. It is because social motives depend upon co-evolution and complex reciprocal, dynamic communication processes, they have been called social mentalities (Gilbert, 1989/2016, 2005b, 2017c). The importance of decoding (from others) and sending signals to others (conspecifics) in complex interpersonal dances is hugely important because it gives rise to competencies for early forms of empathy and mind-reading (Lockwood et al., 2020; Luyten et al., 2020). In addition, these interactional "dances" have profound physiological impacts, including on epigenetic profiles (Cowan et al., 2016). Hence, many mammals can distinguish between signals of caring, signals of threat, signals of sexual interest, and signals of submission, etc., and will have evolved different responses for each. More specifically, they can distinguish between very different types of distress

and suffering that require very different types of intervention and distinguish between different targets (e.g. kin vs non-kin).

Caring and the Body

The physiological infrastructures underpinning caring and compassion have been subjected to considerable research over the last 20 years (for reviews see Porges and Furman, 2011; Keltner et al., 2014; Brown and Brown, 2015, 2017; Mayseless, 2016; Gilbert, 2017a; Seppälä et al., 2017; Stevens and Woodruff, 2018). We know, for example, that the hormones oxytocin and vasopressin played vital roles in the evolution of caring behavior not only for infants, but also pair bonding (Carter et al., 2017). Variations in this gene may also link to variations in compassion and prosocial behavior (e.g., Tost et al., 2010; Marsh, 2019). Changes to the autonomic nervous system, particularly the myelination of the 10th cranial nerve of the parasympathetic system which evolved to become the vagus nerve, played a significant role in the regulation of threat and the soothing qualities of connectedness (Porges, 2007, 2017; Stellar and Keltner, 2017; Petrocchi and Cheli, 2019). It now looks as if the parasympathetic *rest and digest system*, which regulates (sympathetic) threat and drive states, was incorporated into close relating enabling the signals emanating from a parent to have soothing vagal-mediated qualities on an infant (Porges and Furman, 2011; Porges, 2017). Indeed, different physical interactions of the parent to the infant (e.g., touching, holding, stroking, voice tone, and feeding and processes of intersubjectivity) have considerable but different physiological regulating effects (Hofer, 1994; Porges and Furman, 2011; Siegel, 2012; Cozolino, 2014; Schore, 2019). Supportive of mentality theory there is now considerable evidence that mother and baby can synchronise processes within their autonomic and central nervous systems. These synchronies can be thought of as symphonies and dances between their physiological systems that profoundly impact phenotypes for subsequent prosocial behavior and mental health (Lunkenheimer, et al., 2015; Nguyen, et al., 2020). Furthermore, there is good evidence that the vagus plays a major role in prosocial behavior and caring and compassion in general (Keltner et al., 2014; Petrocchi and Cheli, 2019; Di Bello et al., 2020).

Caring Functions and Attachment Processes

As noted above, offspring caring has been identified in multiple species including fish, avian and mammalian, and offspring are epigenetically affected by the quality of the care they receive (Cowan et al., 2016; Uomini et al., 2020). In many species, the interactions between the infant and primary care giver pertain to feeding, thermoregulation, rescuing, and comforting. These effect the maturation of different *physiological systems*, such as autonomic nervous system, neurochemistry, and immune function (Hofer, 1984, 1994; Brown and Brown, 2017). As a psychiatrist interested in human psychological processes and the development of mental health problems, Bowlby (1969, 1973, 1980) offered a functional analysis of the impact of parental care-giving/receiving relationships on *psychosocial systems* and development. He described three core functions associated with what he called attachment (see Cassidy and Shaver, 2016; Music, 2017 for reviews). As noted below, each of these three functions are very important functions of compassion too. When developing a compassionate mind or turning to a compassionate other they are central. These are:

1. *Proximity seeking/maintenance* relates to feature detectors for access and availability to a caring other, staying close to each other for protection and care, and if lost to find and rescue, and if hungry feed. Many physiological systems are maturing in the context of this close, interpersonal connectedness that can be disrupted with ruptures to that closeness (Hofer, 1994; Wang, 2005; Siegel, 2012). Hence, part of proximity seeking and maintenance is to support maturational interpersonal dances. These are impacting physiological levels, brain development, and epigenetics (Cozolino, 2014; Cowan et al., 2016), and a range of psychological competencies (e.g., empathy) are all developing in this context of closeness (Siegel, 2012; Cozolino, 2014). Indeed, throughout life, the way we maintain our proximity to each other, touch each other, smile, and joke with each other, show affiliation, speak with each other (even on the phone and Zoom), help each other, have fundamental impacts on a range of physiological systems (Cozolino, 2014; Petrocchi and Cheli, 2019). We are a physiological, co-regulating species.
2. The provision of a *secure base* provides an environment free from threat, where infants can explore and learn; the parent acts as the "eyes for threat" and "guards the child" allowing the child to focus attention on exploration, play, and learning. As a secure base, the parent "mediates" the world for the infant, titrating threat exposure, guiding discoveries, and promoting skills development with developmental needs for learning (Gilbert, 1989/2016; Cassidy and Shaver, 2016). This is similar to aspects of a working therapeutic relationship (Holmes and Slade, 2017). Along with guidance, a secure base is also a source of encouragement and inspiration. In the context of a secure base and caring parent, the child experiences playful, joyful, exciting, and affectionate interactions (Schore, 2019). They learn that they exist *positively in the minds of others* and that others love and like them, and hence develop (positive) internal working models of self in relationship to others (Gilbert, 1989/2016, 1992a; Cassidy and Shaver, 2016; Music, 2017). Out of the complex melange of varied and multipurpose interactions comes our ability to trust others. The more we experience others as providing a secure base for us, the more we trust them, and the more we trust them, the more they are able to provide a secure base of encouragement and guidance (Fonagy et al., 2017). As we grow, our secure base extends to networks of peers and other individuals (Hrdy, 2009; Narvaez, 2017, 2020). Importantly too, a secure base sets clear boundaries for participants in the relationship enabling predictability, but also maintaining respectfulness and care for participating individuals. A secure base *is not* overly permissive or allows disrespectful or destructive behaviors, or gives in to every "want." A child who has not learned age appropriate respect for others or impulse control is

problematic. This is true in social networks in general. Part of creating secure bases in communities is to have a very clear system of laws, and encouraging citizen respectfulness as a central social behavior.

3. A *safe haven* is where the parent acts as a soothing and emotion regulating other, particularly but not only when the infant-child is distressed. Humans are biologically setup to expect and need emotion regulation to come from the outside and they are physiologically prepared to respond to that – indeed throughout life the care of others can sooth us. Whereas a secure base is partly about stimulating, encouraging, and inspiring, as well as approving and admiring, a safe haven in some ways is the opposite. This is the ability to be soothing and calming often in the context of high arousal, usually threat, but sometimes overexcitement or impulsiveness. Evidence suggests that a lot of safe haven functions operate through the rest and digest system and, in particular, the myelinated vagus nerve, a view developed by Porges (for a review see Porges, 2017; Stellar and Keltner, 2017). In his classic terry cloth (no food) vs. wire (with food), mother surrogate studies in primates, Harry Harlow showed that it was *physical contact* rather than feeding that was the crucial stimulus for soothing (for review see Harlow and Mears, 1979). So soothing stimuli and secure base stimuli are different, and therapists need to guide clients to that awareness so that they can distinguish between them. In other words, when distressed, some aspects of caring and compassion will be about encouraging, supporting, validating, and guiding into and not away from areas of difficulty, whereas others will be about soothing and containing physical distress. It is incorrect to see caring and compassion in CFT as only linked to safe haven function and not secure base function.

Attachment theorists highlight that if one has experienced these in early life, they become internalized such that we can provide them for ourselves (Cassidy and Shaver, 2016). Hence under stress, we remember to "internally proximity seek;" that is we can be sensitive to our distress with a capacity to tune into and generate an inner sense of soothing (safe base) and self-reassurance and encouragement (secure base). So, vital are these inputs to the infant and child, that failure to receive them, or worse experiences of threat and abuse in early life, reset strategic orientation at a phenotypic level (Cowan et al., 2016; Del Giudice, 2016; Kumsta, 2019; Slavich, 2020). The consequences of insecure attachment history have been well-documented and are known to be major sources of mental health problems and anti-social behavior later in life (for reviews see Music, 2017; Lippard and Nemeroff, 2020). In people with mental health difficulties, these inner abilities to provide themselves a sense of secure base, reassurance, and safe haven as in grounding and soothing are often weak or absent. In their place are forms of hostile self-criticism which amplify (sometimes drastically), rather than dampen threat processing (Gilbert and Irons, 2005; Castilho et al., 2017). In other words, when we are distressed, suffer setbacks, or disappointments rather than having an internal secure base and safe haven, we activate the threat system through harsh self-criticism (Gilbert and Irons, 2005). For those with anti-social problems, the focus is on stealing exploiting or harming others.

Increasingly, many therapists have been influenced by attachment theory and understand the importance of creating a secure base and safe haven (Gilbert, 1989/2016; Rothschild, 2000; Van der Kolk, 2015; Holmes and Slade, 2017). Indeed, for some traumatized clients, this is an essential therapeutic endeavor. Importantly, however, is to recognize that feeling safe is different from safety and that both are important, and that in the early days efforts to help people feel safe, for example, trying to stimulate the vagus nerve, might actually make them feel more anxious. See below on fears, blocks, and resistances. It is crucial therefore to distinguish safety from safeness as the latter is more tricky than the former.

Safety Versus Safeness: A Crucial Distinction

Safety

Many forms of mental health difficulties are linked to the way individuals are subjected to, monitor, process, and cope with threats (Gray, 1987; Gilbert, 1989/2016, 1993; Rachman, 1990). This puts *threat management* center ground to most therapy (Rachman, 1990). CFT distinguishes two quite different basic systems involved with threat regulation and explorative behavior (Gilbert, 1989/2016, 1993, 2000, 2009a). Gray (1987) described a threat focused, behavioral inhibition system (BIS) that is triggered by signals indicating punishment and reduction in rewards (losses) and unexpected or novel stimuli. General levels of threat arousal can influence the degree of threat monitoring. These can activate *the responses* of the BIS which are: increased arousal, focused attention, and behavioral inhibition. Part of what anti-anxiety drugs and therapies are designed to do is to tone down sensitivity in the BIS. In contrast, is a behavioral activation system (BAS) linked to drive and resource seeking behaviors. It is triggered by signals of reward/resource, an absence of punishment and when activated individuals show higher levels of goal seeking behaviors and positive emotions (see Carver, 2004 for a pros and cons discussion). Various therapies seek to build these too.

Riskind et al. (2012) highlighted that the degree of threat people experience is related to the degree to which they see threat as "looming," in terms of different types of distance, such as physical and temporal distance and probability of arrival. Individuals also make calculations on the degree of danger and harms and if they can be offset, prepared for, or avoided (Mobbs et al., 2009). All of these can be related to *safety seeking* and *harm prevention or damage limitation*. Attentional sensitivity and coping behaviors operate through the physiology of the threat system such as the amygdala, hypothalamic-pituitary-adrenal axis, and sympathetic nervous system (Gray, 1987; Panksepp, 1998). So, we have a sense of safety when the threat system is not picking up on threats, and therefore, is not being stimulated (although is ticking over in the background). This is sometimes called the *smoke detector* principle (Nesse, 2019), although that does not capture the dimensionality of threat (a little vs. a lot). This is depicted in **Figure 1**.

In everyday life, it is important that we pay attention to safety behaviors, such as putting on our car seat belt, COVID

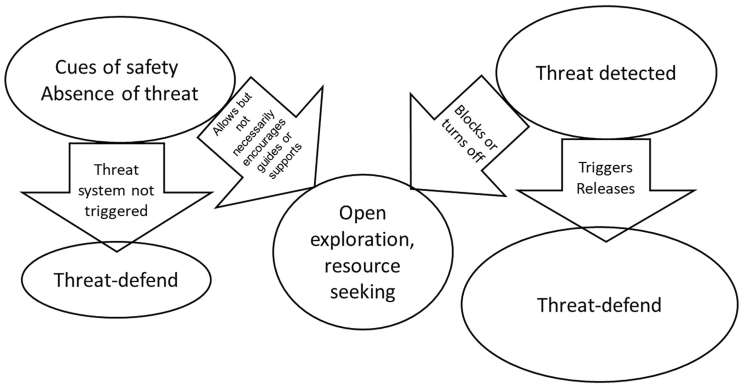


FIGURE 1 | Safety and threat processing © Paul Gilbert.

mask, or taking the vaccine. The focus on safety *is prevention of harm*. While many animals will need to balance threat against opportunity (seek for food in predator environments), the safety seeking system can be constantly "braking" or interrupting explorative behavior to stay vigilant. Watch feeding animals in the wild. Some have argued that interhemispheric differences in the brain evolved to enable animals to engage in activities like feeding while at the same time attending to and keeping "an eye open for threats" (McGilchrist, 2018). McGilchrist argues that the constant conflict between threat vigilance and securing resources was the source of hemispheric differentiation and lot of emotional difficulty, partly because the two hemispheres process information quite differently with quite different functions. Indeed, studies of people who have had their corpus callosum-lesioned, because of epilepsy, have shown that these two parts of the brain can make quite different decisions (see also McGilchrist, 2018; Schore, 2019). Clients who get stuck in the threat monitoring system can live (aspects of) their lives with elevated vigilance "to looming threat" (Riskind et al., 2012).

Figure 1 is reasonably self-explanatory. It simply shows that in the absence of threat signals the threat system remains low key, but an absence of threat will not necessarily promote exploration, play or positive social engagement. A detected threat will activate the threat system and then will suppress other behaviors not related to dealing with threat. There are obvious individual differences in the degree to which people monitor for both 'the presence and absence of threat'. There are of course many other ways in which we can have a sense of safety and regulate the BIS. The BIS might have become oversensitized, due to difficult childhood experiences or be regulated through learning skills we have confidence in. Imagine how you might feel if someone threatens you, but you are a Bruce Lee super karate expert. Having an internal model that we can cope with certain threats obviously influences our monitoring (Mobbs et al., 2009). CFT and other therapies try to help people shift out of inappropriate vigilant and safety seeking motives, by developing confidence to appropriately assess threat, and the courage to tolerate and manage threat (Rachman, 1990; Riskind et al., 2012). This then enables a shift in the BIS-BAS balance and be able to pursue behaviors and build relationships that are more enjoyable, but also engage the rest and digest system more functionally. But the awareness of threat itself is not sufficient for us to understand threat regulation.

Safeness

In 1989, I suggested another dimension for threat regulation that I called the safety system (Gilbert, 1989/2016, p. 88). Using the same reasoning as Gray, of identifying the algorithm in terms of its triggers and responses, I suggested the system was triggered by cues of no threat *and also* cues (as in attachment theory) of supportive others. However, one did not need to have an *attachment relationship* with others, but to see others as supportive and helpful. Early background would lay the foundations for openness to these social communicative signals and stimuli. These signals and stimuli did two things. They: (1) deactivated the threat-defense system and (2) promoted reward/resource seeking and affiliative behavior. The creation of friendly relationships then became self-reinforcing such that affiliative relationships activated safety and the positive rewards/emotions of feeling safe increased the orientation toward affiliation. Prosocial behavior, therefore, was a way of creating interpersonal relationships that were mutually pleasurable and beneficial. Sending signals of safety and safeness to each other have major physiological impacts (Gilbert, 2000; Porges, 2007; Petrocchi and Cheli, 2019).

I had opportunities to discuss the issue of social versus non-social stimuli with Gray and how that related to his BAS and he offered some very insightful concepts. I used them in Gilbert (1993). By 1993, the distinction between safety and safeness was becoming more apparent, and so in 1993, I referred to the system as a safety/safeness system, but still lumping the two functions (monitoring absence of threat and monitoring presence of support cues) together. It was the late primatologist Chance (1988), who became a colleague and who on reading my paper on safety and threat (Gilbert, 1993) advised me that I needed to more clearly separate these functions. We discussed how there is big differences between threat vigilance (absence of threat) and feeling safe. These differences were likely to be physiological as well. He used the example of group behavior. In any group which is competitive or where there is a hierarchy that is potentially punitive (common in many primates),

individuals focus on safety by ensuring they do not behave in ways that stimulate conflict with those more powerful. The group *looks* stable, but this is basically what he called an *agonic mode*, stability through threat and submissive wariness and defense. Families or groups with threatening or bullying parents/bosses can be like this. Levels of stress arousal tend to be high. However, when relationships are friendly and people can trust each other to not be attacking but supportive, the whole group settles into a very *different structure of attention* and shared physiological arousal; here, there is much more openness and sharing. He called this the *hedonic mode*. *Safeness* was when the environment is caring, supportive, helpful and friendly and creates these states of open attention. One of the transitions from primate to hunter gatherer in humans was partly moving away from aggressive hierarchies into hedonic mode type group relating (Boehm, 1999; Ryan, 2019). Ten years later a fascinating, natural event reflected Michael's view. Robert Sapolsky and team (Sapolsky and Share, 2004) had been studying a group of baboons when some of the dominant males ate from a poisoned rubbish dump and died. This left the group with relatively less aggressive males and females and the group then settled into a much more relaxed state noted in patterns of grooming and general levels of arousal (lower stress) which was maintained even with other males migrating in.

I remain fascinated in how to integrate attachment theory and safeness concept into compassion concepts. Sometime later, I discovered that Steven Porges had explored the functions of the vagus nerve and outline the evolution of what he called a social engagement system, which is very similar to the social safeness system. Articulating very carefully the role of the myelinated vagus nerve, it became known as *polyvagal theory* (Porges, 2007, 2017). In CFT, we tend to stick with the concept of social safeness rather than engagement, because one can socially engage for all kinds of reasons (Kelly et al., 2012; Armstrong et al., 2020). However, there is a lot of overlap between the two approaches. So, this brings us back to the evolution of how to create a secure base. This is partly created by recognizing boundaries but also by experiencing the friendliness and helpfulness of those around you. This promotes exploration because one is *not vigilant to threat*; and one's exploratory behavior is not constantly being interrupted by having to check out on threat. When one feels safe, one has relaxed attention, can explore and play. Social relating are positively rewarding and enticing. This also provides the basis for integrative thinking and learning. Clearly, this is a state you want to create in therapy.

We can explore the concept of safeness and how different it is from safety with attachment theory. Bowlby (1969, 1973) suggested that attachment systems are evolved to work on threat in a different way. The mother acts as *a signal of safeness* that the child moves toward rather than away from. She is a source of food comfort and protection and when the infant avails themselves of these resources, this stimulates positive reward centers, not threat ones. As a result of different types of repeated interactions such as physical closeness, feeding, thermoregulation, touch/comfort (Hofer, 1984, 1994) the mother is stimulating oxytocin-endorphin-parasympathetic circuits (Depue and Morrone-Strupinsky, 2005; Lunkenheimer et al., 2018). Over a number of years, Porges (2017) has delineated the special role of the vagus nerve in these functions. What this means is that in her presence, these systems are active and will be suppressing threat system processing. As long as the infant has access to her (or primary care giver) then the infant has access to food, comfort, thermoregulation, protection, guidance, etc. Crucially for CFT, these lay down internal working models such that we can provide them for ourselves; in essence that is the basis of *self-compassion to function like a good parent* to ourselves and stimulate these oxytocin-endorphin-parasympathetic links when we need to.

A number of early classic experiments showed that when a reliable parent is present, children will show positive affect, curiosity, play, and engage in explorative behavior (see Cassidy and Shaver, 2016 for reviews), what Chance (1988) called a hedonic mode of interaction. In addition, the parent may support, encourage, and guide these behaviors. This is clearly not the case if it is simply a safety vs. threat regulation processing issue; affiliative play is not a part of that. If the parent becomes unavailable or separated (e.g., leaves a room), there may be no actual threat in the room, yet this immediately *releases threat*

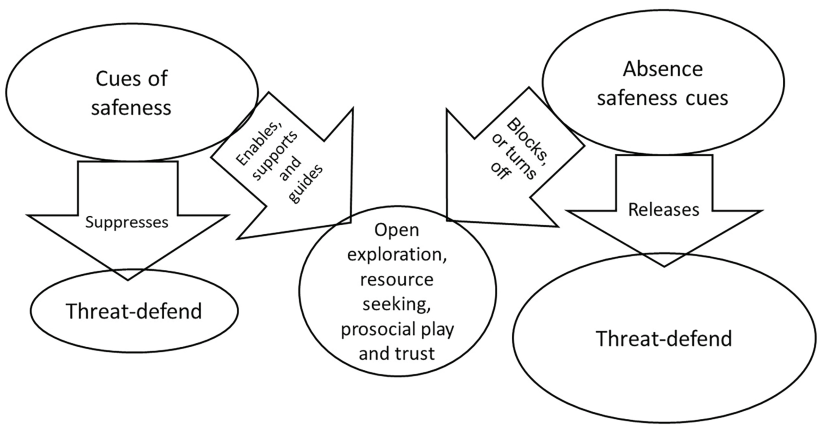


FIGURE 2 | Safeness and threat processing © Paul Gilbert.

system processing and the infant's motive is then searching for the safe-providing object (mother; see Siegel, 2012; Cozolino, 2014; Cassidy and Shaver, 2016; Schore, 2019 for reviews). In other words, the presence of safeness signals (a trusted parent) *suppresses threat system processing*, and in so doing, can bring other systems online such as explorative play which in turn can build affiliative relationships. Hence with their removal (mother goes out), this *releases the threat system* from its inhibition and orientates the child to now pay attention to the (evolutionary important) task of threat vigilance and seeking the return of the safe object. These processes are depicted in **Figure 2**.

The key element implicited in the mode approach of Chance (1988), attachment theory (Bowlby, 1969), and social mentality theory (Gilbert, 1989/2016, 1992b, 2000) is the process by which the presence or absence of "safeness" signals facilitate, release from inhibition, or suppress threat processing. Individuals who are prone to anxiety and stress, therefore, are not just experiencing *facilitators* of threat processing, but also the lack of *inhibitors* of threat processing such as access to caring and support from others or self.

Relaxed and Safe Are Different

This issue showed up in another way. Wanting to see if we could develop a scale that would tap different types of positive emotion, particularly those linked to excitement and achieving versus linked to rest and digest and "chilling out," Gilbert et al. (2008) developed a short self-report questionnaire to tap these different dimensions of positive emotion. While excited/energized types of positive emotion formed a separate factor to that of soothing and calming emotions, what we had not anticipated is that relaxed, positive affect is different to "feeling safe" and contentment positive affect. Importantly, the latter was more powerfully linked to mental health issues. This again suggests that experiences of safeness overlaps with, but are not the same as, rest and digest, but rather link to a sense of social safeness and connectedness (Kelly et al., 2012). This was also found by Matos et al. (2018). In other words, when people feel safe, particularly as provided by social contexts, they may feel content which quells excessive resource seeking and threat focused behaviors (Cordaro et al., 2016). Armstrong et al. (2020) found that feelings of safeness could be seen as a separate type of positive emotion that can blend with playfulness or relaxation.

When people feel "socially safe" they are not necessarily in calm, relaxed, or low arousal states, but could be playful, curious, and enjoying social events like parties and further developing relationships with friends and lovers. Keltner et al. (2018) also review some of the subtleties and differences in the autonomic nervous system relating to subtle variations in positive emotions such as awe, excitement, love, and contentment. Indeed, we could argue that many aspects of joyful social relating from sexual encounters through to going to parties, sharing jokes are examples of creating and experiencing social safeness. It is these dimensions of caring that are so essential for creating these interpersonal experiences that regulate our states in mind. Knowing that people care about you, and will address your suffering and distress if needed, helps to create a sense of safeness and builds trust and closeness.

Priming Social Safeness

There is considerable research showing that safeness signals downregulate threat. For example, Heinrichs et al. (2003) showed that when subjected to certain types of social stress, a person's level of cortisol is influenced not only by oxytocin, but also by the presence of a friend. In a priming experiment by Norman et al. (2015), participants were shown "48 pictures depicting caring behavior and individuals enjoying close attachment relationships, such as hugging loved ones" (p. 833). Control subjects were shown pictures of household objects. Being primed with sharing and caring relationships had the effect of attenuating amygdala responses to threat stimuli from facial expressions and dot probe. Kumashiro and Sedikides (2005) showed that people were much more likely to engage with, and be curious about, negative feedback on a task if they had been previously primed with bringing to mind close positive relationships. Hornstein and Eisenberger (2018) did not distinguish safeness from safety, but nonetheless show that what they are calling safety signals, and what I am calling safeness signals, can have powerful impacts on the acquisition of fear and the extinction of fear. Recently, Gillath and Karantzas (2019) provided an extensive overview of the forms and effects of attachment priming. They found that priming attachment security [or what we refer to here as "caring other(s) and social safeness"] studies have used different methodologies, including subliminally and supraliminally exposing people to security words, such as affection, love, and support, names of attachment figures, and pictures of people hugging a child, thus recalling memories of being loved and supported. Priming people in attachment security (or social safeness; Kelly et al., 2012) impacts positively on how people process a range of potentially threat-based scenarios, including tendencies to make them more pro-social. Kelly and Dupasquier (2016) found that student population experiences of social safeness and sense of connectedness mediated the relationship between recalling parental warmth, and the degree to which individuals were fearful of being self-compassionate or being open to receiving compassion from others. It would appear that for us to be able to use compassion, it helps if we have experienced it in our primary relationships.

Signals indicating safeness can also relate to one's community (e.g., feeling we live in a safe-helpful neighborhood or with safe and supportive neighbors). Keep in mind that these are not just communities that are low threat, but also communities providing a sense of social connection and mutual support; sometimes also seen as social capital. Social safeness is a powerful predictor of well-being, even more than positive and negative effects (Kelly et al., 2012). CFT distinguishes between social safeness and non-social safeness in the sense that being wealthy, and having money easily available, makes the world feel safer than if we are poor. Some forms of an over-reliance on seeking social safeness, however, can be problematic as in those individuals who have what are called dependency problems and who become anxious without access to helpful others; or those who use wealth to feel safe, but want more and more.

Recently, Slavich (2020) wrote extensively on what he called *social safety theory* linking a whole range of physiological systems and their interactions including: the immune system, hypothalamic

pituitary adrenal stress system, the vagus nerve, the lymphatic system, and frontal cortex as very sensitive to an individual's safety. Indeed, it is another facet of the importance of how various phenotypes, developed in safe versus threatening social environments, can channel individuals to quite different strategic orientations in life. However, a distinction between safety and safeness would help to clarify these processes. What are the physiological effects of being in a relatively low threat environment and how might these be different in a socially enriching, fun, caring, and supportive environment? Although calling it safety rather than safeness, Slavich has offered major new insights into the importance of social safeness and social connectedness (Kelly et al., 2012; Armstrong et al., 2020) on the regulation of multiple physiological systems.

To cut a long story short then, when looked at physiologically, removal of a threat versus the presence of safeness stimuli regulate threat processing *via* different physiological systems. Especially important is that some degree of a secure base and sense of safe cues of safeness and helpfulness build courage. We cannot build courage by trying to remove ourselves from the source of threat (avoidance). Hence, whereas the absence or removal of a threat stimulus will *deactivate* threat processing, the presence of affiliative and social safeness signals *stimulate* the oxytocin-opiate circuits, vagus, and have soothing and/or encouraging qualities (Depue and Morrone-Strupinsky, 2005; Carter et al., 2017). Note, too, how research on "lovingkindness" has powerful and direct effects on threat processing systems. Weng et al. (2018) showed that such meditation practices changed the sensitivity in amygdala to threat signals. It is partly because clients use avoidance as a way of regulating threat, rather than developing courage to tolerate and engage with it, that problems escalate for them (Rachman, 1990). Repeatedly then, CFT tries to help clients build the psychological and physiological infrastructures for creating an internal sense of safeness, secure base, and safe haven. Bratt et al. (2020) explored the experiences of adolescent girls with CFT. One of the central experiences for them was "gaining courage to see and accept oneself."

On a neural level, secure versus insecure attachment styles have been shown to moderate the degree to which individuals engage in self-criticism during fMRI. Specifically, at greater levels of an amygdala response during self-criticism (i.e., threat), individuals higher on secure attachment measures have greater neural response within the visual cortex, as a potential marker of engagement in imagery than those with lower scores (Kim et al., 2020a). Importantly, this effect was not observed for individuals with higher avoidant attachment scores. This may indicate that an avoidant attachment style is associated with a greater tendency to disengage from the threat of self-criticism, whereas secure attachment is associated with the ability to tolerate the threat of self-criticism. This may explain why an avoidant attachment style is associated with criticizing others rather than criticizing self (Mikulincer and Shaver, 2016). In addition, people who see themselves as superior tend to blame others rather than themselves for their difficulties (Gilbert and Miles, 2000).

As we have come to understand these processes, therapies are now targeting them in a kind of neuropsychophysiotherapy (Gilbert, 2000, 2009a, 2010; Cozolino, 2017; Fiskum, 2019). For example, compassion training has been shown to produce changes in the autonomic nervous system as measured by heart rate variability (Matos et al., 2017; Di Bello et al., 2020; Kim et al., 2020c; Steffen et al., 2020) in the immune system (Pace et al., 2009) and in various cortical areas (Weng et al., 2013, 2018; Singer and Engert, 2019; Kim et al., 2020b). Useful too are compassion scales developed to measure both positive levels of compassion engagement and action (Gilbert et al., 2017), and fears of compassion (Gilbert et al., 2014; Kim et al., 2020b) are also sensitive to detecting changes in HRV (Di Bello et al., 2020). Put simply, research is finding that the higher one is in compassion engagement and action the better their HRV, but the more fearful they are of compassion the lower their HRV. In addition, Singer and colleagues (e.g., Singer and Engert, 2019) have shown that specific types of interventions such as mindfulness, empathy, and compassion, stimulate different neurophysiological systems.

FROM EVOLVED FUNCTIONS TO A COMPASSIONATE FOCUSED PSYCHOTHERAPY

One of the early observations that inspired CFT was finding that while working with cognitive behavior therapy (CBT), clients could sometimes generate helpful thoughts to counteract negative, self-accusatory, and attacking ones, but these were not always helpful. When I asked a particularly severely depressed client to speak out her "helpful" thoughts *as she actually heard* them in her mind, her emotional tone was aggressive and contemptuous. Helping her begin to develop a compassion motivation and genuine caring emotional textures to her depression, life tragedies and internal dialogues proved a lot more difficult than I had anticipated. I began to explore the same issues with other clients and sure enough they could generate coping thoughts with helpful content but not with any sense of a compassionate motive or emotional texture. Many clients found that even talking to themselves in a compassionate, sensitive, and caring way is very difficult. Pauley and MacPherson (2010) explored the reasons they found self-compassion difficult. In addition, being open and moved by the compassion of others was also difficult to believe, feel, or trust. This led to an exploration of how and why developing motivation, intention, and emotional textures of caring and compassion can be so difficult for some yet be such a powerful antidote for mental health problems. It also reaffirmed the centrality of that motivation for any intervention (Gilbert, 1989/2016, 2000). Part of the explanation involved understanding the function and psychophysiological mechanisms underpinning care motives, compassion and their fears, blocks, and resistances (Kirby et al., 2019). For the most part then, CFT was developed with the more complex and chronic mental health problems and was guided by many of the experiences and recommendations for development that clients offered on their journeys that have improved therapy (Gilbert and Procter, 2006). The therapist uses psychoeducation so that the client has clear insight into *why* they are doing the practices, particularly in terms of developing different competencies, and brain and body states they might not have had a chance to develop in childhood.

Having explored the evolution of care and the specific functions of care on psychosocial development (which is to provide a secure base and safe haven which in turn sets up an internal regulation of threat by the cultivation of a safeness system or process), the rest of this paper will explore how these insights can be used to guide and support psychotherapy. While many CBT therapies focus on helping people deal with threats fairly directly and often helpfully, this is mostly by working with the threat system itself either through exposure or cognitive change. CFT, however, seeks to work with basic motivational systems and, in particular, how to create inner capacities for feeling supported, and hence able to activate "safeness processing" and to develop mutually supportive, prosocial, and caring relationships, and to live ethically.

This paper does not have space to outline the various interventions and processes of training for developing compassionate mind states and competencies (Gilbert and Choden, 2013; Gilbert and Simos, in press). Simply to say that there are a range of practices and interventions such as breathing practices that stimulate the vagus, a range of different visualizations and meditations, exploration of compassionate reasoning, and compassionate behavior, some of which are guided by understanding the physiological underpinnings of caring compassion. Particularly, important is for clients to begin to understand how to create an inner sense of a secure base and safe haven that counteracts (among other things) shame and self-criticism which they can turn into when distressed and also utilize as a source of encouragement and guidance. These are related to what we call the compassionate self, mind and the compassionate image.

Mapping the Mind

To explore how compassion fits into psychotherapy, we need to explore briefly the different dimensions of functioning that give rise to mental suffering and how care and compassion motivation reorganizes these processes. It is extremely important that therapists do not see working with compassion as a simple a "add on," but understand how it is used to change the organization of the processes we are going to discuss; ultimately, we need to be able to have long-term physiological impacts (Cozolino, 2017; Schore, 2019; Steffen et al., 2020) and turn states into traits (Goleman and Davidson, 2017).

People seeking psychotherapy for distressed states of mind present with many different types of difficulty. Psychotherapists require some overview of the domains of functioning that will become a focus for intervention. In addition, articulating different domains of function enables description of how these functions operate in a motivation such as compassion. Taking the basic psychological science approach, CFT focuses on four main domains: motives, emotions, competencies, and behaviors (Gilbert, 1989/2016, 2019). These are depicted in **Figure 3**.

Basic Motives and Needs

From an evolutionary point of view motives run the show. All life forms are faced by three major life tasks which provide the basis for motives. These are: (1) motives to avoid harm, injury, and loss; (2) motives to acquire social and non-social resources promoting survival and reproduction; and (3) motives to rest and digest when not defending against threats or needing to pursue resources. As noted below, CFT refers to social motives, to create certain types of role relationships as *social mentalities*. This is partly because they have to co-evolve and create complex interpersonal dances; e.g., between carer and cared for, sexual partners, co-operators, dominant and subordinate, leader and led. Motives are also linked to needs such that we obviously need to eat and (early in life) to be cared for, have a sense of belonging and be able to compete

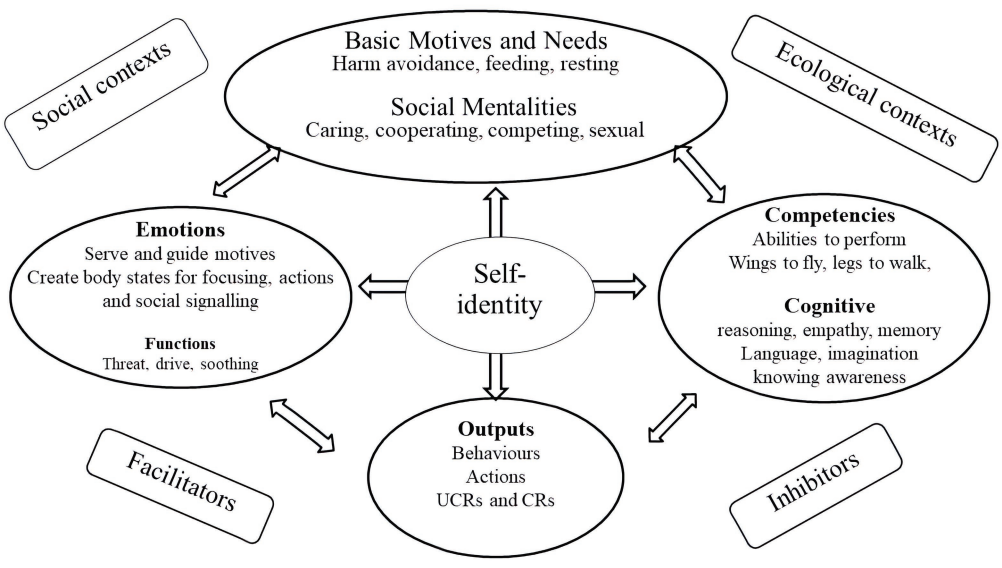


FIGURE 3 | Mapping the mind. Adapted from Gilbert (2019).

for our share of resources and status (Gilbert, 1989/2016; Neel et al., 2016). If these relationships are compromised, if we feel excluded or rejected, unloved or unwanted, marginalized, oppressed and subordinated, we will suffer. These types of unmet needs or overdeveloped pursuits (e.g., for power) are often a focus in psychotherapy. One of the crucial insights that we have been aware of, even before Freud, is that the mind is full of conflicting motivations, emotions, and beliefs which can be very difficult to understand or regulate (Gilbert, 2000). CFT helps clients to recognize that behind any decision, there can be many different motives. For example there are often motives for, getting married or divorced or changing jobs. Therapists can plot these out in a 'mind map'.

In many situations, we are often confronted with opportunities to be caring, sharing or self-focused, acquiring, and achieving. Indeed, the more competitive we see the world, and our need to keep up, the less compassion we may have (Piff et al., 2018) and the more vulnerable to mental health problems (Curran and Hill, 2019; Gilbert, 2020b). This is partly because competing for resources immediately opens up the potential of threat from competitors, but also failing. Importantly, whatever the source of our suffering and mental anguish, if we can activate a care focused and compassion motivation system, this will organize our minds in such a way to make it easier to deal with our suffering. Using the definition above, this means that as we shift into care and compassion motivation, we are oriented to be sensitive to ours and other peoples' suffering; try to turn into it, not away from it, understand it, and then work out the best way to be helpful. This is clearly different from trying to avoid being sensitive to the suffering of self and others, or trying to suppress it, or becoming callous and indifferent. There is increasing evidence that social pressures to be competitive also increase callousness (Piff et al., 2018).

Emotions

One of the major reasons people come to therapy is because of what they feel, that is problems with their emotions and their moods (Greenberg, 2003). While there are many varieties, textures, and approaches to emotions, taking an evolutionary functional approach, Nesse (2019) suggests that "Emotions are specialized states that adjust physiology, cognition, subjective experience, facial expressions, and behavior in ways that increase the ability to meet the adaptive challenges of situations that have reoccurred over the evolutionary history of a species" (p. 53). Basically, emotions serve motives and prepare the body for certain types of action and cognitive focus. CFT uses an evolutionary *clustering of emotions by function* approach. The main functions are as supports for primary motives noted above: (1) threat and harm avoidance, (2) resource seeking and acquiring, and (3) rest and digest and soothing (Gilbert, 2005a, 2009a, 2014). Hence, we have emotions that will help us take actions to defend ourselves (anger, anxiety, and disgust); emotions to help us to seek out and repeat behaviors that bring in resources and rewards (joys, fun, and various pleasures), and emotions that allow us to settle, rest, and recuperate (safeness and peaceful contented).

Central to CFT is the recognition that the brain is a pattern generator and can generate multiple biopsychosocial responses to the same stimulus/event. This is particularly true for threat and harm events. For example, imagine working with abuse trauma, or with major life tragedies such as being diagnosed with cancer or losing a loved partner. CFT suggests that we are commonly hit by what we call "the big three:" anger/rage, fear/anxiety, and sadness. Disgust is also important, but less common in the "usual" traumas and tragedies. Because our experiences are *about patterns of functions and processes*, each of these will have their own motives, attention profiles, ways of thinking, body patterns, action impulses, memories, and ways of settling. They can function like "mini-selves" in a way. CFT explores each of these in turn. This is an exercise called *multiple selves* which helps clients to understand that we are a collection of multiple possibilities not a unitary self (Gilbert, 2000, 2020b; Bell et al., 2020a,b; see **Figure 4**).

Version of **Figure 4** can be shared with clients or drawn out with clients. So, for example, imagine the therapist working

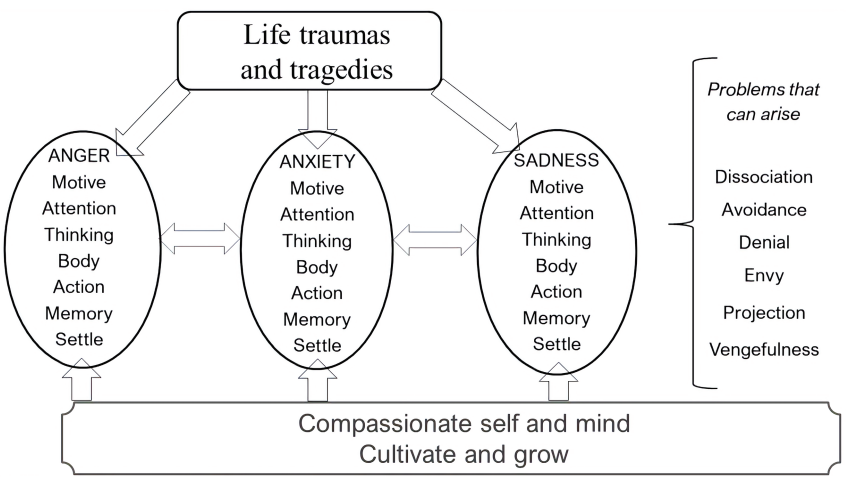


FIGURE 4 | Multiple responses to life traumas and tragedies © Paul Gilbert.

with a threat like cancer or other loss or trauma and says that: "*when we are struck by these types of life events, we can often have a lot of very difficult and complex emotions. There can be a part of us that's very angry about what has happened to us, 'why me, why now' for example. Then there may be another part of us that is very frightened of the consequences and implications for the future. But there can also be a part of us that's very sad and grieving, because the tragedy or trauma has caused considerable losses in our life.*" The therapist then invites clients to reflect on that and see if that resonates with them. CFT suggests that clients benefit from understanding and exploring their multiplicity. This practice and guided discovery offer opportunities to *differentiate* between the different emotions by being guided to focus on one at a time. We can then explore *their relationship* by asking "what does angry self think about anxious self? What does anxious self think about angry self"? and so on. This helps clients to recognize that our emotions can often be in conflict making things even more difficult. Sometimes, people recognize that behind their rage can be great sadness or vice versa.

When the client begins to understand this multiplicity, they can then shift into a compassionate mind state and work compassionately *with each emotion individually*. Over time, clients begin to *recognize their multiplicity*, which is also extremely beneficial for mindfulness. Having differentiated these different emotions, people are much more able to recognize them as they are arising. This makes bringing compassion to them easier. Commonly too clients can be invited to literally step in and become that emotion, like an actor stepping into a role, become it, and in so doing clients sometimes have different insights (Bell et al., 2020a,b). Note that on the right-hand side of **Figure 4**, there are a number of problems that can arise when people struggle with differentiating their emotions and/or are ashamed or frighten to acknowledge or experience. Them the point is that we can hold both the emotions and our reactions (such as our envy or vengefulness), compassionately; that is without shaming and blaming, but simply experiencing, noticing, and finding a compassionate way to work with these basic emotions.

This type of "multiple pattern analysis" can also be very useful for working with dilemmas. For example, suppose a person is in a dilemma of whether to leave or stay in a relationship. The therapist can invite them to take up the dilemma in one of two (or more) chairs and explore the motives, attention, thinking, feeling in the body, behavioral impulses, and memories and "best outcome." When the client has experienced each aspect of the dilemma, they are then invited to take up a position or sit in a "compassion chair," go through a number of the practices such as breathing and compassion focusing of the mind to bring online the compassionate mind (e.g., with vagal activation; Gilbert and Choden, 2013; Porges, 2017) and then, from that position and mind state, reflect on the dilemma. They can then reflect on what they have learned about it, including that most dilemmas involve some kind of major loss. Indeed, it can often be discovered that it is the loss we are less prepared to suffer that guides decision-making. Sometimes, dilemmas are because we have avoided addressing issues. For example, a client is not sure whether to stay or leave their job because the boss is somewhat bullying. This work may help them recognize that before deciding whether to stay or go, because they like the actual job, learning to be assertive, or seek the support of others might be the first steps.

Positive Emotions

It has been known for some time that the ability to recruit positive emotions to help cope with life setbacks provides important sources of resilience and "bounce back" (Fredrickson et al., 2000). Hence, this would be important for compassion as it shows that being able to stimulate positive emotion helps to address suffering. However, rather than treating positive emotion as a single dimension, CFT highlights the importance of distinguishing between two types and functions of positive affect, suggested by the work of Depue and Morrone-Strupinsky (2005). They distinguish affiliation from agency and sociability. Agency and sociability are linked to control and achievement seeking, social dominance, and the (threat focused) avoidance of rejection and isolation. Warm and affiliative interactions, however, are linked to social connectedness and safeness as conferred by the presence and support of others. Affiliative social relationships calm participants, alter pain thresholds, help immune and digestive systems, and operate *via* the oxytocin-opiate system and vagus nerve (Depue and Morrone-Strupinsky, 2005). So, we must distinguish between positive emotions that are about building and broadening, from those that are about contentment and slowing.

When it comes to positive emotions, Hanson (2020) highlights the fact that our minds can be like "teflon for positive emotion and velcro for negative" because we have negativity biases (Baumeister et al., 2001). Increasing positive affect is often *via* behavioral interventions and mindfulness techniques (see below in behaviors). In CFT, we have exercises that specifically focus on: (1) the activating excitement and pleasurable and (2) the more settling and calming effects of contentment. Importantly, however, some clients have fears of either or both (Gilbert et al., 2014). Indeed, one of the reasons people fear compassion is because they are fearful of positive affect in general; for some, it can seem alien or a potential source of threat.

Competencies

To perform any function, organisms need competencies. For example, birds need wings to fly and also brains to navigate them in the air. Flying is neither a motive nor an emotion, but any emotion or motive can recruit competencies. Hence, a bird may fly to find food, to escape predators, and to seek out sexual partners. Competencies that distinguish humans from other animals are our cognitive ones. The early roots of many of our cognitive, "problem solving mind" and intelligent competencies can be traced back to early life forms and are clearly present in other species. For example, cephalopods and invertebrates like octopus (Amodio, 2019), various avian species (Marino, 2017), and primates (Byrne, 1995) have a variety of complex cognitive competencies that allow them to solve their life challenges. Nonetheless, humans have evolved a set of at least three types of cognitive competencies that clearly set us apart from other species. These include:

Our capacities for reasoning, systemic thinking, planning, symbol, and language that underpin problem solving and science (Byrne, 1995; Suddendorf and Whitten, 2001; Suddendorf, 2018; Workman et al., 2020). Because we can think in time, we can think of what to do and what to train in today to help us tomorrow or next year. Language and writing enable us to store and accumulate knowledge, and develop and pass wisdom *through the generations*. These competencies are often targeted in the cognitive therapies that help people look at the way in which they are reasoning, drawing inferences, making attributions, and so forth.

A second major competency relates to forms of *empathy and mind awareness* (Decety and Ickes, 2009; Baron-Cohen, 2011), which many see as essential to compassion. These competencies are very important to become role sensitive and competent in certain roles. For example, individuals who are able to tune into the emotions, motives, and needs of others are more likely to be successful when it comes to any social motive such as mating or building alliances, outwitting competitors, and of course, caring. These competencies are often seen to support some forms of compassion and are a focus in psychotherapy; in other words, the empathic skill of the therapist, and the training in empathy the therapist gives to the client, impacts outcome (Luyten et al., 2020). However, empathy is not equally distributed and can be inhibited to out groups (Hein et al., 2010) and competitor groups (Richins et al., 2019).

Nonetheless, to what degree do we need empathic *accuracy* to behave compassionately? To what extent can men understand what it is like to have a baby or a menstrual cycle? People of diverse ethnicity argue that it is difficult for (say) white middle-class people to understand their cultural, racist experiences in white-dominated societies. Indeed, many argue that without certain shared experiences, it is difficult to "fully" empathize. Clinicians have reported that before they themselves became seriously depressed, they did not fully understand what it was like to suffer from depression, even though they had been treating it for years. People who have lost those they have loved sometimes acknowledge that they did not recognize what a deep state of yearning grief is really like until it happened to them. Lewis (1961) begins his observation of his grief over the death of his wife of just a few short years, that he had not realized how much fear he would experience.

On another level, to what extent do we actually understand the experience of animals? Tragically, the denial of suffering in animals has underwritten horrendous cruelty to them, as in the whaling industry and factory farming. Loewenstein and Small (2007) argue that there are many routes to compassionate and ethical behavior, and that relying on empathy and sympathy may not be sufficient to ensure we deliver moral and compassionate behavior in the areas that we need to. There are times then when being empathic means that we are aware it is difficult to be empathic and we *need to listen and imagine*, recognizing our empathic limits. Nevertheless, even if we cannot be empathic to the details of suffering, we can still wish to address suffering skillfully.

Bloom (2017a,b) goes further and indicates how, where, and why empathy can even lead to harmful outcomes. If one is Machiavellian or wants to be deceptive, empathic skills will help. Weiss and Zaki (2017) conclude their overview of empathy-building interventions with a sentiment long expressed in CFT by saying; "Although these approaches have been successful, intervention should also benefit from adopting a complementary, motive-based approach that targets the underlying forces governing empathy (p. 213)." This has been a prominent feature of CFT for some years and is why it is important to distinguish between a motive and a competency. Empathy as a *competency* can be recruited into the service of any social motive. So again, we come back to the crucial role of motivation in how competencies are used.

An increasing number of therapies recognize that empathy training of different kinds is necessary, both personally and as a therapist (Weiss and Zaki, 2017), with the mentalizing therapies being at the forefront of such in psychotherapy (Fonagy and Adshead, 2012; Luyten et al., 2020). However, like mindfulness, empathy training by itself, without understanding the motives, utilizing these competencies may not be put to good uses. As Eyal et al. (2018) notes, becoming more empathic can take us more deeply into pain, which will need to be tolerated; otherwise, people will turn away from it (Eisenberg et al., 2015). Hence, the key role of courage. One reason for shutting down empathy is because it can open up overwhelming feelings or fear. One colleague mentioned that "I never want to think about people being tortured because it just overwhelms and frightens me." Sometimes, therapists think they are being empathic but are projecting and imagining *themselves* in the situation, not their client in that situation. Projection can be a difficulty. Imagine I am empathizing with a marathon runner. If I imagine *myself* as a marathon runner, it would be very different to imagining *being* this other super fit human being dedicated to train with a love of running. I am not either! There is a difference between imagining oneself in a situation and imagining the client in that situation. We often make assumptions that people will feel what we feel and that can be a failure of empathy. Hence, at the same time, empathy requires us not to blur our boundaries and get lost in the experience with the other.

Therapists can have genuine difficulty in empathizing with people who have caused harm, particularly sexual abusers, for example. Nevertheless, this is important if we are going to be able to work therapeutically with them. It is, in fact, an act of *courageous compassion* to be prepared to move into the dark side of another persons' mind and hold a compassionate position based on the wisdom that we all just find ourselves here and nobody chooses the brain they end up with (Gilbert, 2010; Ashbach et al., 2020). Hence, to some extent, therapeutic empathy means the ability to own and be able to move around in one's own shadow and dark side, visit painful, and frightening areas, while always maintaining independence of the self, and not blurring self-other boundaries.

A third type of competency relates to "awareness of awareness" a type of *consciousness of consciousness*. Some might argue that this type of awareness is not cognitive as such, more of a faculty of mind. Holding that on one side for the moment, the fact is that we can think a thought or have an emotion or desire *and consciously know* that we are having a thought

and emotion. The faculty of knowingness underpins the ability to be mindful. *Knowing awareness and knowing intentionality* have been game changers. While a lion can obviously intend to stalk and kill to eat, it does not knowingly do so. It cannot suddenly decide to become a vegetarian or wake up in the morning to go training to get fitter; as far as we know it cannot reflect on its own actions and decide to hunt in a different way tomorrow or ask questions about the meaning of life. *Knowing intentionality* allied to other forms of reasoning intelligence have changed the way in which basic motives are expressed and developed for good and for bad (Gilbert, 2018). In the last 20 years, various forms of mindfulness training have been incorporated into different schools of psychotherapy (Siegel, 2010) and to help with stress (Bohlmeijer et al., 2010; Gu et al., 2015).

It helps to see these as separate competencies because they are not always related. Some individuals can be brilliant scientists, but poor at empathy or mindfulness. Others may have degrees of empathy but appear to lack caring motivation, as in psychopathic traits (Baron-Cohen, 2011). Some individuals can be very empathic, but will not win Nobel prizes, and some people can be very mindful, but not necessarily empathic, compassionate, or that scientifically orientated. Indeed Singer and Engert (2019) have shown that different "mindfulness" trainings impact the brain in different ways. Hence, in CFT, we might be helping people to reason compassionately or practice compassion focused body work or develop empathy or distress tolerance and develop mindfulness as a skill that supports compassion; and more besides. Clearly, these skills will advance processes of mind awareness and differentiation between given motives and emotions.

Brought together then, CFT highlights competencies that help us to develop the courage to engage with suffering rather than avoid, runaway or dissociate from it, and those competencies that enable wise action. As a useful heuristic, these have been presented as interacting circular processes, because they are not linear and independent (see **Figure 6** below) to be discussed later.

Behaviors

A fourth dimension is the behaviors that we manifest, and these can be regulated in a range of different ways. For example, behaviors can be directly tied to ecologically important stimuli called unconditioned responses. Many basic behaviors such as the so called four Fs, fight, flight, feeding, and sexual behavior are the action parts of the algorithms of the motives. Behavior therapy is, of course, well-known to focus on helping people engage in specific actions and behaviors and to rehearse desired behaviors. We learn to drive by driving, not by reading about or meditating on driving. When we want to act compassionately, we may have to learn and practice specific behaviors.

There are many ways *guided behaviors* can help people to become more mindful and aware of sensory pleasures and "positive" emotions (Hanson, 2020). Behavior therapy for depression focuses on intentionally and deliberately, increasing potentially rewardable behaviors. Sometimes, it is helping clients recognize they can explore behavior experiments to help them to "slow down and learn how to utilize their rest and digest system" to facilitate experiences of contentment and being "good or sufficient enough" without feeling failures or let downs. Some clients have lived trying to please others and have a very poorly developed sense of their own desires and preferences. The technique of guided behaviors can be used to (for example) explore the value of playfulness (which sometimes feels very strange to some clients) "what would your excited, playful, contented, self etc., be motivated to pay attention to, think or do? How could you bring that more into your life; why might that be helpful; what might worry you about developing your ability to be playful or fun loving?" Or you might explore different kinds of behaviors and their meaning. One depressed lady who had lost her joy in cooking was invited to cook something to bring to therapy and be mindful about all the different elements in her cooking, the choice, the ingredients, textures, the smells, the colors, the anticipation of my enjoyment (or fear of not) of her food and so on. This is mindfulness in actions. Cooking could also be seen as a kind of play, to learn to focus on the process, *not the outcome*. For some clients, helping them literally learn "how to play," can be important particularly if they come from a neglectful, rather empty emotional landscapes. For compassion, this also clearly overlaps with concepts such as the 8-fold pathway (Gilbert and Choden, 2013).

From Caring to Compassion: The Knowing Mind

Up until this point, we have been assuming that compassion and caring are pretty identical, but in fact, that is not quite the case. To a large extent compassion depends on our cognitive competencies. There are many explanations for the origins of these types of human competencies. One is that it was social processes, and in particularly, caring processes that drove them and social intelligence (Dunbar, 2009, 2014; Spikins, 2015; Uomini et al., 2020). Another is that of Machiavellian intelligence (Byrne, 1995). Since competencies can be used by any motive, it is quite likely that different motives combined to generate the ones we have today. Whatever their source, it is clear that these competencies are indeed game changes and impact on the activation and expression of all of our motives, including caring.

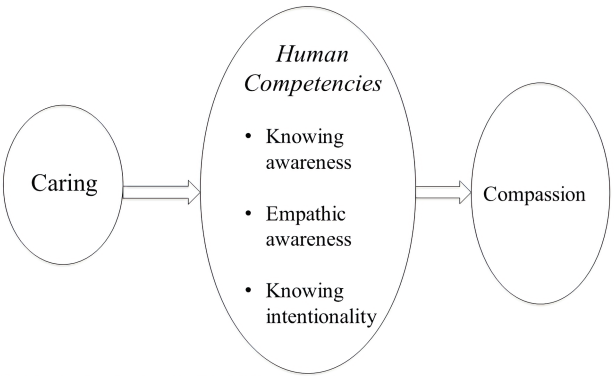


FIGURE 5 | From caring to compassion. Adapted from Gilbert (2018).

Clearly, many species care for their offspring, but we would not call all caring compassionate. Just as Goodall (1990) pointed out that animals are not really capable of cruelty because they do not *intentionally set out to cause suffering* and hence cannot be regarded as cruel (see Gilbert, 2005a), we have compassion when we *intentionally and knowingly* choose to address suffering. Hence, both cruelty and compassion are possible because we can "know" what we are doing, we can *understand the consequences* of our behavior on the physical and mental states of another. CFT suggests, therefore, that it is when caring motives are orientated through our human cognitive competencies that caring becomes compassion. In the Buddhist traditions too, this is why mindfulness and compassion training often go together (Gilbert and Choden, 2013; Ricard, 2015). This is depicted in **Figure 5**.

Compassion and Sentients

Another dimension where caring and compassion differ is in the nature of sentients. Caring is the motivation to *look after*, to prevent harm, and to see the object of ones caring, flourish. So, we can "care" for our gardens, cars, or other or possessions, but if our car was damaged in an accident, we would not have compassion for it because compassion, unlike caring, only applies to suffering. There needs to be a conscious awareness of an experience of suffering. Hence, this brings us again to the issue that it is our knowingness that turns caring into compassion.

Using the Functions of the Mind

CFT helps clients in all the four domains, such as working with motives and emotions, developing competencies, and practicing specific behaviors. Using the algorithm engagement and action definition of compassion, CFT offers a brief process map of six ways of supporting engagement and six of taking helpful action. Together, these create courage to engage with suffering, and wisdoms of what is likely to be helpful. Out of this, develops the commitment to work and live "compassionately." CFT offers psychoeducation into how and why we have tricky brains that are prone to suffering and anti-social behavior; how and why our emotions track the three life tasks; the nature of the autonomic nervous system and the link between breathing practices and other vagal nerve supports, such as biofeedback, diet and exercise; how to ground oneself and one's body; how to differentiate between different motives and emotions; the value of practicing different visualizations, behaviors and ways of reasoning, and exposure to avoided material aimed at build building courage skills and wisdoms. As clients begin to understand the nature of the minds we all have, these all help to reduce unhelpful blame and shame. They build a self-identity to "live to be helpful not harmful to self and others."

For engagement, therapists work with the client on understanding what compassion is and is not (and the key roles of courage and wisdom) and developing their motivation to pursue compassion as an approach to mental anguish, and thus to "*care for one's own and others well being*." This involves developing a type of mindfulness and *sensitivity*, tuning into suffering and its causes. This then activates a *sympathetic* response. For example, as a client begins to tune into their depression (rather than trying to drug it away), they may begin to feel more in touch with the pain of say loneliness or previous trauma. Their distress would be regarded as a sympathetic response to being tuned into themselves. Clearly, they need to be able to tolerate this otherwise they will just close down again and so *distress tolerance* becomes an important competency. As the client is able to tune in, tolerate, and begin to work with the roots of the pain, they develop an empathic understanding which is a non-blaming and accepting awareness, and open and non-judgmental. These six processes are clearly interdependent and support each other. For example, the more we learn distress tolerance, the more sensitive we can be. Therapists will have a range of evidence-based interventions for helping clients with those competencies common to many therapies, but all the time with the motivation and the orientation for compassion. So, for example, the therapist might have taught soothing rhythm breathing as a grounding in the body process and the stepping into the compassionate self and mind state with a clear compassion intention and focus recalling on strengths and wisdoms, before engaging with deeper sensitivities into (say) trauma. Or they might have explored the three major emotions (see **Figure 4**), bringing compassion to each emotion before engaging with the origins of a problem. In addition, the client and therapist would have practiced compassion motivational focusing as the context for physiologically grounding the work.

Courageous engagement processes are important, but there are also the wise action processes. Just as when we go to a medical doctor with a broken arm, their understanding of our pain and acceptance of our pain is important, but we hope they also have the *wisdom of knowing what to do*. So, CFT engages in a lot of psychoeducation to help clients develop the wisdom of how and why the brain is tricky and then develop competencies for processes such as mindfulness, how to use our minds for imagining things that are helpful, to learn perspective taking and reasoning in ways that are going to be helpful, to behave in ways that are going to be helpful, to use our bodies to support our minds, such as using breathing exercises or maybe taking physical exercise or attending to diet or learning assertiveness. The feelings we have would be dependent upon the context of the compassion we are doing. As clients become more skilled in the wisdoms of working with their sources of suffering, they are also able to begin to transform suffering. Note that individuals can be good at some compassion processes, but not others. For example, some people may be very empathic, but not so good at compassionate reasoning. Others may be good at some qualities, but they cannot ground themselves in their bodies to give their compassionate mind a chance to function. Others may have beliefs that compassion is weak or you cannot experience rage if you are compassionate.

Given that these are the core processes for CFT, after a number of disappointing starts, they were developed into a self-report scale (Gilbert et al., 2017). The scale measures engagement and action processes with three orientations: for self, from others, and two others. It has now been used in a number of studies and recently predicted changes in HRV following CFT (Steffen et al., 2020). The six competencies for engagement and six for action are only guides and are given

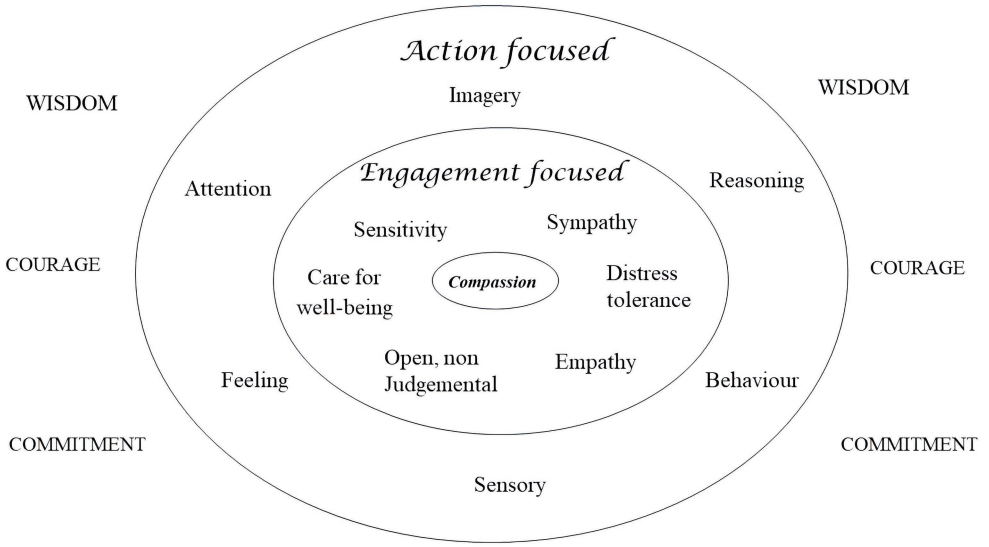


FIGURE 6 | Domains for therapeutic engagement. Adapted from Gilbert (2009a) Compassionate Mind with permission from Little Brown.

in **Figure 6**. Together these give rise to commitment, courage and wisdom to acknowledge and address suffering.

The Flows of Compassion

Many psychological processes have flow. Consider anger. There is the anger we can feel to other people, the anger we feel from other people to us, and the anger at oneself. Similar for motives of sexuality or cooperation. CFT pays attention to all *three flows* of compassion. There are some conditions where learning compassion for others is important for relationship building and quality. There is also evidence that people who are fearful of *receiving compassion* are vulnerable to mental health problems (Hermanto and Zuroff, 2016; Kirby et al., 2019). The reasons for this are clear, because they cannot use others as a secure base or safe haven and if anything, see the world as a threatening and withholding place. And of course having compassion *for oneself*, rather than being harshly self-critical or self-harming is important. All 12 processes outlined in **Figure 6** can be used in each of the flows. For example, when we are sensitive to receiving compassion, we are sensitive to the fact that other people are being sensitive to us and are trying to be empathic, they are able to tolerate our distress and they will work with us to find ways to be helpful. Feeling connected in this way helps us to feel less lonely and even a sense of hope or gratitude; we can move into experiencing more social safeness. When we are being compassionate *to others* then again, we are learning how to be sensitive, empathic, and work out what is helpful. In psychotherapy, sometimes we have to develop the skills for a particular direction. For example, people might be very empathic to others, but not to themselves or they might be able to be very wise for others, but not to themselves and vice versa.

CFT has specific exercises and behavioral practices to address each of these. For example, helping people explore and work with feelings of receiving compassion, they are invited to create an image or concept of an ideal compassionate other relating to them. It is the same principle when people use imagery to stimulate sexual feeling. It is body activation CFT is interested in, rather than clarity of images. So, we guide clients to use compassion images to stimulate care-compassion physiologies, and thereby, opening up certain areas of the frontal cortex. This links very much to the priming attachment type research noted above (e.g. Gillath and Karantzas 2019). The act of imagining and thinking what qualities that image would have is itself a therapeutic process; exploring whether they can trust their own image; practicing generating dialogues with the image; working on misunderstandings about the image such that the image does not want to know about the dark side of the mind, whereas, in fact, it is exactly the opposite – that is partly why we use it; our compassionate images are to help us with our suffering, unruly emotions, and desires. Rather than just *reasoning*, using imagery creates a more natural form of reasoning, which is dialogic. So, we can imagine interacting and communicating with our compassionate image (Lee, 2005; Gilbert, 2020a).

Developing compassion for others can involve empathy training (Luyten et al., 2020) or practicing doing one compassionate act for a person each day or sometimes gratitude focusing. Also, forgiveness can be an important part of developing compassion for others, particularly if they have been harmful to us. Crucially, we recognize that we can forgive people even if we do not like them (Enright and Fitzgibbons, 2015).

Compassion and Self-Identity

At the center of the **Figure 3** is self-identity. Although a huge subject obviously, self-identity is related to the experienced patterning of our motives and emotions; what we value, what frightens us, what inspires us, and what we aspire to become (Taylor, 1989). In CFT, the identity is compassion; *to live to be helpful not harmful to self and others*, not to be a cause

of suffering. This has overlap with the concept of Buddhist pursuit of bodhicitta and also the 8-fold pathway of compassionate living (Gilbert, 2017c).

In the top left and right of **Figure 3** is recognition that the social and ecological contexts in which we live impacts on whether we experience the world as harmful or helpful; benign or hostile. The last 5,000 years of human history highlight our enormous capacity for cruelty and harmfulness, in our wars, tortures, painful executions slavery, exploitations, makers of nuclear and biological weapons, that sit alongside the extraordinary developments in medicine, for example, ridding the world of smallpox (Gilbert, 2018). CFT conveys this to clients by indicating that we are gene built, easily injured, short lived beings with a range of potential motives and emotions that we did not choose (e.g., for terrors, panic, rage, depression, lust, and joy). We have brains and bodies built for us, not by us. Nor did we choose the versions we are (Gilbert, 2009a). We suggest to clients that if "I as therapist had been kidnapped as a 3-day old baby into a violent drug gang, this version of Paul Gilbert would not exist." A very different version with different epigenetic profiles and a physiological patterning of motives, values, and behaviors would be here. The client is invited to hypothesis what I would be like, what I would feel, what would my aspirations and values be, how I might react to someone threatening me; how my body would work etc. The intention is to use oneself to help clients recognize that *we are all* partly socially created versions of ourselves that we never chose. Maybe we could learn how to create inner versions of ourselves *that we can choose* to develop and which will organize our minds in ways that are more conducive to ours and others well being. This is an important de-centering and de-shaming guided discovery. To be kidnapped would not be something I had chosen, any more than any of us choose to be born into the families, social contexts, and cultures we are. The contextual development for a compassionate mind, therefore, is scientific wisdom about the unchosen nature of our biological minds, and as the Buddha (might have) said: that without some kind of mind training and awareness, we are at the mercy of these inherited and socially constructed passions of the mind.

One of the great challenges for compassion training is to incorporate scientific understanding of the mind so that we can begin to break our conditioning. As the science fiction series Westworld so brilliantly indicated, coming to understand the nature of our conditioning is crucial for our development. Part of the point of mindfulness is to help us unstick and decouple ourselves from the experiences of our biological mind as if they are somehow eternal or substantial. We can use mindfulness to start to become aware when different aspects of our programming, such as anger, anxiety or various desires, start to arise. We can be mindful of the fact that we have found ourselves in a male or a female body, living in this ethnic or that ethnic group, but we do not need to over identify with these processes. Crucially, we have greater insight into how the mind is constructed, and hence, why it is so easy for us to be harmful. Evolution cares nothing about harmfulness if it advances gene replication. These insights are actually our challenge as a species.

This leads directly to (see bottom of the **Figure 3**) the fact that motives, emotions, competencies, and behaviors are all subject to *facilitators and inhibitors* (Gilbert et al., 2011; Gilbert and Mascaro, 2017; Kirby et al., 2019). There are things that will bring out the best and the worst in us (Sapolsky and Share, 2004; Sapolsky, 2017). A main reason for mind training is to have insight into the nature of the mind, so that we do not act out the dark side of the mind.

Contextualizing Compassion

Taking a contextual approach also highlights that compassion is not one process but is very dependent upon context. For example, the skills and emotions of a firefighter about to enter a burning house will be very different to say a counselor with a bereaved person, or liberation activists fighting injustice. Although it is sometimes said we need a calm mind to be compassionate, it all depends on the context and what we are developing compassion for. When courageous action is called for, we need a focused mind, not necessarily a calm mind. There is an old story that in training bomb disposal experts would we choose: an anxious or a non-anxious person and the answer is always choose the anxious person (although not out of control anxiety!). Note, too, that some individuals can be extremely compassionate in certain conditions such as risking their lives to save others, but not necessarily that empathic or compassionate with more emotional issues. Our brave firefighter might not be the most empathic partner or parent. And a wonderful loving parent might not make a good firefighter with steady nerves. The role of warmth may be crucial in close relationships, and some forms of psychotherapy, but not in the urgencies of the rescue services. This tells us that compassion is multifaceted, that different people can be skilled in different facets, in different contexts, and should not be seen as unidimensional. At times, compassion can be morally tricky. What is the position of armies who believe they are protecting the population when they go to war?

Self-compassion can also be contextual (Zuroff et al., in press). We may have a lot of compassion if we have lost our jobs through COVID which is not our fault or broken a leg, but not when it comes to making mistakes or getting too anxious to go to the interview for a new job. If we are frustrated or disappointed in ourselves, we can become critical not compassionate. Note too, that although some models of self-compassion combine self-criticism, shame and kindness in its conceptualization and measurement, for clinical purposes CFT keeps these separate. This is partly because there is a large amount of literature on the link between shame and self-criticism and their complexities on mental health problems. In addition, shame and self-criticism operate through the threat system, whereas kindness operates through the soothing and safeness system. If you combine them, it is unclear which process, physiological and psychological, is driving mental health problems. In addition, they may relate to secure base and wellbeing in different ways (Gilbert et al., 2017).

Because so much interest in compassion has grown up around the Buddhist meditative traditions the *courage aspect* and the *activation aspect of compassion*, which can be so important in psychotherapy, is sometimes not emphasized. Also, concepts like compassion can be confused with concepts like love or kindness which are quite different (Gilbert et al., 2019). When we follow an evolutionary approach, we can see that

(western concepts of) love, like assertiveness, and empathy are *ways of being compassionate* in certain contexts, but in many ways the strongest compassion is for those that we do not "love." Kindness is also a signal of friendliness and helpfulness – in other words, it is a safeness *signal* indicating one's motivation orientation from the other or to the other or oneself. Hence, facilitating kindness in therapy is extremely important because it creates the conditions for experiencing a secure base and safe haven, creates trusting and affiliative relationships, stimulates oxytocin and vagal tone, and increases empathy and thoughtfulness. The main difference is that kindness does not require us to have courage to engage with suffering and, when we do kind acts, these tend to be enjoyable; whereas compassion often involves us having to bear some degree of suffering or unpleasant emotions (Gilbert et al., 2019; Mascaro et al., 2020).

A contextual approach also suggests that compassion is a dimensional process with callousness (Gilbert, 2018). Whereas compassion is sensitivity to suffering and wanting to do something about it, callousness is an insensitivity to suffering with an indifference to it. It differs from cruelty, which has the enjoyment of suffering. There are many dimensions that push us from compassion into callousness and self-interest. Perhaps one of the worst examples is slavery, but there have been many instances, where corporations have shown a callous indifference to the ecology they are exploiting and harming and those who work for them (Bakan, 2012). Callousness and indifference to suffering in any form of relationship is problematic. So, when we have a whole economic system based on promoting self-interest and callousness, it poses serious challenges for compassion and sharing Gilbert (in press). Callousness can be a serious problem in psychotherapy, particularly in the forensic services and in those who have psychopathic and narcissistic personalities (Shirtcliff et al., 2009). Importantly, in childhood parental warmth and caring (especially distress sensitivity and positive regard) can offset callous traits (Wright et al., 2018). While compassion training seems to be helpful for individuals who are reasonably orientated that way [studies are typically on WEIRD (White, Educated, Industrialized, Rich, and Democratic) populations; Henrich, 2020], we have yet to discover what kind of compassion training will help narcissistic individuals and organizations become less callous, self-entitled, and exploitive. In many ways, because these are individuals that often manipulate themselves into power, these are the individuals for whom we need to find ways of engaging them with and supporting compassion training. Nonetheless some inspiring work developing CFT in forensic populations have shown that it may l have potential to reduce psychopathic traits in some people (da Silva et al., 2020).

Switching Motives

From an evolutionary point of view, motives organize emotions, competencies, and behaviors. There is a general view that compassion is a social process, that was especially adaptive in relatively small, stable early hunter-gatherer groups. The switch from a caring and sharing hunter-gatherer lifestyle into a more vicious competitive tribal one was consequences of agriculture (Gilbert, in press; Ryan, 2019). However, historically there have been times when we have tried to get back to a more caring sharing world. For example, researchers have highlighted the fact that following World War II ambitions to create a fairer, more just society, flourished resulting in the building of National Health Services, better education, and services generally. Taxes were high; however, the gradual eroding of that ambition with desires to pay lower taxes and hold more of one's personal resources under neoliberalism, western society has increasingly focused on competitive motives in education and life in general (Sachs, 2012; Twenge Miller and Campbell, 2014; Curran and Hill, 2019; Ryan, 2019; Gilbert, 2020b). The movement into a more competitive society is also associated with increasing vulnerabilities to mental health problems (Curran and Hill, 2019; Ryan, 2019). This is partly because competitive motives orientate attention, reasoning, sense of an "individualised self" in ways that tend to increase self-focused attention, social comparison, envy, shame, striving for more and better, and self-criticism for failings (Curran and Hill, 2019; Wetherall et al., 2019). Such increasing competitiveness has been at the expense of other prosocial motives. In 2014, Harvard School of Education reported on a study of 10,000 middle class and high school students from 33 schools.[1] They found that the majority of children prioritized personal success and achievement over caring for others and that concepts of fairness are not given high priority. Many of the students surveyed admitted that they have been prepared to cheat to get on. Students also suggested that their parents and teachers value personal achievement over caring and sharing. The authors believe this indicates a change over the last 20 years or so toward a more intense, individualistic, and personal competitive focus rather than on community values. This change has occurred with prioritizing academic performance as a main indicator of a school's worth rather than moral or prosocial development. Consistent with this, studies of change in narcissism over the last 20 years come to similar conclusions (Twenge et al., 2014). They report that these changes have major consequences for lowering empathy, concern for others, civic engagement, and general community prosocial interest. In my own research (Gilbert, in press; Gilbert et al., 2007, 2009a) exploring why people compete, and the phenomenon of "competing to avoid inferiority and rejection," our studies found those vulnerable to depression and anxiety feel they need to compete to avoid being seen as inferior and rejected. In addition, some forms of competitive behavior, particularly between groups orientate us toward harmful violence and oppression (Perry et al., 2013).

As competitive motivation becomes more intense, it can incline to intensify two basic strategies (Gilbert and Basran et al., 2019). A *down or lower rank* strategy that can be seen in many species involves subordinate and "better safe than sorry" threat sensitive lifestyles, careful self-monitoring of social risk, manifested in humans as social comparison, concern with personal inferiority, needing to prove oneself attractive, competent and desirable, with sensitivity to failure, rejection, and exclusion (Gilbert et al., 2007, 2009a). The other strategy is *up-rank narcissistic*, associated with more impulsive and challenging behavior in animals, and in humans, a sense of superiority

[1]https://mcc.gse.harvard.edu/reports/children-mean-raise

and entitlement, positive social comparison, blame others for setbacks, and a preparedness to exploit others to benefit self and kin. Interestingly, hyper-competitiveness and "competing to avoid inferiority" are also associated with this group (Basran et al., 2019). Hence, some competitive strategies can indicate concerns with being rendered inferior. The fallout from these competitive motives is very common in mental health difficulties. As indicated in **Figure 7**, there are various measures that tap into these different aspects of competitive motivation.

As we have seen however compassionate motives, on the other hand, evolved for completely different functions and brought with them completely different sets of physiological systems. Whereas intensifying competitiveness increases threat sensitivity and stress, and divides people, in contrast caring and compassion do the opposite; they partly evolved to regulate threat processing and bring people together (Brown and Brown, 2015, 2017; Mayseless, 2016). Developing compassion for self and others facilitates a different type of physiological organization as well as self-identity and ethical values. This is depicted in **Figure 7**.

As a general principle then CFT is about *motivational switching*; that is helping people to tune into and recognize the competitive motives/pressures within themselves, for example, the drive to achieve, to avoid failing, the linking achievements with a sense of personal and social worth and identity, worries about being accepted and wanted, the self-criticism that can come out of feeling one is failing (Castilho et al., 2017). As a motive focused therapy, CFT helps clients recognize these two powerful ancient strategies for coping with competitive issues, and how we can get caught in them through no fault of our own. CFT helps people compare and contrast competitive motives with caring motives, and facilitates a number therapeutic stages "for motive switching," that is gradually shifting our interests attention and focus toward a compassionate orientation to the pressures of living rather than just a competitive "succeed or fail" one (Gilbert, 2000, 2010; Gilbert and Choden, 2013).

CORE THERAPY ISSUES: FEARS, BLOCKS, AND RESISTANCES

Fears, Blocks, and Resistances

As a result of difficult backgrounds, giving and receiving care can be very tricky. This is partly because caring strategies evolved in, and work in, trusting caring environments, less so hostile, unpredictable or neglectful ones. For many of our motives and emotions, we can have fears, blocks, and resistances (FBRs) to them. Fears relate to the anticipated effects of engaging with the motive or emotion; blocks are usually to do with unfamiliarity and confusion or lack of opportunity for experiencing them; and resistances can be seeing the consequences as too costly (Gilbert and Mascaro, 2017). There are now many studies on how fears of compassion (Pauley and MacPherson, 2010; Gilbert et al., 2011) are linked to mental health problems (for a major meta-analysis of this scale see Kirby et al., 2019). In the original studies Gilbert et al. (2011) found it is primarily receiving compassion from others or self rather than giving compassion that are associated with mental health, attachment difficulties and self-criticism. This has been confirmed in a recent meta-analysis (Kirby et al., 2019). Hermanto et al. (2017) showed that the fear of receiving compassion from others was especially linked to mental health difficulties. Matos et al. (2017) and Di Bello et al. (2020) found that fears of compassion, especially fears of receiving compassion from self and others were associated with poorer HRV. Ebert et al. (2018) found that in people with borderline personality difficulties the fears of compassion scale were associated with more difficult childhoods and also lower blood levels of oxytocin. Basran et al. (2019) found that traits such as ruthless ambition and hyper competitiveness were associated with fears of compassion to others. Given these individuals seek positions of power this is obviously a concern (Gilbert and Basran, 2019) especially

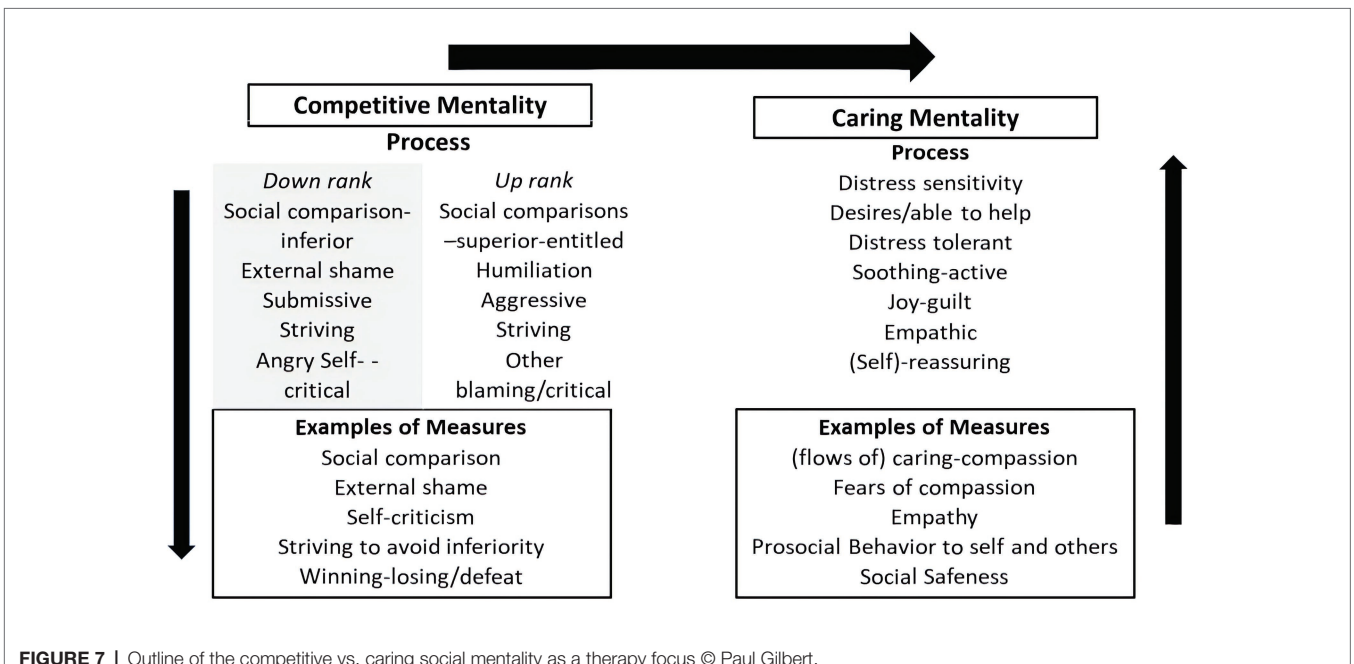


FIGURE 7 | Outline of the competitive vs. caring social mentality as a therapy focus © Paul Gilbert.

since Akmal and Foong (2018) found fears of compassion to others was associated with callous traits.

When it comes to compassion *as a therapeutic process* some of the problems can be linked to simple misunderstandings about the nature of compassion and confusing it with "having to be nice, kind or loving or making one weak, or one must not get angry." Confusions with love are common because of how the internet links western concepts of love with Metta. Indeed, Grammarly software changes compassion into love and kindness. Metta actually means benevolence, open friendliness, and a wish for all sentient beings not to suffer; to wish others well (Ricard, 2015). As most dictionaries will attest love in the west means *liking and wanting to be* with and this will be the concept in the client's mind. However, benevolence and wishing others to be free of suffering does not require that we love them; a firefighter rescuing a family does not need to love or even like the family. These concepts can be a block in therapy. And when we learn forgiveness, we do not have to love the people we have forgiven; that is a fundamental misunderstanding (Enright and Fitzgibbons, 2015). Self-love, in contrast to self-acceptance or self-insight is usually associated with narcissistic preoccupation. The reality is that we have very messy, difficult minds and it is our courage and wisdom and dedication to live helpfully, not harmfully that is crucial.

Clarity over definition and using guided examples (e.g., "how would we help a friend who was suffering from X") can help here, because clients often note that they would be sensitive to their friends suffering and then they would try to work out how to be helpful. Once they have explored that example, then that is the basis for sharing the definition given above with them and distinguishing it from kindness, love and so on. In addition, as noted above, people can block out on compassion if they do not like or trust the person who is seeking compassionate help or who would be offering compassionate help. Similarly, for themselves, clients can find it difficult to be compassionate to the things they are ashamed of, their own dark sides or things they hate about themselves. Pauley and McPherson (2010) found that depressed people could see the value of developing compassion and would like to, but felt unable to, partly because of a lack of deserve and high levels of self-criticism and dislike (see also Castilho et al., 2017). Lawrence and Lee (2014) found similar and in a qualitative study found FBRs to compassion were linked to the fear of giving up self-criticism, loss of an identity, and that compassion felt "alien," and untrustworthy and one to be feared. They also outlined the unfolding steps on their clients abilities to understand, practice and integrate compassion into their way of living.

Other very common sources of FBRs are linked to early life history and the serious ruptures in the internalization and maturation of care focused processing systems and lack of experiencing a safe haven and secure base. Matos et al. (2017) found that fears of compassion, particularly from others and to self were associated with memories of high shame and low parental warmth. Paranoid thoughts were more associated with fears of compassion to others. Various forms of abuse (Lippard and Nemeroff, 2020) and other common histories for people with mental health problems (Van der Kolk, 2015) indicate that either they did not experience feeling a sense of security or safeness and "loving" empathic engagement with developmental needs being met, and/or as they move through life they continued to feel socially disconnected, "searching for a secure base" (Holmes, 2001; Music, 2019). A number of therapies highlight the fact that experiences of shame and lacking a sense of "being held positively in the mind of others" is a common source of feeling separate and disconnected. Indeed, central to CFT is to help generate a sense of connectedness and interdependence as well as self-regulation partly by working with shame and shame trauma. The fear of shame and being "exposed" means that we cannot turn to others for "secure base or safe haven" functions (Gilbert, 1989/2016, 2007a,b; Holmes and Slade, 2017; Music, 2019; Schore, 2019). Facilitating compassion to specifically address shame can be an antidote for the sense of alienation from self and others (Gilbert, 2000; Gilbert and Irons, 2005).

Classically Conditioned Fears

Many years ago, I attended a lecture at the Tavistock Clinic in London reflecting on Bowlby's legacy. Delegates watched a recorded interview made some years earlier where he spoke about how, sometimes when he was empathic and understanding to his clients, trying to help them feel cared about, they would become anxious or angry. This was certainly my experience too. He suggested that if people have a compromised attachment system then they tend to respond to a "care signal" through that threat sensitive lens. One way of thinking about it is in terms of *classical conditioning and emotional learning*. For example, imagine you enjoy holidays, looking forward to them you get excited. Then one year, you are badly beaten up and robbed. What happens the next year when you see advertisements for holidays? Chances are you do not remember all the wonderful holidays you have had, but the trauma will come back. Imagine having somebody take a sexual interest. If your sexual experiences have been primarily positive, this may be enjoyable, but if your experiences have been traumatic, that could be very frightening to you. Hence, stimuli of caring and compassion will open the "attachment systems," and emotion memories of being cared for. If neglect and trauma are in that social mentality memory system, then that is what will start to come back. In addition, the "seeking aspect" of the motive system may generate rage or grief that can be fearful or overwhelm clients. So, it is easy to unintentionally trigger trauma, neglect and loneliness memories through compassion training. One of the simplest ways of dealing with that is simply to share it with our clients so they can make sense about what is happening for them, normalize, and validate "It makes perfect sense why compassion is scary for you" and then begin to work on ways to collaborate on how to detoxify the care seeking system and desensitization trauma. **Figure 8** depicts this process.

How we address these issues with clients is important, and caution is needed. For example, comparing resistance to "a fire backdraft" as has been suggested by some can create frightening imagery for clients. So CFT tries to help the client recognize that what is feared is also the source of their healing. So, CFT invites a shared drawing of figures like **Figure 8** with clients, building them together, and discussing reflecting

and exploring as you go. Time is given to making sense of why compassion feels dangerous or pointless. In addition, the therapist labels fear and resistance as *an intuitive wisdom*; that we sometimes need small steps. We do not learn to swim by jumping off the high diving board. So, we can re-label fears and resistances as *cautions and protections*, but we need to know what is being protected. Hence, at each stage, we can reflect with the client the potential pain and fear of compassion, validating along the way, but also indicating that it is possible to work with compassion, noting the advantage of doing so, for example, having access to a birth right for emotion regulation through the vagus nerve and building on one own inner courage.

In addition, helping clients with the abilities to *feel compassion* can take time and can be linked to the abilities to tolerate sadness and to grieve (or rage) for the love they did not have, but wanted (Gilbert and Irons, 2005). Over the years, I have worked with many who had lived with a long sense of disconnection and loneliness, struggling to achieve things, or to do things to make them feel worthy of love and being wanted. For some clients, there is intense grief; for others, there is rage; and sometimes, it is useful to invite clients to look at the big three threat-based emotions, of anger anxiety and sadness to be able to differentiate them and process them as linked to their FBRs (see **Figure 4**). Hence, when individuals really struggle with compassion, the therapist may recognize the client is not in a position to begin to move down that road and first has to do preparatory work in the care and attachment system. This may involve grief work the balance of teaching how to be "safely embodied" with engagement distress and suffering is not always easy (Rothschild, 2000; Van der Kolk, 2015). Because FBRs are very common in CFT, and at times are frightening to clients, it is important that the therapist recognizes and develops ways to validate this to see these as protections rather than problems, but at the same time not engage in avoidance of compassion cultivation. This because if clients cannot develop the care and compassion motives and competencies, then they are cut off from all of those potentially helpful emotion regulating processes linked to secure base, safe haven, and their physiological substrates.

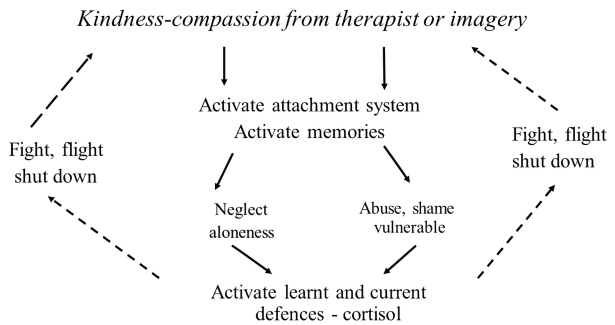


FIGURE 8 | Fears of compassion and attachment history. Adapted from Gilbert (2009b).

BRINGING THINGS TOGETHER

Figure 9 gives a quick overview of a set of processes involved in CFT.

First, we can identify the basic (evolved) algorithm in terms of the stimulus sensitivity (which is suffering, distress or need), and the responses (which are for alleviation and prevention). Throughout, this paper has highlighted that engaging with mental suffering and distress will require building courage (Bratt et al., 2020), Hence, the cultivation of *courage* to help work with suffering,

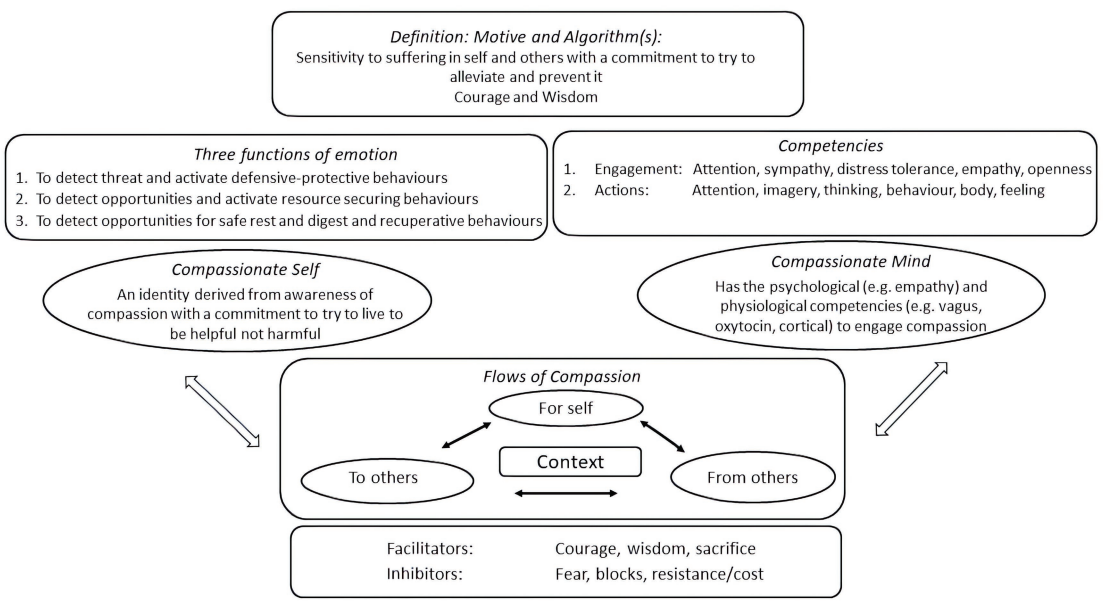


FIGURE 9 | Overview of core processes in CFT © Paul Gilbert.

be it past traumas or current anxieties and depressions, is essential (Rachman, 1990). In addition, understanding how the psychophysiological mechanisms of compassion, particularly as they support secure base and safe haven, give rise to internal states of courage is key and discussed with the client (Gilbert and Choden, 2013, Porges, 2017; Bratt et al., 2020). Because we have complex human cognitive competencies, we can develop wisdoms for compassion. Wanting to be a doctor is a good intention but is useless if we do not study and learn skilled ways of healing. CFT shares with clients why our evolved and socially shaped minds are tricky to navigate, prone to mental distress, and harmful behavior. We help clients to de-shame and de-centre from the processes of a biological mind but learn how to take responsibility for its outputs and behaviors. In both the contemplative traditions and CFT, part of the practices are to help individuals gain insight into the nature of the mind, to become "mind aware and mind wise." Consequently, the first stages are recognizing the basic algorithm for compassion and its roots in the process of developing the client's courage and compassion.

At the next level, we help the client begin to explore the textures and climates of their emotional lives, noting particularly the emotions that are difficult, avoided, or over engaged. CFT helps clients think about the three *main functions of emotion*: threat protection defense, resource and reward seeking, and resting settling, safeness and contentment. We can also explore with clients the link between the autonomic nervous system and other physiological systems and their abilities to emotionally regulate. The right-hand side of **Figure 9** shows the 12 processes depicted in **Figure 6**.

As clients begin to understand the nature of mind, the ease by which we can experience mental suffering, the nature of the tricky mind, and how compassion can reorganize our minds, compassion becomes a focus for the identity of the self (Gilbert and Choden, 2013; Gilbert and Basran, 2018). The client begins to adopt the idea *to live to be helpful, not harmful* to self, and others and becomes more sensitive to the ease by which we can inadvertently be harmful. In addition, the joyfulness of helping and compassion is highlighted.

To live to an identity, however, requires us to have the mind and body to do it. We may be very keen to climb a mountain or run a marathon, but we need the body to do it. CFT argues that this is similar in psychotherapy. People can want to be courageous or to face their difficulties and live compassionately, but they just do not have the physiological resources to do it (Cozolino, 2017; Porges, 2017; Schore, 2019). The threat system is very sensitive. Hence, the importance of all those practices that help to build an inner secure base and safe haven supported with their physiological development. Throughout the therapy, we constantly anticipate and address facilitators and inhibitors of all these processes.

CONCLUSION AND SUMMARY

This paper has highlighted the evolution of caring and its transition into compassion. In addition, it has explored the psychological functions of caring and compassion motives that are salient to psychotherapy for helping people in distressed states in mind. We have addressed the fact that compassion is not one process, but a multi-faceted process, where people can be good at some aspects of compassion or some competencies of compassion, but not others. We noted too that caring compassion evolved to be focused on kin or reciprocating relationships, but then we can extend it through developing a compassionate identity and by training the mind in the insights and competencies of compassion which opens up new opportunities for that identity. Given that the human condition is one of suffering from injury, disease, getting old, decaying, and dying, and experiencing many setbacks and losses along the way, the therapeutic focus is how to deal with the sufferings we experience in life. Along with addressing suffering, however, CFT like many other therapies also aims to help people develop their own sense of meaning, happiness and to flourish. In our relationship with our clients, we help them see that "we see them" as fellow human beings on this tricky journey called life, with different versions of ourselves. So, the therapist is not there to "fix things gone wrong" but rather to help people re-pattern rewire and reprogram themselves, in ways that are more conducive to dealing with suffering and promoting well-being.

With the increasing awareness of the importance of linking psychological processes to physiological states and social relationships many new avenues of therapies are emerging that include: direct vagal stimulation and balancing the ANS with diet and exercise, using sounds, chanting, breath training, yoga and dance, various forms of biofeedback and also the use of psychedelic drugs that can promote experiences of deep social connectedness. In addition, more focus is going to be on developing compassionate community living. Research is revealing new ways to promote insights into the nature of mind, promote mental well-being and prosocial behavior. How these might help those with more narcissistic and callous traits become more compassionate is an exciting research question. Hence, the psychotherapy of the future will look somewhat different to what we have today and be a much more biopsychosocial process (Mascaro et al., 2020) and concerned with ethics and pro social behavior in all dimensions of social relating. For now though some of the conditions for CFT include:

1. A central theme of CFT is clear definitions and understanding of compassion. This is because there are many different concepts of compassion on the internet and clients come with all kinds of ideas that are not conducive to compassion as a therapy. Hence, the focus on compassion is as an algorithm that at its heart is based on wisdom and courage. Moreover, compassion is not one thing, so we might need to develop different types of competencies, abilities, insights, and wisdoms, for different types of problem. This is often new to clients.
2. During the course of the therapy, we cover a functional analysis of the various safety behaviors clients are using, including different forms and functions of self-criticism. We can contrast that with the functions of caring behavior and its derivative compassion and how to turn to compassionate self-correction. The evolved functions of caring on *psychology* are depicted in approaches such as attachment theory and other developmental models. Caring evolved to

provide a *source of protection, a secure base* to offer support, and encouragement and guidance for learning and flourishing, and *safe haven* that offers ways of regulating threat (and sometimes drive) emotions that have become destabilizing or overwhelming. The compassionate imagery reasoning and behavioral exercises, and also compassionate self are cultivated with and for these functions.

3. CFT uses evolution insights to help clients depersonalize and decenter from their inner experience. We are a species among many millions, created by genes to pursue certain life tasks, navigating the myriad of potentially strongly felt emotions, mood shifts and desires that are built into the brain and can be extremely difficult. Therapists also use the idea of what they (therapist) would be like if they had been kidnapped as "three day old babies" into violent gangs. We help clients recognize they have a certain type of consciousness, which in itself is empty of content; the source of content comes from our gene built and socially textured brains and phenotypes; these are mostly a game of chance and luck. We are all just versions of biological beings who have been sculpted by the environment. There is no real self here at all, just patterns of electrochemical activity patterning experiences in consciousness. These insights have important de-shaming effects facilitating a greater preparedness to look at some of the dark or frightening sides of the self without blaming oneself for them.
4. Hence, CFT helps clients develop a sense of common humanity and an appreciation that *we all* just find ourselves here, with a body and mental contents and flow (needs, passions, and fears) that *have been built for us, not by us*. Our life tasks are to try to work out "our programming" so that we can often override it and be helpful, not harmful. Empathy training helps in the recognition that we can unintentionally end up in states of personal suffering and also cause it to others.
5. Once we acknowledge we have this tricky brain, CFT helps clients recognize that if we become *mindful and mind aware*, we become more sensitive to the different textures of the mind. This enables us to become more aware of what motives and emotions are running in our mind and whether we want to let them. Mindfulness in CFT, therefore, is to develop mind awareness into a *biologically and social textured created minds*. Then, we can recognize when to switch attention, thinking, emotions, and motives away from the unhelpful to the helpful.
6. CFT helps clients recognize the importance of insight into our multifarious "multiple selves" and often *conflicting* nature of the mind, and hence, the need to develop mind awareness and *abilities to differentiate the complex of motives and emotions and beliefs*, the texture the mind. Mind awareness gives rise to compassionate wisdom and the issue of integration.
7. Mind awareness goes with body awareness and also body cultivation. CFT offers insight and guidance into how to train/use the body to support the mind. For example, the importance of developing vagal tone, how to use breathing exercises to settle and ground the body and mind, how to use posture and exercise, pay attention to diet which can influence the vagal nerve, learning to process threatening information in ways contextualized with a secure base and safe haven, and how to increase certain activating positive emotions and helpful desires.
8. CFT offers clients a range of mind and body training practices that include breathing, posture visualizations, meditations, behavioral practices, and other traditional western therapeutic skills such as: compassionate writing and journaling, compassionate acting, using chairs to help differentiation of feelings and motives, compassionate behavioral planning; use of art, music and dance.
9. CFT helps clients to reflect on what is *meaningful* to them, the self-identities they want to foster and carry through life, and how they might like to look back on their life as it draws to an end. Compassion is typically experienced as a source of meaningful action.
10. With clients who had complex developmental histories, perhaps, with trauma or neglect, a lot of the work is around fears, blocks, and resistances. That includes working with problems of distrust, and facilitating engagement with unprocessed emotions. A very common process is *grieving for the life one did not have* and the yearning to feel loved, validated cared for, approved of or admired especially but not only by a parental figure. These are basic human needs and when they are not met, they do not simply shrivel up and disappear, they lurk in us in all kinds of ways.
11. Crucial is to recognize that fears, blocks, and resistances are not a problem; *they are the work*. Sometimes when therapists run into them, they take that as a reason not to do CFT! But like behavior therapists, the more avoidance, the more you help people engage and get behind the fears and resistances. CFT treats fears as 'intuitive wisdoms of protection' coded in the body - one just needs to find out, 'protecting from what'?
12. Finally, wherever possible Socratic inquiries and guided discovery are the way to help people understand the nature of the tricky minds we have got, compassion, and enter into the training exercises. Although there are many psychoeducation and behavioral practices, CFT, like other therapies values the therapeutic relationship; the sharing of life stories and narratives with silences for reflection, gentle nudging towards working with difficult emotions, sharing in the joys of movement forward and the sorrows of setbacks. Clients are monitoring the degree to which the therapist is not just empathic but is motivated to help them and are partners on the journey.

The lead up to CFT has emerged slowly over the past 40 years or so. Some of its origins are in early work on motivational processes, distinctions between threat, safety, and safeness systems and integration with attachment theory (Gilbert, 1984, 1989/2016, 1992a,b, 1993). With the unfolding of years, new concepts of compassion, including Buddhist meditation practices and research on how compassion changes a range of physiological and neurophysiological systems, have all added to our understanding of how care-based motive can operate as major regulating systems of emotions and prosocial behavior (Weng et al., 2013; Singer and Engert, 2019). Although CFT utilizes many cognitive behavioral and other techniques, it has always been rooted in evolution informed behavioral models (Gilbert, 1984, 1989/2016). Thus it is not a third wave of CBT. And the future of psychotherapy is in the biopsychosocial

sciences, rather than new versions of particular approaches (Cozolino, 2017; Gilbert, 2019; Schore, 2019; Siegel, 2019). CFT has always been a process therapy and has tried to articulate specific processes of intervention carefully and clearly to put them up for scientific validation. Our outcomes will improve, the better we understand process, and the more we understand what our minds evolved to do and need, the more we will understand process. Finally, we should note that psychotherapy is also about moral and ethical behavior; coming to therapy should also make us more compassionate human beings.

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REFERENCES

Akmal, K. M., and Foong, A. L. S. (2018). Attachment styles: fear of compassion and callous-unemotional traits among juvenile delinquents. *J. Child Adolesc. Behav.* 6:371. doi: 10.4172/2375-4494.1000371

Amodio, P. (2019). Octopus intelligence: the importance of being agnostic. *Anim. Sentience* 4:20.

Armstrong, B. F., Nitschke, J. P., Bilash, U., and Zuroff, D. C. (2020). An affect in its own right: investigating the relationship of social safeness with positive and negative affect. *Pers. Individ. Differ.* 168:109670. doi: 10.1016/j.paid.2019.109670

Ashbach, C., Fraley, K., Koehler, P., and Pollton, J. (2020). *Suffering and sacrifice in the clinical encounter*. Bicester, UK: Phoenix Publishing.

Bakan, J. (2012). *The corporation: The pathological pursuit of profit and power*. UK: Hachette.

Baron-Cohen, S. (2011). *Zero degrees of empathy: A new theory of human cruelty*. UK: Penguin.

Barrett, L. F. (2017). *How emotions are made: The secret life of the brain*. New York: Houghton Mifflin Harcourt.

Basran, J., Pires, C., Matos, M., McEwan, K., and Gilbert, P. (2019). Styles of leadership, fears of compassion, and competing to avoid inferiority. *Front. Psychol.* 9:2460. doi: 10.3389/fpsyg.2018.02460

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., and Vohs, K. D. (2001). Bad is stronger than good. *Rev. Gen. Psychol.* 5, 323–370. doi: 10.1037/1089-2680.5.4.323

Bell, T., Montague, J., Elander, J., and Gilbert, P. (2020a). "A definite feel-it moment": embodiment, externalisation and emotion during chair-work in compassion-focused therapy. *Couns. Psychother. Res.* 20, 143–153. doi: 10.1002/capr.12248

Bell, T., Montague, J., Elander, J., and Gilbert, P. (2020b). "Suddenly we are King Solomon": multiplicity, transformation and integration in compassion focused therapy chairwork. *J. Psychother. Integr.* 1–20. doi: 10.1037/int0000240

Bloom, P. (2017a). *Against empathy: The case for rational compassion*. UK: Random House.

Bloom, P. (2017b). Empathy and its discontents. *Trends Cogn. Sci.* 21, 24–31. doi: 10.1016/j.tics.2016.11.004

Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. Harvard: Harvard University Press.

Bohlmeijer, E., Prenger, R., Taal, E., and Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: a meta-analysis. *J. Psychosom. Res.* 68, 539–544. doi: 10.1016/j.jpsychores.2009.10.005

Bowlby, J. (1969). *Attachment and loss. Vol. 1.* London: Random House.

Bowlby, J. (1973). *Attachment and loss: Separation, anxiety and anger. Vol. 2.* London: The Hogarth Press and the Institute of Psycho-analysis, 1–429.

Bowlby, J. (1980). *Attachment and loss. Vol. 3.* London: Hogarth Press and The Institute of Psycho-Analysis.

Brasini, M., Tanzilli, A., Pistella, J., Gentile, D., Di Marco, I., Mancini, F., et al. (2020). The social mentalities scale: a new measure for assessing the interpersonal motivations underlying social relationships. *Pers. Individ. Differ.* 167:110236. doi: 10.1016/j.paid.2020.110236

Bratt, A., Gralberg, I. M., Svensson, I., and Rusner, M. (2020). Gaining the courage to see and accept oneself: group-based compassion-focussed therapy as experienced by adolescent girls. *Clin. Child Psychol. Psychiatry* 25, 909–921. doi: 10.1177/1359104520931583

Brown, S. L., and Brown, R. M. (2015). Connecting prosocial behavior to improved physical health: contributions from the neurobiology of parenting. *Neurosci. Biobehav. Rev.* 55, 1–17. doi: 10.1016/j.neubiorev.2015.04.004

Brown, S. L., and Brown, R. M. (2017). "Compassionate neurobiology and health" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 159–172.

Buss, D. M. (2015). *Evolutionary psychology: The new science of the mind. 5th Edn*. UK: London Psychology Press.

Byrne, R. (1995). *The thinking ape: Evolutionary origins of intelligence*. UK: Oxford University Press.

Carter, S., Bartal, I. B., and Porges, E. (2017). "The roots of compassion: an evolutionary and neurobiological perspective" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown and M. C. Worline (New York: Oxford), 178–188.

Carter, C. S., Harris, J., and Porges, S. W. (2009). "Neural and evolutionary perspectives on empathy" in *The social neuroscience of empathy*. eds. J. E. Decety and W. E. Ickes (Massachusetts: MIT Press), 169–182.

Carver, C. S. (2004). Negative affects deriving from the behavioral approach system. *Emotion* 4, 3–22. doi: 10.1037/1528-3542.4.1.3

Cassidy, J., and Shaver, P. R. (2016). *Handbook of attachment: Theory, research and clinical applications. 3rd Edn*. New York: Guilford.

Castilho, P., Pinto-Gouveia, J., and Duarte, J. (2017). Two forms of self-criticism mediate differently the shame-psychopathological symptoms link. *Psychol. Psychother.* 90, 44–54. doi: 10.1111/papt.12094

Chance, M. (1988). *Social fabrics of the mind*. London: Lawrence Erlbaum.

Colqhoun, L., Workman, L., and Fowler, J. (2020). "The problem of altruism and future directions" in *Cambridge handbook of evolutionary perspectives on human behavior*. eds. L. Workman, W. Reader and J. H. Barkow (Cambridge: Cambridge University Press), 125–138.

Condon, P., and Makransky, J. (2020). Sustainable compassion training: integrating meditation theory with psychological science. *Front. Psychol.* 11:2249. doi: 10.3389/fpsyg.2020.02249

Cordaro, D. T., Brackett, M., Glass, L., and Anderson, C. L. (2016). Contentment: perceived completeness across cultures and traditions. *Rev. Gen. Psychol.* 20, 221–235. doi: 10.1037/gpr0000082

Cowan, C. S. M., Callaghan, B. L., Kan, J. M., and Richardson, R. (2016). The lasting impact of early-life adversity on individuals and their descendants: potential mechanisms and hope for intervention. *Genes Brain Behav.* 15, 155–168. doi: 10.1111/gbb.12263

Cozolino, L. (2014). *The neuroscience of human relationships: Attachment and the developing social brain*, Norton series on interpersonal neurobiology. *2nd Edn*. New York: WW Norton & Company.

Cozolino, L. (2017). *The neuroscience of psychotherapy: Healing the social brain*, Norton series on interpersonal neurobiology. *2nd Edn*. New York: WW Norton & Company.

Craig, C., Hiskey, S., and Spector, A. (2020). Compassion focused therapy: a systematic review of its effectiveness and acceptability in clinical populations. *Expert. Rev. Neurother.* 20, 385–400. doi: 10.1080/14737175.2020.1746184

Curran, T., and Hill, A. P. (2019). Perfectionism is increasing over time: a meta-analysis of birth cohort differences from 1989 to 2016. *Psychol. Bull.* 145, 410–429. doi: 10.1037/bul0000138

da Silva, D. R., Rijo, D., Salekin, R. T., Paulo, M., Miguel, R., and Gilbert, P. (2020). Clinical change in psychopathic traits after the PSYCHOPATHY. COMP program: preliminary findings of a controlled trial with male detained youth. *J. Exp. Criminol.* 1–25. doi: 10.1007/s11292-020-09418-x

Dalai Lama (1995). *The power of compassion*. India: Harper Collins.

Decety, J. E., and Ickes, W. E. (2009). *The social neuroscience of empathy*. Massachusetts: MIT Press.

Del Giudice, M. (2016). The life history model of psychopathology explains the structure of psychiatric disorders and the emergence of the p factor: a simulation study. *Clin. Psychol. Sci.* 4, 299–311. doi: 10.1177/2167702615583628

Depue, R. A., and Morrone-Strupinsky, J. V. (2005). A neurobehavioral model of affiliative bonding: implications for conceptualizing a human trait of affiliation. *Behav. Brain Sci.* 28, 313–395. doi: 10.1017/S0140525X05000063

Di Bello, M., Carnevali, L., Petrocchi, N., Thayer, J. F., Gilbert, P., and Ottaviani, C. (2020). The compassionate vagus: a meta-analysis on the connection between compassion and heart rate variability. *Neurosci. Biobehav. Rev.* 116, 21–30. doi: 10.1016/j.neubiorev.2020.06.016

Dunbar, R. I. (2009). The social brain hypothesis and its implications for social evolution. *Ann. Hum. Biol.* 36, 562–572. doi: 10.1080/03014460902960289

Dunbar, R. (2014). *Human evolution: A pelican introduction*. UK: Penguin.

Ebert, A., Edel, M.-A., Gilbert, P., and Brüne, M. (2018). Endogenous oxytocin is associated with the experience of compassion and recalled upbringing in borderline personality disorder. *Depress. Anxiety* 35, 50–57. doi: 10.1002/da.22683

Eisenberg, N., VanSchyndel, S. K., and Hofer, C. (2015). The association of maternal socialization in childhood and adolescence with adult offsprings' sympathy/caring. *Dev. Psychol.* 51, 7–16. doi: 10.1037/a0038137

Enright, R. D., and Fitzgibbons, R. P. (2015). *Forgiveness therapy: An empirical guide for resolving anger and restoring hope*. New York: American Psychological Association.

Eyal, T., Steffel, M., and Epley, N. (2018). Perspective mistaking: accurately understanding the mind of another requires getting perspective, not taking perspective. *J. Pers. Soc. Psychol.* 114, 547–571. doi: 10.1037/pspa0000115

Fiskum, C. (2019). Psychotherapy beyond all the words: dyadic expansion, vagal regulation, and biofeedback in psychotherapy. *J. Psychother. Integr.* 29, 412–425. doi: 10.1037/int0000174

Fonagy, P., and Adshead, G. (2012). How mentalisation changes the mind. *Adv. Psychiatr. Treat.* 18, 353–362. doi: 10.1192/apt.bp.108.005876

Fonagy, P., Campbell, C., and Bateman, A. (2017). Mentalizing, attachment, and epistemic trust in group therapy. *Int. J. Group Psychother.* 67, 176–201. doi: 10.1080/00207284.2016.1263156

Fox, J., Cattani, K., and Burlingame, G. M. (2020). Compassion focused therapy in a university counselling and psychological services center: a feasibility trial of a new standardized group manual. *Psychother. Res.* 1–13. doi: 10.1080/10503307.2020.1783708 [Epub ahead of print]

Frank, E. T., Wehrhahn, M., and Linsenmair, K. E. (2018). Wound treatment and selective help in a termite-hunting ant. *Proc. Biol. Sci.* 285:20172457. doi: 10.1098/rspb.2017.2457

Fredrickson, B., Mancuso, R., Branigan, C., and Tugade, M. (2000). The undoing effects of positive emotion. *Motiv. Emot.* 24, 237–258. doi: 10.1023/a:1010796329158

Geary, D. C. (2000). Evolution and proximate expression of human parental investment. *Psychol. Bull.* 126, 55–77. doi: 10.1037/0033-2909.126.1.55

Germer, C. K., and Siegel, R. D. (2012). *Wisdom and compassion in psychotherapy: Deepening mindfulness in clinical practice*. New York: Guilford Press.

Gilbert, P. (1984). *Depression: From psychology to brain state*. London: Lawrence Erlbaum Associates.

Gilbert, P. (1989/2016). *Human nature and suffering*. London: Routledge.

Gilbert, P. (1992a). *Depression: The evolution of powerlessness*. London: Lawrence Erlbaum Associates.

Gilbert, P. (1992b). Defence, safe(ty) and biosocial goals in relation to the agonic and hedonic social modes. *World Futures* 35, 31–70. doi: 10.1080/02604027.1992.9972316

Gilbert, P. (1993). Defence and safety: their function in social behaviour and psychopathology. *Br. J. Clin. Psychol.* 32, 131–153. doi: 10.1111/j.2044-8260.1993.tb01039.x

Gilbert, P. (1995). Biopsychosocial approaches and evolutionary theory as aids to integration in clinical psychology and psychotherapy. *Clin. Psychol. Psychother.* 2, 135–156. doi: 10.1002/cpp.5640020302

Gilbert, P. (2000). "Social mentalities: internal 'social' conflicts and the role of inner warmth and compassion in cognitive therapy" in *Genes on the couch: Explorations in evolutionary psychotherapy*. eds. P. Gilbert and K. G. Bailey (Hove: Psychology Press), 118–150.

Gilbert, P. (2005a). "Compassion and cruelty. A biopsychosocial approach" in *Compassion: Conceptualizations, research and use in psychotherapy*. ed. P. Gilbert (London: Routledge), 11–74.

Gilbert, P. (2005b). "Social mentalities: a biopsychosocial and evolutionary reflection on social relationships" in *Interpersonal cognition*. ed. M. Baldwin (New York: Guilford), 299–333.

Gilbert, P. (2007a). *Psychotherapy and counselling for depression. 3rd Edn*. London: Sage.

Gilbert, P. (2007b). "Evolved minds and compassion in the therapeutic relationship" in *The therapeutic relationship in the cognitive behavioural psychotherapies*. eds. P. Gilbert and R. Leahy (London: Routledge), 106–142.

Gilbert, P. (2009a). *The compassionate mind: A new approach to the challenge of life*. London: Constable & Robinson.

Gilbert, P. (2009b). "Developing a compassion focused approach in cognitive behavioural therapy" in *Cognitive behaviour therapy, a guide to the practicing clinician. Vol. 2.* ed. G. Simos (London: Routledge).

Gilbert, P. (2010). *Compassion focused therapy: The CBT distinctive features series*. London: Routledge.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (ed.) (2017a). *Compassion: Concepts, research and applications* London: Routledge.

Gilbert, P. (ed.) (2017b). "Compassion: definitions and controversies" in *Compassion: Concepts, research and applications*. (London: Routledge), 3–15.

Gilbert, P. (ed.) (2017c). "Compassion as a social mentality: an evolutionary approach" in *Compassion: Concepts, research and applications* (London: Routledge), 31–68.

Gilbert, P. (2018). *Living like crazy*. York: Annwyn House.

Gilbert, P. (2019). Psychotherapy for the 21st century: an integrative, evolutionary, contextual, biopsychosocial approach. *Psychol. Psychother.* 92, 164–189. doi: 10.1111/papt.12226

Gilbert, P. (2020a). "The evolution of prosocial behavior: from caring to compassion" in *Cambridge handbook of evolutionary perspectives on human behavior*. eds. L. Workman, W. Reader and J. H. Barkow (Cambridge: Cambridge University Press), 419–435.

Gilbert, P. (2020b). "Evolutionary functional analysis: the study of social mentalities, social rank and caring-compassion" in *Making an impact on mental health*. eds. J. N. Kirby and P. Gilbert (London: Routledge), 4–42.

Gilbert, P. (in press). Creating a compassionate world: addressing the conflicts between sharing and caring versus controlling and holding evolved strategies. *Frontiers*

Gilbert, P., and Basran, J. (2018). Imagining one's compassionate self and coping with life difficulties. *EC Psychol. Psychiatry* 7, 971–978.

Gilbert, P., and Basran, J. (2019). The evolution of prosocial and antisocial competitive behavior and the emergence of prosocial and antisocial leadership styles. *Front. Psychol.* 10:610. doi: 10.3389/fpsyg.2019.00610

Gilbert, P., Basran, J., MacArthur, M., and Kirby, J. N. (2019). Differences in the semantics of prosocial words: an exploration of compassion and kindness. *Mindfulness* 10, 2259–2271. doi: 10.1007/s12671-019-01191-x

Gilbert, P., Broomhead, C., Irons, C., McEwan, K., Bellew, R., Mills, A., et al. (2007). Development of a striving to avoid inferiority scale. *Br. J. Soc. Psychol.* 46, 633–648. doi: 10.1348/014466606X157789

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., et al. (2017). The development of compassionate engagement and action scales for self and others. *J. Compassionate Health Care* 4, 1–24. doi: 10.1186/s40639-017-0033-3

Gilbert, P., and Choden, (2013). *Mindful compassion*. London: Constable Robinson.

Gilbert, P., and Irons, C. (2005). "Focused therapies and compassionate mind training for shame and self-attacking" in *Compassion: Conceptualisations, research and use in psychotherapy*. ed. P. Gilbert (London: Routledge), 263–325.

Gilbert, P., and Mascaro, J. (2017). "Compassion: fears, blocks, and resistances: an evolutionary investigation" in *The oxford handbook of compassion science*.

eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 399–420.

Gilbert, P., McEwan, K., Bellew, R., Mills, A., and Gale, C. (2009). The dark side of competition: how competitive behaviour and striving to avoid inferiority are linked to depression, anxiety, stress and self-harm. *Psychol. Psychother.* 82, 123–136. doi: 10.1348/147608308X379806

Gilbert, P., McEwan, K., Catarino, F., Baião, R., and Palmeira, L. (2014). Fears of happiness and compassion in relationship with depression, alexithymia, and attachment security in a depressed sample. *Br. J. Clin. Psychol.* 53, 228–244. doi: 10.1111/bjc.12037

Gilbert, P., McEwan, K., Matos, M., and Rivis, A. (2011). Fears of compassion: development of three self-report measures. *Psychol. Psychother.* 84, 239–255. doi: 10.1348/147608310X526511

Gilbert, P., McEwan, K., Mitra, R., Franks, L., Richter, A., and Rockliff, H. (2008). Feeling safe and content: a specific affect regulation system? Relationship to depression, anxiety, stress, and self-criticism. *J. Posit. Psychol.* 3, 182–191. doi: 10.1080/17439760801999461

Gilbert, P., and Miles, J. N. (2000). Sensitivity to social put-down: it's relationship to perceptions of social rank, shame, social anxiety, depression, anger and self-other blame. *Pers. Individ. Differ.* 29, 757–774. doi: 10.1016/s0191-8869(99)00230-5

Gilbert, P., and Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: a pilot study of a group therapy approach. *Clin. Psychol. Psychother.* 13, 353–379. doi: 10.1002/cpp.507

Gilbert, P., and Simos, G. (in press). *Compassion focused therapy: Clinical practice and applications*. London: Routledge.

Gillath, O., and Karantzas, G. (2019). Attachment security priming: a systematic review. *Curr. Opin. Psychol.* 25, 86–95. doi: 10.1016/j.copsyc.2018.03.001

Goetz, J. E., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Goleman, D., and Davidson, R. J. (2017). *Altered traits: Science reveals how meditation changes your mind, brain, and body*. New York: Penguin.

Goodall, J. (1990). *Through a window: My thirty years with the chimpanzees of Gombe*. London: Penguin.

Gray, J. A. (1987). *The psychology of fear and stress. 2nd Edn*. Cambridge: University Press.

Green, M., Kirby, J. N., and Nielsen, M. (2018). The cost of helping: an exploration of compassionate responding in children. *Br. J. Dev. Psychol.* 36, 673–678. doi: 10.1111/bjdp.12252

Greenberg, L. (2003). Evolutionary perspectives on emotion: making sense of what we feel. *J. Cogn. Psychother.* 16, 331–348. doi: 10.1891/jcop.16.3.331.52517

Gu, J., Strauss, C., Bond, R., and Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clin. Psychol. Rev.* 37, 1–12. doi: 10.1016/j.cpr.2015.01.006

Hanson, R. (2020). *Neurodharma: New science, ancient wisdom, and seven practices of the highest happiness*. New York: Harmony.

Harlow, H. F., and Mears, C. (1979). *The human model: Primate perspectives*. Washington, DC: V.H. Winston.

Hein, G., Silani, G., Preuschoff, K., Batson, C. D., and Singer, T. (2010). Neural responses to ingroup and outgroup members' suffering predict individual differences in costly helping. *Neuron* 68, 149–160. doi: 10.1016/j.neuron.2010.09.003

Heinrichs, M., Baumgartner, T., Kirschbaum, C., and Ehlert, U. (2003). Social support and oxytocin interact to suppress cortisol and subjective response to psychosocial stress. *Biol. Psychiatry* 54, 1389–1398. doi: 10.1016/s0006-3223(03)00465-7

Henrich, J. (2020). *The weirdest people in the world: How the west became psychologically peculiar and particularly prosperous*. London: Penguin.

Hermanto, N., and Zuroff, D. C. (2016). The social mentality theory of self-compassion and self-reassurance: the interactive effect of care-seeking and caregiving. *J. Soc. Psychol.* 156, 523–535. doi: 10.1080/00224545.2015.1135779

Hermanto, N., Zuroff, D. C., Kelly, A. C., and Leybman, M. J. (2017). Receiving support, giving support, and self-reassurance: a daily diary test of social mentality theory. *Pers. Individ. Differ.* 107, 37–42. doi: 10.1016/j.paid.2016.11.013

Hofer, M. A. (1984). Relationships as regulators: a psychobiologic perspective on bereavement. *Psychosom. Med.* 46, 183–197. doi: 10.1097/00006842-198405000-00001

Hofer, M. A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatr.* 83, 9–18. doi: 10.1111/j.1651-2227.1994.tb13260.x

Holmes, J. (2001). *The search for the secure base: Attachment theory and psychotherapy*. UK: Routledge.

Holmes, J., and Slade, A. (2017). *Attachment in therapeutic practice*. London: Sage.

Hornstein, E. A., and Eisenberger, N. I. (2018). A social safety net: developing a model of social-support figures as prepared safety stimuli. *Curr. Dir. Psychol. Sci.* 27, 25–31. doi: 10.1177/0963721417729036

Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Cambridge, MA: Belknap/Harvard.

Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E., Finkelstein, J., Simon-Thomas, E., et al. (2013). Enhancing compassion: a randomized controlled trial of a compassion cultivation training program. *J. Happiness Stud.* 14, 1113–1126. doi: 10.1007/s10902-012-9373-z

Kelly, A. C., and Dupasquier, J. (2016). Social safeness mediates the relationship between recalled parental warmth and the capacity for self-compassion and receiving compassion. *Pers. Individ. Differ.* 89, 157–161. doi: 10.1016/j.paid.2015.10.017

Kelly, A. C., Zuroff, D. C., Leybman, M. J., and Gilbert, P. (2012). Social safeness, received social support, and maladjustment: testing a tripartite model of affect regulation. *Cogn. Ther. Res.* 36, 815–826. doi: 10.1007/s10608-011-9432-5

Keltner, D., Kogan, A., Piff, P. K., and Saturn, S. R. (2014). The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: core processes from gene to meme. *Annu. Rev. Psychol.* 65, 425–460. doi: 10.1146/annurev-psych-010213-115054

Keltner, D., Oatley, K., and Jenkins, J. M. (2018). *Understanding emotions. 4th Edn.* London: Wiley Global Education.

Kessler, S. E. (2020). Why care: complex evolutionary history of human healthcare networks. *Front. Psychol.* 11:199. doi: 10.3389/fpsyg.2020.00199

Kim, J. J., Kent, K. M., Cunnington, R., Gilbert, P., and Kirby, J. N. (2020a). Attachment styles modulate neural markers of threat and imagery when engaging in self-criticism. *Sci. Rep.* 10:13776. doi: 10.1038/s41598-020-70772-x

Kim, J. J., Parker, S., Doty, J., Cunnington, R., Gilbert, P., and Kirby, J. (2020b). Neurophysiological and behavioural markers of compassion. *Sci. Rep.* 10:6789. doi: 10.1038/s41598-020-63846-3

Kim, J. J., Parker, S. L., Henderson, T., and Kirby, J. N. (2020c). Physiological fractals: visual and statistical evidence across timescales and experimental states. *J. R. Soc. Interface* 17:20200334. doi: 10.1098/rsif.2020.0334

Kirby, J. N., Day, J., and Sagar, V. (2019). The 'Flow'of compassion: a meta-analysis of the fears of compassion scales and psychological functioning. *Clin. Psychol. Rev.* 70, 26–39. doi: 10.1016/j.cpr.2019.03.001

Kirby, J., and Gilbert, P. (2017). "The emergence of the compassion focused therapies" in *Compassion: Concepts, research and applications*. ed. P. Gilbert (London: Routledge), 258–285.

Kumashiro, M., and Sedikides, C. (2005). Taking on board liability-focused information: close positive relationship as a self-bolstering resource. *Psychol. Sci.* 16, 732–739. doi: 10.1111/j.1467-9280.2005.01603.x

Kumsta, R. (2019). The role of epigenetics for understanding mental health difficulties and its implications for psychotherapy research. *Psychol. Psychother.* 92, 190–207. doi: 10.1111/papt.12227

Lampert, K. (2005). *Traditions of compassion: From religious duty to social activism*. New York: Palgrave Macmillan.

Lawrence, V. A., and Lee, D. (2014). An exploration of people's experiences of compassion-focused therapy for trauma, using interpretative phenomenological analysis. *Clin. Psychol. Psychother.* 21, 495–507. doi: 10.1002/cpp.1854

Lee, D. (2005). "The perfect nurture a model to develop a compassionate mind within the context of cognitive therapy" in *Compassion: Conceptualisations, research and use in psychotherapy*. ed. P. Gilbert (London: Routledge), 326–351.

Lewis, C. S. (1961). *A grief observed*. London: Faber & Faber.

Lippard, E. T., and Nemeroff, C. B. (2020). The devastating clinical consequences of child abuse and neglect: increased disease vulnerability and poor treatment response in mood disorders. *Am. J. Psychiatry* 177, 20–36. doi: 10.1176/appi.ajp.2019.19010020

Lockwood, P. L., Apps, M. A., and Chang, S. W. (2020). Is there a 'social'brain? Implementations and algorithms. *Trends Cogn. Sci.* 24, 802–813. doi: 10.1016/j.tics.2020.06.011

Loewenstein, G., and Small, D. A. (2007). The scarecrow and the tin man: the vicissitudes of human sympathy and caring. *Rev. Gen. Psychol.* 11, 112–126. doi: 10.1037/1089-2680.11.2.112

Lunkenheimer, E., Tiberio, S. S., Skoranski, A. M., Buss, K. A., and Cole, P. M. (2018). Parent-child coregulation of parasympathetic processes varies by social context and risk for psychopathology. *Psychophysiology* 55:e12985. doi: 10.1111/psyp.12985

Luyten, P., Campbell, C., Allison, E., and Fonagy, P. (2020). The mentalizing approach to psychopathology: state of the art and future directions. *Annu. Rev. Clin. Psychol.* 16, 297–325. doi: 10.1146/annurev-clinpsy-071919-015355

Margana, L., Bhogal, M. S., Bartlett, J. E., and Farrelly, D. (2019). The roles of altruism, heroism, and physical attractiveness in female mate choice. *Pers. Individ. Differ.* 137, 126–130. doi: 10.1016/j.paid.2018.08.018

Marino, L. (2017). Thinking chickens: a review of cognition, emotion, and behavior in the domestic chicken. *Anim. Cogn.* 20, 127–147. doi: 10.1007/s10071-016-1064-4

Marsh, A. A. (2019). The caring continuum: evolved hormonal and proximal mechanisms explain prosocial and antisocial extremes. *Annu. Rev. Psychol.* 70, 347–371. doi: 10.1146/annurev-psych-010418-103010

Mascaro, J. S., Florian, M. P., Ash, M. J., Palmer, P. K., Frazier, T., Condon, P., et al. (2020). Ways of knowing compassion: how do we come to know, understand, and measure compassion when we see it? *Front. Psychol.* 11:547241. doi: 10.3389/fpsyg.2020.547241

Mascaro, J., Negi, L. T., and Raison, C. (2017). "Cognitively based compassion training. Gleaning generalities from specific biological effects" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 247–257.

Matos, M., Duarte, J., Duarte, C., Gilbert, P., and Pinto-Gouveia, J. (2018). How one experiences and embodies compassionate mind training influences its effectiveness. *Mindfulness* 9, 1224–1235. doi: 10.1007/s12671-017-0864-1

Matos, M., Duarte, C., Duarte, J., Pinto-Gouveia, J., Petrocchi, N., Basran, J., et al. (2017). Psychological and physiological effects of compassionate mind training: a pilot randomised controlled study. *Mindfulness* 8, 1699–1712. doi: 10.1007/s12671-017-0745-7

Mayseless, O. (2016). *The caring motivation: An integrated theory*. Oxford: Oxford University Press.

McGhee, K. E., and Bell, A. M. (2014). Paternal care in a fish: epigenetics and fitness enhancing effects on offspring anxiety. *Proc. Biol. Sci.* 281:20141146. doi: 10.1098/rspb.2014.1146

McGilchrist, I. (2018). *Ways of attending: How our divided brain constructs the world*. Oxon, UK: Routledge.

Melis, A. P. (2018). The evolutionary roots of prosociality: the case of instrumental helping. *Curr. Opin. Psychol.* 20, 82–86. doi: 10.1016/j.copsyc.2017.08.019

Mikulincer, M., and Shaver, P. R. (2016). *Attachment in adulthood: Structure, dynamics, and change*. *2nd Edn*. New York: Guilford Press.

Miller, J. G., Kahle, S., Troxel, N. R., and Hastings, P. D. (2020). The development of generosity from 4 to 6 years: examining stability and the biopsychosocial contributions of children's vagal flexibility and mothers' compassion. *Front. Psychol.* 11:2988. doi: 10.3389/fpsyg.2020.590384

Mobbs, D., Marchant, J. L., Hassabis, D., Seymour, B., Tan, G., Gray, M., et al. (2009). From threat to fear: the neural organization of defensive fear systems in humans. *J. Neurosci.* 29, 12236–12243. doi: 10.1523/JNEUROSCI.2378-09.2009

Mullen, G., and O'Reilly, G. (2018). How can social mentality theory help us understand eating disorder presentations? A scoping review. *J. Relat. Res.* 9:e18. doi: 10.1017/jrr.2018.17

Muris, P., and Otgaar, H. (2020). The process of science: a critical evaluation of more than 15 years of research on self-compassion with the self-compassion scale. *Mindfulness* 11, 1469–1482. doi: 10.1007/s12671-020-01363-0

Music, G. (2017). *Nurturing natures attachment and children's emotional social cultural and brain development*. *2nd Edn*. Oxon, UK: Routledge.

Music, G. (2019). *Nurturing children: From trauma to growth using attachment theory, psychoanalysis and neurobiology*. London: Routledge.

Narvaez, D. (2017). "Evolution, child raising and compassionate morality" in *Compassion: Concepts, research and applications*. ed. P. Gilbert (London: Routledge), 31–68.

Narvaez, D. (2020). Ecocentrism: resetting baselines for virtue development. *Ethical Theory Moral Pract.* 23, 1–16. doi: 10.1007/s10677-020-10091-2

Neel, R., Kenrick, D. T., White, A. E., and Neuberg, S. L. (2016). Individual differences in fundamental social motives. *J. Pers. Soc. Psychol.* 110, 887–907. doi: 10.1037/pspp0000068

Neff, K. D. (2020). Commentary on Muris and Otgaar (2020): let the empirical evidence speak on the self-compassion scale. *Mindfulness* 11, 1900–1909. doi: 10.1007/s12671-020-01411-9

Neff, K., and Germer, C. (2017). "Self-compassion and psychological well-being" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 371–386.

Nesse, R. M. (2019). *Good reasons for bad feelings: Insights from the frontier of evolutionary psychiatry*. New York: Dutton.

Nguyen, T., Schleihauf, H., Kayhan, E., Matthes, D., Vrtička, P., and Hoehl, S. (2020). The effects of interaction quality on neural synchrony during mother-child problem solving. *Cortex* 124, 235–249. doi: 10.1016/j.cortex.2019.11.020

Norman, L., Lawrence, N., Iles, A., Benattayallah, A., and Karl, A. (2015). Attachment-security priming attenuates amygdala activation to social and linguistic threat. *Soc. Cogn. Affect. Neurosci.* 10, 832–839. doi: 10.1093/scan/nsu127

Overmier, J. B. (2002). On learned helplessness. *Integr. Physiol. Behav. Sci.* 37, 4–8. doi: 10.1007/BF02688801

Pace, T. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., et al. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology* 34, 87–98. doi: 10.1016/j.psyneuen.2008.08.011

Panksepp, J. (1998). *Affective neuroscience*. New York: Oxford University Press.

Pauley, G., and McPherson, S. (2010). The experience and meaning of compassion and self-compassion for individuals with depression or anxiety. *Psychol. Psychother.* 83, 129–143. doi: 10.1348/147608309X471000

Perry, R., Sibley, G., and Duckitt, J. (2013). Dangerous and competitive worldviews: a meta-analysis of their associations with social dominance orientation and right-wing authoritarianism. *J. Res. Pers.* 47, 116–127. doi: 10.1016/j.jrp.2012.10.004

Petrocchi, N., and Cheli, S. (2019). The social brain and heart rate variability: implications for psychotherapy. *Psychol. Psychother.* 92, 208–223. doi: 10.1111/papt.12224

Piff, P. K., Kraus, M. W., and Keltner, D. (2018). Unpacking the inequality paradox: the psychological roots of inequality and social class. *Adv. Exp. Soc. Psychol.* 57, 53–124. doi: 10.1016/bs.aesp.2017.10.002

Porges, S. W. (2007). The polyvagal perspective. *Biol. Psychol.* 74, 116–143. doi: 10.1016/j.biopsycho.2006.06.009

Porges, S. W. (2017). "Vagal pathways: portals to compassion" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown and M. C. Worline (New York: Oxford University Press).

Porges, S. W., and Furman, S. A. (2011). The early development of the autonomic nervous system provides a neural platform for social behaviour: a polyvagal perspective. *Infant Child Dev.* 20, 106–118. doi: 10.1002/icd.688

Poulin, M. J. (2017). "To help or not to help: goal commitment and the goodness of compassion" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 355–367.

Preston, S. D. (2013). The origins of altruism in offspring care. *Psychol. Bull.* 139, 1305–1341. doi: 10.1037/a0031755

Rachman, S. J. (1990). *Fear and courage*. New York: WH Freeman/Times Books/Henry Holt & Co.

Ricard, M. (2015). *Altruism: The power of compassion to change itself and the world*. Great Britain: Atlantic Books.

Richins, M. T., Barreto, M., Karl, A., and Lawrence, N. (2019). Empathic responses are reduced to competitive but not non-competitive outgroups. *Soc. Neurosci.* 14, 345–358. doi: 10.1080/17470919.2018.1463927

Riskind, J. H., Rector, N. A., and Taylor, S. (2012). Looming cognitive vulnerability to anxiety and its reduction in psychotherapy. *J. Psychother. Integr.* 22, 137–162. doi: 10.1037/a0028011

Rothschild, B. (2000). *The body remembers: The psychophysiology of trauma & trauma treatment*. New York: WW Norton & Company.

Ryan, C. (2019). *Civilized to death: The price of progress*. New York: Avid Reader Press/Simon & Schuster.

Sachs, J. D. (2012). *The price of civilization: Reawakening American virtue and prosperity*. London: Random House.

Sapolsky, M. R. (2017). *Behave: The biology of humans at our best and worst*. London: Vintage.

Sapolsky, R. M., and Share, L. J. (2004). A pacific culture among wild baboons: its emergence and transmission. *PLoS Biol.* 2:E106. doi: 10.1371/journal.pbio.0020106

Schore, A. N. (2019). *Right brain psychotherapy*. New York: Norton.

Seppälä, E. M., Simon-Thomas, E., Brown, S. L., Worline, M. C., Cameron, C. D., and Doty, J. R. (eds.) (2017). *The Oxford handbook of compassion science*. New York: Oxford University Press.

Shirtcliff, E. A., Vitacco, M. J., Graf, A. R., Gostisha, A. J., Merz, J. L., and Zahn-Waxler, C. (2009). Neurobiology of empathy and callousness: implications for the development of antisocial behavior. *Behav. Sci. Law* 27, 137–171. doi: 10.1002/bsl.862

Siegel, D. J. (2010). *The mindful therapist: A clinician's guide to mindsight and neural integration*. New York: WW Norton.

Siegel, D. J. (2012). *The developing mind: How relationships and the brain interact to shape who we are*. New York: Guilford Press.

Siegel, D. J. (2019). The mind in psychotherapy: an interpersonal neurobiology framework for understanding and cultivating mental health. *Psychol. Psychother.* 92, 224–237. doi: 10.1111/papt.12228

Singer, T., and Engert, V. (2019). It matters what you practice: differential training effects on subjective experience, behavior, brain and body in the ReSource project. *Curr. Opin. Psychol.* 28, 151–158. doi: 10.1016/j.copsyc.2018.12.005

Slavich, G. M. (2020). Social safety theory: a biologically based evolutionary perspective on life stress, health, and behavior. *Annu. Rev. Clin. Psychol.* 16, 265–295. doi: 10.1146/annurev-clinpsy-032816-045159

Spikins, P. (2015). *How compassion made us human: The evolutionary origins of tenderness trust and morality*. Barnsley: Spear and Sword Books.

Spikins, P. (2017). "Prehistoric origins the compassion of far distant strangers" in *Compassion: Concepts, research and applications*. ed. P. Gilbert (London: Routledge), 16–30.

Steffen, P. R., Foxx, J., Cattani, K., Alldredge, C., Austin, T., and Burlingame, G. M. (2020). Impact of a 12-week group-based compassion focused therapy intervention on heart rate variability. *Appl. Psychophysiol. Biofeedback*. doi: 10.1007/s10484-020-09487-8 [Epub ahead of print]

Stellar, J. E., and Keltner, D. (2017). "Compassion in the autonomic nervous system: the role of the vagus nerve" in *Compassion: Concepts, research and applications*. ed. P. Gilbert (London: Routledge), 120–134.

Stevens, J., and Woodruff, C. C. (2018). *The neuroscience of empathy, compassion and self-compassion*. London: Academic Press.

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., et al. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clin. Psychol. Rev.* 47, 15–27. doi: 10.1016/j.cpr.2016.05.004

Suddendorf, T. (2018). "Two key features created the human mind: inside our heads" in *Scientific American. Vol. 319.* 42–47.

Suddendorf, T., and Whitten, A. (2001). Mental evolutions and development: evidence for secondary representation in children, great apes, and other animals. *Psychol. Bull.* 127, 629–650. doi: 10.1037/0033-2909.127.5.629

Taylor, C. (1989). *Sources of the self: The making of the modern identity*. Cambridge: Harvard University Press.

Thayer, J. F., Åhs, F., Fredrikson, M., Sollers, J. J. III, and Wager, T. D. (2012). A meta-analysis of heart rate variability and neuroimaging studies: implications for heart rate variability as a marker of stress and health. *Neurosci. Biobehav. Rev.* 36, 747–756. doi: 10.1016/j.neubiorev.2011.11.009

Tost, H., Kolachana, B., Hakimi, S., Lemaitre, H., Verchinski, B. A., Mattay, V. S., et al. (2010). A common allele in the oxytocin receptor gene (OXTR) impacts prosocial temperament and human hypothalamic-limbic structure and function. *Proc. Natl. Acad. Sci. U. S. A.* 107, 13936–13941. doi: 10.1073/pnas.1003296107

Twenge, J. M., Miller, J. D., and Campbell, W. K. (2014). The narcissism epidemic: commentary on modernity and narcissistic personality disorder. *Pers. Disord.* 5, 227–229. doi: 10.1037/per0000008

Uomini, N., Fairlie, J., Gray, R. D., and Griesser, M. (2020). Extended parenting and the evolution of cognition. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 375:20190495. doi: 10.1098/rstb.2019.0495

Van der Kolk, B. A. (2015). *The body keeps the score: Brain, mind, and body in the healing of trauma*. UK: Penguin Books.

Wang, S. (2005). "A conceptual framework for integrating research relatedto the physiology of compassion and the wisdom of Buddhist teachings" in *Compassion: Conceptualizations, research and use in psychotherapy*. ed. P. Gilbert (London: Routledge), 75–120.

Weiss, E., and Zaki, J. (2017). "Empathy building interventions: a review of existing work and suggestions for future directions" in *The Oxford handbook of compassion science*. eds. E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron and J. R. Doty (New York: Oxford University Press), 399–420.

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychol. Sci.* 24, 1171–1180. doi: 10.1177/0956797612469537

Weng, H. Y., Lapate, R. C., Stodola, D. E., Rogers, G. M., and Davidson, R. J. (2018). Visual attention to suffering after compassion training is associated with decreased amygdala responses. *Front. Psychol.* 9:771. doi: 10.3389/fpsyg.2018.00771

Wetherall, K., Robb, K. A., and O'Connor, R. C. (2019). Social rank theory of depression: a systematic review of self-perceptions of social rank and their relationship with depressive symptoms and suicide risk. *J. Affect. Disord.* 246, 30–39. doi: 10.1016/j.jad.2018.12.045

Workman, L., Reader, W., and Barkow, J. H. (2020). *The Cambridge handbook of evolutionary perspectives on human behavior*. Cambridge: Cambridge University Press.

Wright, N., Hill, J., Sharp, H., and Pickles, A. (2018). Maternal sensitivity to distress, attachment and the development of callous-unemotional traits in young children. *J. Child Psychol. Psychiatry* 59, 790–800. doi: 10.1111/jcpp.12867

Zuroff, D. C., Clegg, K. A., Levine, S. L., Hermanto, N., Armstrong, B. F., Haward, B., et al. (in press). Beyond trait models of self-criticism and self-compassion: variability over domains and the search for signatures.

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Arts-Based Compassion Skills Training (ABCST): Channelling Compassion Focused Therapy Through Visual Arts for Australia's Indigenous Peoples

James Bennett-Levy[1], Natalie Roxburgh[1], Lia Hibner[1], Sunita Bala[2], Stacey Edwards[3], Kate Lucre[4], Georgina Cohen[5], Dwayne O'Connor[5], Sharmaine Keogh[5] and Paul Gilbert[6]*

[1] University Centre for Rural Health, The University of Sydney, Lismore, NSW, Australia, [2] RealArtWorks, Lismore, NSW, Australia, [3] Department of Psychology, Charles Sturt University, Bathurst, NSW, Australia, [4] Birmingham and Solihull Mental Health NHS Foundation Trust, Birmingham, United Kingdom, [5] Rekindling the Spirit, Lismore, NSW, Australia, [6] Centre for Compassion Research and Training, University of Derby, Derby, United Kingdom

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***Correspondence:**
James Bennett-Levy
james.bl@sydney.edu.au

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The last 20 years have seen the development of a new form of therapy, compassion focused therapy (CFT). Although CFT has a growing evidence base, there have been few studies of CFT outside of an Anglo-European cultural context. In this paper, we ask: Might a CFT-based approach be of value for Indigenous Australians? If so, what kind of cultural adaptations might be needed? We report the findings from a pilot study of an arts-based compassion skills training (ABCST) group, in which usual CFT group processes were significantly adapted to meet the needs of Indigenous Australians. At face value, CFT appeared to be a promising approach to enhancing the social and emotional wellbeing of Australia's Indigenous peoples. However, despite initial consultations with Indigenous health professionals, the first attempts to offer a more conventional group-based CFT to Indigenous clients were largely unsuccessful. Following a review and advice from two Indigenous clients, we combined elements of CFT with visual arts to develop a new approach, "arts-based compassion skills training" (ABCST). This paper reports an evaluation of this pilot ABCST group. The group had 6 × 4 h sessions of ABCST, facilitated by two psychologists (1 Indigenous, 1 non-Indigenous) and two artists (1 Indigenous, 1 non-Indigenous). There were 10 participants, who attended between 2 and 6 sessions: five were clients, five were health professionals. Between 1 and 3 months later, six of the participants (2 clients, 4 health professionals) were interviewed. Qualitative analysis of interview data identified that two key processes—creating a positive group atmosphere and channeling compassion skills training through the medium of visual arts—led to four positive outcomes for participants: planting the seeds of new understandings, embodying the skills of compassion, strengthening relationships with others, and evolving a more self-compassionate relationship. We suggest that the preliminary results are sufficiently encouraging to warrant further development of ABCST in Indigenous communities.

Keywords: compassion focused therapy, Indigenous, Aboriginal, art, self-compassion, compassion, group-based treatment

INTRODUCTION

The strength and resilience of Australia's Aboriginal and Torres Strait Islander peoples (henceforth respectfully termed Indigenous Australians or Indigenous peoples) can be measured by the fact that this may be the oldest culture on earth with continuous occupation of Australia for at least 60,000 years (Malaspinas et al., 2016; Florin et al., 2020). That strength and resilience remains a key feature of Indigenous Australians in the twenty-first century, in the face of the massive disruption, exploitation and trauma which have resulted from European colonization (Australian Human Rights Commission, 1997; Dudgeon et al., 2014; Cronin et al., 2019).

Fundamental to Indigenous Australians' conception of strength, resilience and health is the idea of connectivity across multiple domains, grounded in the concept of Social and Emotional Wellbeing (SEWB) (Gee et al., 2014; Butler et al., 2019). The SEWB model suggests that optimal health and wellbeing is associated with strong connections across seven domains: connection to body, mind and emotions, family and kinship, community, culture, land, and spirit (Gee et al., 2014). Conversely when these connections are disrupted, Indigenous ill health is a likely outcome (Dudgeon et al., 2014). It is evident that this Indigenous worldview is more holistic and encompassing that the western concept of "mental health."

Since the first European colonization in 1788, the history of Indigenous Australians has been marked by genocide, transgenerational trauma, abuse, marginalization and discrimination. For instance, the experiences of the Stolen Generation have led to mass disconnections across all areas of SEWB, particularly connection to family, country and culture (Australian Human Rights Commission, 1997). This transgenerational history of trauma, abuse and racism has led to huge disparities in present day socio-economic status, education and health compared with the non-Indigenous population of Australia (Dudgeon et al., 2017; Brockman and Dudgeon, 2019). Relatedly, on all measures of psychological wellbeing, mental health, and suicide, Australia's Indigenous peoples have far poorer outcomes, with three to six times the mental distress of non-Indigenous Australians, far higher suicide rates particularly amongst Indigenous youth, and destructive levels of self-blame and shame (Nasir et al., 2018; Brockman and Dudgeon, 2019).

Recognition of the potential impacts of transgenerational and personal trauma is central to any therapeutic initiative in working with Indigenous individuals or groups (Brockman and Dudgeon, 2019). However, evidence for the effectiveness of any specific therapy with Indigenous peoples is sadly lacking (Brockman and Dudgeon, 2019).

Having reviewed a number of available therapies, our conclusion was that compassion focused therapy (CFT) (Gilbert, 2014) looked to be a promising approach to enhance the SEWB of Indigenous peoples. CFT has been specifically designed to address issues of trauma, abuse, self-criticism and shame (Gilbert, 2014, 2017), drawing on evolutionary theory, neuroscience and attachment theory (Gilbert, 2020). Central to CFT formulation is recognition of the negative impacts of past and present social determinants in the way that we relate to ourselves, with shame and self-criticism often arising as unintended consequences of vulnerability (Gilbert, 2017, 2020). Furthermore, CFT is an inherently relational therapy. Connection and disconnection to self and others are central features of CFT (Gilbert, 2017, 2020). Although the CFT conception of connection and disconnection is not currently as all-encompassing as the Indigenous conception of SEWB, one of the primary goals of CFT is to cultivate the "safeness and soothing system" (see below), which is seen as a prerequisite for the facilitation of compassion for others and self-compassion. This CFT emphasis on connection and relationality, on the role of historical and current social determinants, and on compassion as a key antidote to shame and self-criticism (Gilbert, 2017; Kirby et al., 2017) was what led us to suggest that CFT might be a particularly good fit as a therapeutic approach in working with Aboriginal and Torres Strait Islander clients.

For present purposes, two key elements that play a prominent role in CFT therapeutic strategies should be noted. First, CFT aims to enhance clients' awareness of their emotions (Gilbert, 2017). A key psychoeducational component of CFT is the "three systems" model of emotion (Gilbert, 2010). The CFT model suggests that, through evolution, three emotional systems have developed with specific functions to:

(1) detect threats to ourselves (the Threat System)
(2) identify, pursue and experience rewards (the Drive System)
(3) experience feelings of safeness, peacefulness, calm, and connection with others and the world (the Safeness and Soothing System).

An initial goal of CFT is to enable clients to identify which of these emotional systems are dominant. For most clients, a first step may involve developing greater awareness of the pervasive influence of their threat system. Typically, a next step is to cultivate the safeness and soothing system to enhance the sense of connection that is so fundamental to SEWB.

Second, CFT proposes that we have different innate motivational systems that determine how we experience and respond to external events, or to our own threat-related thoughts (e.g., self-criticism) and emotions (e.g., anxiety, shame) (Gilbert, 2014, 2017). For instance, if we feel threatened, then our threat motivational system tends to orient us to avoid, attack or freeze in response to external threats; or to avoid, ruminate or engage in destructive behaviors in response to negative internal experiences (emotions, thoughts). On the other hand, if our caring motivational system is dominant, then we are likely to feel motivated to treat ourselves or others with care and compassion.

It is a key aim of CFT to activate and strengthen the caring motivational system, in particular by cultivating and strengthening our "Compassionate Self," often through a series of imagery-based practices. A particular challenge for CFT therapists is to facilitate sufficient safeness by strengthening the safeness and soothing system to enable the Compassionate Self to flourish and address typical threats such as self-criticism, shame and disconnection (Gilbert, 2017). Given the extensive history of trauma, disconnection, and grief that has been experienced by Australia's Indigenous peoples, and the prominent experience

of "shame" in Indigenous society, CFT looked to be a valuable approach in working with Indigenous clients.

Studies of the relationship between compassion and mental health have provided strong support for CFT's central propositions. For instance, people with strong fears of compassion tend to have poor mental health (Kirby et al., 2019). Relatedly, self-criticism and lack of self-compassion are highly correlated with the experience of depression and anxiety (Van Dam et al., 2011; Werner et al., 2019), including amongst Indigenous students from Canada (Chahar Mahali et al., 2020). Furthermore, evaluation of CFT treatment programs is leading to a progressively stronger evidence base for CFT's effectiveness (Kirby et al., 2017; Craig et al., 2020). A recent systematic review (Craig et al., 2020) has suggested that CFT is at its most efficacious when delivered in a group-based format over at least 12 h (Judge et al., 2012; Cuppage et al., 2018; Ashfield et al., 2020).

The study reported here is a pilot study of an adaptation of CFT that we call *arts-based compassion skills training* (ABCST). In ABCST, compassion skills are facilitated and channeled through the medium of visual arts, supplemented by music and story-telling. As detailed below, this visual arts-based approach (Phase 2) was only developed after a more mainstream group-based CFT approach (Phase 1) was perceived as culturally inappropriate. The aim of the study was therefore to determine whether ABCST might be an acceptable, feasible, and culturally safe way to deliver a compassion-based program derived from CFT in an Indigenous Australian context. The program has been named "arts-based compassion *skills training*" because the idea of "skills training" was seen to be more culturally acceptable than "therapy" in this context, and because the form of the program is more skills-focused than therapy-focused.

MATERIALS AND METHODS

The Development of Arts-Based Compassion Skills Training (Phase 1 to Phase 2)

The arts-based (AB) component of ABCST was only developed after a mainstream (Phase 1) approach to group-based CFT, albeit with some cultural adaptations, appeared not to work too well with two groups of Indigenous clients in an earlier iteration of this project. Participant feedback indicated that the Phase 1 version was not perceived as culturally appropriate or culturally safe. For example, the early phases of "mainstream CFT" usually involve a strong verbal/psychoeducational component (e.g., conveying ideas derived from evolutionary theory and neuroscience). Many group members in Phase 1 found the concepts and language did not fit their way of thinking. Mainstream CFT typically makes extensive use of imagery exercises; but for our Phase 1 group members, imagery work triggered traumatic memories that were overwhelming. Similarly difficult experiences with imagery have been reported in some studies with non-Indigenous clients with traumatic backgrounds (Naismith et al., 2018).

Other Western psychotherapies such as cognitive behaviour therapy have also required significant adaptations to fit different cultural contexts (Iwamasa and Hays, 2019), so it was not entirely surprising that this direct translation of a Western psychotherapy into an Australian Indigenous context did not sit well with some group members. It therefore became necessary to re-think the approach.

Two of the Phase 1 group members gave feedback that it might be valuable to use art when working with Indigenous peoples. They suggested that focusing on art might provide more of a cultural fit, as has been suggested by other researchers working with Indigenous peoples (Jersky et al., 2016; Hammond et al., 2018). Moreover, a study from Canada (of which we were not aware at the time) had concluded that combining CFT and art might be a good fit (Williams, 2018). Accordingly, the first two authors (JBL, NR), in collaboration with a local community artist (SB), developed a six-session arts-based group approach (Phase 2), which we have termed "arts-based compassion skills training" (ABCST).

Setting

This study of an ABCST group (Phase 2) took place in regional New South Wales, Australia in 2018. The group, specifically for Indigenous Australians, met for a 4 h session every week for 6 weeks. The sessions were facilitated by two clinical psychologists (one Indigenous) with the assistance of two local artists (one Indigenous). The group sessions took place in an Aboriginal health service. Anecdotal reports of high self-criticism and shame amongst clients and some health workers led to the proposal that the primary purpose of the groups should be to enhance self-compassion skills.

Participants

The 10 ABCST participants were five Indigenous clients of the health service and five health professionals (4 Indigenous, 1 non-Indigenous) employed there. Participation was voluntary. Due to life circumstances, the number of participants attending each session varied from four to eight ($M = 5.67$).

The clients and the health professionals were a purposive sample nominated by the health service as appropriate for an ABCST group. Exclusion criteria were an active psychotic condition or current suicidal ideation. Whilst mental health was not formally assessed using a Western diagnostic framework due to concerns about cultural validity (Mullins and Khawaja, 2018; Brockman and Dudgeon, 2019), it was apparent that the social and emotional wellbeing of each of the clients was compromised: the experience of depression and/or anxiety appeared to be common to all.

The health professionals were included in the program as full participants to build a culturally safe space and to support clients in the event that any of them became distressed and needed to leave the room. Sharing personal stories between the health professionals and clients was not unusual in this Aboriginal health service. This sharing helps to normalize the common humanity of historical trauma and social disadvantage amongst Indigenous Australians. Only one of the five clients had a direct case management or therapy relationship with any of the five

health professionals. Far from being a problem, this relationship was experienced as supportive in the group context.

Protocol

Each session of the 6 week ABCST program consisted of three parts. The first part of the session, 20 min in duration, was led by one of the clinical psychologists, who orientated the group toward that week's compassion topic. Some examples of weekly topics were: *What is Compassion?, Creating Safeness, the Three Systems Model and the Three Flows of Compassion (compassion for others, receiving compassion from others, self-compassion).* During this early part of the session, the psychologist engaged the group in a discussion by drawing upon participants' life journeys and inner wisdom and exploring how their experiences related to compassion.

For the next 3 h, including morning tea and lunch, the community artists led the group with encouragement and humor in the creation their compassion art cards (approx. 20 × 10 cm). Artistic instruction and feedback was provided if requested. Music selected by the members of the group and informal story-telling were other key features of the program. An initial aim was to create a sense of group safeness in which the safeness and soothing system and creativity could flourish. If they found themselves triggered or upset, participants were encouraged to step outside the room, and take a few minutes with one of the health professionals.

The psychologists and Indigenous health professionals were full participants in this section of the program, creating their own artworks alongside the clients. Participants were provided with a range of arts materials (e.g., paints, crayons, glitter, magazines for collage, printed compassion-oriented words). On A6 size cards, these materials were used to represent the aspects of compassion most salient to the participants and the topic of the day.

The third part of the session (˜30 min) was led by one of the psychologists. Participants shared the stories of their day's artworks, drawing on personal experience to reflect on how compassion was involved in their stories. Each week finished with one of the core CFT practices, soothing-rhythm breathing, which aims to stimulate the vagus nerve and activate the parasympathetic nervous system (Gilbert, 2010, 2017).

After the end of the program, the participants' artworks were professionally printed. The result was a boxed set of "compassion cards," like a pack of playing cards. A set of these cards were given to each of the participants. See **Table 1** for examples.

Data Collection

One to three months after the ABCST group, eight participants who attended at least three of the six sessions were contacted by telephone and invited to participate in post-program interviews. Six participants, who attended an average of 4.33 sessions were available for interview. The six participants (5 female, 1 male; M = 46.7 years) were two clients and four of the health professionals. Neither of the interviewed clients had a case management or therapeutic relationship with any of the health professionals. Accordingly we consider that the interview data are free from any actual or perceived conflicts of interest.

Interview Schedule

A semi-structured interview schedule was developed to assess participants' experience of the ABCST program. The interviews were conducted by two researchers (LH, SE), who had not taken part in the ABCST groups.

Interview questions were open-ended, focusing on the following issues:

- whether or not the program had been helpful and if so, how
- whether or not participants had felt safe
- whether or not the program had felt culturally appropriate and relevant
- what had been difficult
- what they would have wanted to be different
- whether there had been any change in their relationship with themselves or others as a result of the program
- whether their understanding of compassion had changed as a result of the program

For the health professionals, the questions addressed not only their own experience, but what they observed to be the experience of the clients. The interviews ranged between 17 and 60 min. The interviewer-researchers (LH and SE) transcribed the audio-recordings of the interviews.

Data Analysis

The data was subjected to thematic analysis using the qualitative analytic method described by Braun and Clarke (Braun and Clarke, 2006). They outline a six-phase process of thematic analysis, which is illustrated in **Figures 1–3**, alongside a description of the research activities associated with each phase. Braun and Clarke (2006) and other authors (Tong et al., 2007; Nowell et al., 2017) have identified a number of data analytic processes designed to enhance the trustworthiness and credibility of qualitative research findings. As illustrated in **Table 1**, the design of the current study followed many of those recommended processes (Tong et al., 2007; Nowell et al., 2017), for example: prolonged engagement with the data, researcher triangulation involving three researchers, data management strategies for complex data; extensive documentation and archiving, using a coding framework, creating an audit trail of code generation, diagramming to make sense of connections, and connecting raw data with codes and themes for credibility checks.

RESULTS

Two principal categories that are common to many psychotherapy studies emerged from the data: Process (of ABCST) and Outcomes. Within Process, there were two main themes: *Creating a Positive Group Atmosphere* and *Art as a Medium for Compassion* (see **Figure 4**). Within Outcomes, there were four main themes: *Planting the Seeds of New Understandings, Embodying the Skills of Compassion*, *Strengthening Relationships with Others*, and *Evolving a More Self-Compassionate Relationship*. Description of these themes with illustrative examples are provided below. Participant

TABLE 1 | Data analytic method: the Braun and Clarke (2006) six-phase process.

Phase	Activities
1. Familiarize with the data	In this first phase, one of the interviewer-researchers (LH) immersed herself in the data, reading and re-reading each participant's interview to familiarize herself with the whole data set. A data management system, NVivo, was used to store and manage the extensive data. All records of the data, transcripts and process were archived. Initial reflections about potential codes/themes were documented.
2. Generate initial codes	LH generated preliminary codes, developed a coding framework to organize the codes, and kept an audit trail of code generation. NVivo was used to manage the data and create the coding framework. A second researcher (JBL—one of the group facilitators) was introduced to create researcher triangulation and enhance the credibility of the process, LH and JBL reviewed the preliminary codes against the quotes and adjusted the codes as necessary.
3. Search for themes	Researcher triangulation continued. LH and JBL wrote each code on a card. All the cards were mounted on a wall. The researchers grouped and re-grouped the cards into preliminary higher order themes. An initial tree diagram was generated to connect the themes.
4. Review themes	Researcher triangulation continued. Each theme was reviewed by LH and JBL. Key quotes were selected which illustrated each theme. The themes were reviewed and in some cases re-categorized after determining their match with the raw data. Revised tree diagrams were generated, available for the audit trail.
5. Define and name themes	Researcher triangulation continued. The key themes were defined and named by LH and JBL. They were then reviewed by JBL and a third researcher, group facilitator NR, to enable further researcher triangulation. Some minor changes to names of themes were recommended, prior to a final review by LH. Team consensus on themes was reached. A revised tree diagram was generated.
6. Produce a report	There was continued prolonged engagement with the data. A preliminary report was delivered to the funders at the conclusion of the project. There were conference presentations in first year after project completion. This article was submitted for publication in the second year, after being circulated to two of the health professionals (co-authors) for member checking.



FIGURE 1 | Examples of the ABCST Group's Compassion Art Cards.

quotes are identified as Clients (C1, C2) or Health Professionals (HP1, HP2, HP3, HP4).

Process of ABCST

Creating a Positive Group Atmosphere

Participants consistently remarked on the warmth, supportiveness, safeness and strength of the group atmosphere. In reference to the facilitators (clinical psychologists and artists), they used terms such as "humble," "gentle," "non-threatening," "non-judgmental," "mindful," and "accommodating," as well as more upbeat terms like "animated."

A frequently noted observation was: *"there was no distinction made between facilitators and participants"* (HP2). Quite a unique feature of the 3 h art time was that the psychologists and health professionals did their own art alongside the clients, while the artists facilitated this section of the program. The participants were surprised and delighted at the non-hierarchical nature of the process. They didn't expect that the psychologists would *"get down and dirty"* (HP2). A client remarked that *"as a group, we all participated with the cutting out and drawings and the paintings and doing the cards, the symbols, what the meanings were. . . the group dynamic was just so overwhelming"* (C1). (The client used "overwhelming" here to mean "overwhelmingly positive").

The ABCST context of art, plus music chosen by participants and informal yarning (chat), also appeared to facilitate the group process and elevate the group atmosphere. *"Just talking, sharing stories, laughing, playing music. that was a big connection with everyone. . . through music"* (HP1).



FIGURE 2 | Examples of the ABCST Group's Compassion Art Cards.



FIGURE 3 | Examples of the ABCST Group's Compassion Art Cards.

Art as a Medium for Compassion

There was strong recognition that channeling CFT through the medium of art represented a cultural fit for Indigenous Australians. *"It's relevant, especially through the art. That's an appropriate way to teach, through art"* (HP3). *"Some wonderful cards were made from our paintings, that was very personal. That was a great resource to have. I think they [the clients] were quite blown away to see something tangible"* (HP2).

Art was seen to enhance connection and conversation. *"I was able to connect to them [clients] on a different level, through this medium, the art. . . when you're doing something it's much easier talking about issues that are coming up for you"* (HP2). *"If it was just set in theory, you probably would've lost a lot of your participants. I believe there would have been a lot more disengagement"* (HP2).

However, as one of the Indigenous staff noted, this was much more than an art class. *"The magic comes out of combining art with compassion focused therapy. It's the way it was done. . . You could always get some artist to come in and you could always get a psychologist professor dude to come with a concept, but it is quite special how [it was] married it together"* (HP3). *"That medium was really good. It was just a winner doing it that way. Anybody black, white, or brindle could take to that way of delivering the program"* (HP2).

The HPs noted that there was a difference between discussing ideas about compassion and channeling compassion through arts-based processes. *"You don't have to be intellectual to do a drawing or create"* (HP2). Another HP remarked: *"It's easy to switch off when someone is telling you jargon, like big words and stuff that you don't understand, that you need a dictionary to look at. I would say it's pretty hard to relate to*

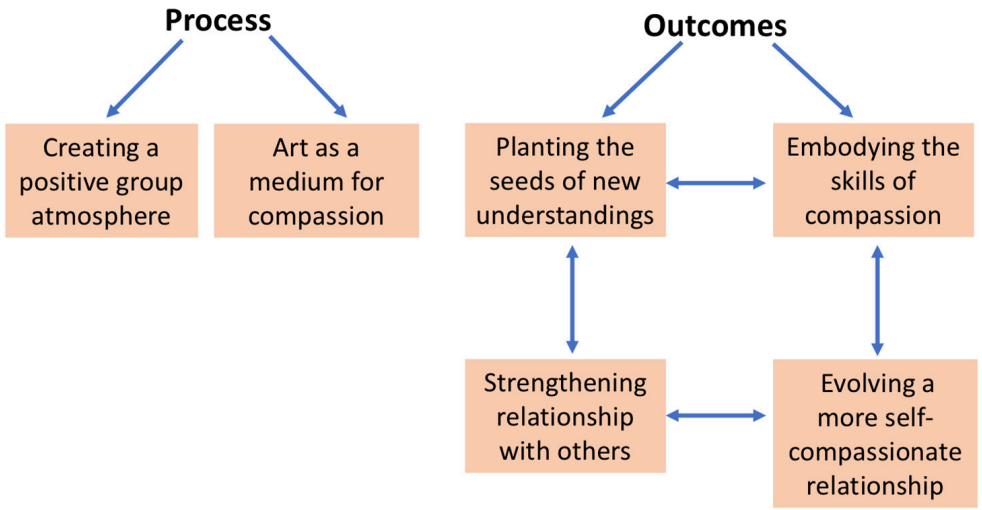


FIGURE 4 | Six key themes from the Qualitative Analysis.

that. Rather than just what was generally getting passed around the room: people's journeys, people's lives, everyone's honesty, that stuff is way richer than that other stuff. There's a power in that" (HP3).

Painting the cards seemed to enable participants to process their experience deeply yet safely. As one client said: *"The cards are more healing and helping me understand a little bit more. . . just looking at the painting, it just takes me into another dimension altogether"* (C1). A staff member who had previously been exposed to a more conventional verbally based CFT group contrasted the arts-based approach with her previous CFT experience, which had triggered past hurtful experiences. *"I've done it before, the compassion focused therapy, where it wasn't through the art. . . I was more into the hurt I suppose. That's all I could sort of see, a lot of hurt I've caused others, others have cause me. . . so it brings that stuff up for me. But this different way, I can remember there is drive, threat, and now soothing components to the compassion. Self-compassion. . . . This time I got introduced to self-compassion in a totally different way. But the other model, without the art, it was. . . abrasive"* (HP3). In short, for this Indigenous health professional, art provided a culturally safe context that seemed to be highly compatible with compassion.

Outcomes of ABCST

The interviews with the six participants—clients and health professionals—indicated that the ABCST groups had *planted the seeds of new understandings* about compassion, and led to *embodying compassion skills*, which in turn led to a *strengthening of the relationship with others*, and a different *more compassionate relationship with themselves*. Examples from each of these categories are given below.

Planting the Seeds of New Understandings

Two core elements of CFT are (1) early discussion of the meanings of compassion and (2) creating a rationale for focusing on compassion, see **Figure 4**. In ABCST, these ideas become pictorially represented through paint, collage and printed words as illustrated in **Figures 1–3**. There were a number of ways in which participants' understandings broadened as a result. One client remarked: *"I just thought compassion was just compassion when someone was dying. That's the way I looked at it. . . . And there is more to compassion like warmth and, you know, nurturing and comfort and you know all these. . . I didn't realize there was so many words that fit into compassion"* (C1).

Extending the idea of compassion to self-compassion was a novel concept for many in the group. As one HP noted: *"A lot of us, probably without even knowing, we display a lot of empathy and compassion towards other people, maybe we weren't aware that we were or we weren't displaying that to ourselves"* (HP1). Similarly, a client commented: *"I thought of compassion for other people, but not myself"* (C2).

Opening up the concept of compassion enabled participants to see that self-criticism and lack of self-compassion were common experiences amongst group members. Participants noted a possible reduction in their sense of isolation and shame as they recognized their common humanity. *"It showed to me that I am not the only person that needed self-compassion. There are a lot of people out there that need self-compassion just as much as me"* (C2). Experiencing common humanity also enhanced participants' self-compassion: *"When you hear other people's stories, and you kind of like 'oh, I can relate to that'. And it's good to know. . . that we are not the only one that is feeling like that. To hear it from somebody else, it makes you feel. a bit of relief"* (HP4).

For some members, the three systems model (the threat, drive and soothing emotional systems) had particular resonance. One of the health professionals recognized that *"I am sort of in drive and threat a lot of the time, so I have to connect more to the soothing, to centre myself a bit more, calm, decision making changes too. A lot of different things stem of that"* (HP3).

Embodying the Skills of Compassion

Both during group time and in-between sessions, participants noted how compassion had registered as a change in bodily experience. At one session, a client had arrived very distressed after an argument with his son but this changed once he started painting. One of the other clients observed: *"He felt really relaxed after he had done his artwork and he said 'gee, that feels really good'. He said 'I let my frustrations out', but when the frustrations come out, his artwork was so lovely, so beautiful and you wouldn't think that came from an angry man, the artwork that he ended up doing. It was completely different. The anger wasn't there. It was more colourful and more cheerful and he said that he felt really good and relaxed after doing the painting and it made him more aware to be compassionate about himself and to be compassionate towards his son. . . it made us all feel good 'cause we were trying to cheer him up, but he cheered his own self up with his artwork"* (C1).

Outside of sessions, clients reported using the compassion resources. One client noted about soothing-rhythm breathing: *"The breathing techniques, I have taken that on board. When I start feeling a bit of anxiety I use my breathing techniques. . .. It makes me relax instead of being so hyperactive"* (C2). Another participant particularly valued the cards of the group's artworks, which were printed soon after the six sessions were completed. "*I put mine on my breakfast table and look at them every morning, a different card each day. . . And just reflecting back to that memory and that time sitting around the table. Like sitting around a campfire. That yarn coming up again. Yeah and that yarn is going to carry on and linger, you know, and it is going to linger and linger and linger. It is never going to go away*" (C1).

Strengthening Relationships With Others

For some participants, relationships with family and friends appear to have been strengthened following the program. A client reported that *"It has changed the relationship with my flatmate. We had a few arguments there before. . . but it has seemed to have helped since I have done this course. . .. Not retaliating back. . . he pays for a lot around here and does a lot for me and I suppose I took it for granted so now I am just more compassionate to the fact that he helps me a lot"* (C2). In a similar vein, one of the Indigenous health professionals remarked: *"I know it made me really look a lot more at myself and the way I do things with my children, around. . . listening to them, trying to understand them even more"* (HP1).

Interestingly, the program also seemed to enhance participants' courage to provide feedback and create stronger boundaries in order to change the nature of some relationships which had been detrimental to their wellbeing. For instance, a client had a realization about a friend: *"I am thinking: why did I let this person walk all over me, why did I let her drink at my place, why did I let this happen? But I realized: 'No, I let you come in, I let you spend time here. I don't drink. You drink in my place, you had no respect for me. . . all you wanted to do was lay around, drink, watch DVDs,. . . watch movies, when I could have been doing what I wanted to do'. So now I just realize I don't got to jump for people anymore. . . It is either my way or it is no way at all"* (C1).

Similarly, one of the health professionals changed her behavior with her family: *"I am the type of person that helped everyone in my family: financially, emotionally, physically. . . And I started saying no and I was looking out for myself. So this kind of fell into place and came in a really good time cause it kind of made me understand a little bit more about myself. It made me realise that saying no was okay, and it didn't make me feel bad or guilty"* (HP4).

Evolving a More Self-Compassionate Relationship

Clients and health professionals also began to develop a more compassionate relationship with themselves: not only by creating stronger boundaries as above, but also by recognizing the importance of developing their soothing system and choosing to motivate themselves with compassion.

A health professional reported: *"I realised within the group that myself personally that I go on a lot of drive and threat. I never really go into the soothing. That was like a new awareness for me"* (HP3). The ambience of the group was such that participants were able to slip easily into mindfully reflective states: *"Sometimes silence is good. Just to sit in yourself. And then you start reflecting as well: "What's going on here? Why am I thinking this way?"* (HP1).

A client noted that *"I pretty well didn't have self-compassion until I went and did that course. It has changed me into giving myself more"* (C2). Compassion created motivation. She continued: "*Well usually I would just stay in bed and not do much, do nothing really, and just be depressed. But since doing the course. . . I motivate myself now. Instead of just staying in bed I get out in the garden or do some painting or do something creative just to make myself feel better."* Moreover, "*I have actually moved house. I was living next door in a unit and I have moved here. It helped me, I suppose, make the decision to move because without compassion to myself I didn't really care where I lived*" (C2).

In linking compassion with art, participants were also developing new skills as well as a new relationship with themselves through the program: "*I think they were surprised, as I was, at how much they actually can do paintings, given the theme that they were given. They were quite surprised with the fact that they could actually (including me) create an image*" (HP2). She continued: "*I found parts of me that I didn't even know existed, as in a creative side that could produce something that made sense*" (HP2). It would seem that self-appreciation started to emerge in group members, alongside of self-compassion.

DISCUSSION

As far as we are aware, this is the first study which has trialed CFT with Indigenous clients. After unpromising beginnings with conventional verbally oriented CFT groups, the transition to arts-based CFT groups seemed to provide a much stronger cultural fit. The combination of creating a positive group atmosphere and channeling CFT through the medium of art led to new understandings of compassion and embodiment of compassion skills. In turn, participants reported that these changes led to greater self-compassion and compassion for others. Although this was a pilot study with a small group of 10 people and six follow-up interviews, what was notable was the complete contrast between participants' experiences of ABCST and the previous verbally oriented CFT groups.

A key issue raised by the present study is the need to make adaptations to western psychotherapies for different cultural contexts (Iwamasa and Hays, 2019). Modern Western

psychotherapies such as CBT, ACT, and CFT are largely based on a set of evidence-based psychological principles that are considered to be generally applicable to human suffering. However, it is also well recognized that for these therapies to be effective in Indigenous (Nelson et al., 2014; Toombs et al., 2020) or other cultural contexts (Rathod and Kingdon, 2009; Iwamasa and Hays, 2019), they need to be culturally responsive. Moreover, in order to be culturally responsive, community engagement processes such as co-design workshops and reference groups with key stakeholders over an extended period of time are required (Singer et al., 2015; Toombs et al., 2020).

In the present case, this CFT project had pilot funding for just 1 year. This tight timeline precluded the kind of more extended co-design or community involvement processes that would have been desirable. Our solution to the tight timeline was to pilot a preliminary four session CFT trial with Indigenous health professionals, using the verbally oriented format typically reported in non-Indigenous contexts. Although the Indigenous health professional group voiced some reservations about this approach, we retained this format in the absence of any recognized alternatives, while making adaptations consistent with their feedback. However, after the first set of groups, it became clear that that format did not meet the participants' needs.

As reported here, participants' experiences with ABCST were radically different. There were strong themes of safeness and connection. They experienced the facilitators and each other as supportive, gentle, non-threatening, non-judgmental, and accommodating. They reported strong connections with one another through the sharing of stories, music and art. As well as connecting with one another, they also experienced greater care/positive connection with themselves, and experienced the medium of art as enhancing their soothing system. Connection is central to the concept of SEWB. Though the links between the processes of ABCST and SEWB have yet to be fully articulated, the importance CFT places on the safeness and soothing system in helping to balance the threat and drive systems, and CFT's relational focus in facilitating connection suggests ABCST's promise as a partner in initiatives to enhance SEWB for Indigenous Australians.

We believe there are a number of reasons why art was found to be a natural partner for CFT in Indigenous contexts. First, art is well-recognized as a core part of Indigenous Australian culture and represented a natural cultural fit (Jersky et al., 2016), even for the majority of participants who had no pretensions to be artists.

Second, the nature of art is that it is a slow, absorbing process. As an activity, art would seem to have a natural affinity with the safeness and soothing system (Gilbert, 2010, 2017), drawing participants into a creative realm where their imagination can flourish. Contrast this with verbally oriented groups featuring new ways of thinking that may be difficult to grasp conceptually. It is not hard to see that for some participants—Indigenous or non-Indigenous - such groups will trigger their threat systems. One client from a related study who attended a conventional CFT group and a 1 day ABCST workshop summarized the difference this way: *"Instead of sitting in a room with someone that you sort of didn't know, someone you maybe thought was judging you… You are not in that headspace of guilt, the headspace of shame, you are in the headspace of… things that are joyful in your life… Things that you are proud of. Things that you want in your life. For me that sort of helped a lot."* In CFT terms, it makes sense that when people are grounded in their soothing systems, it is far easier for them to develop their Compassionate Self than when they are sitting in their threat systems.

Third, we re-emphasize the comment of one of the health professionals, *"the magic come out of combining art with compassion focused therapy,"* reinforcing the view that art and compassion are natural partners. By its very nature, art may often facilitate a focused, mindful state; when this is combined with the subject matter of compassion, both "wings" of the mindfulness-compassion "bird" are facilitated (Williams, 2018). An observation which we hope to follow up in future studies is that our group members appeared to experience far less of the fears, blocks and resistances to compassion which have been reported as major hurdles to be overcome in more verbally based CFT groups (Gilbert, 2010). One hypothesis is that ABCST primes the soothing system, allowing compassion to slip past the usual resistances.

Alongside of *Art as a Medium for Compassion*, the other key process variable that emerged from the data was *Creating a Positive Group Atmosphere.* Central to CFT is the idea of "safeness" (Gilbert, 2017); therapy should provide a secure base in order to activate and strengthen the soothing system. Our aim was to build in a sense of safeness from the start of the ABCST group. Group feedback suggests that this was successfully achieved. Some of the key elements were: the safe space created through the personal local knowledge of the Indigenous health professionals; the facilitation skills of the clinical psychologists and artists; the absence of hierarchy; the sense of enjoyment through art, music, story-telling and humor; the comfort of spending 4 h together including the sharing of lunch; the opportunity to admire each other's work; and to hear the stories associated with each week's painting.

A notable feature of the group was the spontaneous informal conversations which emerged. Some were clearly focused on the topic of compassion, and how it manifested, or didn't, in participants' lives. The character of these conversations was quite different from what might happen in a conventional CFT group. They were spontaneous and informal, yet there was often deep personal sharing—sometimes in pairs, or in threes or fours, or sometimes in the whole group. No-one was put on the spot; people shared their experience if they felt like it.

From a CFT perspective, participants had positive experiences of the three flows of compassion: giving compassion to others, experiencing the compassion of others, and experiencing self-compassion. Consistent with the findings from a recent qualitative study of group CFT treatment for complex PTSD (Ashfield et al., 2020), the positive group atmosphere and receiving compassion from others appear to have been two important elements of the present program.

Participants reported positive outcomes from the program, both in terms of their understanding (*Planting the Seeds of Compassion*) and their skills (*Embodying the Skills of*

Compassion). These skills manifested both in their relationship with others and with themselves.

What was it about arts processes that may have been so effective in facilitating compassion? It was notable how compassion concepts became easily integrated into their art pictorially and through inclusion of words associated with compassion (see **Figures 1–3**). During the 3 h of art, participants became absorbed in their artworks physically, emotionally, cognitively and behaviorally. They reported that they were more easily able to take on board the concepts: *"This different way, I can remember there is drive, threat and now soothing components to the compassion."* This was in contrast to: *"If it was just set in theory, you probably would have lost a lot of your participants."*

Epstein (1994, 2014), Teasdale and Barnard (1993); Teasdale (1999), and other dual process theorists (Power and Dalgleish, 2008) have suggested that there is a fundamental distinction between two types of information processing system: Epstein termed these a "rational system" and an emotionally driven "experiential system" (Epstein, 1994, 2014). Teasdale and Barnard referred to a "propositional code" and an "implicational code" (Teasdale and Barnard, 1993; Teasdale, 1999). On the one hand, they suggest that there is a rational-verbal-propositional system that is analytic and reason-oriented, that has no emotional content or sensory elements, and that represents "head level intellectual belief." This is contrasted with an experiential/implicational system that encodes information schematically through imagery and metaphor (Teasdale and Barnard, 1993; Teasdale, 1999; Hackmann et al., 2011), is closely tied to emotion and bodily sensation, is essentially non-rational and automatic, and has a felt sense of "rightness" ("heart level emotional belief"). We hypothesize that ABCST taps directly into the experiential/implicational system, in a similar way to other forms of imagery (Hackmann et al., 2011); and that the arts-based groups were therefore experienced as far more compelling, memorable and embodied compared with our previous CST groups which were rather more verbal-propositional and intellectualized in the way that the concepts of compassion were conveyed.

This is a small-scale pilot study, and as such, there are a number of limitations. First, there were 10 people in the group and only six of the 10 were interviewed. Two of these were clients, four were health professionals. We did not have access to personal histories or backgrounds of participants. The extent to which they are representative of Indigenous peoples in their own community, or in other communities, is unknown, as too is the extent to which the results might generalize to other contexts and other clients. Second, the interview data were obtained from interviews 1–3 months after the end of the program. It is not known whether or how any positive effects of the program persisted in the longer term. Third, there were no objective measures of SEWB, or compassion measures pre- and post-workshops to gauge the extent of any changes. Fourth, we have yet to determine the most important components of ABCST or the optimum length of such a program. Some core CFT practices were included in ABCST (soothing-rhythm breathing, the three systems model); others were largely implicit (e.g., "it's not your fault") or omitted (e.g., individual formulation, compassionate visual imagery, addressing fears, blocks and resistances). Some elements of ABCST (e.g., visual arts, art-focused story-telling, music, informal conversations, cultural practices such as acknowledgment of country) were included *de novo*. Future ABCST studies should examine which components should be included to yield the greatest benefits.

The study raises a number of other interesting questions. For instance, would other forms of art (e.g., music, or traditional Aboriginal art forms such as weaving or dancing) be equally suitable vehicles for cultivating compassion? Would visual arts or other arts work equally well with non-Indigenous clients? Should different ways of delivering group-based compassion skills training be compared to determine whether different strategies might work best in different contexts? For instance, our prior experience was that conventional CFT imagery practices were triggering for Indigenous clients; arts-based CST delivery seemed safer and more benign. Can ABCST be extended so that the processes are more explicitly oriented not just toward compassion and connection to self and others, but also toward some of the other SEWB domains (e.g., country, spirituality, culture)?

CONCLUSION

In conclusion, cultural relevance is central to effectiveness of any therapy in the Indigenous space. By listening to community feedback, we changed our CFT approach from more conventional verbal-based CFT groups to CST delivered through the medium of visual arts. The contrast in participant experience was immediately apparent. Arts-based CST looks to be a more promising and efficacious mode of delivery for Indigenous clients, which appears consistent with the SEWB conception of illness and health. Future studies with larger numbers of clients in various contexts, ideally with some objective measures alongside of self-report interview data, will determine to what extent the findings from the present study may generalize to other contexts.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Aboriginal Medical Council Ethics Committee and the University of Sydney Human Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JB-L, NR, KL, SB, and PG were all involved in the original design of the project, and all have either contributed to written

sections or commented on the drafts of the manuscript. JB-L, NR, and SB were involved in the day-to-day design and running of the arts-based compassion focused therapy groups. LH and SE were interviewers and undertook qualitative data analyses; also commented on the manuscript. GC, DO'C, and SK made contributions to recruitment and support of the Aboriginal and Torres Strait Islander participants in the project. DO'C and SK supported the clients and contributed content to the arts-based workshops. All authors have contributed materially to this manuscript.

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REFERENCES

Ashfield, E., Chan, C., and Lee, D. (2020). Building 'a compassionate armour': the journey to develop strength and self-compassion in a group treatment for complex post-traumatic stress disorder. *Psychol. Psychother.* doi: 10.1111/papt.12275 [Epub ahead of print].

Australian Human Rights Commission. (1997). *Bringing Them Home: The 'Stolen Children' Report*. Canberra: Commonwealth of Australia.

Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qual. Res. Psychol.* 3, 77–101. doi: 10.1191/1478088706qp063oa

Brockman, R., and Dudgeon, P. (2019). "Indigenous clinical psychology in Australia: a decolonising social–emotional well-being approach," in *Beyond the Psychology Industry: How Else Might We Heal?*, ed. P. Rhodes (Basel: Springer Nature), 83–93. doi: 10.1007/978-3-030-33762-9_8

Butler, T. L., Anderson, K., Garvey, G., Cunningham, J., Ratcliffe, J., Tong, A., et al. (2019). Aboriginal and Torres Strait Islander people's domains of wellbeing: a comprehensive literature review. *Soc. Sci. Med.* 233, 138–157. doi: 10.1016/j.socscimed.2019.06.004

Chahar Mahali, S., Beshai, S., and Wolfe, W. L. (2020). The associations of dispositional mindfulness, self-compassion, and reappraisal with symptoms of depression and anxiety among a sample of Indigenous students in Canada. *J. Am. Coll. Health* 29, 1–9. doi: 10.1080/07448481.2020.1711764

Craig, C., Hiskey, S., and Spector, A. (2020). Compassion focused therapy: a systematic review of its effectiveness and acceptability in clinical populations. *Expert Rev. Neurother.* 20, 385–400. doi: 10.1080/14737175.2020.1746184

Cronin, D., D'Arcy, J., and Murphy, L. (2019). *Stories of Resilience: Indigenous Resilience Project Report*. Sydney, NSW: Edmund Rice Centre.

Cuppage, J., Baird, K., Gibson, J., Booth, R., and Hevey, D. (2018). Compassion focused therapy: exploring the effectiveness with a transdiagnostic group and potential processes of change. *Br. J. Clin. Psychol.* 57, 240–254. doi: 10.1111/bjc.12162

Dudgeon, P., Calma, T., and Holland, C. (2017). The context and causes of the suicide of Indigenous people in Australia. *J. Indig. Wellbeing* 2, 5–15.

Dudgeon, P., Milroy, H., and Walker, R. (eds) (2014). *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*. Canberra: Commonwealth of Australia.

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. *Am. Psychol.* 49, 709–724. doi: 10.1037/0003-066x.49.8.709

Epstein, S. (2014). *Cognitive-Experiential Theory: An Integrative Theory of Personality*. New York, NY: Oxford University Press.

Florin, S. A., Fairbairn, A. S., Nango, M., Djandjomerr, D., Marwick, B., Fullagar, R., et al. (2020). The first Australian plant foods at Madjedbebe, 65,000-53,000 years ago. *Nature Commun.* 11:924. doi: 10.1038/s41467-020-14723-0

Gee, G., Dudgeon, P., Schultz, C., Hart, A., and Kelly, K. (2014). "Aboriginal and Torres Strait Islander social and emotional wellbeing and mental health," in *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*, 2nd Edn, eds P. Dudgeon, H. Milroy, and R. Walker (Canberra: Commonwealth of Australia), 55–68.

Gilbert, P. (2010). *Compassion Focused Therapy: Distinctive Features*. Hove: Routledge.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (2017). *Compassion: Concepts, Research and Applications*. Abingdon: Routledge.

Gilbert, P. (2020). Compassion: From its evolution to a psychotherapy. *Front. Psychol.* 11:586161. doi: 10.3389/fpsyg.2020.586161

Hackmann, A., Bennett-Levy, J., and Holmes, E. A. (2011). *The Oxford Guide to Imagery in Cognitive Therapy*. Oxford: Oxford University Press.

Hammond, C., Rabaa, S., Thomas, O., and Domecq, M.-C. (2018). Arts-based research methods with indigenous peoples: an international scoping review. *AlterNative* 14, 260–276. doi: 10.1177/1177180118796870

Iwamasa, G. Y., and Hays, P. A. (eds) (2019). *Culturally Responsive Cognitive-Behavioral Therapy: Practice and Supervision*, 2nd Edn. Worcester, MA: American Psychological Association.

Jersky, M., Titmuss, A., Haswell, M., Freeman, N., Osborne, P., Callaghan, L., et al. (2016). Improving health service access and wellbeing of young Aboriginal parents in an urban setting: mixed methods evaluation of an arts-based program. *Aust. N. Z. J. Public Health* 40(Suppl. 1), S115–S121. doi: 10.1111/1753-6405.12448

Judge, L., Cleghorn, A., Gilbert, P., and McEwan, K. (2012). An exploration of group-based Compassion Focused Therapy for a heterogeneous range of clients presenting to a community mental health team. *Int. J. Cogn. Ther.* 5, 420–429. doi: 10.1521/ijct.2012.5.4.420

Kirby, J. N., Day, J., and Sagar, V. (2019). The 'Flow' of compassion: a meta-analysis of the fears of compassion scales and psychological functioning. *Clin. Psychol. Rev.* 70, 26–39. doi: 10.1016/j.cpr.2019.03.001

Kirby, J. N., Tellegen, C. L., and Steindl, S. R. (2017). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav. Ther.* 48, 778–792. doi: 10.1016/j.beth.2017.06.003

Malaspinas, A. S., Westaway, M. C., Muller, C., Sousa, V. C., Lao, O., Alves, I., et al. (2016). A genomic history of Aboriginal Australia. *Nature* 538, 207–214. doi: 10.1038/nature18299

Mullins, C., and Khawaja, N. G. (2018). Non-indigenous psychologists working with Aboriginal and Torres Strait Islander people: towards clinical and cultural competence. *Aust. Psychol.* 53, 394–404. doi: 10.1111/ap.12338

Naismith, I., Mwale, A., and Feigenbaum, J. (2018). Inhibitors and facilitators of compassion-focused imagery in personality disorder. *Clin. Psychol. Psychother.* 25, 283–291. doi: 10.1002/cpp.2161

Nasir, B. F., Toombs, M. R., Kondalsamy-Chennakesavan, S., Kisely, S., Gill, N. S., Black, E., et al. (2018). Common mental disorders among Indigenous people living in regional, remote and metropolitan Australia: a cross-sectional study. *BMJ Open* 8:e020196. doi: 10.1136/bmjopen-2017-020196

Nelson, J., Ryan, K., Rotumah, D., Bennett-Levy, J., Budden, W., Stirling, J., et al. (2014). Aboriginal practitioners offer culturally safe and responsive CBT: response to commentaries. *Aust. Psychol.* 49, 22–27. doi: 10.1111/ap.12041

Nowell, L. S., Norris, J. M., White, D. E., and Moules, N. J. (2017). Thematic analysis: striving to meet the trustworthiness criteria. *Int. J. Qual. Methods* 16, 1–13. doi: 10.1177/1609406917733847

Power, M. J., and Dalgleish, T. (2008). *Cognition and Emotion: From Order to Disorder*, 2nd Edn. New York, NY: Psychology Press.

Rathod, S., and Kingdon, D. (2009). Cognitive behaviour therapy across cultures. *Psychiatry* 8, 370–371. doi: 10.1016/j.mppsy.2009.06.011

Singer, J., Bennett-Levy, J., and Rotumah, D. (2015). "You didn't just consult community, you involved us": transformation of a 'top-down' Aboriginal mental health project into a 'bottom-up' community-driven process. *Australas. Psychiatry* 23, 614–619. doi: 10.1177/1039856215614985

Teasdale, J. D. (1999). Emotional processing, three modes of mind and the prevention of relapse in depression. *Behav. Res. Ther.* 37, S53–S77.

Teasdale, J. D., and Barnard, P. J. (1993). *Affect, Cognition and Change: Re-Modelling Depressive Thought*. Hove: Lawrence Erlbaum.

Tong, A., Sainsbury, P., and Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int. J. Qual. Health Care* 19, 349–357. doi: 10.1093/intqhc/mzm042

Toombs, M., Nasir, B., Kisely, S., Kondalsamy-Chennakesavan, S., Hides, L., Gill, N., et al. (2020). Australian Indigenous model of mental healthcare based on transdiagnostic cognitive-behavioural therapy co-designed with the Indigenous community: protocol for a randomised controlled trial. *BJPsych Open* 6:e33. doi: 10.1192/bjo.2020.16

Van Dam, N. T., Sheppard, S. C., Forsyth, J. P., and Earleywine, M. (2011). Self-compassion is a better predictor than mindfulness of symptom severity and quality of life in mixed anxiety and depression. *J. Anxiety Disord.* 25, 123–130. doi: 10.1016/j.janxdis.2010.08.011

Werner, A. M., Tibubos, A. N., Rohrmann, S., and Reiss, N. (2019). The clinical trait self-criticism and its relation to psychopathology: a systematic review - Update. *J. Affect. Disord.* 246, 530–547. doi: 10.1016/j.jad.2018.12.069

Williams, P. R. (2018). ONEBird: integrating mindfulness, self-compassion, and art therapy (ONEBird : intégration de la pleine conscience, de l'autocompassion et de l'art-thérapie). *Can. Art Ther. Assoc. J.* 31, 23–32. doi: 10.1080/08322473.2018.1454687

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How Do Health Professionals Maintain Compassion Over Time? Insights From a Study of Compassion in Health

*Sofie I. Baguley[1], Vinayak Dev[1], Antonio T. Fernando[2] and Nathan S. Consedine[1]**

[1] Department of Psychological Medicine, University of Auckland, Auckland, New Zealand, [2] Taylor Centre, Auckland District Health Board, Auckland, New Zealand

Although compassion in healthcare differs in important ways from compassion in everyday life, it provides a key, applied microcosm in which the science of compassion can be applied. Compassion is among the most important virtues in medicine, expected from medical professionals and anticipated by patients. Yet, despite evidence of its centrality to effective clinical care, research has focused on compassion fatigue or barriers to compassion and neglected to study the fact that most healthcare professionals maintain compassion for their patients. In contributing to this understudied area, the present report provides an exploratory investigation into how healthcare professionals report trying to maintain compassion. In the study, 151 professionals were asked questions about how they maintained compassion for their patients. Text responses were coded, with a complex mixture of internal vs. external, self vs. patient, and immediate vs. general strategies being reported. Exploratory analyses revealed reliable individual differences in the tendency to report strategies of particular types but no consistent age-related differences between older and younger practitioners emerged. Overall, these data suggest that while a range of compassion-maintaining strategies were reported, strategies were typically concentrated in particular areas and most professionals seek to maintain care using internal strategies. A preliminary typology of compassion maintaining strategies is proposed, study limitations and future directions are discussed, and implications for the study of how compassion is maintained are considered.

Keywords: compassion, physician—patient communication, emotion regulation, healthcare [MeSH], emotion, health

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***Correspondence:**
Nathan S. Consedine
n.consedine@auckland.ac.nz

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INTRODUCTION

Compassion is one of the most important virtues in medicine, expected from medical professionals and anticipated by patients (Frampton et al., 2013; Fernando and Consedine, 2014a). Despite evidence of its centrality to effective clinical care, most research has focused on compassion fatigue and burnout (Fernando and Consedine, 2014a,b), neglecting the study of compassion itself (Fernando and Consedine, 2014a; Strauss et al., 2016). More recently, researchers have identified several factors or barriers that may interfere with compassion in healthcare settings

(Fernando and Consedine, 2014b). Although this is a promising digression from the compassion fatigue framework, studies have not yet investigated how medical professionals *maintain* compassion for their patients. To bridge this gap in an area in which compassion research has serious implications, this study was designed to preliminarily characterize and categorize the types of strategies medical professionals use to maintain compassion for their patients.

In beginning to consider how medical professionals may maintain compassion, it is useful to briefly clarify the construct. As in other areas of study, there is ongoing debate about the nature of compassion, both in medicine and in other areas of study. In medicine, compassion is broadly thought to consist of two core elements—a deep awareness and willingness to gain knowledge of an individual's suffering *and* a desire to relieve the suffering (Chochinov, 2007). Although more differentiated views (e.g., Strauss et al., 2016) suggest that compassion may incorporate up to five elements—recognizing suffering, understanding the universality of human suffering, feeling for the person suffering, tolerating uncomfortable feelings, and motivation to act/acting to alleviate suffering—the strong desire to alleviate suffering appears to be the key characteristic that differentiates compassion from related prosocial responses like empathy, concern, and sympathy (Goetz et al., 2010; Sinclair et al., 2016). In relation to the present study, recognizing that compassion is a complex and differentiated construct means we must think broadly when seeking to characterize the strategies medical professionals report using as a means to maintain it.

In considering the need for such research more fully, it is worth recalling how compassion is important to health systems. First, compassion and related states are important through their associated positive patient outcomes such as reductions in anxiety (Fogarty et al., 1999), improved patient satisfaction (Lown et al., 2011), strengthened physician-patient relationships (Fogarty et al., 1999), lower PTSD following health emergencies (Moss et al., 2019), and better health outcomes (Post, 2011; Del Canale et al., 2012); research suggests that doctors who are more compassionate provide more meticulous care (Trzeciak et al., 2017). Second, compassion is associated with positive outcomes for physicians, including higher job satisfaction (Gleichgerrcht and Decety, 2013, 2014) and job retention (Sinclair et al., 2016). Neurological studies suggest a clear overlap between pleasure and compassion activation in physicians (Klimecki et al., 2014), which may buffer or counteract stress pathways (Abdulghani et al., 2011; Trzeciak et al., 2017). Three, compassion is a professional obligation and a patient right (Bramley and Matiti, 2014), legislatively mandated in most countries (Paterson, 2011). Finally, although data are scanty, compassion may be associated with financial benefits for health care systems, via lower absenteeism, fewer malpractice lawsuits, and fewer medical errors (Trzeciak et al., 2017). In sum, compassion is critical to effective and sustainable healthcare environments implying that identifying the strategies medical professionals report using to maintain compassion may be of benefit.

A small prior literature has examined the ways by which healthcare professionals attempt to connect with their patients, although studies are a few and remain restricted to nursing and psychology samples. A recent qualitative study of mental health nurses (n = 13) and patients receiving care (n = 7) suggested that asking patients questions and reflecting on their own difficulties were the most frequently reported strategies when attempting to cultivate empathy (Gerace et al., 2018). More broadly, psychological writings suggest that mindfulness meditation (Block-Lerner et al., 2007; Shapiro and Izett, 2008), self-compassion (Morgan and Morgan, 2005; Gilbert, 2009; Neff, 2012; Fulton, 2018), and connecting with patients are seen as facilitating empathy and rapport (Bibeau et al., 2016). As noted, however, while empathy may provide a path to compassion, it is distinct. Compassion in healthcare is distinct insofar as it is professionally mandated and repeated; although strategies may be shared, healthcare contexts represent a particular challenge to care.

To this point, however, how healthcare professionals maintain compassion and the strategies they use remains unknown—studies have focused on compassion fatigue (Van Mol et al., 2015; Nolte et al., 2017; Sinclair et al., 2017) and burnout (Potter et al., 2010). However, compassion fatigue is a problematic construct (Fernando and Consedine, 2014a; Ledoux, 2015), in part because it does not capacitate interventions to improve or maintain compassion. The notion of fatigue tends to imply that healthcare workers have a reservoir of compassion which, when depleted, leads to services being provided without care (Fernando and Consedine, 2014a). Empirically, however, while this view implies that compassion should be reduced over time (Fernando and Consedine, 2014a), empirical work suggests the opposite; compassion fatigue is reliably *lower* in more experienced workers (Shanafelt et al., 2009; Potter et al., 2010; Berger et al., 2015; Dasan et al., 2015). Although age is conflated with differences in seniority, autonomy, and the like, such findings imply that older, more experienced physicians may have developed strategies to manage their ability to care. Therefore, a second aim of this study was to test for age-related differences in the normative strategies used to maintain compassion. Possible differences in the strategies used by more experienced professionals may inform how medical trainees might be instructed in ways that facilitate the maintenance of compassion.

Other recent studies seeking areas in which interventions might be developed have examined the *barriers* to compassion in healthcare. Researchers in this area have developed the Transactional Model of Compassion (Fernando and Consedine, 2014a), which views compassion as a dynamic process influenced by factors from four key areas: the physician, patient and family, clinical context, and environmental and institutional factors. Evidence gathered within this framework suggests that barriers vary in predictable ways across healthcare disciplines (Fernando and Consedine, 2017) and lower with more experience (Dev et al., 2019). Again, however, while this work has deepened our understanding of what *interferes with* compassion in health contexts, it focused on barriers and is readily supplemented by studies of the processes used to *enhance* compassion.

STUDY OBJECTIVES

Given evidence for compassion's centrality to effective clinical care and the benefits it holds for patients, practitioners, and the healthcare system, the objectives of the current study were to (a) preliminarily identify and characterize the strategies medical professionals use to maintain compassion for their patients, and (b) explore potential developmental variation in such strategies.

In the absence of prior work circumscribing the processes that health professionals use to maintain compassion in clinical practice, making specific predictions regarding possible strategies was not possible. However, it seemed reasonable to expect that professionals would report a range of strategies encompassing general self-care and self-management, as well as strategies that specifically involve changing the way they think about themselves, their roles, and their patients. Strategies seemed likely to encompass a mixture of approaches that were oriented to the self vs. concerned with the patient as well as those that were more internally vs. externally focused. Some strategies might be very "immediate" and thus suited to deployment during clinical encounters while others may well be more "distal" and reflect more general self-maintenance strategies that (subjectively) allow for compassion to be sustained over time. As noted, as a secondary interest, we also investigate the possibility that the tendency to report different types of strategies are used will vary developmentally, with younger vs. older practitioners potentially being more and less likely to employ different types of strategies.

MATERIALS AND METHODS

Study Design and Setting

Permission to conduct the present study was obtained from The University of Auckland Human Participants Ethics Committee (Approval Number: 022709). Health professionals (N = 300), registered to attend the Compassion in Healthcare Conference in New Zealand in March 2019, were recruited to the study via email 2 weeks prior to the event. Participants were sent an email invitation containing a link to a description of the study and a 5-min questionnaire. The questionnaire included five demographic questions and three open-ended questions related to compassionate processes and behaviors (see **Supplementary Appendix 1**). Participants who completed the online questionnaires were invited to enter a draw to win one of two $100 gift vouchers. To preserve anonymity in the sample, minimal identifying data were acquired and contact information needed for the prize draw was not linked to primary responses.

Participants

Participants (N = 151, 50.33% of invitees) responded to the study invitation. Of 151, 57.62% were physicians, 19.87% were nurses, 5.96% were psychologists, and 16.55% other health professionals. Across the sample, 84.11% were female. The mean age of physicians was 46.32 years, of nurses was 52.77 years, of psychologists was 48.47 years, and of other professionals 48.64 years. Participants reported being born in New Zealand (51.66%), the United Kingdom (20.53%), Europe (10.60%), Asia (3.98%), and elsewhere (13.23%; see **Table 1**).

Variables and Data Measurement

Background Characteristics

Participants were asked to report gender (male/female), age, and country of birth. Regarding professional practice, participants were asked to describe their main type of clinical practice; responses were coded as: "medicine/surgery," "nurse," "psychologist," and "other." Descriptive characteristics are summarized in **Table 1** below.

Coding Self-Reported Strategies to Maintain Compassion

In this preliminary investigation of the processes by which medical professionals maintain compassion for their patients, respondents were asked two, open-ended questions. The target question stated that: "Sustaining compassion over time can be difficult. How do you maintain compassion for your patients inside yourself?" A second question asked whether "There are (*sic*) particular things you do or think about when seeking to maintain compassion?" Responses to the first question were coded using a system developed for the study and is described below.

The development of the coding system was an iterative process that combined top-down theoretical considerations with bottom-up categories based in the data themselves. Ultimately, coding categories were based on three considerations: (a) the five elements of compassion proposed by Strauss et al. (2016) and the influences on care posited in the Transactional Model of Physician Compassion (Fernando and Consedine, 2014a), (b) the content of the responses from participants, and (c) guidance from academics and

TABLE 1 | Demographic characteristics of the health professional sample.

Variable	*n* (% or SD)
Ethnicity	
New Zealander	78 (51.66%)
British	31 (20.53%)
European	16 (10.60%)
Asian	6 (3.98%)
Other	19 (13.23%)
Age (in years)	
Physicians	46.32 (± 11.58)
Nurses	52.77 (± 11.79)
Psychologists	48.47 (± 11.79)
Other	48.64 (± 10.86)
Gender	
Females	127 (84.10%)
Males	24 (15.89%)
Profession	
Physicians	87 (57.62%)
Nurses	30 (19.87%)
Psychologists	9 (5.96%)
Other	25 (16.55%)

clinicians with expertise in communication and compassion, including the authors (NC, AF). Ultimately, six content global categories were coded: connecting with the patient, common humanity, empathy, tolerance of psychological discomfort, mindfulness, and general self-care/maintenance, together with an "uncodable" category. As is typical in research of this kind, the six content categories acted as supraordinate classes of compassion-maintaining strategy and were further sub-coded to create greater differentiation. After several iterative phases of development, the resultant system appeared as summarized in **Table 2**.

Coding Procedure

All 151 responses were coded independently by two coders (SB and VD) using the coding scheme developed for the study. Given the open-ended nature of the prompting question, codes were not mutually exclusive; responses could score concurrently in multiple categories and/or subcategories. For each category or subcategory, responses were coded on a present/absent basis. When responses were not scored for any of the six primary content codes they were coded in category (7), as "uncodable."

Following independent coding, inter-rater reliability was assessed. Overall agreement between raters was κ (Cohen's

TABLE 2 | Final coding system used to score self-reported compassion maintaining strategies in healthcare professionals.

Supraordinate code	Sub-codes	Description	Example
1. Connection with patient	1a. Communication (CP1)	Reference made to the use of communication skills as a means to maintain compassion for patients.	"I utilize open-ended questions."
	1b. Active listening (CP2)	Reference made to using active listening to maintain compassion.	"I put down my pen and listen."
2. Common humanity	2a. General common humanity (CH1)	Reference made to the shared or common nature of being human.	"I acknowledge that we are more similar than different."
	2b. Common humanity of suffering (CH2)	Response specifically includes reference to the commonality of *suffering*.	"I remind myself that all people suffer."
3. Empathy	3a. Openness to experience of patients (EP1)	*Explicit* reference made to remaining "open" to patients or text indicated a more general openness to the experience of others.	"deliberately or consciously open," "open to them."
	3b. Cognitive empathy (EP2)	Reference made to taking the patient's perspective.	"I try to imagine their situation from their perspective and put myself in their shoes."
	3c. Affective empathy (EP3)	Reference made to *emotionally* connecting with patient distress.	"I feel moved by the person suffering."
4. Tolerance of psychological discomfort	4a. Tolerance of psychological discomfort (TD)	References *internal or external* psychological processes aimed at increasing the ability to tolerate or manage distress, difficult feelings, or discomfort.	"I remind myself it is not their fault they are being difficult and take a breather from the situation."
5. Mindfulness	5. Mindfulness	Reference made to mindfulness as a tool/strategy and/or a way of being/state of mind to maintain compassion for patients.	"I practice mindfulness."
6. Self-care/maintenance	6a. Recognizing limits (SC1)	Reference made to recognition of personal or professional limits.	"I acknowledge that I am human and cannot fix everything."
	6b. Supervision (SC2)	Reference made to using supervision to maintain compassion.	"I get regular supervision," or "see a clinical psychologist."
	6c. Exercise (SC3)	Reference made to using exercise or physical activity as a means of self-care.	"I go to the gym or for a run."
	6d. Refresh (SC4)	Reference made to taking time out to refresh and look after wellbeing.	"I take a holiday when I need."
	6e. Socialization (SC5)	Reference made to engaging in socialization for self-care/maintenance.	"Catching up with people close to me."
	6f. Prevent burnout (SC6)	Reference made to limiting work schedules to prevent burnout or exhaustion.	"I ensure I take 2 days off each week."
	6g. Praying (SC7)	Reference made to use of prayer as a means to maintain compassion for patients.	"I pray."
	6h. Going to church (SC8)	Reference made to the act of going to church or a religious establishment.	"I visit my place of worship."
	6i. Meditation (SC9)	Reference made to using meditative practices.	"I practice meditation."
	6j. Other physical and mental self-care (SC10)	Reference to other self-care processes not captured by the categories above.	

Kappa) = 0.70 with categories of strategies ranging from κ = 0.61 to κ = 0.93. The independent coding resulted in disagreement on 4.39% of 3,222 codes. Discrepencies were resolved between the two coders by discussing each individual code and agreeing on the category of best fit. Discrepancies were coded in favor of the first coder 39% (n = 57) and the second coder 61% (n = 89) of the time.

RESULTS

In line with the aims of this report, responses were analyzed in three steps—descriptive characterization of individual strategies and strategy types, examination of the extent to which individuals systematically preferred particular types of strategy (an examination of proportions), and developmental analyses.

Descriptive Characterization of Strategies

Of the 151 healthcare professionals in the sample, 52.79% reported utilizing self-care behaviors, 18.44% reported using empathy, 13.41% common humanity, 5.87% connection with patient, 4.19% tolerance of discomfort, and 3.07% reported using mindfulness as a means to maintain compassion. Fewer than 3% of responses were uncodable (see **Table 3**). Descriptively, 60.06% of the responses indexed reports of using self-focused strategies as a means to maintain compassion while 37.71% reported on patient-focused strategies. As previously, the remaining 2.23% of responses could not be classified. Other examinations showed that 55.87% of the sample reported internally focused strategies while 22.35% of the responses reported use of external strategies; the remaining 21.78% of responses could not be classified as either internal or external focused. Finally, 55.86% of strategies were classified as general and 41.91% as "immediate" strategies, more likely used in the present moment during patient consultation.

Frequency of Different Strategy Types

Second, we considered how the frequency of strategy use was distributed across different *types* of strategy and whether individuals manifest any preference for particular classes of strategy. To minimize Type 1 error inflation, individual codes were recoded into conceptually meaningful categories. So, for the self-other strategy contrast, strategies were regrouped into self-focused (distress tolerance, mindfulness, and self-care codes) vs. strategies which focused attention toward the patient (connection with patient, common humanity, empathy). Second, to examine differences in the use of internal vs. external strategies, strategies were regrouped into those involving internal mental processes (connection with patient, common humanity, empathy, distress tolerance processes, mindfulness, and self-care codes SC1, SC7, and SC9) and strategies involving use of external or behavioral processes (self-care codes SC2, SC3, SC4, SC5, SC6, and SC8). Finally, as analyses progressed, it became clear that some strategies might also be usefully classified as immediate while some were more general. To capture this possible distinction, strategies were regrouped into those occurring within the clinical context (connection with patient, common humanity, empathy and distress tolerance) vs. strategies that were not of exclusive/primary relevance to the immediate clinical context and/or were not limited by time (mindfulness, and self-care).

TABLE 3 | Descriptive breakdown of self-reported strategies to maintain compassion.

Strategy	Number of participants reporting use of strategy (%)
Connection with patient	21 (5.87%)
Common humanity	48 (13.41%)
Empathy	66 (18.44%)
Tolerance of discomfort	15 (4.19%)
Mindfulness	11 (3.07%)
Self-care behaviors	189 (52.79%)
Uncodable	8 (2.23%)

Because responses could be scored in multiple categories, percentages may not total 100.

Questions Regarding Individual Differences in Strategy Use

To facilitate interpretation and enable an examination of whether individuals typically reported strategies of particular kinds, these scores were then proportionalized. The raw proportions of self vs. other, and immediate vs. general, and internal vs. external were recoded into 0 (strategy type not reported), 1 (a proportion between 0 and 1) and 2 (100% of reported strategies in that class). Chi-square analyses were then used to examine the proportions of self vs. other-focused strategies to maintain compassion.

Descriptively, 42.38% reported no self-focused strategies, 25.17% reported some, and for 32.45% of the sample, all strategies were self-focused. Comparably, for the proportions of immediate vs. general strategies, 35.76% reported no immediate strategies, 24.50% reported a mixture of immediate and general strategies, and for 39.74% all reported strategies were immediate in nature. Finally, analyses of the proportion of internal strategies suggested that 21.19% reported no use of internal strategies, 20.53% reported a mixture of internal and external, and for 58.28% of the sample, all strategies were internal strategies to maintain compassion (see **Figure 1** below).

Possible Developmental Variation in Strategy Use

Given the trend toward lower compassion fatigue and lower barriers to compassion with age and the substantial covariation between age and clinical experience (Dev et al., 2019), the possibility that healthcare professionals of different ages might differentially report different strategies was examined. For these analyses, respondents were split into three groups based on the sample characteristics (i.e., 20–43 years, 44–54 years, and 55–77 years). In the interests of

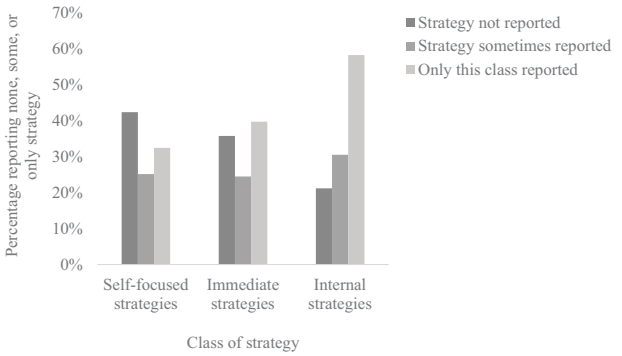


FIGURE 1 | Bar graph demonstrating proportions of the sample reporting none, some, or only self-focused, immediate, and internal compassion maintaining strategies.

parsimony, we restricted our tests to the proportionalized aggregate scores (internal v. external, self v. other, and immediate v. general).

Somewhat in contrast to expectation, analyses revealed no age-related differences in the proportion of self vs. other-focused strategy use $X^2(2, N = 151) = 2.68$, $p = 0.613$, nor were there age-related differences in the proportion of internal vs. external, $X^2(2, N = 151) = 1.93$, $p = 0.749$, or immediate vs. general strategy use, $X^2(2, N = 151) = 0.945$, $p = 0.918$. Because of some concern regarding cell sizes in the analyses of the portion of internal strategies, these proportions were further considered in a 3 (age group) by 2 (none vs. some or all) chi-square. Again, no difference was evident $X^2(2, N = 151) = 0.172$, $p = 0.918$. Put simply, although individuals systematically varied in the extent to which they concentrated their strategies within particular classes (see **Figure 1**), there was no systematic developmental variation evident in the types of strategies reported in this sample.

DISCUSSION

In extending prior research, this report offers a first attempt at identifying and characterizing the strategies healthcare professionals reporting using to maintain compassion. While a few studies have examined how empathy might be facilitated in nursing (Gerace et al., 2018) and psychology samples (Bibeau et al., 2016), prior to this report no studies have specifically focused *on the maintenance of compassion in healthcare*. While this sample of healthcare professionals predominately reported employing self- over patient-focused strategies to maintain compassion, a range of strategies involving self-care, patient empathy, remembering patient humanity, and others were reported. In line with general expectations, participants varied in the extent to which strategies were concentrated in particular classes—people seem to have a "style" at least as measured in this way. However, developmental variation in strategy use was not evidenced. Below, these findings are discussed in further detail, positioned relative to existing work on compassion in health, some preliminary interpretations are given, and a provisional typology of strategies is offered.

Characterizing *Types* of Compassion-Maintaining Strategies

As noted, prior studies of compassion in health have historically focused on the study of compassion fatigue (Van Mol et al., 2015; Nolte et al., 2017; Sinclair et al., 2017), a problematic construct that does little to illuminate potential interventions (Fernando and Consedine, 2014a). In contributing to work beyond the compassion fatigue and barriers frameworks, the current study provides a beginning to the process of examining the strategies by which the healthcare workers maintain compassion despite the serious challenges inherent to this environment.

Descriptively, the range of strategies subjectively experienced as enabling the maintenance of compassion was extensive. Participants reported the expected clustering of strategies involving the use of empathy and connecting to patients as well as tolerating their own discomfort, mindfulness, and reporting deliberately recalling the patients' humanity. While empathy and connection are relatively widely studied (e.g., Amutio-Kareaga et al., 2017) and emotional skills (Zeidner et al., 2013) and mindfulness (e.g., Lim and DeSteno, 2016; Fernando et al., 2017) have also been studied in the context of compassion, the frequency with which common humanity was referenced is interesting.

Indeed, while they may reflect something of the particular sample employed in this study (see below), references to common humanity may suggest a relatively widespread understanding among healthcare professionals that recalling the commonality of suffering and/or consciously recalling that it is a *person* that is suffering helps maintain care. Exactly why perceptions of common or shared humanity are so central to compassionate responding is unclear, although although writings in the medical tradition suggest that stress and emotional upset in response to suffering may "trigger a safety ethic" in which compassion in replaced by a focus on patient *management* (Davin et al., 2018). Put simply, when the management of the patient's condition (rather than the patient themselves) predominates, the patient's humanity is lost and thus too a major component of compassion is absent. More broadly, it is notable that strategies involving mental changes of some kind accounted for approximately 45% of the reported strategies. Their commonality, coupled with the fact that such strategies are (a) potentially trainable and (b) do not require major adjustments to day-to-day clinical practice environments suggest studies of their trainability and efficacy are warranted.

A second grouping of strategies that medical professionals reported using as a means to maintain compassion was possibly broader—maintaining compassion via general self-care. Thus, at least as indexed by these self-report data, healthcare professionals view general physical, social, and psychological care for the self as central to the ability to maintain compassion in clinical practice. Reviews have suggested that self-care may be the most significant preventive measure needed to prevent compassion fatigue (Sorenson et al., 2016), and practical guides to compassion

in healthcare treat self-care as the cornerstone of compassion fatigue prevention (Baverstock and Finlay, 2016). Such a finding is likewise consistent with evidence linking self-compassion to health promoting behaviors such as better diet (Dunne et al., 2018), stress management (Allen and Leary, 2010), interpersonal relationships, nutrition, and physical activity (Homan and Sirois, 2017). Interestly, in the empathy literature, self-related thoughts have been suggested to aid in the ability to connect with another individual and take on their perspective (Davis et al., 2004; Gerace et al., 2013). Consistent with views suggesting that compassion fades when those working in healthcare are burnt out or heavily fatigued (Neville and Cole, 2013), self-care featured heavily in the strategies reported by this sample. In some views, compassion evolved to both protect oneself and facilitate cooperative relationships (Keltner, 2009; Strauss et al., 2016). Thus, the maintenance of compassion may also be facilitated by self-care behaviors because they allow the individual to husband resources and, in doing so, provide compassionate care for others. Clearly, such strategies have the potential to be of benefit in the pressured work environments characterizing modern healthcare.

Perhaps unsurprisingly given the prompts used to elicit reports of strategies, the present study revealed that strategies to maintain compassion tended to focus on the self rather than the patient. This finding may suggest an intuitive understanding among healthcare professionals of their own role in the generation of compassionate responses. *Prima facie*, it might suggest that encouraging or training healthcare professionals to engage in self-focused strategies (e.g., mindfulness, tolerance of own discomfort, and self-care behaviors) may improve their ability to not only maintain compassion but also to provide more compassionate care. Although the evidence base is weak and few studies have tested potentially compassion-enhancing interventions in healthcare workforce samples, such interventions might include compassion training (Condon et al., 2013), self-compassion (Rao and Kemper, 2017), Mindfulness-Based Stress Reduction (MBSR; Birnie et al., 2010), meditation (Jazaieri et al., 2013; Weng et al., 2013; Boellinghaus et al., 2014), or clinical supervision (Lindahl and Norberg, 2002).

However, it should also be recalled that the professional is likely only one factor in the process by which compassion is (and is not) generated in healthcare (Fernando et al., 2016). Experimental studies, for example, suggest that the effects of patient characteristics on compassion are often substantially larger than the effects of physician factors (Fernando and Consedine, 2017), perhaps particularly in less experienced practitioners (Reynolds et al., 2019). Patient factors such as the degree to which are seen as responsible for suffering, have off-putting or disgusting characteristics, are unpleasant, rude, demanding or hostile "suck the oxygen" from compassion (Fernando et al., 2016). Thus, although interventions to increase the ability or motivation of healthcare workers to maintain compassion are needed, we must also remember that compassion is a systemic problem that requires systemic solutions.

Overall then, this sample of healthcare professions reported a range of self vs. other, internal vs. external, and immediate vs. general strategies. Although sample selectivity and the specific assessment methods must be borne in mind, the relatively low rate of uncodable responses suggest many compassion-maintaining strategies can be organized along these three underlying dimensions (see **Table 4**). While some specific strategies (e.g., mindfulness) may periodically reflect both immediate, self-focused, internal strategies as well as internal, self-focused, and *general* strategies, literatures such as those in coping suggest there is utility both in the provision of typologies as well as in considering a professional's functioning as involving a portfolio of compassion enhancing tools that may be more or less well-developed or employed. A working typology for the strategies reported as maintaining compassion in healthcare is provided in **Table 4**.

Characterizing the *Range* of Compassion-Maintaining Strategies

As this project unfolded, it became clear that while some professionals reported a range of strategies encompassing different types of strategy, others reported strategies that

TABLE 4 | Preliminary typology of self-reported strategies to maintain compassion (with examples).

Temporal range	Focus of strategy			
	Self		Patient	
	More internal	More external	More internal	More external
More immediate	Distress tolerance, imagining patient as family member, awareness of own responses	Go outside and take a breath	Active empathy and perspective taking, remind myself of similarities and our shared humanity, connect with person in front of me, minimize judgment	Active listening, ask patient about their lives, communication skills, consciously warm my eyes or touch patient kindly, use reminders to care
More general	Be a mindful person, practice self-compassion	Self-care including diet, exercise, yoga, meditation, supervision, manage schedules, maintain clinical knowledge, connect with nature, prayer	Remember why I got into this line of work and that it is a privilege to work and learn from patients	

were concentrated in particular areas. Because quantifying the tendency to concentrate strategies in different areas may help identify imbalances in a "portfolio" of compassion-maintaining strategies, the *proportions* with which participants' strategies were concentrated in particular classes of strategy were descriptively assessed. An interesting pattern was evidenced. Specifically, there was a broad three-way split between persons (a) using only self-focused strategies, (b) using some self-focused strategies, and (c) not reporting self-focused strategies. A similar pattern was evident in analysis of the proportions of immediate vs. more general strategies but not for internal vs. externally focused; comparatively few reported only externally focused strategies.

Although it is empirically understudied, the notion that flexibility is central to coping (Cheng et al., 2014), emotion regulation (Aldao et al., 2015), and psychological functioning in general (Kashdan and Rottenberg, 2010), is increasingly accepted. In coping research, for example, it has been shown that having a "balanced" repertoire of coping skills that can be deployed in response to varying environmental demands predicts better psychological adjustment (Cheng et al., 2014). In the context of compassion in health, this approach may suggest that identifying professionals who rely heavily on particular classes of strategy may be of benefit. While any benefits associated with having a "balanced repertoire" needs empirical investigation, it may be that professionals whose compassion maintenance repertoire is unbalanced may struggle to maintain compassion when particular classes of patient or situation are encountered.

The Transactional Model (Fernando and Consedine, 2014a) suggests that compassion arises out of the dynamic interactions between patient, clinician, the clinical picture, and the environments in which compassion is needed. Consistent with this view, basic science work tells us that "compassion fade" is moderated by dispositional factors (Markowitz et al., 2013) and that the extent to which suffering is self-inflicted (Reynolds et al., 2019) and that greater self-other similarity are likely important (Oveis et al., 2010). More directly, experimental studies in health contexts have shown that compassion and patient engagement are more impacted by aversive patient characteristics among student physicians than among more experienced practitioners (Reynolds et al., 2019). Although developmental effects were not evident in the data presented here, individual differences in the tendency or ability to use particular types of compassion-maintaining strategies may well help us understand responses to the array of challenges to compassion evident in healthcare settings. While we do not yet know whether these (or other) strategies are actually effective in maintaining compassion in healthcare settings, providing professionals with an array of options to strengthen or supplement the approaches they typically use is a useful starting point for both research and practice.

Exploring Possible Developmental Variation in Normative Strategies

Finally, given evidence that compassion fatigue is reliably lower in older/more experienced healthcare professionals (Dev et al., 2019) while compassion satisfaction is greater (Gleichgerrcht and Decety, 2014), a final, exploratory aim of this study was to examine whether the types and proportions of compassion-maintaining strategies reported varied as a function of age. Identifying age-related variation has the potential to identify the strategies that accumulated experience suggests are effective in maintaining compassion over time and thus provide targets for medical education as well as compassion-enhancing interventions.

In this preliminary study, however, age related differences in self-reported strategy use were not evidenced in either differences in the reporting of specific strategies or in the proportion of different types of strategy. Given developmental trends where compassion fatigue and the barriers to compassion appear to lower with age (Dev et al., 2019), our sense here is that developmental variations are likely minimized or obscured in a sample that self-selected for interest in compassion (participants were registered attendees at a compassion conference) and/or that our data were unsuited to providing the necessary "resolution" to find differences. Indeed, the possibility that there is something to learn from the compassion-maintaining strategies that are time-tested in the repertoire of more experienced physicians remains worth pursuing. Age brings with it a wealth of psychological changes (e.g., the tendency to regulate emotions anticipatorily), and covaries with professional experience, seniority, and autonomy. More experienced practitioners report lower barriers to compassion and prior work has shown that a history of past adversity (albeit not necessarily health-related) can enhance compassionate responding under some conditions (Lim and DeSteno, 2016). Given the implications for selection and training in the health workforce, direct examination of this possibility in the context of health is an important future direction for applied compassion research.

Limitations and Future Research

The present study provides novel insight into the range of strategies health professionals from a range of specialities employ when seeking to maintain compassion as well as the breadth of strategies employed. Although it represents a useful beginning to work in an area with almost no research, there are several limitations that should be borne in mind. First, the sample was self-selected from a group of professionals enrolled to attend the Compassion in Healthcare Conference in New Zealand, March 2019. Although this sample was professionally diverse, those electing to attend this event likely differ from the general population of professionals. Potentially exaggerating self-selection biases is the fact that a direct invitation from study organizers was used. Although participation was anonymous, compassion studies in medicine are prone to bias (Fernando et al., 2017), and both social desirability and self-presentational biases may be important. Thus, the sample may either be (or present) as kinder, more aware of the role of compassion in their work, or be more likely to report particular strategies such as mediation, reference to shared humanity and the like. Equally, the large proportion of self-focused strategies may reflect the phrasing of the specific questions that were asked. Although self-report is likely a necessary first step in this area, such considerations mean

the relative frequency with which different types of compassion-maintaining strategies are used among healthcare providers more widely remains unclear.

As importantly, degrees of clinical experience were only indirectly measured via self-reported age. In part, this decision reflects the difficulty in gauging what "clinical experience" actually means and, in part, it reflects the fact that clinical experience and age are so highly correlated to make possible differences empirically near-inseparable (see e.g., Dev et al., 2019). In a similar vein, it is possible that there may be particular aspects of clinical experience that are relevant or that working in different clinical environments lends itself to the use of particular strategies. For example, brief walks to clear the mind and refresh may be more likely/viable when tasks are scheduled in particular ways, where autonomy is greater, and/or where an environment suited to walking is available.

Perhaps most importantly, however, this study does not provide evidence that these self-reported strategies are actually *effective* in maintaining compassion. The fact that strategies are subjectively experienced as helping maintain compassion seems clear but research has yet empirically determine whether subjectively useful strategies translate into a patients experience of greater care. Mindfulness, for example, which was mentioned by a significant minority of participants in this study, has complex links with feelings of compassion as well as with compassionate behavior (Fernando et al., 2016). If the study of compassion in medicine is to further the deployment of compassion-enhancing strategies into education and professional practice it must move beyond ideology, values, and appearance to become an evidence-based agenda. Empirical study evaluating the efficacy of particular strategies is clearly warranted.

CONCLUSION

While compassion is increasingly seen as central to patient outcomes as well as work satisfaction among healthcare professionals, prior work has concentrated on the study of compassion fatigue and/or the barriers to compassion. In contributing to this critical applied area of compassion research, the present study presents a first attempt at identifying and descriptively characterizing the strategies health professionals report using as a means to maintain compassion. While some strategies were focused on the patient, these data suggest that self-focused strategies predominate. In turn, such a pattern suggests that self-care is seen as central to the capacity to maintain care for others, something also evident in other writings (Sanchez-Reilly et al., 2013). That said, a significant proportion of the strategies reported were patient-focused, emphasizing empathy, shared humanity, and connecting with patients. Overall, these descriptive data provide initial grounds for moving research beyond a focus on the factors that may interfere with compassion to include the study of the processes that may enhance and sustain it over time. It thus provides fertile grounds for future research to develop and assess interventions designed to maintain medical professionals' compassion, ensuring the preservation of compassion in healthcare.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because: participants consented to participate with the understanding that access to data would be restricted to the named researchers. Requests to access the datasets should be directed to NC, n.consedine@auckland.ac.nz.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Human Participants Ethics Committee, University of Auckland. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AF and NC designed the study and collected the data. SB and VD developed the coding system and coded the data. SB analyzed the data and drafted the initial manuscript. NC oversaw all elements of the project and edited drafts. All authors provided feedback on manuscript drafts and have approved the final version of the manuscript.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2020.564554/full#supplementary-material

REFERENCES

Abdulghani, H. M., Al Kanhal, A. A., Mahmoud, E. S., Ponnamperuma, G. G., and Alfaris, E. A. (2011). Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J. Health Population Nutr.* 29:516. doi: 10.3329/jhpn.v29i5.8906

Aldao, A., Sheppes, G., and Gross, J. J. (2015). Emotion regulation flexibility. *Cogn. Ther. Res.* 39, 263–278. doi: 10.1007/s10608-014-9662-4

Allen, A. B., and Leary, M. R. (2010). Self-compassion, stress, and coping. *Soc. Pers. Psychol. Compass* 4, 107–118. doi: 10.1111/j.1751-9004.2009.00246.x

Amutio-Kareaga, A., García-Campayo, J., Delgado, L. C., Hermosilla, D., and Martínez-Taboada, C. (2017). Improving communication between physicians and their patients through mindfulness and compassion-based strategies: a narrative review. *J. Clin. Med.* 6:33. doi: 10.3390/jcm6030033

Baverstock, A. C., and Finlay, F. O. (2016). Maintaining compassion and preventing compassion fatigue: a practical guide. *Arch. Dis. Childhood Educ. Pract.* 101, 170–174. doi: 10.1136/archdischild-2015-308582

Berger, J., Polivka, B., Smoot, E. A., and Owens, H. (2015). Compassion fatigue in pediatric nurses. *J. Pediatric Nurs.* 30, e11–e17. doi: 10.1016/j.pedn.2015.02.005

Bibeau, M., Dionne, F., and Leblanc, J. (2016). Can compassion meditation contribute to the development of psychotherapists' empathy? A review. *Mindfulness* 7, 255–263. doi: 10.1007/s12671-015-0439-y

Birnie, K., Speca, M., and Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress Health* 26, 359–371. doi: 10.1002/smi.1305

Block-Lerner, J., Adair, C., Plumb, J. C., Rhatigan, D. L., and Orsillo, S. M. (2007). The case for mindfulness-based approaches in the cultivation of empathy: Does nonjudgmental, present-moment awareness increase capacity for perspective-taking and empathic concern? *J. Marital Family Ther.* 33, 501–516. doi: 10.1111/j.1752-0606.2007.00034.x

Boellinghaus, I., Jones, F. W., and Hutton, J. (2014). The role of mindfulness and loving-kindness meditation in cultivating self-compassion and other-focused concern in health care professionals. *Mindfulness* 5, 129–138. doi: 10.1007/s12671-012-0158-6

Bramley, L., and Matiti, M. (2014). How does it really feel to be in my shoes? Patients' experiences of compassion within nursing care and their perceptions of developing compassionate nurses. *J. Clin. Nurs.* 23, 2790–2799. doi: 10.1111/jocn.12537

Cheng, C., Lau, H. P. B., and Chan, M. P. S. (2014). Coping flexibility and psychological adjustment to stressful life changes: a meta-analytic review. *Psychol. Bull.* 140:1582. doi: 10.1037/a0037913

Chochinov, H. M. (2007). Dignity and the essence of medicine: the A. B, C, and D of dignity conserving care. *BMJ* 335, 184–187. doi: 10.1136/bmj.39244.650926.47

Condon, P., Desbordes, G., Miller, W. B., and DeSteno, D. (2013). Meditation increases compassionate responses to suffering. *Psychol. Sci.* 24, 2125–2127. doi: 10.1177/0956797613485603

Dasan, S., Gohil, P., Cornelius, V., and Taylor, C. (2015). Prevalence, causes and consequences of compassion satisfaction and compassion fatigue in emergency care: a mixed-methods study of UK NHS Consultants. *Emergency Med. J.* 32, 588–594. doi: 10.1136/emermed-2014-203671

Davin, L., Thistlethwaite, J., and Bartle, E. (2018). "Compassion, the first emotion ditched when I'm busy'. The struggle to maintain our common humanity'. *MedEdPublish* 7:29. doi: 10.15694/mep.2018.0000167.1

Davis, M. H., Soderlund, T., Cole, J., Gadol, E., Kute, M., Myers, M., et al. (2004). Cognitions associated with attempts to empathize: how do we imagine the perspective of another? *Pers. Soc. Psychol. Bull.* 30, 1625–1635. doi: 10.1177/0146167204271183

Del Canale, S., Louis, D. Z., Maio, V., Wang, X., Rossi, G., Hojat, M., et al. (2012). The relationship between physician empathy and disease complications: an empirical study of primary care physicians and their diabetic patients in Parma, Italy. *Acad. Med.* 87, 1243–1249. doi: 10.1097/ACM.0b013e3182628fbf

Dev, V., Fernando, A. T., Kirby, J. N., and Consedine, N. S. (2019). Variation in the barriers to compassion across healthcare training and disciplines: a cross-sectional study of doctors, nurses, and medical students. *Int. J. Nurs. Stud.* 90, 1–10. doi: 10.1016/j.ijnurstu.2018.09.015

Dunne, S., Sheffield, D., and Chilcot, J. (2018). Brief report: self-compassion, physical health and the mediating role of health-promoting behaviours. *J. Health Psychol.* 23, 993–999. doi: 10.1177/1359105316643377

Fernando, A. T., Arroll, B., and Consedine, N. S. (2016). Enhancing compassion in general practice: it's not all about the doctor. *Br. J. Gen. Pract.* 66, 340–341. doi: 10.3399/bjgp16X685741

Fernando, A. T., and Consedine, N. S. (2017). Barriers to medical compassion as a function of experience and specialization: psychiatry, pediatrics, internal medicine, surgery, and general practice. *J. Pain Symptom Manage.* 53, 979–987. doi: 10.1016/j.jpainsymman.2016.12.324

Fernando, A. T., and Consedine, N. S. (2014a). Beyond compassion fatigue: the transactional model of physician compassion. *J. Pain Symptom Manage.* 48, 289–298. doi: 10.1016/j.jpainsymman.2013.09.014

Fernando, A. T., and Consedine, N. S. (2014b). Development and initial psychometric properties of the barriers to physician compassion questionnaire. *Postgraduate Med. J.* 90, 388–395. doi: 10.1136/postgradmedj-2013-132127

Fernando, A. T., Skinner, K., and Consedine, N. S. (2017). Increasing compassion in medical decision-making: can a brief mindfulness intervention help? *Mindfulness* 8, 276–285. doi: 10.1007/s12671-016-0598-5

Fogarty, L. A., Curbow, B. A., Wingard, J. R., McDonnell, K., and Somerfield, M. R. (1999). Can 40 seconds of compassion reduce patient anxiety? *J. Clin. Oncol.* 17, 371–371. doi: 10.1200/JCO.1999.17.1.371

Frampton, S. B., Guastello, S., and Lepore, M. (2013). Compassion as the foundation of patient-centered care: the importance of compassion in action. *J. Comp. Effect. Res.* 2, 443–455. doi: 10.2217/cer.13.54

Fulton, C. L. (2018). Self-compassion as a mediator of mindfulness and compassion for others. *Counsel. Values* 63, 45–56. doi: 10.1002/cvj.12072

Gerace, A., Day, A., Casey, S., and Mohr, P. (2013). An exploratory investigation of the process of perspective taking in interpersonal situations. *J. Relationships Res.* 4:e6. doi: 10.1017/jrr.2013.6

Gerace, A., Oster, C., O'kane, D., Hayman, C. L., and Muir-Cochrane, E. (2018). Empathic processes during nurse–consumer conflict situations in psychiatric inpatient units: a qualitative study. *Int. J. Ment. Health Nurs.* 27, 92–105. doi: 10.1111/inm.12298

Gilbert, P. (2009). *The Compassionate Mind: A New Approach to Life's Challenges*. Oakland, CA: New Harbinger Publications.

Gleichgerrcht, E., and Decety, J. (2013). Empathy in clinical practice: how individual dispositions, gender, and experience moderate empathic concern, burnout, and emotional distress in physicians. *PLoS One* 8:e61526. doi: 10.1371/journal.pone.0061526

Gleichgerrcht, E., and Decety, J. (2014). The relationship between different facets of empathy, pain perception and compassion fatigue among physicians. *Front. Behav. Neurosci.* 8:243. doi: 10.3389/fnbeh.2014.00243

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136:351. doi: 10.1037/a0018807

Homan, K. J., and Sirois, F. M. (2017). Self-compassion and physical health: exploring the roles of perceived stress and health-promoting behaviors. *Health Psychol. Open* 4:2055102917729542. doi: 10.1177/2055102917729542

Jazaieri, H., Jinpa, G. T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., et al. (2013). Enhancing compassion: a randomized controlled trial of a compassion cultivation training program. *J. Happiness Stud.* 14, 1113–1126. doi: 10.1007/s10902-012-9373-z

Kashdan, T. B., and Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clin. Psychol. Rev.* 30, 865–878. doi: 10.1016/j.cpr.2010.03.001

Keltner, D. (2009). *Born to Be Good: The Science of a Meaningful Life*. New York, NY: WW Norton & Company.

Klimecki, O. M., Leiberg, S., Ricard, M., and Singer, T. (2014). Differential pattern of functional brain plasticity after compassion and empathy training. *Soc. Cogn. Affect. Neurosci.* 9, 873–879. doi: 10.1093/scan/nst060

Ledoux, K. (2015). Understanding compassion fatigue: understanding compassion. *J. Adv. Nurs.* 71, 2041–2050. doi: 10.1111/jan.12686

Lim, D., and DeSteno, D. (2016). Suffering and compassion: the links among adverse life experiences, empathy, compassion, and prosocial behavior. *Emotion* 16:175. doi: 10.1037/emo0000144

Lindahl, B., and Norberg, A. (2002). Clinical group supervision in an intensive care unit: a space for relief, and for sharing emotions and experiences of care. *J. Clin. Nurs.* 11, 809–818. doi: 10.1046/j.1365-2702.2002.00652.x

Lown, B. A., Rosen, J., and Marttila, J. (2011). An agenda for improving compassionate care: a survey shows about half of patients say such care is missing. *Health Affairs* 30, 1772–1778. doi: 10.1377/hlthaff.2011.0539

Markowitz, E., Slovic, P., Vastfjall, D., and Hodges, S. (2013). Compassion fade and the challenge of environmental conservation. *Judgment Decis. Making* 8, 397–406.

Morgan, W. D., and Morgan, S. T. (2005). "Cultivating attention and empathy," in *Mindfulness and Psychotherapy*, eds C. K. Germer, R. D. Siegel, and P. R. Fulton (New York, NY: Guilford Press), 73–90.

Moss, J., Roberts, M. B., Shea, L., Jones, C. W., Kilgannon, H., Edmondson, D. E., et al. (2019). Healthcare provider compassion is associated with lower PTSD symptoms among patients with life-threatening medical emergencies: a prospective cohort study. *Intensive Care Med.* 45, 815–822. doi: 10.1007/s00134-019-05601-5

Neff, K. D. (2012). "The science of self-compassion," in *Wisdom and Compassion in Psychotherapy: Deepening Mindfulness in Clinical Practice*, eds C. K. Germer and R. D. Siegel (New York, NY: Guilford Press), 79–92.

Neville, K., and Cole, D. A. (2013). The relationships among health promotion behaviors, compassion fatigue, burnout, and compassion satisfaction in nurses practicing in a community medical center. *J. Nurs. Adm.* 43, 348–354. doi: 10.1097/NNA.0b013e3182942c23

Nolte, A. G., Downing, C., Temane, A., and Hastings-Tolsma, M. (2017). Compassion fatigue in nurses: a metasynthesis. *J. Clin. Nurs.* 26, 4364–4378. doi: 10.1111/jocn.13766

Oveis, C., Horberg, E. J., and Keltner, D. (2010). Compassion, pride, and social intuitions of self-other similarity. *J. Pers. Soc. Psychol.* 98, 618–630. doi: 10.1037/a0017628

Paterson, R. (2011). Can we mandate compassion? *Hastings Cent. Rep.* 41, 20–23. doi: 10.1353/hcr.2011.0036

Post, S. G. (2011). Compassionate care enhancement: benefits and outcomes. *Int. J. Person Centered Med.* 1, 808–813. doi: 10.5750/ijpcm.v1i4.153

Potter, P., Deshields, T., Divanbeigi, J., Berger, J., Cipriano, D., Norris, L., et al. (2010). Compassion fatigue and burnout: prevalence among oncology nurses. *Clin. J. Oncol. Nurs.* 14:E56. doi: 10.1188/10.CJON.E56-E62

Rao, N., and Kemper, K. J. (2017). Online training in specific meditation practices improves gratitude, well-being, self-compassion, and confidence in providing compassionate care among health professionals. *J. Evid. Complement. Altern. Med.* 22, 237–241. doi: 10.1177/2156587216642102

Reynolds, L. M., Powell, P., Lin, Y. S., Ravi, K., Chung, C. Y. K., and Consedine, N. S. (2019). Fighting the flinch: experimentally induced compassion makes a difference in health care providers. *Br. J. Health Psychol.* 24, 982–998. doi: 10.1111/bjhp.12390

Sanchez-Reilly, S., Morrison, L. J., Carey, E., Bernacki, R., O'Neill, L., Kapo, J., et al. (2013). Caring for oneself to care for others: physicians and their self-care. *J. Supportive Oncol.* 11:75. doi: 10.12788/j.suponc.0003

Shanafelt, T. D., Balch, C. M., Bechamps, G. J., Russell, T., Dyrbye, L., Satele, D., et al. (2009). Burnout and career satisfaction among American surgeons. *Ann. Surg.* 250, 463–471. doi: 10.1097/SLA.0b013e3181ac4dfd

Shapiro, S. L., and Izett, C. D. (2008). "Meditation: a universal tool for cultivating empathy," in *Mindfulness and the Therapeutic Relationship*, eds S. F. Hick and T. Bien (New York, NY: Guilford Press), 161–175.

Sinclair, S., Norris, J. M., McConnell, S. J., Chochinov, H. M., Hack, T. F., Hagen, N. A., et al. (2016). Compassion: a scoping review of the healthcare literature. *BMC Palliative Care* 15:6–20. doi: 10.1186/s12904-016-0080-0

Sinclair, S., Raffin-Bouchal, S., Venturato, L., Mijovic-Kondejewski, J., and Smith-MacDonald, L. (2017). Compassion fatigue: a meta-narrative review of the healthcare literature. *Int. J. Nurs. Stud.* 69, 9–24. doi: 10.1016/j.ijnurstu.2017.01.003

Sorenson, C., Bolick, B., Wright, K., and Hamilton, R. (2016). Understanding compassion fatigue in healthcare providers: a review of current literature. *J. Nurs. Scholarship* 48, 456–465. doi: 10.1111/jnu.12229

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., et al. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clin. Psychol. Rev.* 47, 15–27. doi: 10.1016/j.cpr.2016.05.004

Trzeciak, S., Roberts, B. W., and Mazzarelli, A. J. (2017). Compassionomics: Hypothesis and experimental approach. *Med. Hypotheses* 107, 92–97. doi: 10.1016/j.mehy.2017.08.015

Van Mol, M. M., Kompanje, E. J., Benoit, D. D., Bakker, J., and Nijkamp, M. D. (2015). The prevalence of compassion fatigue and burnout among healthcare professionals in intensive care units: a systematic review. *PLoS One* 10:e0136955. doi: 10.1371/journal.pone.0136955

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychol. Sci.* 24, 1171–1180. doi: 10.1177/0956797612469537

Zeidner, M., Hadar, D., Matthews, G., and Roberts, R. D. (2013). Personal factors related to compassion fatigue in health professionals. *Anxiety Stress Coping* 26, 595–609. doi: 10.1080/10615806.2013.777045

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Compassion As an Intervention to Attune to Universal Suffering of Self and Others in Conflicts: A Translational Framework

S. Shaun Ho[1], Yoshio Nakamura[2] and James E. Swain[1]*

[1] Department of Psychiatry and Behavioral Health, Stony Brook University, Stony Brook, NY, United States, [2] Department of Anesthesiology, Division of Pain Medicine, Pain Research Center, University of Utah School of Medicine, Salt Lake City, UT, United States

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Myriam Mongrain, York University, Canada

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***Correspondence:**
S. Shaun Ho
hosh@umich.edu

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As interpersonal, racial, social, and international conflicts intensify in the world, it is important to safeguard the mental health of individuals affected by them. According to a Buddhist notion "if you want others to be happy, practice compassion; if you want to be happy, practice compassion," compassion practice is an intervention to cultivate conflict-proof well-being. Here, compassion practice refers to a form of concentrated meditation wherein a practitioner attunes to friend, enemy, and someone in between, thinking, "I'm going to help them (equally)." The compassion meditation is based on Buddhist philosophy that mental suffering is rooted in conceptual thoughts that give rise to generic mental images of self and others and subsequent biases to preserve one's egoism, blocking the ultimate nature of mind. To contextualize compassion meditation scientifically, we adopted a Bayesian active inference framework to incorporate relevant Buddhist concepts, including mind (buddhi), compassion (*karuna*), aggregates (*skandhas*), suffering (*duhkha*), reification (*samaropa*), conceptual thoughts (*vikalpa*), and superimposition (*prapañca*). In this framework, a person is considered a Bayesian Engine that actively constructs phenomena based on the aggregates of forms, sensations, discriminations, actions, and consciousness. When the person embodies rigid beliefs about self and others' identities (*identity-grasping beliefs*) and the resulting *ego-preserving bias*, the person's Bayesian Engine malfunctions, failing to use prediction errors to update prior beliefs. To counter this problem, after recognizing the causes of sufferings, a practitioner of the compassion meditation aims to attune to all others equally, friends and enemies alike, suspend identity-based conceptual thoughts, and eventually let go of any identity-grasping belief and ego-preserving bias that obscure reality. We present a brain model for the Bayesian Engine of three components: (a) Relation-Modeling, (b) Reality-Checking, and (c) Conflict-Alarming, which are subserved by (a) the Default-Mode Network (DMN), (b) Frontoparietal Network (FPN) and Ventral Attention Network (VAN), and (c) Salience Network (SN), respectively. Upon perceiving

conflicts, the strengthening or weakening of ego-preserving bias will critically depend on whether the SN up-regulates the DMN or FPN/VAN, respectively. We propose that compassion meditation can strengthen brain regions that are conducive for suspending prior beliefs and enhancing the attunements to the counterparts in conflicts.

Keywords: meditation, neuroimaging, Bayesian, free energy principle, Buddhism, compassion (*karuna*), conflicts, *lojong*

INTRODUCTION

Conflicts are inevitable in a society whose members have diverse interests and ideologies. Unfortunately, political polarization and inter-group animosity has increased in the United States in the past decade (Pew Research Center, 2014). Even when facing the pandemic of COVID-19, which is blind to one's viewpoint, the partisan gap has grown even wider on nearly all important matters (Pew Research Center, 2020a,b). Due to built-in self-organizing algorithms, social media users tend to encounter messages that are similar to what they already liked or viewed. Since the cognitive costs for *attuning to counterparts* in conflicts are much higher than those for sticking to one's own ideas, the likelihood of attuning to people with different views is diminishing.

As social conflicts increase in frequency and intensity, their adverse effects on personal well-being also increase in extent and severity. Conflict-related adversities in early life are associated with poor health and reduced well-being. For example, complete social isolations since birth caused great harms (Harlow et al., 1965); adverse childhood experiences (ACEs) predicted adulthood psychopathology (Anda et al., 2006), incoherent social relationships (Tyrka et al., 2009), suicidality (Dube et al., 2001), and other mortality risk factors (Felitti et al., 1998); poor quality in social relationships have detrimental effects on health (Umberson and Montez, 2010) and positive association with cellular aging (Uchino et al., 2012); an animal model suggested that when conflicts resulted in social defeat, individuals are prone for substance abuse and social emotional disorders (Hammels et al., 2015). Across mental disorders that conflict-induced adversities may aggravate, the failure of updating beliefs is very common (Kube and Rozenkrantz, 2020). Thus, rigid beliefs may be a manifestation or cause of post-conflict malfunctioning.

Notably, not all individuals subjected to defeats in social conflicts are devastated. When people with childhood adversity became adults, while about two-thirds of them suffered from various symptoms of substance use, psychopathology, impaired functioning in professional social realms, one-third of them were resilient, doing even better than low-adversity controls by showing more personal competence, determination, strong social support from a domestic partner, and reliance on faith and prayer (Werner, 1992). Likewise, many studies have documented that spirituality and intimate social support played crucial roles in the post-adversity bifurcation between resilient and worsened well-being (Feiring et al., 1996; Leskela et al., 2002; Wilson et al., 2006; Sippel and Marshall, 2011; Saraiya and Lopez-Castro, 2016; Lahav et al., 2017). Mother–child attunement is considered a foundation of resilience (Feldman, 2020).

We postulate that one of the key ingredients in the post-conflict resilience afforded by spirituality and positive social relationship is attunement, which can be construed from two perspectives: (1) In psychotherapy, attunement refers to a kinesthetic and emotional sensing of others knowing (tuning-in) their rhythm, affect and experience. This is a two-part process of communion of interpersonal contact—beginning with *empathy*, i.e., being sensitive to and identifying with the other person's sensations, needs or feelings, and then communication of that sensitivity to the other person (Erskine, 1998). (2) In Buddhism, as it will become clear below, attunement refers to both the function of mind and meditative trainings of mind, as Arya Shantideva said in *A Guide to the Bodhisattva's Way of Life* (hereafter, GBWL):

> *"Thus, because he loves to pacify the pains of others, he whose mind is attuned in this way, would enter even the deepest hell, just as a wild goose plunges into a lotus pond."* (Shantideva, c. 700/1979)

An authentic instruction on this particular verse in GBWL is that "if you keep on doing it, your mind will be trained in that way. It will become part of your habit, your way of life. You function that way; your mind is attuned. If you do so, it will be like birds that are attracted to a beautiful lotus lake. No matter how far they have to fly, all the birds and animals will try to come to the lotus lake... What does that mean? When you can develop compassion, caring for people, they will be with you. They will help you and protect you, because you serve them." (Gelek Rimpoche, 2008). Notably, these two perspectives on attunement are highly coherent; after all, it is the mind that makes the attunement in psychotherapy possible.

Would empathy and compassion help us deal with conflicts? Induced perspective-taking can facilitate autonomic attunement and reduced negative affect after conflicts (Nelson et al., 2017). In a systematic review on the roles of affective empathy, personal distress, and compassion in interpersonal and intergroup conflicts, it was found that empathy, compassion, and training thereof may facilitate the resolution of interpersonal and intergroup conflicts and overcome otherwise limiting factors such as intergroup empathy bias, identifiable victim effect, and reduced motivation for empathy toward out-group members (Klimecki, 2019).

Can compassion be cultivated through non-religious training to safeguard post-conflict well-being? As well-being can be promoted by mental skills related to inner experiences, there has been an emerging interest on cultivating compassion toward self and others (Gilbert, 2019). For examples, studies of loving-kindness meditation demonstrated that a brief practice was able to increase feelings of social connectedness and affiliation toward

strangers (Hutcherson et al., 2008) and that repeated weekly training sessions led to increase positive emotions, mindfulness, feelings of purpose in life and social support as well as to decrease illness symptoms (Fredrickson et al., 2008).

While a comprehensive review of compassion training is beyond the scope of this paper, the literature suggested that compassion-based interventions produced moderate effect sizes for reduced suffering and improved life satisfaction, suggesting the potential benefits of compassion-based interventions on a range of outcomes related to well-being (Kirby, 2017; Kirby et al., 2017). Future research is required to study the effects of Buddhism-derived compassion trainings on conflict resolution.

While perhaps nobody would dislike being a recipient of attunement from others, i.e., being heard and understood, attuning to others, especially to counterparts who stand in conflicts with oneself, may be resisted or even dismissed under some circumstances. Such resistance to attune to unfriendly others may result from fears of being overwhelmed by others' suffering, diversion of one's own limited resources, being exploited, losing the competition, or irrationality that may compromise rule-of-law in society; see Mascaro and Gilbert (2017) for a model of fears, blocks, and resistances of compassion. All these fears point to an attack against one key ingredient of empathy, i.e., identifying with others' pains as if they are your own (Bloom, 2017).

If attunement to others in suffering already has drawbacks, why should anyone attune to counterparts who stand against him or her? Buddhist philosophy provides an answer to this provocative question: If one recognizes *the ultimate nature of mind*, then one can see it is one's own *ego-preserving bias*, not the counterparts in conflicts, that blocks one's equal attunement to self and others and harms one's own post-conflict well-being. That is, any discontents against equal attunement to self and others will cease to exist, *if and only if* one truly recognizes the ultimate nature of mind.

Against this backdrop, we aim to introduce relevant Buddhist concepts in the present work in order to identify an entry point for attunement-oriented interventions to safeguard personal well-being despite inevitable conflicts, although such personal intervention is by no means a substitute for more socially active processes such as better journalism, better accountability of politicians, and better rule of law. We identified an entry point at the point of bifurcation between two incompatible post-conflict responses in an individual: (a) attuning to the counterparts' perspectives and needs *despite* the conflicts and (b) blocking the attunement to the counterparts *due to* the conflicts. We hypothesize that:

Hypothesis 1: A form of bias, namely ego-preserving bias, can prevent a person from attuning to those whose perspectives conflict with his or her own.

Hypothesis 2: A form of compassion meditation designed to cultivate equal attunement to universal suffering of self and others can ultimately eliminate the ego-preserving bias.

Given that people's normal responses to conflicts are driven by the brain that is of limited capacity and irrationalities, it has been noted that "if we are to become more than just actors in ancient archetypal dramas, it requires us to take responsibility to understand our brains" (Gilbert, 2015, p. 265). We wish to add that we also need to take responsibility to understand the ultimate nature of mind. It is in this spirit that we put together this multi-faceted paper with the following sections: Section "Introduction," our post-conflict bifurcation hypotheses, described above; Section "Parsing Our Hypotheses in Terms of Buddhist Concepts," Buddhist notions of the ultimate nature of mind and key processes through which ego-preserving bias can entrap the mind in universal sufferings; Section "Compassion Meditation and How It Maintains Attunement to Others," Buddhist science and practice of compassion to elucidate the ultimate nature of the mind and to remove ego-preserving bias by attuning to friends, enemies, and strangers' universal suffering equally; Section "Incorporating Buddhist Concepts in a Bayesian Active Inference Framework," how the Buddhist notions of "person" can be understood in a Bayesian active inference framework that has powerfully accounted for various forms of complex adaptive systems in the literature; Section "A Brain Model for the Social Cognition, Embodied Identity-Grasping Beliefs, and Compassion Meditation Effects," a putative brain model of the bifurcation of post-conflict responses.

PARSING OUR HYPOTHESES IN TERMS OF BUDDHIST CONCEPTS

Buddha Gotama gave his first teaching on the foundation of Buddhism, Four Noble Truths, namely, (1) Truth of Suffering, (2) Truth of the Origin of Suffering, (3) Truth of Cessation (of suffering), and (4) Truth of the Path (to cessation of suffering), that can be recognized by those noble persons who directly perceive ultimate reality (Tenzin Gyatso, 1997). We consider that our first hypothesis lies in the scope of the second Noble Truths, and our second hypothesis in the scope of the fourth Noble Truths.

To parse our hypotheses in terms of Buddhist concepts, we introduce Buddhist concepts mainly according to three authoritative texts, (1) the Science and Philosophy in the Indian Buddhist Classics, Volume II: the Mind (hereafter, SPIBC-M) (Tenzin Gyatso, 2020), (2) the Princeton Dictionary of Buddhism (hereafter, PDB) (Buswell and Lopez, 2013), and (3) Arya Shantideva's GBWL (Shantideva, c. 700/1979). The transliteration of Sanskrit and Tibetan is printed in all-upper-case and all-lower-case-italic, respectively.

The backbone of our hypotheses is reflected in the following verses from Arya Shantideva's GBWL (BODHISATTVACHARYAVATARA) (Shantideva, c. 700/1979):

Ch. 6, V.52

Since my mind is not physical, in no way can anyone destroy it. But through its being greatly attached to my body, it is caused harm by suffering.

Ch. 8, V.90

First of all, I should make an effort to meditate upon the equality between self and others: I should protect all beings as I do myself

because we are all equal in (wanting) pleasure and (not wanting) pain.

Ch. 8, V.107

Thus, because he loves to pacify the pains of others, He whose mind is attuned in this way, would enter even the deepest hell, just as a wild goose plunges into a lotus pond.

Ch. 8, V.115

Through acquaintance has the thought of "I" arisen toward this impersonal body; So, in a similar way, why should it not arise toward other living beings?

The key concepts in the above verses that will be covered in the following sections include:

(1) In ultimate truth, *mind is not physical*, and therefore it is neither destroyable nor vulnerable for sufferings. We will discuss this notion in Sections "The Nature of Mind and The Ultimate Nature of All Phenomena."
(2) Through certain *acquaintance* (and *misattribution*) processes, mind can be attached to an otherwise impersonal (selfless) collection of aggregates, giving rise of a false identity of "I" that is bound to suffer. We will discuss these processes in Sections "Buddhist Concepts of Person and Its Impersonal Processes and How VIKALPA and PRAPAÑCA Prevent Attunements to Others."
(3) Recognizing the faults of misattribution of "I," one who aspires the ultimate excellence will attune the mind upon the equal identification with self and others and the nature of mind to pacify distorted conceptions. We will discuss these notions in Section "Compassion Meditation and How It Maintains Attunement to Others."

The Nature of Mind

We consider the concept of attunement as synonymous with "awareness," the function of mind. The notion of "attunement to a person" means awareness of a person's mental and sense awareness manifesting in the person's five aggregates (SKANDHAS), described later, which encompass the person's physical and social attributes, e.g., sex, age, nationality, religion, social status, and non-physical attributes, e.g., mental awareness and mental factors, e.g., feelings, intentions, perspectives, memories etc.

The nature of mind is clear (as its ultimate nature) and aware (as its function), as explained in SPIBC-M (Tenzin Gyatso, 2020):

"*Generally, in the context of Buddhist texts, the terms cognition [or comprehension or discernment] (Sanskrit: BUDDHI, Tibetan: blo), consciousness (JNANA), and awareness (SAṂVITTI) are all treated as coextensive or synonymous. The nature of cognition is stated to be awareness, and the nature of consciousness is said to be clear (or luminous) and aware. "Clear" here expresses the essential nature of consciousness, and "aware" expresses its function. "Clear" also indicates: (1) that consciousness is beyond the nature of matter, which is characterized as tangible and obstructive, so it is clear in nature; (2) that just as reflections appear in a mirror, any internal or external object whatsoever — good or bad, pleasant or unpleasant — can appear in consciousness, so consciousness is luminous in that it illuminates objects; and (3) that the essential nature of consciousness is not contaminated by the stains of mental afflictions such as attachment, so its nature is clear or luminous*" (Tenzin Gyatso, 2020).

Buddhist teachers often likened the nature of the mind to a clear lamp shade (Geshe Rabten, 1997; Gelek Rimpoche, 2005). In this metaphor, a clear lamp shade is colorless (clear) and any object that the mind perceives is like a light bulb in the clear lamp shade, which can color the clear lamp shade with the color of its light, e.g., the lamp shade's color becomes red when a light bulb sheds red light to the shade. However, just like the light bulb can never stain the lamp shade, the object perceived by the mind can never stain the mind. Thus, the mind (lamp shade) returns to its colorless clarity as soon as the object (light bulb) is turned off.

In Buddhism, there is a distinction between the ultimate nature of mind (CITTA) and the mental factors (CAITTA). The former is not causally related to any objects other than being aware of them; the latter are causally defined in terms of their functional relationships with other factors, e.g., intention, feeling, discrimination, thinking, etc. Although the ultimate nature of mind is irreducible to physical forms, like a clear lamp shade is irreducible to light bulbs, the mind can be entrapped in an impersonal Bayesian active inference process and the brain, as explained in Sections "Incorporating Buddhist Concepts in a Bayesian Active Inference Framework" and "A Brain Model for the Social Cognition, Embodied Identity-Grasping Beliefs, and Compassion Meditation Effects."

The Ultimate Nature of All Phenomena

The third Noble Truth, the cessation of suffering, refers to the realization of ultimate nature of all phenomena (Nagarjuna, 1995). The key to this realization is to understand the notion of dependent origination (PRATĪTYASAMUTPĀDA), and thus it has ontological, epistemological, and soteriological implications. In Buddha Gotama's earliest teaching, PRATĪTYASAMUTPĀDA was explained as "*from the arising of this, that arises; from the cessation of this, that ceases,*" Later, Arya Nāgārjuna, the founder of the MAHAYANA MADHYAMAKA school, expounded this notion further that everything comes into existence in dependence on something else, with such dependence including (1) the dependence of an effect upon its cause, (2) the dependence of a whole upon its parts, and (3) the dependence of an object on the consciousness that designates it. The MADHYAMAKA school sees a necessary relation between dependent origination and emptiness (ŚŪNYATĀ), arguing that because everything is dependently arisen, everything is empty of independence and intrinsic existence (SVABHĀVA) (Buswell and Lopez, 2013). When a person directly perceives the union of dependent origination and emptiness, the person is considered to become totally enlightened, as a buddha (Nagarjuna, 1995; Tenzin Gyatso, 2009).

In sum, as far as the ultimate truth is concerned, the nature of mind, which is clear and aware, and the nature of all phenomena, which is dependent origination, are both empty of intrinsic existence, i.e., the ultimate nature of what is observed is not identical to what it appears in phenomena.

Buddhist Concepts of Person and Its Impersonal Processes

The concept of person, as in the "attunement to a person," does not refer to an indivisible entity, but a collection of five aggregates (SKANDHAS) functioning in an *impersonal* (selfless) process of dependent origination, including: (1) materiality or form (RŪPA), (2) sensations or feelings (VEDANĀ), (3) perception or discrimination (SAṂJÑĀ), (4) conditioning factors or volitional actions (SAṂSKĀRA), and (5) consciousness (VIJÑĀNA). According to PDB, in this impersonal process of perception-action cycle, consciousness (VIJÑĀNA) in one of six modalities (visual, auditory, olfactory, gustatory, bodily, and mental consciousness) occurs as the result of the interactions between an internal sense base (INDRIYA) and an external sense object (ĀYATANA) in each modality. When the internal sense base, external sense object, and consciousness co-occur in a contact (SPARŚA), it leads to the feeling (VEDANĀ) of that contact as pleasant, unpleasant, or neutral. At that point, however, this *impersona*l process can be intruded by a sense of ego, which refers to the perspective of a conceited, self-affirming "I" when all sensory experiences are perceived in relation to "I" itself. After the intrusion of ego, this process becomes egoistically personal, whereby what one feels, one perceives (mediated by a prior mental image) (SAṂJÑĀ); what one perceives, one thinks about (VITARKA); and what one thinks about, one proliferatively conceptualizes (PRAPAÑCA), all infused with the sense of self. As a result, the person lives in a bondage to SAṂSĀRA, when everything that can be experienced in the past, present, and future is bound together into a tangled network of concepts, all tied to oneself and projected into the external world as craving (TṚṢṆĀ), conceit (MĀNA), and wrong views (DṚṢṬI) (Buswell and Lopez, 2013).

The conceptual proliferation (PRAPAÑCA), as described above, refers to the tendency to superimpose the perspective of ego throughout all of one's sensory experience via the medium of concept (Buswell and Lopez, 2013). PRAPAÑCA develops when the mind is already infused with conceptual thoughts (VIKALPA) that can be proliferated. Conceptual thoughts (VIKALPA) operate through the medium of generic images (SĀMĀNYALAKṢAṆA), i.e., mental images or qualities that are generic to a class of phenomena, as opposed to those specific qualities that are unique to a given object. Closely related to VIKALPA is a mental factor of thinking or applied thought (VITARKA), which refers to a mental factor of an initial engagement of or inquiry into an object that is not sufficient for a full-blown VIKALPA (Tenzin Gyatso, 2020). Both conceptual thoughts (VIKALPA) and conceptual constructions (KALPANĀ) are often contrasted against the direct perception (PRATYAKṢA), especially yogic direct perception (YOGIPRATYAKṢA), in which reality is perceived directly without the medium of mental images (Buswell and Lopez, 2013).

How VIKALPA and PRAPAÑCA Prevent Attunements to Others

It is important to note that mental awareness is one of six kinds of consciousnesses, in addition to five sense consciousness, i.e., vision, audition, olfaction, gustation, and bodily senses, which are afforded by different organs in the body (Tenzin Gyatso, 2020). The percepts in sense consciousness are direct perceptions when three factors, an object (say a cup), sense organ (eyes), and a top-down model from a previous moment come in contact. As the sixth kind of consciousness, mental awareness is pervading but distinct from the sense consciousnesses, as mental awareness is non-organic (not bound to an organ) and non-local (not bound to any perceived object at a specific locus in time and space). Nonetheless, mental awareness can be conceptual, mediated by mental images, which can obscure direct perceptions. When a person's mental awareness becomes nothing but direct perception of any phenomenon as it is, i.e., non-conceptual (unmediated by mental images), the person is a buddha (Tenzin Gyatso, 2020).

As Dharmakirti said, the nature of the mind is luminous clarity and the stains are adventitious (Tenzin Gyatso, 2020), so attunement to one's counterpart can occur despite conflicts, because mental awareness is not bound to attributes that one's sense and conceptual consciousnesses have designate as conflicts. That is, conceptual thoughts that obstruct direct perceptions (attunement) of self and counterparts are only adventitious "stains" to the mind. Since the primary causes of mind-entrapping "stains," VIKALPA and PRAPAÑCA, are not inherently existing, they can be ultimately eradicated through systematic methods.

To promote the awareness of VIKALPA and PRAPAÑCA, we hereby discuss how VIKALPA and PRAPAÑCA are related to our first hypothesis. According to Arya Asanga, PRAPAÑCA is a process that can proliferate and embody eight types of conceptual thoughts (VIKALPA) that are supported by three levels of substances, i.e., vehicles of conceptual thoughts (Asanga, 2016). The eight types of VIKALPA are as follows.

Type 1. The conceptual thought that conceives of an essential nature.
Type 2. The conceptual thought that conceives of a distinguishing characteristic.
Type 3. The conceptual thought that grasps a collection (of distinguishing characteristics) as a separate entity.
Type 4. The conceptual thought that conceives of an "I."
Type 5. The conceptual thought that conceives of entities as being "mine."
Type 6. The conceptual thought that conceives of entities as being agreeable.
Type 7. The conceptual thought that conceives of entities as being disagreeable.
Type 8. The conceptual thought that conceives of entities as being neither agreeable nor disagreeable, thus leading to an attitude of indifference toward it.

VIKALPA are embodied in three levels of substances (vehicles), which are developed in the order described below (Asanga, 2016):

Level I: this level of substance provides a basis for the first three types of VIKALPA (Types 1–3). These three types are beliefs that a property exists deterministically in a specific form, identical to

its observed appearance, independent of specific circumstances. This substance serves as the basis of PRAPAÑCA, a proliferating process that superimpose ego onto an impersonal process, through which the next levels of substances, and the VIKALPA supported by them, develop.

Level II: this level of substance is the basis of the next two types of VIKALPA (Types 4–5). The view of ego is one that erringly grasps a self that is separate from a collection of perishable events, i.e., the "I" who affirms itself to exist, which is the root of all egocentric views. The egoistic views feed an egoistic conceit—a sense of entitlement to justify an event's value as "good" or "bad" according to one's own views, self-affirmingly, e.g., "It's good or bad (because I think so)."

Level III: this level of substance is the basis of the last three types of VIKALPA (Types 6–8)—which evaluate entities as being agreeable, disagreeable, or neither and give rise to craving, hatred, or ignorance according to circumstances, respectively.

In the context of conflicts, we postulate that the eight types of VIKALPA and the three levels of substances can account for the identity-dependent social cognition, as follows:

The first three types of VIKALPA (Types 1–3) point to the fundamental reification (SAMĀROPA), i.e., a mistaken attribution to an object of a quality that the object does not in fact possess (Buswell and Lopez, 2013). When dealing with complex social interactions, the subtle VIKALPA compels a person to think of characteristics that he or she believes to be identical to another person's "true nature," forming a mis-belief that the true nature of a person is identical to certain attributes based on *generic images of a person*, such as stereotypes of gender, race, religion, nationality, etc.

The middle two types of VIKALPA (Types 4 and 5) point to a further reduction of a person to divide up the world based on available existing identities, i.e., the identity of the observing subject "I" that is different from the identities of the observed objects, including other people. Based on the level of similarity between the identities of self and others, other people whose generic images are relatively similar to "I" are reduced to the identity of "my people" (in-group), and those others whose generic images are distinct from "I" are reduced to the identity of "not my people" (out-group). These identities of "I" and "my people" are *over-reductions* because nuanced information that is not represented by generic images, such as feelings, thoughts, and relationships, is disregarded erroneously in the construction of the VIKALPA. We refer to these types of VIKALPA as identity-grasping beliefs. As beliefs, these embodied identity-grasping thoughts are always biased to serve the ego, *self-righteously*, disregarding any counter evidence suggesting that this may be a misbelief (wrong view).

The last three types of VIKALPA point to the generic images of friends, enemies, and neutral persons who can serve as objects that can invoke feelings of attraction, repulsion, and indifference, and these feelings lead to thoughts and actions that behaviorally condition a person in a network of concepts. These types of VIKALPA are cognitive bases of ego-preserving bias. A person with ego-preserving bias will strive to maintain his or her prior beliefs related to self and others, denying or neglecting any data that suggest nuanced information inconsistent with his or her own identity-grasping beliefs.

Thus, as our first hypothesis, we hypothesize that ego-preserving bias can prevent a person from attuning to those whose perspectives conflict with his or her own. If someone firmly holds an identity-grasping belief, any conflicts between self and others can be over-reduced to an inevitable battle between good and evil categorically (however fictitious that may be), and this person will self-affirm his or her own view and act to preserve his or her own egocentric interest. In such ego-preserving bias, there is no space or need to attune to the counterparts' expectations and interests or their fleeting thoughts and feelings.

COMPASSION MEDITATION AND HOW IT MAINTAINS ATTUNEMENT TO OTHERS

"If you want others to be happy, practice compassion; if you want to be happy, practice compassion." by Khunu Lama Tenzin Gyaltsen, according to HHDL Tenzin Gyatso

In Buddhism, compassion (KARUNA), i.e., the wish that others be free from suffering, and benevolence (MAITRI), i.e., the wish that others be happy, are like two sides of the same coin (Buswell and Lopez, 2013). In this section, we will introduce Buddhist compassion meditation and explain how it can subdue ego-preserving bias, hence making it possible to attune to self and others equally and make self and others happy (being well).

Three Types of Suffering to Be Recognized in Compassion Meditation

As the wish for others to be free from suffering, the meaning of compassion is incomplete in the absence of the recognition of suffering. According to Buddhism (Tenzin Gyatso, 2020), when a person's mental awareness is obscured by conceptual thoughts (VIKALPA), or conceptual construction (KALPANĀ), life is nothing but SAṂSĀRA—a bondage to three types of suffering (DUHKHAS), as follows (Buswell and Lopez, 2013):

(1) Misery caused by physical or mental suffering (DUHKHADUHKATA).
(2) Misery caused by change (VIPARINAMADUHKHATA), i.e., pleasant sensations may be a cause of suffering because they do not persist and eventually turn into pain.
(3) Misery caused by conditioning (SAMSKARADUHKHATA), i.e., sensations that are neither painful nor pleasant may still be a cause of suffering because they are impermanent and thus undependable; because of past actions (KARMAN), suffering may always occur unexpectedly in the next moment.

The three types of suffering can be named differently in social domains (Buswell and Lopez, 2013):

(1) The misery caused by mental suffering can manifest as "the suffering of being associated with persons and things one dislikes," which involves VIKAPLA of thinking a generic image of enemies.
(2) The misery caused by change can manifest as "the suffering of being separated from persons and things one likes," which involves VIKALPA of thinking a generic image of friends.
(3) The misery of conditioning can be summarized as "the suffering of not getting what one wants," which involves the dissatisfaction despite the push-and-pull between the VIKALPA of thinking enemies, friends, and anyone in between.

We point to the following ingenious animal study as a model to illustrate the three types of suffering. In this study, the rats were implanted with electric stimulation in the lateral hypothalamus and they were placed in a shuttle box, with a lever on either end of the box. Pressing the lever in one end could turn on electric stimulation and the lever in the other end could turn it off. Electric stimulation of the lateral hypothalamus is known to evoke appetite and other motivational behaviors. Surprisingly, after the rats learned to press the levers to turn the stimulation on or off, the rats ran between two ends constantly, alternating between turning on the stimulation on one end and turning it off on the other end (Mendelson and Freed, 1973). Thus, neither of the presence ("on") and absence ("off") of electric stimulation in the lateral hypothalamus can fully satisfy the rats such that they can stop running.

Using this animal study as a metaphor, a person entrapped in VIKALPA and PRAPAÑCA is like the rats in the study described above. Say, evoking a mental image of "friend" or "enemy" is like turning on the electric stimulation in the rats, and the cessation of this mental image is like turning off the stimulation in the rat. Whether turning on the stimulation is appetitive (like thinking of a mental image of "friend") or aversive (like thinking of a mental image of enemy), the stimulation or cessation of these mental images are miseries caused by suffering or miseries caused by change (the first two types of suffering); and the conditioning that causes the alternation between turning on and off a mental image is misery caused by conditioning actions (the third type of suffering).

Buddhist Compassion Meditation - *Lojong*

Lojong (or *blo sbyong*) is a specific compassion meditation to train (*sbyong*) a practitioner to comprehend (*blo*) the ultimate nature of mind and all phenomena. It emphasizes how to see conflicts (and other circumstances that are ordinarily upsetting or depressing) as reasons for happiness in the perspective of dependent origination, e.g., thinking that difficulties faced in day-to-day life are exhausting negative karmic results of one's own non-virtuous actions in the past; how to transform a self-cherishing attitude into cherishing others, by contemplating the illusory nature of the self, the faults in self-cherishing, and the benefits that flow from cherishing others; the trainings are based primarily on the techniques for equalizing the attunement to self and others and exchange of self and other by taking other's suffering and giving them self's happiness (Buswell and Lopez, 2013).

Notably, the exchange of self and other, known as give-and-take (*tonglen, or gtong len*), depends on one's firm re-appraisal of how one relates to adversities that one experiences, that is, from seeing adversities as unwanted trash to welcoming them as treasury, as it exhausts negative consequences of past non-virtuous deeds, and enhances one's renunciation of such non-virtues and compassion for others who shared the same experiences, and aspiration for realizing the ultimate nature of mind and all phenomena for the benefits of all, as stated in GBWL (Shantideva, c. 700/1979):

Ch. 6, V.21
Furthermore, suffering has good qualities: through being disheartened with it (SAṂSĀRA is renounced), arrogance is dispelled, compassion arises for those in cyclic existence, evil (non-virtue) is shunned, and joy is found in virtue.

Since adversities can never obstruct the ultimate nature of mind, this is why the transformation of adversities is always possible if one realizes the ultimate nature of mind. On the basis of such transformation, our second hypothesis points to the pith of *lojong* meditation, the equal attunement to self and other's universal suffering, as stated in GBWL (Shantideva, c. 700/1979):

Ch. 8, V.90
First of all, I should make an effort to meditate upon the equality between self and others: I should protect all beings as I do myself because we are all equal in (wanting) pleasure and (not wanting) pain.

Ch. 8, V.91
Although there are many different parts and aspects such as the hands; As a body that is to be protected they are one. Likewise all the different sentient beings in their pleasure and their pain have a wish to be happy that is the same as mine.

Ch. 8, V.92
The suffering that I experience does not cause any harm to others. But that suffering (is mine) because of my conceiving of (myself as) "I"; Thereby it becomes unbearable.

Ch. 8, V.93
Likewise the misery of others does not befall me. Nevertheless, by conceiving of (others as) "I" their suffering becomes mine; Therefore it too should be hard to bear.

Ch. 8, V.94
Hence I should dispel the misery of others because it is suffering, just like my own, and I should benefit others because they are sentient beings, just like myself.

Ch.8, V.131
If I do not actually exchange my happiness for the sufferings of others, I shall not attain the state of Buddhahood and even in cyclic existence shall have no joy.

Prerequisites of Practicing Buddhist Compassion Meditation

On the basis of firm renunciation of ego-preserving bias, a *lojong* practitioner has to first cultivate equality in three levels as prerequisites (Gelek Rimpoche, 2007):

(1) The first level is dwelling on the notion of wishing all beings to be happy and free from suffering.
(2) The second level is the notion of developing equanimity to friends and enemies within one's self, i.e., inhibiting one's attraction to friends and repulsion from enemies.
(3) The third level is the notion of *identifying with* friends and enemies *equally* as if their sufferings are one's own.

Notably, only the third notion, that of identifying with friends and enemies equally, is directly aiming to counter ego-preserving bias. Due to the unwavering equality among self, friends, and foes, this notion of equal identification is therefore not the same as bias-prone *partial* identification, deemed as irrational side effects of empathy (Bloom, 2017), which only further corroborates the necessity of renunciation of ego-preserving bias before practicing *lojong*.

Main Practice of Buddhist Compassion Meditation

After the prerequisites, a *lojong* practitioner is ready to cultivate a concentrated meditation on Awakening Mind (BODHICITTA), i.e., the intention to reach the complete, perfect enlightenment, in order to liberate all sentient beings in the universe from suffering. This goal is informed by the recognition of the nature of universal sufferings, as the targets to eliminate, and knowledge of the nature of the mind, as the basis of eventual success. We hereby introduce a technical feature of compassion meditation that is directly relevant to our second hypothesis and explain how it may counter PRAPAÑCA and VIKALPA that cause ego-preserving bias, as follows.

Je Tsongkhapa (1357–1419) taught that a compassion meditation practitioner should focus on the friend, enemy, and those in between, thinking, 'I'm going to help them' (Gelek Rimpoche, 2014). Likewise, benevolence (or loving-kindness) meditation is to focus on the friend, enemy, and those in between, thinking, 'I'm going to make them happy.' Typically, in these forms of meditations, the three types of people (friends, enemies, and in-between) are visualized in front of the practitioner, and then compassion or benevolence is generated and distributed to them equally.

We postulate that the visualization of friends, enemies, and anyone in between in one's "meditation field" invokes the mental images of these people, which are preexisting VIKAPLAS in one's mind. By spatially arranging these three mental images in the "meditation field," with the images of friends and enemies put on either side and the neutral persons' image in the center, the inclination to mentally run toward friend or away from enemy is effectively balanced out. By ceasing to have such mental activities of push-and-pull in this visualization process, the conditioning of emotional obsession toward friends, hatred toward enemies, and indifference toward someone in between are gradually weakened and extinguished. In this way, PRAPAÑCA is temporarily suspended and VIKALPA are weakened, from the coarsest type (Types 6–8) to a subtler type of VIKALPA (Types 4 and 5). Ultimately, PRAPAÑCA and VIKALPA as well as resulting identity-grasping belief and ego-preserving bias that are supported by them, can cease to exist when compassion meditation is practiced over time and skillfully mastered.

We hereby summarize a structure of the main practice of compassion meditation below:

(1) Recognize that all people are entrapped in three types of suffering, self and others alike.
(2) Invoke mental images of friends, enemies, and anyone in-between, and arrange these images appropriately in the field of meditation.
(3) Identify with friends, enemies, and anyone in-between *equally*, e.g., their suffering *is* my suffering, no matter who they are.
(4) Think to help them by attuning to their three types of suffering, noticing the resistance from one's own identity-grasping belief and ego-preserving bias, and let go of them.
(5) Concentrate on this state of mind and let go of conceptual thoughts that emerge, focusing on the ultimate nature of mind until the end of the meditation session.

Evidence of Buddhist Compassion Practice Effects

The evidence of *lojong* practice's effectiveness is living in the lives of the practitioners, as demonstrated by many anecdotes. For example, according to a biography of Ribur Rinpoche, a Tibetan monk who practiced and taught *lojong*, he did not lose his compassion and attunement to those who relentlessly tortured him, nor did he feel any psychological sufferings, during his 1959–1976 stint in a Chinese labor camp (Ribur Rinpoche, 1999).

While an experimental trial demonstrating torture-proof effects of compassion meditation is impossible for ethical reasons, a hint of preliminary evidence of our conjecture has been reported in a series of empirical studies testing the effects of a *lojong*-inspired compassion training, Cognitively-Based Cognitive Training (CBCT®), which aims to cultivate equal attunement to self and others, although the practice of self-other exchange (*tonglen*) was excluded in its curriculum and post-conflict well-being was not measured as outcome variables in these studies (Pace et al., 2009; Desbordes et al., 2012; Mascaro et al., 2013; Lang et al., 2019; Ash et al., 2020).

INCORPORATING BUDDHIST CONCEPTS IN A BAYESIAN ACTIVE INFERENCE FRAMEWORK

Recent advances in theoretical neurobiology suggest that Bayesian active inference is a universal principle in biological evolution (Campbell, 2016), genotypic phylogeny (Price, 1970), and phenotypic ontogeny (Friston, 2013). According to Free Energy Principle (FEP) (Friston, 2013; Ramstead et al., 2017), an organism is a self-organizing adaptive system, which develops ergodic (self-repeating) models (1) by sensing the features that the environments require the organism to predict and (2) by acting on what the organism expects the environments to be. In so doing, biological organisms capture free energy and thus defy the second law of thermodynamics that requires everything to naturally dissipate into a higher level of randomness. The FEP framework is described in more details in **Box 1**.

BOX 1 | Free energy principle in biological self-organizing systems.

By interacting with different entities in the environments, biological systems are self-organizing systems that defy the second law of thermodynamics, which requires that everything naturally dissipates into a higher level of randomness. Thus, biological organisms are inter-dependently self-organizing systems. Karl Friston described Free Energy Principle, as a heuristic model of Bayesian active inference system, capable of drawing random fluctuation and outcomes bounded in a sample space (Friston, 2013). An organism can have many layers of Bayesian Networks. In a Bayesian Network, the relations between nodes can be designated as parent (cause), child (effect), or peer (interaction). If *x* causes *y* to change, then *x* is a parent of *y*, and *y* is a child of *x*; if *x* and y mutually depend on each other, then *x* is a peer of *y*. A Markov Blanket of a node, *x*, refers to a set of variables including *x*'s parents, *x*'s children, and *x*'s children's other parents. When all the knowledge in *x*'s Markov Blanket is known, then *x* is known.

Free Energy Principle can be heuristically described as follow. As depicted in **Figure 1**, there are four nodes in a basic Bayesian Network, namely Internal, External, Sensory, and Active States. Internal State is a parent of Active State and a child of Sensory State; External State is a parent of Sensory State and a child of Active State; In addition, Sensory State and Active State are peers, and they are the Markov Blanket of Internal and External States, which means Internal State does not directly observe External State, but it can predict External State through the Markov Blanket. A biological organism is a Bayesian Engine using its Internal State, Sensory State, and Active State to perform Bayesian active inferences of its External State.

(1) External States are the source of observable events that cause sensations and depend on action;
(2) Internal State serves as working models that cause actions and depend on sensations;
(3) Sensory State constitutes a probabilistic mapping from action to external states; and
(4) Active State depends on sensations and working models.

The Bayesian Engine optimizes the inferences actively by updating the prior probability in Internal State to minimize (variational) free energy, the upper bound of prediction error computed as the difference between sensation and actions.

Karl Friston's Bayesian Network Model: Free Energy Principle

Although an adaptive system must possess many layers of Bayesian Networks, Friston described a heuristic model with only four nodes, namely Active State (Node A), Sensory State (Node S), Internal State (Node I), and External State (Node E) (Friston, 2013). Every biological organism is a Bayesian Engine, which consists of Nodes I, S, and A, to perform Bayesian active inferences of Node E from the environments. The Bayesian Engine optimizes the inferences actively by computing the prediction error, i.e., the difference between Node S and Node A, and then updating the prior probability in Node I to minimize (variational) free energy, the upper bound of prediction error. See **Figure 1**.

Thus, a person as a Bayesian Engine can initiate an Internal State as a seed of prior knowledge (prior probabilities) about its environments, and the seed can be transformed into mature "working models" to predict the environments (External State) by utilizing the engine's sensory receptors (Sensory State) and active effectors (Active State). FEP points to the possibility that the development of a working model—from an initial "seed" of prior probability to its eventual maturity—depends on ongoing optimization of Bayesian active inference, prompted by prediction errors of prior models, but the "life span" of a working model will depend on its capacity in capturing (variational) free energy caused by prediction errors.

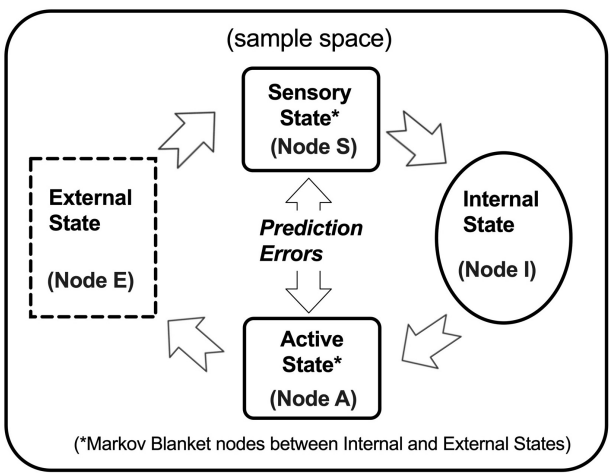


FIGURE 1 | Bayesian active inference framework. Biological organisms are Bayesian Engines, equipped with nodes of Sensory State and Active State (Node S and A, solid round-corner rectangles) and of Internal State (Node I, solid oval), to observe events from the node of External State (Node E, dashed rectangle) in a sample space (bounded by the outer boundary). The causal relations among these nodes follow Free-Energy Principle, described in **Box 1**.

Comparison of Bayesian Network and Five Aggregates

In comparison to Buddhist concepts, we postulate that the *impersonal* Bayesian network may instantiate a network of five aggregates (SKANDHAS). In Buddhist concepts, consciousness (VIJÑĀNA) occurs by the conditioning of an internal sense base (INDRIYA) and an external sense object (ĀYATANA). In the Bayesian network, Node E is equivalent to the external sense object ĀYATANA, while Bayesian Engine (Nodes S, I, A) is equivalent to the internal sense base INDRIYA. When the Node E makes a contact (SPARŚA) with the Bayesian Engine, it leads to the feeling (VEDANĀ), which is equivalent to Node S, of that contact as pleasant, unpleasant, or neutral. Then, Node S leads to Node I (SAṂJÑĀ) when prior models are used to make predictions of the events; the predictions cause Node A to act to interact with the events, so Node A is a conditioning factor or volitional action (SAṂSKĀRA). All these nodes are embodied and supported by materiality or form (RŪPA). In this

process, consciousness emerges when the top-down model (Node I) interacts with the bottom-up data (encoded in Nodes S and A) (He and Raichle, 2009; Bachmann and Hudetz, 2014).

Thus, it is relatively straightforward to create potential mappings between Buddhist concepts and the Bayesian framework. Because of this, we are encouraged to use the Bayesian framework to explicate Buddhist concepts in the process related to conflicts and compassion meditation.

Stress, Resilience, and Free Energy in Bayesian Networks

Since free energy increases when prediction errors increase, and prediction errors increase when one's expected outcomes conflict with others' expected outcomes, conflicts tend to increase free energy temporarily until the Bayesian Engine learns to reduce prediction errors by addressing the conflicts. Accordingly, it has been postulated that stress ensues when an organism's existing working models fail to minimize free energy under challenging circumstances, i.e., uncertainty that threatens one's prior models (Peters et al., 2017). In other words, as a Bayesian Engine, an individual's efficacy in re-capturing (and thus reducing) the free energy induced by conflicts is directly related to the individual's stress resilience. The notion that the exposure and subsequent reduction of conflict promote stress resilience is highly consistent with the stress inoculation hypothesis, supporting that brief intermittent stress exposure in early life can induce relatively low stress reactivity to stressors in adulthood in humans and non-human primates (Parker et al., 2006).

The Embodiment of Bayesian Engine

According to FEP, the development of an individual organism (ontogeny) is a dynamic process of individual-environment transactions that gradually *embody* the functional nodes of the Bayesian Engine. The embodiment of Bayesian Engine is probably corresponding to the notion of clinging to physical existence depending on conceptual imputation, i.e., dependent designation (PRAJÑAPTI UPĀDĀNA). Once embodied, the nodes serve as conditioned circumstances that interact with the environments to register features of an incoming event (via Nodes S and A), as a primary transaction, and then to infer how the Bayesian Engine should relate to the event (via Node I), as a secondary transaction. The embodiment of these nodes makes these primary and secondary transactions *automatic*, such that the agent subjectively experiences phenomena without any efforts. In other words, the agent automatically takes an observer perspective when perceiving events that seem to occur separately from one's viewpoint, hence the split between the observer and the observed (i.e., the emergence of the duality in the mind).

The embodiment of Bayesian Engine does not entitle any intrinsic independent existence of an individual agent. When multiple agents interact in a multi-agent system, each agent is not only a subject of his or her own experience but also an object for other agents. In other words, all phenomena that can be observed must be originated from the interactions among multiple Bayesian Engines. Because none of the nodes in any Bayesian Engines can be a constant (i.e., non-variable), otherwise it will be drop out of mathematical operations that give rise to any phenomena, there cannot be any permanent observer (self) or observed objects (others). Since all nodes are inter-dependent in any Bayesian networks, there is no inherently individual entity as a Bayesian Engine. For a discussion on the limitation of Darwinian self-preservation interpretation in prosocial behaviors, see Ludwig and Welch (2019). We postulate that the self-preservation interpretation should be replaced by the notion of attunement to the environments, including one's counterparts in conflicts.

VIKALPA Mediated the Reification of Self and Other's Divided Identities

By the age of two a child normally develops object permanence, i.e., a phenomenon wherein a child starts to seek an object when it is not sighted surprisingly (Shaffer and Kipp, 2013). The development of object permanence suggests the emergence of mental image that mediates the child's object seeking, implicating an operation of conceptual thoughts (VIKALPA). Because phenomena appear to the observer so automatically and reliably, the observer may likely neglect the mental images mediating the object permanence of self and others, such that identities of self (the observer) and others (the observed) are reified as truly existing, i.e., identity-grasping beliefs. In so doing, the observer may over-reduce others (the observed) to mental objects, neglecting that other people are also living Bayesian Engines who can actually feel (equipped with Node S), do (Node A), and think (Node I). See **Figure 2**.

We wish to underscore that identity-grasping beliefs are not "innately" built-in features of any Bayesian Engines. As demonstrated by the success of artificial intelligence programs, these artificial Bayesian Engines are *impersonal* and free of any identity-grasping, as they never refuse to update any prior models (Silver et al., 2017a,b). Thus, it is clear that identity-grasping beliefs are adventitious not only to the nature of mind, but also to the operations of Bayesian Engines.

A BRAIN MODEL FOR THE SOCIAL COGNITION, EMBODIED IDENTITY-GRASPING BELIEFS, AND COMPASSION MEDITATION EFFECTS

The human neuroimaging literature suggests that mental factors (not the ultimate nature of mind *per se*) can be related to the brain from the perspective of *neurophenomenology* (Varela, 1996). Here we propose a putative brain model to contemplate how five-aggregates-related Bayesian Engine is supported by the brain, and how the brain responds to conflicts in a bifurcating way, either disturbed by identity-grasping beliefs or not. We postulate that *lojong-like* compassion meditations would shun the influences of identity-grasping beliefs (hence ego-preserving bias) in the brain. Notably, this postulation does not necessarily support the notion that the brain is a physical cause of mind. Rather, the putative brain model is like a model of two modes of brain in response to conflicts. Using the clear lamp

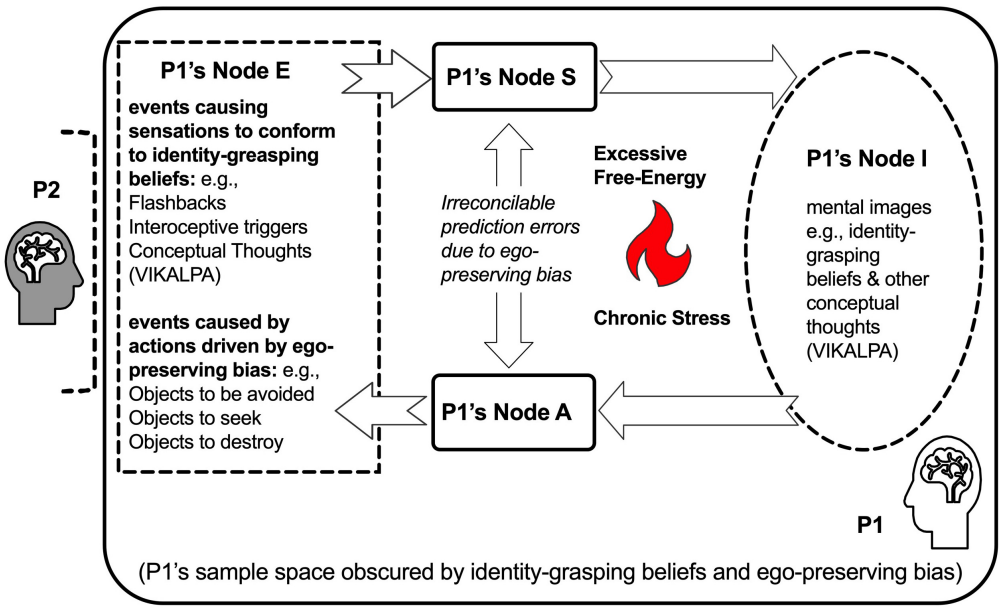


FIGURE 2 | Bayesian Engine in a state that identity-grasping beliefs and ego-preserving bias obscure its sampling space. When identity-grasping beliefs and other conceptual thoughts (VIKALPA) "hijack" a person P1's Node I, these conceptual thoughts explain away prediction errors without attuning to another person P2. The reactions to the events from Node E pre-occupy P1's Nodes S, A, and I at the expense of actual attunement to P2's Bayesian Engine, manifesting as an ego-preserving bias. Outwardly, the identity-grasping beliefs in P1's Node I drive P1's Node A (escape, aggression, or acquisition) to avoid fear-provoking objects and/or seek distracting or addictive objects with negative reinforcement; Inwardly, the sampling of the events is biased toward covert cues, e.g., trauma-related flashbacks, interoceptive triggers, and conceptual thoughts (VIKALPA) that cause fear, anger, or obsession in P1's Node S to re-confirm the conceptual thoughts (VIKALPA) in P1's Node I. In such an obscured state, P1 fails to infer and "see" the other person in the relationship, denoted by the dashed bracket in front of P2. The obscuration of P1's Bayesian Engine is denoted by the other person P2 who is excluded from P1's sample space. Due to the conflicts that are not constructively reduced by the obscured Bayesian Engine, excessive free energy ensues and results in chronic stress.

shade metaphor, the model of brain is not a model of clear lamp shade (the nature of mind), but a model of two light bulbs (two modes of mental factors), in which one light bulb would color the mind with the ego-preserving bias and the other would not.

A Brain Model in Bayesian Framework

The Bayesian active inference framework has been applied to several domains, e.g., self-reference (Carhart-Harris and Friston, 2010), interoception (Barrett and Simmons, 2015), visuo-motor mirror-neuron system (Kilner et al., 2007), and post-conflict well-being (Connolly, 2018). We reported a meta-analysis to explain a post-adversity bifurcation in the brain responses, highlighting a brain network, namely the Affect-Object Generating Network, through which conceptual thoughts can be generated by linking the representations of self (as a proximal object) and others (as a distal object) to affective potentials via thinking processes propelled by a thought generator, depicted in **Figure 3** (Ho and Nakamura, 2017).

We hereby propose a putative brain model of social cognition in the Bayesian framework, as depicted in **Figure 4**. To simplify the description, we will first parse the brain-based Bayesian Engine into three functional components, namely Relation-Modeling, Reality-Checking, and Conflict-Alarming. As seen below, these three functional components are large-scale brain networks that support complex mental processes involved in social cognition in general and cognitive processing of potential conflicts in particular.

(1) Relation-Modeling refers to the development and selection of Relational Models in the Bayesian Engine's Node I (Internal State). It is primarily subserved by the hippocampus and the Default-Mode Network (DMN) that consists of the precuneus, ventromedial prefrontal cortex (vmPFC), orbitofrontal cortex (OFC), (anterior) middle medial prefrontal cortex (mmPFC), dorsomedial prefrontal cortex (dmPFC), perigenual ventral anterior cingulate cortex (vACC), temporal poles, and parietal lobes. We will discuss the functional significance of these regions in Section "Relation-Modeling: Generating Affect-Objects in Conceptual Thoughts (VIKALPA)."
(2) Reality-Checking refers to the detection and regulation of data-driven, primary transactions in the Bayesian Engine. It is primarily subserved by the following frontoparietal areas: (a) the Mirror-Neuron System that automatically detects the intention of others' actions in premotor and parietal areas (Iacoboni et al., 2005), and this Mirror-Neuron System overlaps with the DMN in the parietal lobe; (b) the Ventral Attention Network (VAN) that monitors features of episodic events (reality monitoring), prediction errors, and response conflicts; (c) the Frontoparietal Network (FPN) that performs higher order cognitive

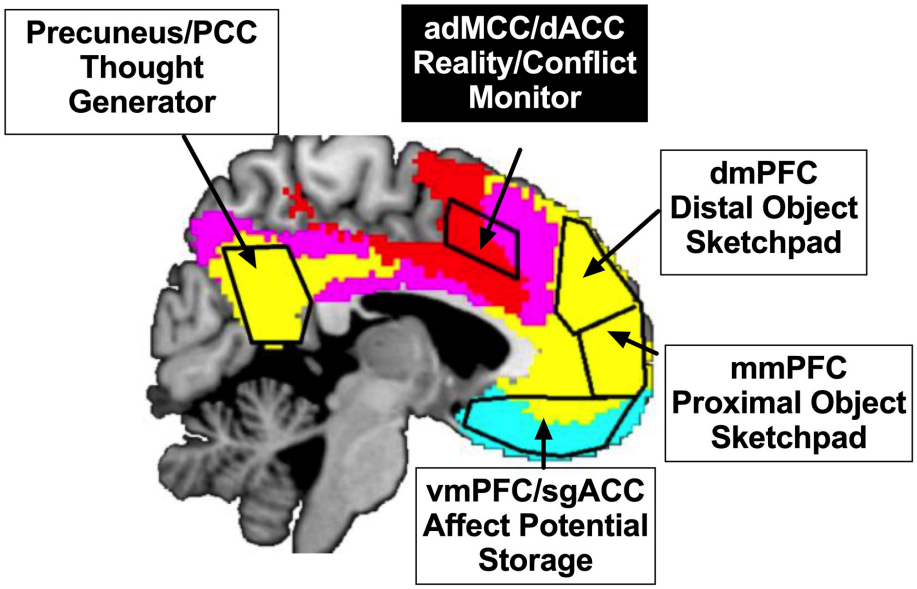


FIGURE 3 | Affect-object generative inference and regulation (AGIR) model, adapted from Ho and Nakamura (2017). There are two systems in the model. In the first system, an affect-object inference generation system encompasses four components: a thought generator in precuneus/posterior cingulate cortex (PCC), an affect potential storage in subgenual anterior cingulate cortex (sgACC) for negative affect and ventromedial prefrontal cortex (vmPFC) for positive affect, a proximal object sketchpad in middle medial prefrontal cortex (mmPFC), and a distal object sketchpad in dorsomedial prefrontal cortex (dmPFC). When "vehicles" of conceptual thoughts are running in this system, thoughts of affect-objects can be represented as mental objects (e.g., self = proximal objects charged with affective potentials; other = distal objects charged with affective potentials). In the second system, a cognitive control system encompasses a component of reality/conflict monitoring in anterior dorsal middle cingulate cortex (adMCC)/dorsal anterior cingulate cortex (dACC) and other cortical components not depicted in the figure. The main function of reality/conflict monitoring is to pause an ongoing affect-object generating thought and observe all modalities of information involved in a potential conflict, allowing an unrealistic expectation generated in the first system to be paused and updated. In terms of cortical networks that are self-organized in intrinsic resting-state functional connectivity in Yeo et al. (2011), the first system primarily involves Default Mode Network (yellow) and Cortical Limbic Network (cyan), and the second system primarily involves Ventral Attention Network (red) and Frontal-Parietal Network (violet). The colors of the components' text boxes are reversed between the two systems, indicating an anti-correlative relationship between them. The demarcation of the brain areas is approximate.

control including working memory that maintains or updates the contents as mental objects (Cohen et al., 1997), and FPN is involved in releasing a set of rules or thoughts according feedback (Buchsbaum et al., 2005) and in spatial frame processing to represent objects according to ego-centric or allocentric (other-centered) references in space. This FPN overlaps with the DMN in the hippocampus, parahippocampal cortex, and retrosplenial cortex (Ekstrom et al., 2014). We will discuss some key functions of this component in more details in Section "Reality-Checking: The Gateway to Attuning to Self and Others."

(3) Conflict-Alarming refers to the intense responses when an individual perceives threats to his or her prior model, as a *special case* of severe prediction error signals in the Bayesian Engine. The Conflict-Alarming component is primarily subserved by the Salience Network (SN), which includes dorsal anterior cingulate cortex (dACC), posterior ventral middle cingulate cortex (pvMCC), bilateral anterior insula/orbital frontal insula, subcortical regions such as periaqueductal gray (PAG), hypothalamus, thalamus, midbrain, striatum (including caudate), and extended amygdala (Seeley et al., 2007). While SN and VAN overlap in several cortical areas, as they are both involved in the processing of prediction error signals, the substrate of Conflict-Alarming component refers to the part of SN that is preferentially activated in pain, i.e., intense emotional responses related to belief-violating or survival-threatening prediction errors (Lieberman and Eisenberger, 2015). According to the public online database providing automatic term-based meta-analysis of neuroimaging studies (Yarkoni et al., 2011), brain regions that are preferentially associated with the term "pain" include the SN mentioned above, and additionally some regions overlapping with the anterior midline regions in DMN (mmPFC, vmPFC, and vACC) and the lateral regions of FPN/VAN (right prefrontal and bilateral parietal lobes). The SN network largely overlaps with the parental brain (Ho et al., 2014; Swain and Ho, 2017) and the SN (amygdala and frontoinsular) responses to infant cry was associated with mother–child intersubjectivity in free play (Hipwell et al., 2015) pointing to the roles of parenting in the development of compassion (Swain et al., 2013). We will discuss some key functions of this component in more details in Section "Conflict-Alarming: The Salience Network at the Pivotal Point."

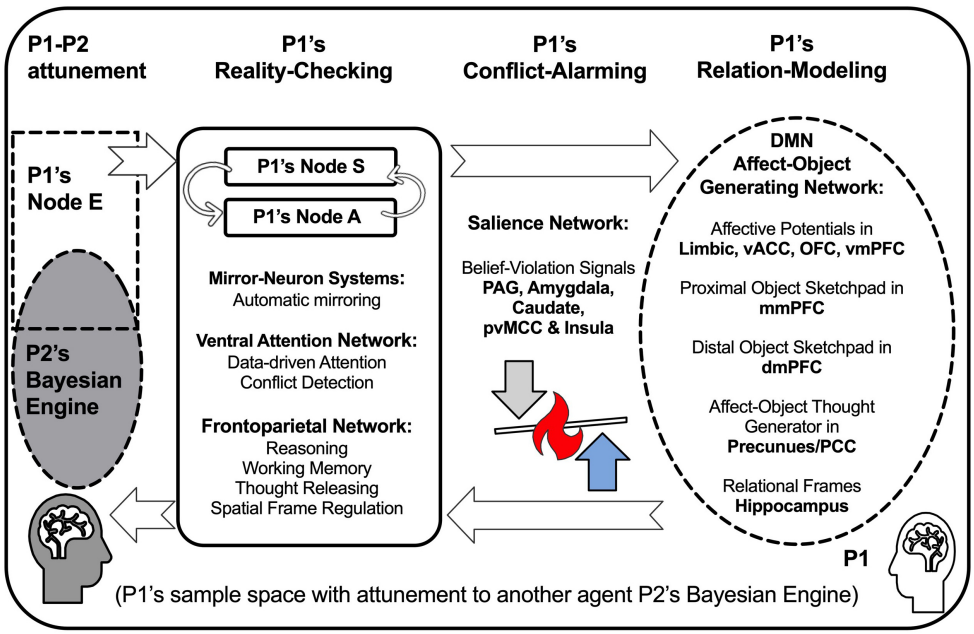


FIGURE 4 | Bayesian Engines in a state of attuning to others, such that all agents (e.g., P1 and P2) in the system are present in the sampling space of their Bayesian Engines. Here, we focus on P1's Bayesian Engine as an example, even though P2's Bayesian Engine is also present in the same sampling space (denoted by the inclusion of P2 in P1's sample space). The Bayesian Engine consists of three functional components, namely Relation-Modeling, Reality-Checking, and Conflict-Alarming. Relation-Modeling is a component, consisting of Node I, wherein conceptual thoughts involving self and others are generated in the Affect-Object Generating Network (part of Default-Mode Network, DMN) in a relational frame generated by hippocampus and parahippocampal cortex. Reality-Checking is a component, consisting of Nodes S and A, subserved by multiple brain networks for data detection, reality monitoring, and attention regulation, including the Mirror-Neuron System, Ventral Attention Network, and Frontoparietal Network. Conflict-Alarming is a component that can be triggered by excessive free-energy due to conflicts that violate one's rigid beliefs, so conflicts can activate the brain regions in the Salience Network, including periaqueductal grey (PAG), amygdala, caudate nucleus, posterior ventral middle cingulate cortex (pvMCC), and anterior insula. We postulate that when a conflict between P1 and P2 occurs, P1's Conflict-Alarming is triggered, then P1's subsequent course of actions can bifurcate, pivotally depending on how P1's Salience Network regulates other brain networks underlying Relation-Modeling and Reality-Checking, denoted by the up/down arrows near the flame: Post-conflict resilience will ensue if the activations of Salience Network consistently down-regulate pre-existing Relation-Modeling and up-regulate Reality-Checking, such that P1 can attune to P2 adaptively, which will ultimately reduce conflicts in the long run; conversely, identity-grasping beliefs and ego-preserving bias will be exacerbated if the activations of Salience Network consistently up-regulate pre-existing Relation-Modeling and down-regulate Reality-Checking, which will generate even more conflicts in the long run.

In what follows, we provide more detailed functional characterizations of the three components in the Bayesian Engine in the context of conceptual thoughts (VIKALPA), attunement, and post-conflict bifurcation.

Relation-Modeling: Generating Affect-Objects in Conceptual Thoughts (VIKALPA)

Some evidence for the designation of these regions' functions is described below. The functional distinction of the affective potential, proximal object sketchpad, and distal object sketchpad is highly consistent with a body of literature showing how the respective brain regions (the vmPFC, mmPFC, and dmPFC) are functionally connected to other brain regions distinctively (Li et al., 2014). The relative distinction between the proximal and distal object sketchpads is that the former can represent one's self and the latter can represent remote objects (animate or inanimate) during mentalization in the mmPFC and dmPFC, respectively. A meta-analysis suggested that self- and other-oriented mentalizations are mapped onto the medial prefrontal cortex with a spatial gradient in the direction from the mmPFC (self-oriented) to the dmPFC (other-oriented) (Denny et al., 2012). When individuals had more gripping experiences during the retrieval of negative autobiographical memories, the mmPFC activation was increased accordingly (Kross et al., 2009). Anatomically, as compared to the dmPFC, the mmPFC (also known as BA10p) is more intimately connected to interoception-processing areas such as the insular, vACC, vmPFC, and OFC (Petrides and Pandya, 2007). The distinction is further supported by a study using machine learning algorithm in neuroimaging to validate their roles across different tasks (Skerry and Saxe, 2014), which documented that both mmPFC and dmPFC can represent cross-modal, abstract values, rather than stimulus-driven values (consistent with the notion that both mmPFC and dmPFC are "sketchpads" that can represent abstract information) and the mmPFC, not dmPFC, can also represent subjectively experienced values (consistent with the distinction of proximal versus distal representation between the two regions); furthermore, the vmPFC can represent subjectively experienced values, rather than abstract values (consistent with its role as affective potential).

In addition to the medial prefrontal cortex, the precuneus/PCC is considered to play a role in thought generation, suggested by the converging evidence that

the precuneus/PCC region is associated with the terms of "thinking" or "thoughts" (Ho and Nakamura, 2017). Indeed, in a neurofeedback study based on the activity level of precuneus/PCC, this region became more active when the participants exerted more efforts in thinking while they performed a self-regulation task and conversely, the region became rested when they achieved a state of mental quiescence (Garrison et al., 2013).

Thus, the Relation-Modeling component is supported by the combination of the Affect-Object Thought Generation—subserved by the amygdala, precuneus, vACC, vmPFC, OFC, mmPFC, and dmPFC—and the Relational Framing—subserved by the hippocampus, parahippocampal cortex, retrosplenial cortex, and parietal lobe. The relation frames provide a temporal-spatial context in which an individual is virtually situated in, and in this context the precuneus/PCC can produce temporal affect-objects by generating thoughts that "affectively color" the representations of self or other in the sketchpads of proximal object (mmPFC) or distal objects (dmPFC), respectively, by channeling the affective potentials (mediated in the amygdala, vACC, OFC, and vmPFC) to these sketchpads, leading to the formation of affect-objects. Under the influences of identity-grasping beliefs, the conceptual thoughts (VIKALPA) regarding the identities of self and others can influence the precuneus/PCC that may serve as the generator of thought (VITARKA).

Reality-Checking: The Gateway to Attuning to Self and Others

The Reality-Checking component should involve the VAN and FPN: the former can monitor background information and inhibit ongoing responses when surprises (prediction errors) happen, and the latter can make information explicitly available in one's awareness. For examples, FPN forms a coherent coupling with another network containing the information (Cole et al., 2013). When individuals become subjectively aware of their spontaneous thoughts generated in Affect-Object Generating Network, they will have co-activation of FPN and DMN (Fox et al., 2015); likewise, the FPN's connectivity with DMN was strengthened when the participants retrieved autobiographical episodic memories from the past or imagining a future scene (both tasks activating the DMN), but not when they were performing visual-spatial tasks unrelated to the DMN (Schacter et al., 2012).

Here, we focus on the adMCC, as it plays an integral role in functions related to both VAN and FPN, e.g., conflict monitoring, working memory, and inhibition (de la Vega et al., 2016). The adMCC region has been specifically identified as a region in which the gray matter structural property is directly associated with reality monitoring performance in a memory task, which required monitoring memory retrieval and inhibiting distractors (Buda et al., 2011). The individual differences in the morphology of adMCC are related to the capacity for the regulation of negative emotions (Shackman et al., 2011).

Notably, the roles of the reality-monitoring adMCC in FPN/VAN and the distal object dmPFC in DMN are dissociable in social cognition. In an empirical study (Sommer et al., 2007), the dmPFC in DMN was more activated when individuals predicted what others might do on the basis of a belief that was identical with the self's perspective (undifferentiated belief), as compared to what they might do on the basis of a differentiated (individuated) belief, when the other's perspective would be opposite to the self's; conversely, the regions in FPN/VAN, including the dACC/adMCC, right prefrontal cortex, right temporal parietal junction, and right dorsal precuneus were more activated in differentiated belief than in undifferentiated belief conditions. This study provides supportive evidence that the dmPFC represents another person's attributes as a distal object in an ego-centric frame (which is VIKALPA-dependent), while the dACC/adMCC is needed when one represents others in an allocentric frame with differentiated perspectives. Interestingly, always seeing another person in an ego-centric frame is considered a symptom of under-developed self with inadequate understanding of others (Kohut, 1982; Summers, 2014). Thus, the Reality-Checking component of the Bayesian Engine, mediated by the FPN/VAN, can be considered a gateway to facilitate engagement with others effectively, as it enables the person to see self and other's subjectivity flexibly.

Conflict-Alarming: The Salience Network at the Pivotal Point

We postulate that excessive free energy should trigger the SN underlying the Conflict-Alarming component, thus the SN should play a pivotal role in regulating the dynamic coherence between the DMN and FPN/VAN underlying Relation-Modeling and Reality-Checking components, respectively.

In accordance with this notion, it has been found that the SN can initiate the up- or down-regulation of DMN and FPN/VAN (Goulden et al., 2014). In addition, the striatum, as part of the Conflict-Alarming component, also plays a pivotal role in regulating DMN and FPN. In a healthy state, violation of expectations (a form of prediction error) can activate the caudate (O'Doherty et al., 2004) and the caudate was associated with urge-to-react (Jackson et al., 2011). The urge to smoke increased response in the vACC and vmPFC along with increased craving for nicotine in smokers (Wilson and Sayette, 2015). Patients with Obsessive Compulsive Disorder (who have excessive urge-like thoughts or behaviors) showed excessive coupling between the caudate and the vACC, vmPFC, and dmPFC (Harrison et al., 2009). When facing a fear-evoking situation, a stronger coupling between the caudate and vACC (part of DMN) resulted in a greater urge to react with unnecessary but prepotent responses, while a stronger coupling between the caudate and right prefrontal cortex (part of FPN/VAN) resulted in the inhibition of the urge to act out the unnecessary reactions (Gillan et al., 2015). Thus, the caudate can up- or down-regulate FPN and DMN motivationally. When healthy individuals were challenged by acute stressors in the laboratory, their adaptive coping responses increased when the SN increased its functional connectivity with the FPN, but their negative affects and ruminative thoughts increased when the SN increased its functional connectivity with the DMN (van Oort et al., 2017).

The SN may fail to down-regulate the DMN when one's mental states are associated with exacerbated ego-preserving bias. For example, after trauma-related episodes were triggered,

the functional connectivity among the amygdala (part of SN) and vACC and vmPFC (part of DMN) was hyperactive in patients with PTSD (Dunkley et al., 2014). The integrity of SN, measured as the white matter tractography between the right anterior insula and dACC, was associated with the capacity for response inhibition, which was achieved by deactivating DMN when receiving a signal to stop a response (Bonnelle et al., 2012). Indeed, the dACC and anterior insula in the SN are of great clinical significance because structural and functional deficits of these regions are commonly identified in multiple major psychiatric disorders including major depression, anxiety, obsessive-compulsive (OCD), substance use, bipolar, and schizophrenia disorders (Goodkind et al., 2015).

The Brain Model Underlying Post-conflict Bifurcation

According to our model, prior models supported by conceptual thoughts of self and others (VIKALPA) are subserved by DMN in the Relational Modeling component. Reality is registered and prediction errors are detected by FPN/VAN in the Reality-Checking component. When interpersonal conflicts contradict the prior model, SN in the Conflict-Alarming component is triggered. This Bayesian model is consistent with a recent meta-analysis on brain responses to viewing faces of same or different races (Bagnis et al., 2020). In this meta-analysis, own- and other-race visual categorizations led to distinct activation patterns in the brain: Categorization of own-race mainly activated DMN and categorization of other-race mainly activated visuo-attentive processing and amygdala (part of SN) (Bagnis et al., 2020). We interpret these meta-analysis results as consistent with our model, because the same-race stimuli are relatively familiar and similar to the prior models stored in DMN, so these stimuli can mainly activate DMN; and the other-race stimuli are relatively unfamiliar and dissimilar to the prior models, so they may carry more prediction errors (relative to the same-race stimuli) to activate the SN and other reality-checking regions.

We hereby describe how this brain model can explain the post-conflict bifurcation between maintaining the attunement and exacerbating ego-preserving bias. As described in the section above, when excessive free energy resulting from conflicts activates the Conflict-Alarming component, the underlying SN plays a key role in the regulation of what behavior will follow afterward. When the SN down-regulates the DMN and up-regulates FPN/VAN, the person can inhibit the previous Relational Models and potentially engage more productively with the ongoing demands from the environments. When the SN fails to down-regulate DMN, the Bayesian Engine would not be able to use the excessive free energy to inhibit ongoing prepotent Relational Models subserved by DMN, and then the person is susceptible to urges to act out automatic habitual behaviors that are entangled with prior models instantiated in the Bayesian Engine. In other words, in the latter case, the individual will exacerbate the ego-preserving bias, which manifests as the inability to update one's prior models or beliefs in the presence of salient prediction errors during the conflicts with others.

The notion that SN's post-conflict up-regulation of DMN can indicate a potential exacerbation of ego-preserving bias is consistent with a recent neuroimaging study on implicit racial bias in samples of Black and White Americans (Wang et al., 2019). As shown in this study, both Black and White participants rated other people's social encounters less favorably when the social encounters were cross-race, involving one Black and one White person, as compared to those same-race encounters involving two persons of the same race; both Black and White participants showed reduced reward activities, indicating negative values as prediction errors in rewards, and enhanced activities in the temporal-parietal junction in the DMN when viewing the cross-race encounters as compared to same-race ones (Wang et al., 2019).

In addition, the ego-preserving bias may be exacerbated when certain overlapping regions between the Relation-Modeling and Reality-Checking components are functionally impaired. These regions include the parietal lobe, hippocampus and adjacent hippocampal cortex, and retrosplenial cortex, which are all closely related to spatial frame processing and regulation. These overlapping regions are known to mediate the regulation of egocentric-allocentric frames in a mental space, which is key to interpersonal understanding and resilience to adversity (Frith and de Vignemont, 2005; Gilbertson et al., 2007; Langston and Wood, 2010; Ekstrom et al., 2014). As evidenced in animal models (Hammels et al., 2015), hippocampus and related regions are crucial regions mediating the bifurcation of post-trauma stress disorders and resilience. The hippocampus is crucial for pattern differentiation and contextual frame completion. The neurogenesis in hippocampus is crucial for the resilience in chronic stress and mood regulation through enhancing cognitive flexibility (Anacker and Hen, 2017), and social experiences can modulate the hippocampal neurogenesis (Dranovsky et al., 2011). Conversely, the impairment of hippocampus will compromise contextual frame processing, e.g., allocentric spatial framing, (Langston and Wood, 2010). In human twin studies, the weaker capacity of hippocampus-dependent allocentric framing is a dispositional risk factor for developing posttraumatic stress disorders (Gilbertson et al., 2007).

The Relations Between Compassion Meditations and the Brain Model

Here we postulate some predictions of compassion meditation effects on the brain based on our Bayesian brain model, discussed above. First, we predict that compassion should inhibit conceptual thoughts (VIKALPA) that are generated in the affect-object generating network, which is largely overlapping with DMN, as part of the Relation-Modeling component. This is consistent with a neurofeedback study showing that the more one can rest the precuneus/PCC, which may be a generator of active conceptual thoughts in the DMN, the calmer and peaceful the participants can be in the study (Garrison et al., 2013).

Second, we predict that the compassion meditation can enhance the attunement to others through enhancing the

reality monitoring capacity or volume in the adMCC (Buda et al., 2011), as the volumes of adMCC are related to the capacity for the regulation of negative emotions (Shackman et al., 2011). This is consistent with the meta-analysis of meditation, showing that the activity in the adMCC is enhanced by both open monitoring meditation that improves awareness of spontaneous mental phenomena and single-pointed meditation that improves attentional focus and stability (Fox et al., 2016).

Third, we predict that the compassion meditation can enhance the capacity in the FPN/VAN as part of the Reality-Checking component through enhancing the attunement to others' feelings. This is consistent with several studies showing that long-term meditation practitioners have increased cortical thickness in the frontal-insular cortices, and greater responses in these regions when performing loving-kindness meditation, as compared to meditation-naive controls (Engen et al., 2018). Interestingly, enhancing the attunement to others' feelings may be different from feeling painful when observing other people in pain. In a neuroimaging study, the long-term meditation practitioners, who practiced mindfulness meditation just prior to observing others' social pain, showed reduced left anterior insula activation during the observation of others' pain, as compared to meditation-naive controls, and the strength of the anterior insula activation following the mindfulness meditation was negatively associated with levels of trait compassion in these long-term meditation practitioners (Laneri et al., 2017). While these results may suggest that concentration meditation could reduce potential vicarious distress due to the observation of others' suffering, an alternative explanation may be that the practitioners have reduced their alarming signals, as the anterior insula is a key region in the SN, as part of the Conflict-Alarming component, because they have reduced ego-preserving bias when observing others' suffering.

Lastly, as described above, the hippocampus and adjacent areas play a critical role in the bifurcation of post-trauma mental disorders and resilience (Hammels et al., 2015), possibly by promoting the neurogenesis in hippocampus that can enhance cognitive flexibility (Anacker and Hen, 2017). Furthermore, a human twin study suggested that the weaker capacity of hippocampus-dependent allocentric framing is a dispositional risk factor for developing posttraumatic stress disorders (Gilbertson et al., 2007). Thus, we predict that compassion meditation should help promote the capacity in the hippocampus and adjacent areas by its spatial arrangement of the visualization of the mental images of friends, enemies, and anyone in between. Specifically, we predict that compassion meditation can promote neurogenesis in the hippocampus after conflicts or other anxiety-provoking situations. This prediction is consistent with a randomized controlled longitudinal study: (1) after mindfulness meditation training, the volume increases in the left subiculum (potentially due to neurogenesis in the hippocampus) were associated with decreased coupling between the left hippocampus and two clusters in lateral occipital cortex, and (2) the larger decreases in the hippocampus-occipital functional coupling were associated with the larger decreases in anxiety levels after the meditation training (Sevinc et al., 2020).

The Neuroscience of Compassion Meditations

Neuroimaging research in the neural correlates of compassion meditation is still in its infancy. While more studies are needed to test our predictions described above, results from some studies on neuroscience of compassion meditation or similar training are described here. In a meta-analysis of functional neuroimaging research in compassion based on 16 fMRI studies reviewed, the shared brain regions that are consistently related to compassion were identified, including the PAG, bilateral anterior insula, and putamen, which are part of the SN, the dorsal ACC/adMCC, which is part of the FPN/VAN, and the inferior frontal gyrus and subgenual ACC, which are part of DMN. This meta-analysis failed to identify regions purportedly common to compassion such as the DLPFC, OFC, and amygdala, possibly due to the inclusion of a small number of studies that used loving-kindness meditation in their meta-analysis (Kim et al., 2020).

Specifically, a 2-week compassion training (focusing on benevolent wishes for family, friends and difficult people) was found to have increased altruistic behaviors, which were associated with altered activation in the inferior parietal cortex and dorsolateral prefrontal cortex (DLPFC), and in DLPFC connectivity with the nucleus accumbens (Weng et al., 2013). In a randomized study investigating effects of 2-week compassion vs. reappraisal training (Weng et al., 2018), neural responses were measured before and after training while participants actively engaged in their assigned training in response to images depicting human suffering or non-suffering; the study found that increases in the amount of time looking at aversive images due to compassion training were associated with decreases in the amygdala responses. The authors of the study suggested that compassion meditation can cultivate an enhanced motivation to look at visual images depicting suffering while attenuating amygdala responses to the aversiveness of stimuli. However, an alternative interpretation may be that the compassion training increased the synchrony between the negative valence of the pictures and the valence-dependent responses in the amygdala, as suggested by a recent study on compassion-promoting parenting intervention effects on amygdala (Ho et al., 2020).

As mentioned earlier, a *lojong*-inspired compassion training showed beneficial effects on stress reactivity and the brain (Pace et al., 2009; Desbordes et al., 2012; Mascaro et al., 2013; Lang et al., 2019; Ash et al., 2020). In a longitudinal study (Singer and Engert, 2019), distinct constructs of attention and interoception (present-moment), socio-emotional processes (compassion and loving-kindness), and meta-cognitive processes (perspective-taking), were evaluated and found to be differentially augmented in the 9-month training program; generally, the results supported differential neural plasticity that promoted differential training effects on social cognition, altruism, and hormonal response to psychosocial stress. Notably, we recently reported how a compassion-promoting parenting intervention

in mothers promoted the attunement to their child through the changes in the brain network in support of our predictions, e.g., better maternal attunement to the child was associated with decreased parenting stress and increases in attunement-dependent responses in the amygdala and reality-checking networks; the training also decreased dmPFC responses that may mediate child-specific conceptual thoughts when the mothers responded to the child; the decreases in functional connectivity between PAG and dmPFC were associated with decreases in parenting stress, suggesting that maternal stress was reduced when relatively less defensive signals from PAG were channeled to the mothers' mental images of the child, which would have "stained" the maternal perception of the child (Ho et al., 2020).

CONCLUSION

In this paper, we aimed to expand the science of compassion in multiple aspects: (a) we expanded the scope of the science of compassion by suggesting that the practice of compassion is an intervention to recognize the ultimate nature of mind and promote post-conflict well-being, over and beyond studies of social emotions and prosocial motivations; (b) we expanded the theoretical background of compassion science by importing Buddhist concepts; (c) we expanded the translational framework of compassion science by juxtaposing the concepts in Buddhism, Bayesian active inference, and Neuroscience in a unified framework. We hope that the present paper may serve as an example of interdisciplinary contemplative science investigation that can stimulate and facilitate cross-disciplinary integrations in compassion research.

> "Compassion is not religious business; it is human business; it is not luxury; it is essential for our own peace and mental stability; it is essential for human survival." – HH the 14th Dalai Lama.

The turmoil of COVID-19 pandemic, United States presidential election, and geopolitical struggles happening in year 2020 may have marked a transformative opportunity for the humanity to bifurcate into future actions. Will the humankind traverse a right course of actions into the future? Our theoretical work may support the notion that compassion is a necessity, not a luxury, for the survival of the humanity, as quoted above. We wish to present this work as a small steppingstone toward the humanity's evolution into a future where conflicts in all levels of the society can be addressed with compassion and kindness by as many people as possible, i.e., doing our best to recognize the ultimate nature of mind and universal suffering caused by ego-preserving bias and rather wishing to attune to all people equally, friends and enemies alike.

DATA AVAILABILITY STATEMENT

The original contributions generated for this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

SH is the principal developer of the theoretical framework and hypotheses and writer of the manuscript. He created the figures in the study. YN collaborated with SH in developing and refining the theoretical framework. He also co-wrote the manuscript. JS co-wrote the manuscript and supported the research involved in the manuscript. All authors contributed to the article and approved the submitted version.

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REFERENCES

Anacker, C., and Hen, R. (2017). Adult hippocampal neurogenesis and cognitive flexibility – linking memory and mood. *Nat. Rev. Neurosci.* 18, 335–346. doi: 10.1038/nrn.2017.45

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., et al. (2006). The enduring effects of abuse and related adverse experiences in childhood. *Eur. Arch. Psychiatry Clin. Neurosci.* 256, 174–186. doi: 10.1007/s00406-005-0624-4

Asanga (2016). "The nature of reality," in *The Bodhisattva Path to Unsurpassed Enlightenment: A Complete Translation of the Bodhisattvabhumi*, (Boston, MA: Shambhala Publications), 63–103.

Ash, M. J., Walker, E. R., Diclemente, R. J., Florian, M. P., Palmer, P. K., Wehrmeyer, K., et al. (2020). Compassion meditation training for hospital chaplain residents: a pilot study. *J. Health Care Chaplain* [Epub ahead of print],

Bachmann, T., and Hudetz, A. G. (2014). It is time to combine the two main traditions in the research on the neural correlates of consciousness: C = L x D. *Front. Psychol.* 5:940. doi: 10.3389/fpsyg.2014.00940

Bagnis, A., Celeghin, A., Diano, M., Mendez, C. A., Spadaro, G., Mosso, C. O., et al. (2020). Functional neuroanatomy of racial categorization from visual perception: a meta-analytic study. *Neuroimage* 217, 116939. doi: 10.1016/j.neuroimage.2020.116939

Barrett, L. F., and Simmons, W. K. (2015). Interoceptive predictions in the brain. *Nat. Rev. Neurosci.* 16, 419–429. doi: 10.1038/nrn3950

Bloom, P. (2017). Empathy and its discontents. *Trends Cogn. Sci.* 21, 24–31. doi: 10.1016/j.tics.2016.11.004

Bonnelle, V., Ham, T. E., Leech, R., Kinnunen, K. M., Mehta, M. A., Greenwood, R. J., et al. (2012). Salience network integrity predicts default mode network function after traumatic brain injury. *Proc. Natl. Acad. Sci. U.S.A.* 109, 4690–4695. doi: 10.1073/pnas.1113455109

Buchsbaum, B. R., Greer, S., Chang, W. L., and Berman, K. F. (2005). Meta-analysis of neuroimaging studies of the Wisconsin card-sorting task and component processes. *Hum. Brain. Mapp.* 25, 35–45. doi: 10.1002/hbm.20128

Buda, M., Fornito, A., Bergström, Z. M., and Simons, J. S. (2011). A specific brain structural basis for individual differences in reality monitoring. *J. Neurosci.* 31, 14308–14313. doi: 10.1523/jneurosci.3595-11.2011

Buswell, R. E., and Lopez, D. S. (2013). *The Princeton Dictionary of Buddhism*. Princeton, NJ: Princeton University Press.

Campbell, J. O. (2016). Universal darwinism as a process of Bayesian inference. *Front. Syst. Neurosci.* 10:49. doi: 10.3389/fnsys.2016.00049

Carhart-Harris, R. L., and Friston, K. J. (2010). The default-mode, ego-functions and free-energy: a neurobiological account of Freudian ideas. *Brain* 133, 1265–1283. doi: 10.1093/brain/awq010

Cohen, J. D., Perlstein, W. M., Braver, T. S., Nystrom, L. E., Noll, D. C., Jonides, J., et al. (1997). Temporal dynamics of brain activation during a working memory task. *Nature* 386, 604–608. doi: 10.1038/386604a0

Cole, M. W., Reynolds, J. R., Power, J. D., Repovs, G., Anticevic, A., and Braver, T. S. (2013). Multi-task connectivity reveals flexible hubs for adaptive task control. *Nat. Neurosci.* 16, 1348–1355. doi: 10.1038/nn.3470

Connolly, P. (2018). Expected free energy formalizes conflict underlying defense in freudian psychoanalysis. *Front. Psychol.* 9:1264. doi: 10.3389/fpsyg.2018.01264

de la Vega, A., Chang, L. J., Banich, M. T., Wager, T. D., and Yarkoni, T. (2016). Large-scale meta-analysis of human medial frontal cortex reveals tripartite functional organization. *J. Neurosci.* 36, 6553–6562. doi: 10.1523/jneurosci.4402-15.2016

Denny, B. T., Kober, H., Wager, T. D., and Ochsner, K. N. (2012). A meta-analysis of functional neuroimaging studies of self- and other judgments reveals a spatial gradient for mentalizing in medial prefrontal cortex. *J. Cogn. Neurosci.* 24, 1742–1752. doi: 10.1162/jocn_a_00233

Desbordes, G., Negi, L. T., Pace, T. W., Wallace, B. A., Raison, C. L., and Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. *Front. Hum. Neurosci.* 6:292. doi: 10.3389/fnhum.2012.00292

Dranovsky, A., Picchini, A. M., Moadel, T., Sisti, A. C., Yamada, A., Kimura, S., et al. (2011). Experience dictates stem cell fate in the adult hippocampus. *Neuron* 70, 908–923. doi: 10.1016/j.neuron.2011.05.022

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., and Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: findings from the adverse childhood experiences study. *JAMA* 286, 3089–3096. doi: 10.1001/jama.286.24.3089

Dunkley, B. T., Doesburg, S. M., Sedge, P. A., Grodecki, R. J., Shek, P. N., Pang, E. W., et al. (2014). Resting-state hippocampal connectivity correlates with symptom severity in post-traumatic stress disorder. *NeuroImage* 5, 377–384. doi: 10.1016/j.nicl.2014.07.017

Ekstrom, A. D., Arnold, A. E. G. F., and Iaria, G. (2014). A critical review of the allocentric spatial representation and its neural underpinnings: toward a network-based perspective. *Front. Hum. Neurosci.* 8:803. doi: 10.3389/fnhum.2014.00803

Engen, H. G., Bernhardt, B. C., Skottnik, L., Ricard, M., and Singer, T. (2018). Structural changes in socio-affective networks: multi-modal MRI findings in long-term meditation practitioners. *Neuropsychologia* 116, 26–33. doi: 10.1016/j.neuropsychologia.2017.08.024

Erskine, R. G. (1998). Attunement and involvement: therapeutic responses to relational needs. *Int. J. Psychother.* 3, 235–244.

Feiring, C., Taska, L., and Lewis, M. (1996). A process model for understanding adaptation to sexual abuse: the role of shame in defining stigmatization. *Child Abuse Neglect* 20, 767–782. doi: 10.1016/0145-2134(96)00064-6

Feldman, R. (2020). What is resilience: an affiliative neuroscience approach. *World Psychiatry* 19, 132–150. doi: 10.1002/wps.20729

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood experiences (ACE) study. *Am. J. Prevent. Med.* 14, 245–258. doi: 10.1016/s0749-3797(98)00017-8

Fox, K. C., Dixon, M. L., Nijeboer, S., Girn, M., Floman, J. L., Lifshitz, M., et al. (2016). Functional neuroanatomy of meditation: a review and meta-analysis of 78 functional neuroimaging investigations. *Neurosci. Biobehav. Rev.* 65, 208–228. doi: 10.1016/j.neubiorev.2016.03.021

Fox, K. C., Spreng, R. N., Ellamil, M., Andrews-Hanna, J. R., and Christoff, K. (2015). The wandering brain: meta-analysis of functional neuroimaging studies of mind-wandering and related spontaneous thought processes. *Neuroimage* 111, 611–621. doi: 10.1016/j.neuroimage.2015.02.039

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., and Finkel, S. M. (2008). Open hearts build lives: positive emotions, induced through loving-kindness meditation, build consequential personal resources. *J. Pers. Soc. Psychol.* 95, 1045–1062. doi: 10.1037/a0013262

Friston, K. (2013). Life as we know it. *J. R. Soc. Interface* 10, 20130475.

Frith, U., and de Vignemont, F. (2005). Egocentrism, allocentrism, and Asperger syndrome. *Conscious. Cogn.* 14, 719–738. doi: 10.1016/j.concog.2005.04.006

Garrison, K. A., Santoyo, J. F., Davis, J. H., Thornhill, T. A. T., Kerr, C. E., and Brewer, J. A. (2013). Effortless awareness: using real time neurofeedback to investigate correlates of posterior cingulate cortex activity in meditators' self-report. *Front. Hum. Neurosci.* 7:440. doi: 10.3389/fnhum.2013.00440

Gelek Rimpoche (2005). *SEM - The Nature of Mind*. New York, NY: Jewel Heart.

Gelek Rimpoche (2007). *Lojong Mind Training in Seven Points*. New York, NY: Jewel Heart.

Gelek Rimpoche (2008). *Shantideva's Guide to the Bodhisattva's Way of Life: Chapter 8 Concentration*. New York, NY: Jewel Heart Corp.

Gelek Rimpoche (2014). *How the Mind Works*. New York, NY: Jewel Heart Inc.

Geshe Rabten (1997). *Treasury of Dharma*. Le Mont-Pèlerin: Rabten.

Gilbert, P. (2015). "Negotiating in the world of mixed beliefs and value systems: a compassion-focused model," in *Handbook of International Negotiation: Interpersonal, Intercultural, and Diplomatic Perspectives*, ed. M. Galluccio (Cham: Springer International Publishing), 261–277. doi: 10.1007/978-3-319-10687-8_19

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbertson, M. W., Williston, S. K., Paulus, L. A., Lasko, N. B., Gurvits, T. V., Shenton, M. E., et al. (2007). Configural cue performance in identical twins discordant for posttraumatic stress disorder: theoretical implications for the role of hippocampal function. *Biol. Psychiatry* 62, 513–520. doi: 10.1016/j.biopsych.2006.12.023

Gillan, C. M., Apergis-Schoute, A. M., Morein-Zamir, S., Urcelay, G. P., Sule, A., Fineberg, N. A., et al. (2015). Functional neuroimaging of avoidance habits in obsessive-compulsive disorder. *Am. J. Psychiatry* 172, 284–293.

Goodkind, M., Eickhoff, S. B., Oathes, D. J., Jiang, Y., Chang, A., Jones-Hagata, L. B., et al. (2015). Identification of a common neurobiological substrate for mental illness. *JAMA Psychiatry* 72, 305–315. doi: 10.1001/jamapsychiatry.2014.2206

Goulden, N., Khusnulina, A., Davis, N. J., Bracewell, R. M., Bokde, A. L., Mcnulty, J. P., et al. (2014). The salience network is responsible for switching between the default mode network and the central executive network: replication from DCM. *NeuroImage* 99, 180–190. doi: 10.1016/j.neuroimage.2014.05.052

Hammels, C., Pishva, E., De Vry, J., Van Den Hove, D. L. A., Prickaerts, J., Van Winkel, R., et al. (2015). Defeat stress in rodents: from behavior to molecules. *Neurosci. Biobehav. Rev.* 59, 111–140. doi: 10.1016/j.neubiorev.2015.10.006

Harlow, H. F., Dodsworth, R. O., and Harlow, M. K. (1965). Total social isolation in monkeys. *Proc. Natl. Acad. Sci. U.S.A.* 54, 90–97. doi: 10.1073/pnas.54.1.90

Harrison, B. J., Soriano-Mas, C., Pujol, J., Ortiz, H., López-Solà, M., Hernández-Ribas, R., et al. (2009). Altered corticostriatal functional connectivity in obsessive-compulsive disorder. *Arch. Gen. Psychiatry* 66, 1189–1200. doi: 10.1001/archgenpsychiatry.2009.152

He, B. J., and Raichle, M. E. (2009). The fMRI signal, slow cortical potential and consciousness. *Trends Cogn. Sci.* 13, 302–309. doi: 10.1016/j.tics.2009.04.004

Hipwell, A. E., Guo, C., Phillips, M. L., Swain, J. E., and Moses-Kolko, E. L. (2015). Right frontoinsular cortex and subcortical activity to infant cry is associated with maternal mental state talk. *J. Neurosci.* 35, 12725–12732. doi: 10.1523/jneurosci.1286-15.2015

Ho, S. S., Konrath, S., Brown, S. L., and Swain, J. E. (2014). Empathy and stress related neural responses in maternal decision making. *Front. Neurosci.* 8:152. doi: 10.3389/fnins.2014.00152

Ho, S. S., Muzik, M., Rosenblum, K. L., Morelen, D., Nakamura, Y., and Swain, J. E. (2020). Potential neural mediators of mom power parenting intervention effects on maternal intersubjectivity and stress resilience. *Front. Psychiatry* doi: 10.3389/fpsyt.2020.568824 [Epub ahead of print],

Ho, S. S., and Nakamura, Y. (2017). Healing dysfunctional identity: bridging mind-body intervention to brain systems. *J. Behav. Brain Sci.* 7, 137–164. doi: 10.4236/jbbs.2017.73013

Hutcherson, C. A., Seppala, E. M., and Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion* 8, 720–724. doi: 10.1037/a0013237

Iacoboni, M., Molnar-Szakacs, I., Gallese, V., Buccino, G., Mazziotta, J. C., and Rizzolatti, G. (2005). Grasping the intentions of others with One's own mirror neuron system. *PLoS Biol.* 3:e79. doi: 10.1371/journal.pbio.0030079

Jackson, S. R., Parkinson, A., Kim, S. Y., Schüermann, M., and Eickhoff, S. B. (2011). On the functional anatomy of the urge-for-action. *Cogn. Neurosci.* 2, 227–243. doi: 10.1080/17588928.2011.604717

Kilner, J. M., Friston, K. J., and Frith, C. D. (2007). Predictive coding: an account of the mirror neuron system. *Cogn. Process.* 8, 159–166. doi: 10.1007/s10339-007-0170-2

Kim, J. J., Cunnington, R., and Kirby, J. N. (2020). The neurophysiological basis of compassion: an fMRI meta-analysis of compassion and its related neural processes. *Neurosci. Biobehav. Rev.* 108, 112–123. doi: 10.1016/j.neubiorev.2019.10.023

Kirby, J. N. (2017). Compassion interventions: the programmes, the evidence, and implications for research and practice. *Psychol. Psychother.* 90, 432–455. doi: 10.1111/papt.12104

Kirby, J. N., Tellegen, C. L., and Steindl, S. R. (2017). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav. Ther.* 48, 778–792. doi: 10.1016/j.beth.2017.06.003

Klimecki, O. (2019). The role of empathy and compassion in conflict resolution. *Emot. Rev.* 11, 175407391983860.

Kohut, H. (1982). Introspection, empathy, and the semi-circle of mental-health. *Int. J. Psycho Anal.* 63, 395–407.

Kross, E., Davidson, M., Weber, J., and Ochsner, K. (2009). Coping with emotions past: the neural bases of regulating affect associated with negative autobiographical memories. *Biol. Psychiatry* 65, 361–366. doi: 10.1016/j.biopsych.2008.10.019

Kube, T., and Rozenkrantz, L. (2020). When beliefs face reality: an integrative review of belief updating in mental health and illness. *Perspect. Psychol. Sci.* doi: 10.1177/1745691620931496 [Epub ahead of print],

Lahav, Y., Kanat-Maymon, Y., and Solomon, Z. (2017). Posttraumatic growth and dyadic adjustment among war veterans and their wives. *Front. Psychol.* 8:1102. doi: 10.3389/fpsyg.2017.01102

Laneri, D., Krach, S., Paulus, F. M., Kanske, P., Schuster, V., Sommer, J., et al. (2017). Mindfulness meditation regulates anterior insula activity during empathy for social pain. *Hum. Brain Mapp.* 38, 4034–4046. doi: 10.1002/hbm.23646

Lang, A. J., Malaktaris, A. L., Casmar, P., Baca, S. A., Golshan, S., Harrison, T., et al. (2019). Compassion meditation for posttraumatic stress disorder in veterans: a randomized proof of concept study. *J. Trauma Stress* 32, 299–309. doi: 10.1002/jts.22397

Langston, R. F., and Wood, E. R. (2010). Associative recognition and the hippocampus: Differential effects of hippocampal lesions on object-place, object-context and object-place-context memory. *Hippocampus* 20, 1139–1153. doi: 10.1002/hipo.20714

Leskela, J., Dieperink, M., and Thuras, P. (2002). Shame and posttraumatic stress disorder. *J. Trauma. Stress* 15, 223–226. doi: 10.1023/a:1015255311837

Li, W., Mai, X., and Liu, C. (2014). The default mode network and social understanding of others: what do brain connectivity studies tell us. *Front. Hum. Neurosci.* 8:74. doi: 10.3389/fnhum.2014.00074

Lieberman, M. D., and Eisenberger, N. I. (2015). The dorsal anterior cingulate cortex is selective for pain: results from large-scale reverse inference. *Proc. Natl. Acad. Sci.* 112, 15250–15255. doi: 10.1073/pnas.1515083112

Ludwig, R. J., and Welch, M. G. (2019). Darwin's other dilemmas and the theoretical roots of emotional connection. *Front. Psychol.* 10:683. doi: 10.3389/fpsyg.2019.00683

Mascaro, J. S., and Gilbert, P. (2017). *Compassion Fears, Blocks and Resistances: An Evolutionary Investigation*, 1 Edn. Oxford: Oxford University Press.

Mascaro, J. S., Rilling, J. K., Tenzin Negi, L., and Raison, C. L. (2013). Compassion meditation enhances empathic accuracy and related neural activity. *Soc. Cogn. Affect. Neurosci.* 8, 48–55. doi: 10.1093/scan/nss095

Mendelson, J., and Freed, W. J. (1973). Do rats terminate hypothalamic stimulation only in order to turn it on again? *Behav. Biol.* 8, 619–628. doi: 10.1016/s0091-6773(73)80147-6

Nagarjuna (1995). *The Fundamental Wisdom of the Middle Way : Nagarjuna's Mulamadhyamakakarika*. Oxford: Oxford University Press.

Nelson, B. W., Laurent, S. M., Bernstein, R., and Laurent, H. K. (2017). Perspective-taking influences autonomic attunement between partners during discussion of conflict. *J. Soc. Pers. Relat.* 34, 139–165. doi: 10.1177/0265407515626595

O'Doherty, J., Dayan, P., Schultz, J., Deichmann, R., Friston, K., and Dolan, R. J. (2004). Dissociable roles of ventral and dorsal striatum in instrumental conditioning. *Science* 304, 452–454. doi: 10.1126/science.1094285

Pace, T. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., et al. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology* 34, 87–98. doi: 10.1016/j.psyneuen.2008.08.011

Parker, K. J., Buckmaster, C. L., Sundlass, K., Schatzberg, A. F., and Lyons, D. M. (2006). Maternal mediation, stress inoculation, and the development of neuroendocrine stress resistance in primates. *Proc. Natl. Acad. Sci. U.S.A.* 103, 3000–3005. doi: 10.1073/pnas.0506571103

Peters, A., Mcewen, B. S., and Friston, K. (2017). Uncertainty and stress: why it causes diseases and how it is mastered by the brain. *Prog. Neurobiol.* 156, 164–188. doi: 10.1016/j.pneurobio.2017.05.004

Petrides, M., and Pandya, D. N. (2007). Efferent association pathways from the rostral prefrontal cortex in the macaque monkey. *J. Neurosci.* 27, 11573–11586. doi: 10.1523/jneurosci.2419-07.2007

Pew Research Center (2014). *Political Polarization in the American Public*. Available online at: https://www.pewresearch.org/politics/2014/06/12/political-polarization-in-the-american-public/ (accessed March 8, 2020).

Pew Research Center (2020a). *As the U.S. Copes with Multiple Crises, Partisans Disagree Sharply on Severity of Problems Facing the Nation*. Available online at: https://www.pewresearch.org/fact-tank/2020/07/14/as-the-u-s-copes-with-multiple-crises-partisans-disagree-sharply-on-severity-of-problems-facing-the-nation/ (accessed March 8, 2020).

Pew Research Center (2020b). *Republicans, Democrats Move Even Further Apart in Coronavirus Concerns*. Available online at: https://www.pewresearch.org/politics/2020/06/25/republicans-democrats-move-even-further-apart-in-coronavirus-concerns/ (accessed March 8, 2020).

Price, G. R. (1970). Selection and covariance. *Nature* 227, 520.

Ramstead, M. J. D., Badcock, P. B., and Friston, K. J. (2017). Answering Schrödinger's question: a free-energy formulation. *Phys. Life Rev.* 24, 1–16. doi: 10.1016/j.plrev.2017.09.001

Ribur Rinpoche (1999). *How to Generate Bodhicitta*. Singapore: Amitabha Buddhist Centre.

Saraiya, T., and Lopez-Castro, T. (2016). Ashamed and afraid: a scoping review of the role of shame in post-traumatic stress disorder (PTSD). *J. Clin. Med.* 5, 94. doi: 10.3390/jcm5110094

Schacter, D. L., Addis, D. R., Hassabis, D., Martin, V. C., Spreng, R. N., and Szpunar, K. K. (2012). The future of memory: remembering, imagining, and the brain. *Neuron* 76, 677–694. doi: 10.1016/j.neuron.2012.11.001

Seeley, W. W., Menon, V., Schatzberg, A. F., Keller, J., Glover, G. H., Kenna, H., et al. (2007). Dissociable intrinsic connectivity networks for salience processing and executive control. *J. Neurosci.* 27, 2349–2356. doi: 10.1523/jneurosci.5587-06.2007

Sevinc, G., Greenberg, J., Hölzel, B. K., Gard, T., Calahan, T., Brunsch, V., et al. (2020). Hippocampal circuits underlie improvements in self-reported anxiety following mindfulness training. *Brain Behav.* 10, e01766.

Shackman, A. J., Salomons, T. V., Slagter, H. A., Fox, A. S., Winter, J. J., and Davidson, R. J. (2011). The integration of negative affect, pain and cognitive control in the cingulate cortex. *Nat. Rev. Neurosci.* 12, 154–167. doi: 10.1038/nrn2994

Shaffer, D. D. R., and Kipp, K. (2013). *Developmental Psychology: Childhood & Adolescence: Childhood and Adolescence*. Boston, MA: Wadsworth Cengage Learning.

Shantideva. (c. 700/1979). *A Guide to the Bodhisattva's Way of Life*. Dharamshala: Library of Tibetan Works & Archives.

Silver, D., Hubert, T., Schrittwiesser, J., Antonoglou, I., Lai, M., Guez, A., et al. (2017a). Mastering chess and shogi by self-play with a general reinforcement learning algorithm. *arXiv [Preprint]* Available online at: https://arxiv.org/abs/1712.01815 (accessed March 8, 2020).

Silver, D., Schrittwieser, J., Simonyan, K., Antonoglou, I., Huang, A., Guez, A., et al. (2017b). Mastering the game of Go without human knowledge. *Nature* 550, 354–359. doi: 10.1038/nature24270

Singer, T., and Engert, V. (2019). It matters what you practice: differential training effects on subjective experience, behavior, brain and body in the ReSource Project. *Curr. Opin. Psychol.* 28, 151–158. doi: 10.1016/j.copsyc.2018.12.005

Sippel, L. M., and Marshall, A. D. (2011). Posttraumatic stress disorder symptoms, intimate partner violence perpetration, and the mediating role of shame processing bias. *J. Anxiety Disord.* 25, 903–910. doi: 10.1016/j.janxdis.2011.05.002

Skerry, A. E., and Saxe, R. (2014). A common neural code for perceived and inferred emotion. *J. Neurosci.* 34, 15997–16008. doi: 10.1523/jneurosci.1676-14.2014

Sommer, M., Döhnel, K., Sodian, B., Meinhardt, J., Thoermer, C., and Hajak, G. (2007). Neural correlates of true and false belief reasoning. *NeuroImage* 35, 1378–1384. doi: 10.1016/j.neuroimage.2007.01.042

Summers, F. (2014). The bonds of empathy: beyond the selfobject concept. *Int. J. Psychoanal. Self Psychol.* 9, 222–236. doi: 10.1080/15551024.2014.917464

Swain, J. E., and Ho, S. S. (2017). "Parental brain: the crucible of compassion," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, C. D. Cameron, and J. R. Doty (Oxford: Oxford University Press).

Swain, J. E., Konrath, S., Dayton, C. J., Finegood, E. D., and Ho, S. S. (2013). Toward a neuroscience of interactive parent-infant dyad empathy. *Behav. Brain Sci.* 36, 438–439. doi: 10.1017/s0140525x12002063

Tenzin Gyatso, T. T. D. L. (1997). *The Four Noble Truths: Fundamentals of Buddhist Teachings*. London: Thorsons.

Tenzin Gyatso, T. T. D. L. (2009). *The Middle Way: Faith Grounded in Reason*. Boston, MA: Wisdom Publications.

Tenzin Gyatso, T. T. D. L. (2020). *Science and Philosophy in the Indian Buddhist Classics: The Mind*. Boston, MA: Wisdom Publications.

Tyrka, A. R., Wyche, M. C., Kelly, M. M., Price, L. H., and Carpenter, L. L. (2009). Childhood maltreatment and adult personality disorder symptoms: influence of maltreatment type. *Psychiatry Res.* 165, 281–287. doi: 10.1016/j.psychres.2007.10.017

Uchino, B. N., Cawthon, R. M., Smith, T. W., Light, K. C., Mckenzie, J., Carlisle, M., et al. (2012). Social relationships and health: is feeling positive, negative, or both (ambivalent) about your social ties related to telomeres? *Health Psychol.* 31, 789–796. doi: 10.1037/a0026836

Umberson, D., and Montez, J. K. (2010). Social relationships and health: a flashpoint for health policy. *J. Health Soc. Behav.* 51, S54–S66.

van Oort, J., Tendolkar, I., Hermans, E. J., Mulders, P. C., Beckmann, C. F., Schene, A. H., et al. (2017). How the brain connects in response to acute stress: a review at the human brain systems level. *Neurosci. Biobehav. Rev.* 83, 281–297. doi: 10.1016/j.neubiorev.2017.10.015

Varela, F. (1996). Neurophenomenology: a methodological remedy for the hard problem. *J. Conscious. Stud.* 3, 330–349.

Wang, Y., Schubert, T. W., and Quadflieg, S. (2019). Behavioral and neural evidence for an evaluative bias against other people's mundane interracial encounters. *Soc. Cogn. Affect. Neurosci.* 14, 1329–1339. doi: 10.1093/scan/nsaa005

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., et al. (2013). Compassion training alters altruism and neural responses to suffering. *Psychol. Sci.* 24, 1171–1180. doi: 10.1177/0956797612469537

Weng, H. Y., Lapate, R. C., Stodola, D. E., Rogers, G. M., and Davidson, R. J. (2018). Visual attention to suffering after compassion training is associated with decreased amygdala responses. *Front. Psychol.* 9:771. doi: 10.3389/fpsyg.2018.00771

Werner, E. E. (1992). The children of kauai – resiliency and recovery in adolescence and adulthood. *J. Adolesc. Health* 13, 262–268. doi: 10.1016/1054-139x(92)90157-7

Wilson, J. P., Drožđek, B., and Turkovic, S. (2006). Posttraumatic shame and guilt. *Trauma Violence Abuse* 7, 122–141.

Wilson, S. J., and Sayette, M. A. (2015). Neuroimaging craving: urge intensity matters. *Addiction* 110, 195–203. doi: 10.1111/add.12676

Yarkoni, T., Poldrack, R. A., Nichols, T. E., Van Essen, D. C., and Wager, T. D. (2011). Large-scale automated synthesis of human functional neuroimaging data. *Nat. Methods* 8, 665–670. doi: 10.1038/nmeth.1635

Yeo, B. T., Krienen, F. M., Sepulcre, J., Sabuncu, M. R., Lashkari, D., Hollinshead, M., et al. (2011). The organization of the human cerebral cortex estimated by intrinsic functional connectivity. *J. Neurophysiol.* 106, 1125–1165. doi: 10.1152/jn.00338.2011

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Compassion-Focused Group Therapy for Treatment-Resistant OCD: Initial Evaluation Using a Multiple Baseline Design

Nicola Petrocchi[1,2], Teresa Cosentino[3], Valerio Pellegrini[4], Giuseppe Femia[3], Antonella D'Innocenzo[2,3] and Francesco Mancini[3,5]*

[1] Department of Economics and Social Sciences, John Cabot University, Rome, Italy, [2] Compassionate Mind Italia, Rome, Italy, [3] Scuola di Psicoterapia Cognitiva S.r.l., Rome, Italy, [4] Department of Social and Developmental Psychology, Faculty of Medicine and Psychology, Sapienza University of Rome, Rome, Italy, [5] Department of Psychological Sciences, Guglielmo Marconi University, Rome, Italy

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***Correspondence:**
Nicola Petrocchi
npetrocchi@johncabot.edu

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Obsessive–compulsive disorder (OCD) is a debilitating mental health disorder that can easily become a treatment-resistant condition. Although effective therapies exist, only about half of the patients seem to benefit from them when we consider treatment refusal, dropout rates, and residual symptoms. Thus, providing effective augmentation to standard therapies could improve existing treatments. Group compassion-focused interventions have shown promise for reducing depression, anxiety, and avoidance related to various clinical problems, but this approach has never been evaluated for OCD individuals. However, cultivating compassion for self and others seems crucial for OCD patients, given the accumulating research suggesting that fear of guilt, along with isolation and self-criticism, can strongly contribute to the development and maintenance of OCD. The primary aim of this pilot study was to evaluate the acceptability, tolerability, and effectiveness of an 8-week group compassion-focused intervention for reducing OCD symptoms, depression, fear of guilt and self-criticism, and increasing common humanity and compassionate self-reassuring skills in treatment-resistant OCD patients. Using a multiple baseline experimental design, the intervention was evaluated in a sample of OCD patients ($N = 8$) who had completed at least 6 months of CBT treatment for OCD, but who continued to suffer from significant symptoms. Participants were randomized to different baseline assessment lengths; they then received 8 weekly, 120-min group sessions of compassion-focused therapy for OCD (CFT-OCD), and then were tested again at post-treatment and at 1 month follow up. Despite the adverse external circumstances (post-treatment and follow-up data collection were carried out, respectively, at the beginning and in the middle of the Italian lockdown due to the COVID-19 pandemic), by the end of treatment, all participants demonstrated reliable decreases in OCD symptoms, and these improvements were maintained at 4-week follow-up for seven of eight participants. The intervention was also associated with improvements

in fear of guilt, self-criticism, and self-reassurance, but less consistent improvements in depression and common humanity. Participants reported high levels of acceptability of and satisfaction with the intervention. Results suggest that the intervention may be beneficial as either a stand-alone treatment or as an augmentation to other treatments.

Keywords: compassion-focused therapy, obsessive–compulsive disorder, fear of guilt, self-reassuring, self-criticism, multiple baseline design, self-compassion, compassionate mind training

INTRODUCTION

Obsessive–compulsive disorder (OCD) is a debilitating mental health condition characterized by obsessions (persistent and distressing thoughts, images, doubts, or urges) and compulsions (interfering and ritualistic mental or physical behaviors the individual feels compelled to perform in order to alleviate distress and/or prevent negative outcomes; American Psychiatric Association APA, 2013), which affects 2–3% of the population (Brakoulias et al., 2017). OCD has a high comorbidity with depression and anxiety disorders and can easily develop into a treatment-resistant condition. Although effective treatments for OCD exist, such as cognitive–behavior therapy (CBT) that includes exposure and response prevention (ERP), only about half of patients seem to benefit from them when treatment refusal and dropout rates are taken into account (e.g., Fisher and Wells, 2005). This constitutes a limit of the actual treatments of OCD, given that patients who attain only partial recovery are less likely to maintain their treatment improvements (Simpson et al., 2004), and their quality of life is negatively impacted by residual symptoms (Fontenelle et al., 2010; Key et al., 2017).

It has been suggested that one of the reasons for this sub-optimal capacity to treat OCD is that, traditionally, CBT treatments have mainly focused on intrapersonal/cognitive determinants of the disease (i.e., the role of negative appraisal in the development and persistence of obsessions), while overlooking the importance of social/relational elements (such as the participant's relationships with themselves and others) and self-conscious moral emotions such as guilt. Indeed, guilt has long been considered an important aspect of the phenomenology of OCD. Even if OCD individuals do not seem to differ from anxious controls in levels of trait or state guilt (Steketee et al., 1991), there is increasing empirical evidence suggesting that OCD patients are characterized by heightened *fear of guilt* and that obsessive activity is aimed at preventing, reducing, or neutralizing the possibility of being guilty (see Shapiro and Stewart's, 2011). Parental psychological control based on guilt induction over matters one could not control, harsh criticism, and withdrawal of love, support, and validation in response to child wrongdoing seems to play a significant role on the future genesis of OCD, by rendering the child increasingly fearful of guilt and motivated to atone for it (Barcaccia et al., 2015; Mancini, 2019). Indeed, retrospective accounts of childhood experiences of guilt induction significantly predicted feelings of mental contamination and washing rituals in non-clinical individuals (Berman et al., 2012).

Moreover, in the last decade, empirical evidence supporting the distinction between two types of guilt has accumulated. One might feel the emotion of guilt based on compassionate/altruistic principles without the transgression of moral norms (i.e., altruistic guilt), or based on the transgression of moral norms without the presence of actual victims (i.e., deontological guilt; Mancini, 2019). Intriguingly, it is the deontological type of guilt, and *not* the altruistic/compassionate guilt, that is associated with the feeling of disgust, consequently with more washing behaviors (the Lady Macbeth effect), and also is the type experienced (and dreaded) more by OCD patients (D'Olimpio and Mancini, 2014; Ottaviani et al., 2019).

Only a few studies have tested the effectiveness of psychological interventions intended to directly impact fear of guilt, and most have used cognitive procedures like socratic dialogue, cognitive restructuring, and double standard, in order to detoxify maladaptive beliefs about guilt (Cosentino et al., 2012; Perdighe and Mancini, 2012). However, mounting empirical evidence suggests that therapeutic "experiential" approaches that focus on increasing compassion for oneself and others, such as compassion-focused therapy (CFT; Gilbert, 2014; Kirby et al., 2015), may be extremely effective in helping OCD patients allow and accept the possibility of experiencing guilty feelings and respond more adaptively to their fear of guilt.

Compassion-focused therapy proposes a model of affect regulation involving three cross-regulating evolved emotional systems: the threat and self-protection system, the drive and resource-seeking system, and the soothing system. Some emotional difficulties, such as high shame, self-criticism and, in the context of OCD, the fear and avoidance of some emotional experience such as guilt, can be conceptualized as stemming from a threat system that has been defensively hyperactivated by interpersonal traumas such as bullying or emotionally abusive dynamics in the family of origin. However, CFT conceptualizes another cause of emotional difficulties as an under-activated soothing system. Adults who have had experiences of parental warmth and affection are able to regulate threat-focused emotions by activating soothing memories, emotions or schemas of support, encouragement, and validation (Gilbert, 2017; Naismith et al., 2019). Indeed, Mancini et al. (2004) found that OCD patients evaluated the facial expressions of anger, contempt, and disgust they imagined were aimed at them as more severe than expressions of fear, sadness, and joy. Furthermore, they remembered being the target of these expressions during childhood more than controls.

Compassion-focused therapy, from its evolutionary perspective, sees compassion as a motivational system rooted in mammalian caring and defines it as "the sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it" (Gilbert, 2017). For individuals with OCD, particularly

when treatment resistant, cultivating compassion may address pervasive feelings of isolation, "abnormality," unworthiness and insufficiency, while increasing common humanity and countering the tendencies to withdraw and self-criticize. Rather than relying primarily on higher-level reason and logic to challenge distorted cognitions about oneself, compassion may activate the attachment and caregiving emotion-regulation system, creating a felt sense of inner safeness and caring (Gilbert and Procter, 2006). Research has shown that compassion is associated with increased heart rate variability (HRV), an index of the vagal regulation of the heart and the ability to downregulate physiological arousal when facing stress (for a recent meta-analysis see Di Bello et al., 2020). Moreover, CFT interventions, whose primary aim is to cultivate all three flows of compassion (from others, to others and to the self), have been shown to increase the ability to generate a self-validating and self-soothing response to our own suffering, while reducing self-critical self-talk (Boersma et al., 2015). Cultivating a compassionate attitude toward others, especially in a group context, might help the OCD individuals feel less "alone," "abnormal," and ashamed of their suffering (Cândea and Szentagotai-Tăta, 2018), an important outcome given the difficulties in mentalizing and empathizing with the negative emotional experiences the OCD patients present (Pino et al., 2016). Moreover, by cultivating the ability to soothe, validate, and compassionately comfort themselves when distress surfaces, OCD patients might experience less fear of guilt and be more willing to accept this unpleasant emotional state ("I am only human, like everyone, I can't avoid doing mistakes, and if I make them I'm motivated to be there for myself, trying to forgive me"), and therefore more able to abstain from compensatory defensive behaviors (compulsions). A deeper and "experiential" understanding of the origin and functions of their self-criticism might reduce the shameful, punishing self-attacking that OCD patients exert on themselves as a way to keep their compulsion under control, which usually leads to the exacerbation of symptoms, adding to the morbidity of their condition (Mancini, 2019).

Preliminary findings offer some support to the usefulness of a compassion-focused intervention in the treatment of OCD patients. Two recent studies on OCD patients demonstrated that self-compassion was correlated to reduced OCD symptoms and that this correlation was partially explained by lower emotion regulation difficulties (Chase et al., 2019; Eichholz et al., 2020). Another recent cross-sectional study comparing treatment-seeking adults (N = 1871) and non-treatment-seeking adults (N = 540) found that participants with clinically significant OCD symptoms reported lower trait mindfulness and self-compassion compared to participants with clinically significant anxiety/depression and to non-clinical controls, with mindfulness and self-compassion as unique predictors of OCD symptoms, even when controlling for depression severity (Leeuwerik et al., 2020).

Moreover, mindfulness-based interventions such as mindfulness-based cognitive therapy (MBCT), which indirectly promote a compassionate and accepting attitude toward internal experience, have been found to be effective in alleviating OCD symptoms (Key et al., 2017; Didonna et al., 2019). However, to the best of our knowledge, no study so far has developed and tested a compassion-focused intervention that is entirely aimed at helping OCD patients cultivate a less self-critical and more compassionate attitude toward themselves and others. This is important, considering that a recent meta-analysis on 25 randomized trials has found significant beneficial effects when CBT was integrated with psychosocial augmentations (especially with patients with more severe OCD), while other forms of augmentations (for example, the combination of CBT with d-cycloserine or serotonin reuptake inhibitors or mindfulness-based augmentations of CBT) were not significantly more effective than CBT alone (Guzick et al., 2018).

Thus, the primary aim of this pilot study was to evaluate the acceptability, tolerability, and effectiveness of an 8-week group compassion-focused intervention for reducing OCD symptoms, depression, fear of guilt and self-criticism, and increasing common humanity and compassionate self-reassuring skills in treatment-resistant OCD patients. The intervention (CFT-OCD) was an adaptation of group CFT for OCD: it included an emphasis on developing greater understanding and acceptance of the "unchosen nature" of our evolved brain, of its "loops," and cultivating present moment awareness and compassion to intrusive obsessive thoughts to help participants disengage from unhelpful automatic responses (compulsions).

Multiple baseline, a type of single-case experimental design that randomizes individuals to different lengths of baseline phase before starting treatment, was used as a time- and cost-effective method for evaluating effectiveness while controlling for the passage of time and repeated assessments. In particular, it helps to differentiate between a genuine treatment effect and natural recovery over time or other confounding factors. As a primary outcome, it was hypothesized that OCD symptoms would remain stable or increase during the baseline phase, be decreased at the end of the treatment, and remain low during follow-up. As secondary outcomes, decreases in depressive symptoms, fear of guilt and self-criticism, and increases in compassionate self-reassuring and common humanity were expected to occur during the treatment phase. Finally, we predicted that participants would report that they were satisfied with the CFT intervention.

MATERIALS AND METHODS

Participants

Participants were recruited among patients treated at the Unit for treatment of anxiety and mood disorders of the School of Cognitive Psychotherapy (SPC) in Rome. The procedures were approved by the ethic committee of the University Guglielmo Marconi in Rome. Participants were recruited from patients who, in the current therapy, had completed at least 6 months of CBT treatment for OCD (with ERP), referred to us by their treating clinicians. Referred patients were subsequently contacted by phone to further describe the study and to invite them to the initial assessment session. The intervention started once the group reached eight participants, which has been described as the optimal number of members for a group intervention (Yalom, 2008). Participants did not receive any

monetary compensation at the end of their participation in the study. Inclusion criteria for the study were as follows: being over 18 years of age; having a principal diagnosis of OCD, as diagnosed by an expert clinician using the Structured Clinical Interview for Diagnosis (SCID-I; First et al., 1994); having completed at least 6 months CBT with ERP; reporting significant residual OCD symptoms at the end of CBT (defined as a score on the Y-BOCS greater than or equal to 14; Storch et al., 2015); not having previous experience with compassion-focused practices. Exclusion criteria included the following: significant mental or physical comorbid disorders or illnesses (lifetime or current bipolar I or II disorder, schizophrenia, delusional disorder, brain injuries, post-traumatic stress disorder or physical illnesses); alcohol or drug abuse or dependence within the last 6 months; a current marked risk to self (self-harm or suicide). Significant physical and medical comorbidities were assessed by a semi-structured face-to-face interview conducted by the same clinician who administered the SCID-I. Taking psychotropic medication was not an exclusion criterion in this study; for those taking a psychoactive medication, eligibility required no changes in dose during the 3 months prior to entering study and maintenance of a stable dose for duration of the study. In multiple baseline designs, the baseline phase can be used to exclude participants who spontaneously recover before the beginning of the treatment. Participants were required to show stable or worsening symptomatology during baseline, defined in this study as no more than a 10-point decrease on either the Y-BOCS or OCI-r between the last two baseline observations. The Consolidated Standards of Reporting Trials (CONSORT) diagram (see **Figure 1**) summarizes the process of recruitment and flow of participants through the study. Through screening, 20 patients were assessed for eligibility; 12 were excluded for not meeting inclusion criteria; 8 completed the intervention and the post-intervention assessment; 7 completed the 4-week follow-up assessment. All participants reported being single, except for P5 that reported being in a stable relationship. Participant characteristics are presented in **Table 1.**

Procedure and Study Design

To evaluate the effectiveness of the group CFT-OCD intervention, a randomized, multiple baseline design was used (Kazdin, 2011; Smith, 2012). After the initial screening for eligibility, informed consent was obtained by all participants, and they were randomized to different baseline assessment lengths (T1 and T2—between 2 and 6 weeks). During the subsequent treatment phase, all participants received 8 weekly, 120-min group sessions of CFT-OCD. Participants completed the full battery of measures at baseline (T1), pre-treatment (T2), post-treatment (T3), and 1 month after the end of the treatment (T4). Given the pilot nature of the study, and in order to avoid the assessment fatigue that OCD patients often experience as result of their meticulousness and obsessive intrusive thoughts about exactness (Roth et al., 2004), participants were not assessed during the acute treatment phase. Randomizing participants to baseline periods of varying lengths enables assessment of whether symptom changes occur only when the intervention is applied. This design allows causal inferences to be made and controls for many threats to internal validity, including the passage of time and repeated assessments. Each participant acts as their own control; thus, fewer participants are needed to demonstrate change as a result of the intervention. The multiple assessments also provide information on whether symptom changes coincide with the introduction of the treatment.

Measures

Yale–Brown Obsessive–Compulsive Scale

Yale–Brown Obsessive–Compulsive Scale (Y-BOCS; Goodman et al., 1989; Italian version by Hénin, 2012) was used to assess severity of OCD symptoms. It is a widely used clinician-administered interview for assessing the presence and the severity of OCD symptoms in adults. The Y-BOCS includes two sections: the Symptom Checklist (Y-BOCS-SC) and the Severity Scale (Y-BOCS-SS). The Severity Scale, which has been used in the present study, consists of 10 items that assess the severity of obsessions (five items) and compulsions (five items) using a five-point Likert-type scale (from 0 to 4; the total score of the scale may range between 0 and 40). In the present study, the total Y-BOCS-SS score and the obsessions and compulsions subscales are reported. The scale showed strong internal consistency for the total score and each subscales (α = 0.89–93; Melli et al., 2015).

Obsessive–Compulsive Inventory-Revised

Obsessive–Compulsive Inventory-Revised (OCI-R; Foa et al., 2002; Italian version by Sica et al., 2009) is a brief, 18-item, self-report questionnaire designed to measure obsessive–compulsive symptom presence and distress on a five-point Likert scale from 0 ("not at all disturbed") to 4 ("extremely disturbed"). The OCI-R assesses symptoms on six different dimensions including washing, checking, ordering, obsessing, hoarding, and mental neutralizing (three items each). The Italian version of the OCI-R has been found to have good internal consistency (α = 0.85). In the present study, only the total score was computed.

Beck Depression Inventory

Beck Depression Inventory (BDI—II; Beck et al., 1996; Italian version by Sica and Ghisi, 2007) is a 21—item self—report inventory designed to measure the presence and intensity of depressive symptomatology in both adult and adolescent populations. The questionnaire is presented in multiple choice format with each item scored on a four—point scale ranging from 0 (low intensity) to 3 (high intensity) with overall total scores ranging from 0 to 63. The inventory has demonstrated excellent internal consistency reliability (e.g., α = 0.91–0.93; Beck et al., 1996).

Fear of Guilt Scale

Fear of Guilt Scale (FOGS; Chiang et al., 2016; Italian version by Cosentino et al., 2020) is a 17-item scale designed to determine the extent to which respondents fear feeling guilt

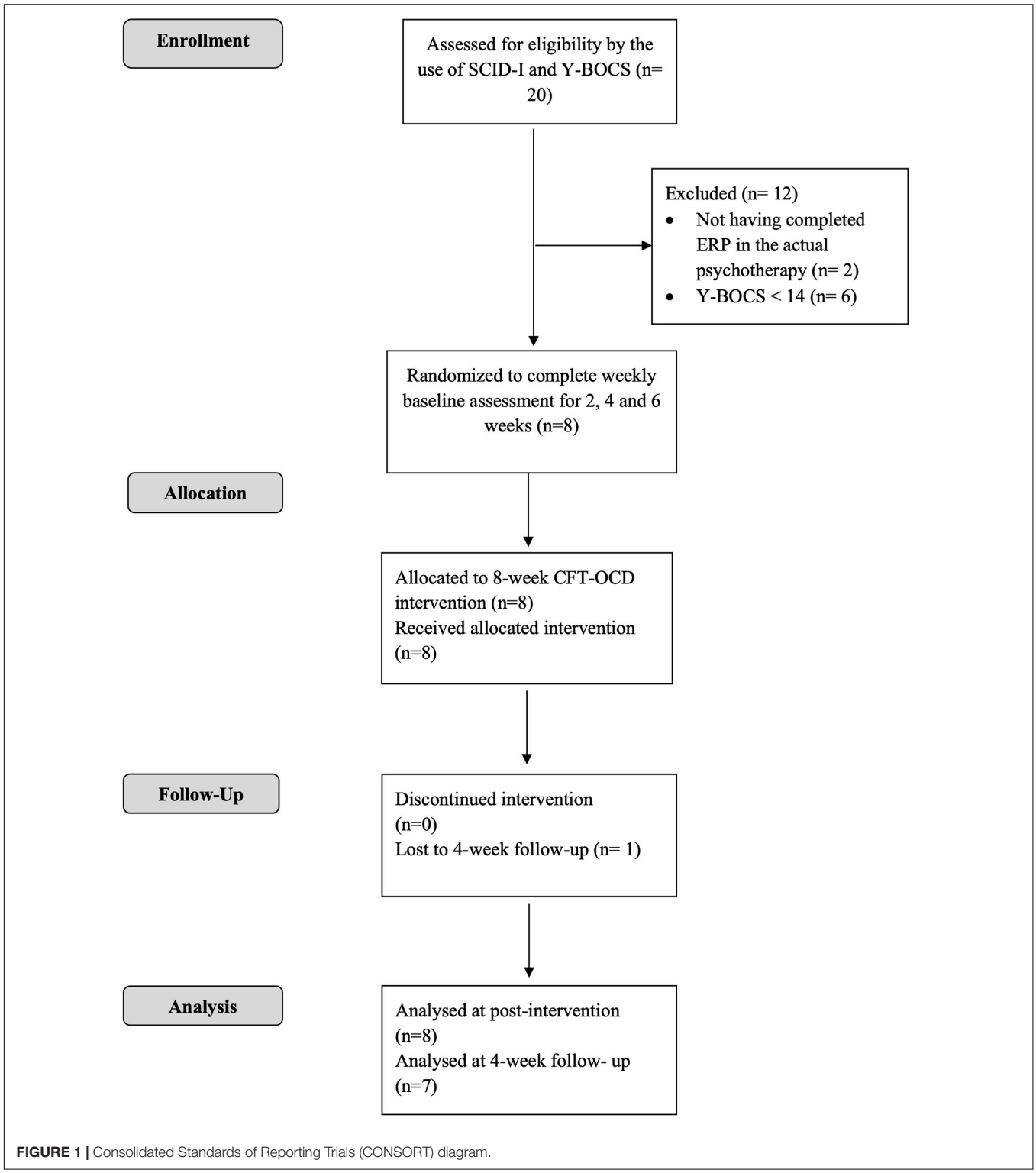


FIGURE 1 | Consolidated Standards of Reporting Trials (CONSORT) diagram.

and behave in ways to minimize, prevent, or atone for guilt on a seven-point Likert scale and consists of two factors—Punishment (drive to punish oneself or atone for guilt, inability to forgive oneself) and Harm Prevention (belief that one can and should be able to prevent guilt). The FOGS is closely linked to OCD symptoms and has demonstrated strong internal consistency and convergent, divergent, and concurrent validity. Only the total score, which has shown good internal consistency (α = 0.92; Chiang et al., 2016), has been employed in the present study.

TABLE 1 | Participants' characteristics.

	Age	Gender	Education	Type of DOC	Medications	Age of OCD onset	Years of therapy since onset	Previous treatments	Number of CBT/ERP sessions before CFT treatment
P1	36	F	Bachelor's degree	D and C	No	Adolesc.	>1	CBTstandard	40
P2	24	M	Bachelor's degree	U and R, C and W	Anafranil	Childhood	5	CBT standard	29
P3	38	F	Bachelor's degree	C and W, D and C	Fluoxetine	18 years	>1	CBTstandard	43
P4	41	F	Master's degree	C and W, S and C, U and R	Elopram	Childhood	16	CBT standard Psychoan.	42
P5	31	F	Master's degree	U and R, D and C	No	30 years	>1	CBTstandard Schema therapy	36
P6	29	M	Bachelor's degree	C and W	Escitalopram	21 years	>1	CBTstandard	33
P7	34	M	Bachelor's degree	D and C	No	32 years	>1	CBTstandard	37
P8	31	M	Master's degree	U and R, D and C	No	23 years	>1	CBTstandard	32

D and C, doubts about accidental harm and checking; U and R, unacceptable taboo thoughts and mental rituals; C and W, contamination and washing; S and C, symmetry, arranging, and counting.

The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale

The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (Gilbert et al., 2004; Italian version by Petrocchi and Couyoumdjian, 2016) was used to evaluate how individuals "treat themselves" when things go wrong. This instrument is composed of 22 items with a five-point Likert scale from 0 (not at all like me) to 4 (extremely like me) and consists of three subscales: *self-criticizing*, which evaluates feelings of inadequacy and senses of irritation and frustration toward the self; *self-attacking*, which evaluates a more extreme form of self-criticism, characterized by feelings of self-repugnance and desires to hurt the self in response to failures and setbacks; *self-reassuring*, which evaluates the capacity to be self-soothing and consider the self with kindness and compassion. Adequate levels of internal consistency (α ranging from 0.76 to 0.91) and construct validity were found for all the subscales in the original and in the Italian version (Petrocchi and Couyoumdjian, 2016). In this study, *self-criticizing* and *self-attacking* subscales were combined, as recommended by recent investigations on the factor structure of the scale (Halamová et al., 2018). Higher scores at these subscales indicate higher levels of self-criticism and self-reassurance, respectively.

Common Humanity

Common humanity subscale of the Self-compassion Scale (Neff, 2003; Italian version by Petrocchi et al., 2014) was used to assess the participants' ability to remind themselves that suffering is part of the human nature, and to see one's experiences as part of the larger human experience rather than as separating and isolating. Common humanity subscale contains four items, with a five-point Likert scale ranging from 1 (*Almost Never*) to 5 (*Almost Always*), and was obtained calculating the mean of the items' scores. The subscale has demonstrated good internal consistency ($\alpha = 0.81$).

Acceptability

At post-intervention, participants were asked to quantitatively rate the usefulness (from 1 = not at all useful to 7 = extremely useful) of several aspects of the intervention: the CFT-DOC psychoeducation, the group climate, visualizations techniques, body techniques, meditation techniques, practices in pairs, and practices at home. They were also asked to rate (from 1 = not at all to 5 = extremely) how acceptable the intervention was, how satisfied they were with it, whether they would recommend this treatment to friends or family suffering from OCD, and how much the treatment had improved their quality of life. Participants also provided qualitative feedback on some of the changes they had noticed as a result of the intervention and suggestions on how to improve the treatment.

Intervention—Compassion-Focused Therapy for OCD (CFT-OCD)

Treatment was delivered by two facilitators. The first facilitator (NP) is a psychotherapist with more than 8 years of direct training with Paul Gilbert and one of the co-authors of the soon-to-be published manual for group CFT. The second facilitator (AD) is a psychotherapist trained in CFT, for more than 5 years, by the first author, with extensive experience in leading mindfulness meditation interventions. Both facilitators have practiced personal meditation for over 5 years. All sessions were conducted in the group therapy room at the counseling center of the School of Cognitive Psychotherapy (SPC) in Rome. Participants attended 8 weekly sessions of 120 min of group CFT. Treatment rationale and objectives, the structure of the sessions,

and the scripts of the compassion-focused visualizations and meditations were based on the soon-to-be published manual for group CFT (one the co-authors of the manual is the first author of the present paper) and the book *Mindful compassion* (Gilbert and Choden, 2014). All group sessions had the following format: (1) initial 10-min "landing" meditation, (2) review and discussion of the previous week's home practice with a focus on exploring the barriers and difficulties that clients faced, (3) introduction of a specific CFT-related theme and practice of relevant CFT exercises within the group, (4) assignment of home practice for clients to practice over the subsequent week, and (5) final compassion-focused mediation. All meditations and visualizations were audio-recorded and uploaded on a shared online group. At the beginning, participants were asked to complete a home-practice log reporting the CFT meditations and tools they had used during the week. However, the extreme scrupulousness, exactness, and self-doubt that characterized OCD patients made this task too anxiety inducing for participants, and it was decided by the group to discontinue it, opting for a less structured review and discussion of the previous week's home practice at the beginning of each session.

Compassion-focused therapy for OCD began with psychoeducation on the evolved nature and difficulties of the human mind such as tendencies for negativity bias, negative rumination, aversion of certain emotions and experiences, shame, and self-criticism. In particular, patients were introduced to the concept of "tricky brain" and to the nature of the evolved human mind, its emphasis on threat, and how this can create unhelpful loops between thoughts, feelings, and behaviors. They were invited to reflect on the fact that built from genes they did not choose, and that genetic background constituted one of the reasons not only for physical, but also for psychological suffering (there is prevalence of OCD diagnoses among first-degree relatives of persons affected with the same pathology; Fyer et al., 2005). Humans also grew up in environments that that they did not choose, which, in their case, have established the foundation of their vulnerability to OCD. Clients were nudged to consider and reflect in group how interpersonal context, family atmosphere, and certain styles of childrearing (e.g., rigid obsessive beliefs in parents, especially tied to inflated responsibility, overestimation of threats, perfectionism, and intolerance of uncertainty) might have played a role in the emergence of the obsessive symptomology they had developed later on. In fact, family climate is often described by OCD patients as rigid and characterized by a marked attention to morality and normative behavior. It is not rare for OCD patients to remember harsh and scornful reproaches and the interruption of affective bonds (often accompanied by a peculiar facial expression, represented by a "long face") as punishment, without explicit forgiveness during childhood (Shapiro and Stewart, 2011). Such serious perceived threats could have been motivators for behaving impeccably, a typical goal of the obsessive mind. This psychoeducational aspect was aimed to help clients adopt a de-shaming and depersonalizing approach, which created the context for realizing that much of what goes on in their "obsessive" mind (their doubts, their fear of experiencing certain emotions, such as guilt, their compulsive behaviors) is not their fault, but that it is their responsibility to learn how to work with the mind in a way that is helpful. Patients were then offered experiential insights into the nature of three emotion regulation systems (the threat, the seeking, and the soothing systems), and the regulating effect that the soothing system, via increased activity of the vagus nerve and the prefrontal cortex, exerts on the other two systems. They were helped to focus on their OCD difficulties and their self-criticism as stemming from their threat system (i.e., in terms of safety behaviors) and to explore the usefulness of becoming understanding and compassionate to those safety behaviors (e.g., to de-shame and de-pathologize, activating the soothing system). Patients were taught to explore the fears and the functions behind their self-criticism and to identify some of the protective purposes it may be trying to serve (e.g., preventing the client from being scolded, rejected, or humiliated for their mistakes and for their OCD symptoms). In general, obsessive patients typically show a primary self-critical rumination ("how could I have been so careless, couldn't I have thought ahead of time about avoiding such contact? I did something really stupid!") which triggers compulsions, which are usually followed by a secondary self-critical rumination ("I'm crazy! It's not rational. I'm strange. I'm ruining my life and my parents' life! I have to stop!"). Patients were guided to realize that both self-critical self-talks triggered the threat system, with unintended psychophysiological consequences that maintain OCD (reduced prefrontal inhibitory regulation, increased selective attention to potential threats, increased self-evaluation moral standards, "more better than sorry" reasoning style, avoidance etc.; Gilbert, 2019). They then were invited to experience, with several body-based visualization and mediation practices, how extending warmth and compassion to others as much as to the suffering parts of themselves (including their self-criticism) had beneficial effects in terms of lowering arousal and in particular, dampening self-criticism and its "looping effect" on OCD symptomatology. It was very important that the participant understood the way external and internal soothing and reassurance can stimulate soothing systems, and viewed CMT as a kind of physiotherapy for the brain. **Table 2** describes the content addressed in each CFT group session.

Data Analyses

In multiple baseline single case series design, visual inspection is one of the main methods employed to describe data and make inferences about the changes' reliability due to a treatment. Such method consists of the visual examination of graphed data in order to evaluate the amount and rate of changes across phases (e.g., baseline, treatment, and follow-up). Given the reduced sample size that often characterizes single-case studies, visual inspection is considered a conservative and reliable approach with respect to other classic statistical tests. Indeed, it relies on consistent effects that are readily seen (Kazdin, 2011). In this study, Y-BOCS, OCI-r, FOGS, and BDI-II data were plotted graphically in order to examine changes in OCD-related symptoms and constructs for each participant. Likewise, common humanity subscale (CHS) and self-criticism and self-reassurance (FSCRS) data were graphically examined as compassion-related measures.

Auxiliary to the visual inspection, non-overlap methods for analyzing the difference between phases in single-case designs were implemented. These methods approach the problem of trying to quantify differences between two adjacent phases in a single-case study by descriptively summarizing the extent to which data points in the phases do not overlap. Parker et al. (2011) recommended two methods as the most robust combination: the percentage of all non-overlapping data (PAND) and non-overlap of all pairs (NAP). These indexes express the percentage of participants' scores at post-treatment and follow up that don't overlap (in the expected direction) with participants' scores at baseline. Moreover, the percentage of data points exceeding the median (PEM) should also be considered, as it is least likely to be influenced by autocorrelation (Manolov et al., 2010). Therefore, these three non-overlap methods have been employed in the study. For both visual inspection graphs and overlap statistics, the R package SCAN was implemented using the RStudio graphical interface (RStudio Team, 2015).

We also computed a change score and the related 95% confidence interval for each participant on all the measures included in the study. This method was used to supplement the visual inspection in order to monitor the symptoms' variations across particular time intervals. Specifically, change scores on each outcome measure were calculated to assess change from first baseline to pre-treatment (i.e., last baseline), change from pre- to post-treatment, and change from pre-treatment to follow-up (see **Table 3** for variables and means used to calculate reliability coefficients). Then, standard error of the difference was computed (S_{diff}; Jacobson and Truax, 1991), which embodied the average variation in score that would be anticipated on that measure by chance variation alone, between two detection times. S_{diff} was computed by using the SDs and reliability coefficients (i.e., Cronbach's alpha) of the scales at the first baseline measurement time (see **Supplementary Table 1**). Afterward, S_{diff} for each measure was multiplied by the Z critical value of 1.96 to create a 95% CI around each participant's change score. This CI provides the range of plausible values for each change score

TABLE 2 | Overview of group sessions.

Session topic	Key elements
1. Introducing compassion	Group exploration of compassion: definition, intro to fears of compassion; influences of evolved brain, genetics, and social context on OCD vulnerability. Introduction to the nature, functions, and unintended consequences for OCD of the self-critical voice; why and how compassion might help when we experience OCD symptoms; introductions and outlining of group objectives.
2. The three emotion regulation systems	Three emotion regulation systems and how they are unbalanced in OCD; obsessions and compulsions as stemming from the threat system. Definition of internal (fear of guilt) and external threats for an OCD patient. How to use soothing rhythm breathing, friendly facial expression, and friendly inner tone of voice to start stimulating the soothing system and heart rate variability.
3. Mindfulness and attention	How to use attention intentionally for awareness and amplification; how mindfulness can facilitate less reactivity to obsessive thoughts and feelings, especially when it is infused with compassionate intention (compassionate labeling); compassionate refocusing; compassionate body posture
4. Safeness vs. safety and the first flow of compassion	Discussion on the difference between safety and safeness and how crucial affiliation with self and others is to generate a state of safeness; explorations of the "power of visualization"; compassion from others: "safe place" imagery and "compassionate other" imagery and how they can create safeness (instead of safety) when they experience obsessive doubts.
5. Compassionate self and the second flow of compassion (for others)	"Compassionate self" imagery: focusing on oneself as a compassionate person with the three core qualities of compassion: wisdom, strength and authority, and commitment; discussion on how they can bring compassion to life difficulties that other people in their life might experience, starting with the other OCD group members; discussion of what it would be like to deliberately cultivate this self and operate from this part of self more often when obsessive thoughts emerge. Visualizations of future scenarios of their compassionate self-dealing with triggering circumstances
6. Self-criticism	Exploration of the forms and functions of self-criticism—purpose and unintended effects on our OCD symptoms; using "compassionate self" imagery to address both primary ("Am I stupid?? I should have been more careful!!") and secondary ("I can't go on like this, I need to stop compulsions, I'm crazy!") self-criticism; developing a repertoire of compassionate statements and behaviors to use in response to the self-critical voice.
7. The third flow of compassion: compassion for our multiple selves	Visualization: exploring multiple emotions of the threat system (primary guilt and the avoidance of it) and their conflicts; addressing multiple emotions and their needs through our compassionate self; discussion of common traps and barriers, and practice within the group.
8. Cultivating self-compassion and wrap-up	Cultivating self-compassion; compassionate letter writing to themselves; review and relapse prevention; discussion of lessons learned, experiences people want to take away from group and plans for moving forward

TABLE 3 | Descriptive statistics of variables at the first baseline measurement time.

	Y-BOCS	Obses.	Comp.	OCI-r	FOGS	BDI-II	CHS	S-C	S-R
M	2.80	2.90	2.70	1.55	5.27	0.87	2.17	2.46	1.48
SD	0.61	0.52	0.77	0.58	0.53	0.38	0.76	0.75	0.90
Alpha	0.93	0.79	0.96	0.75	0.69	0.79	0.90	0.75	0.91
S_{diff}	0.23	0.34	0.22	0.41	0.42	0.24	0.34	0.34	0.38
95% CI	±0.45	±0.66	±0.42	±0.80	±0.82	±0.47	±0.67	±0.66	±0.75

YBOCS, Yale–Brown Obsessive–Compulsive Scale, and the obsessive (Obses.) and compulsive (Comp.) sub-dimensions; OCI-r, Obsessive–Compulsive Inventory Revised; FOGS, Fear of Guilt Scale; BDI-II, Beck Depression Inventory II; CHS, Common Humanity Subscale; S-C, Self-Criticism; S-R, Self-Reassurance. These indices were used to compute change scores.

within a 95% confidence level; additionally, when the CI does not include zero, the observed change can be considered a reliable change (Jacobson and Truax, 1991).

Given the relatively small number of participants, we tried to provide further support and robustness to our results through another non-parametric test. Thus, we implemented a Wilcoxon Signed Ranks Test for the non-parametric comparison of the Y-BOCS, OCI-r, BDI-II, FOGS, CHS, and FSCRS scores between the baseline and post-treatment, as well as between the baseline scores and the follow-up. Moreover, all test statistics were associated with an effect size (r). These effect sizes were computed by dividing the Z test statistic by the square root of the total number of observations (Fritz et al., 2012).

Finally, an overall and standardized mean difference was calculated for each dependent variable, using a Hedges' g effect size specifically developed for single-case designs (Shadish et al., 2014). The standardized differences pertained to the comparisons of the average score at the baseline phases in respect to post-treatment and follow-up. This effect size index is particularly suitable for single-case studies since it takes into account the scores' autocorrelation across the different measurement times and corrects the estimate for small sample bias. Moreover, this effect size can be incorporated in a future meta-analysis study as it is based on classical Cohen's d metric. Following the procedure outlined by Shadish et al. (2014), a test of the statistical significance of G against the two-tailed critical value of Z and the related 95% confidence interval was computed for all the interested standardized differences. Specifically, the authors suggest to compute the square root of the G's variance to obtain the associated standard error and to multiply the latter by the Z critical value of 1.96 to obtain a 95% CI. These analyses were run using the SPSS macro developed by Shadish (2015).

RESULTS

Visual Inspection, Non-overlapping Data Analyses, and Change Score

As regards the primary outcome, **Figure 2** graphically displays the OCD-related symptoms severity assessed by means of the Y-BOCS. Specifically, it shows the total score and the specific sub-dimensions (compulsions and obsessions) for all eight participants. Visual inspection suggested that the scores at the post-treatment phases were all lower than those at both the baseline phases, except for the compulsions subscale score of participant 7 at the follow-up measurement time. This visual evidence was corroborated by the non-overlapping data analyses (**Table 4**), which showed only a little overlap of data points at the Yale–Brown compulsion scores. Indeed, PAND, NAP, and PEM were all equal to 100% for the obsessive dimension and the overall score of Y-BOCS, whereas around 93% for the compulsions dimension. This means that for all participants, total Y-BOCS and the obsession subscale scores at post-treatment and follow-up were lower than scores at baseline. These results indicate large beneficial intervention effects. Consistently, it highlights a reliable improvement of all participants on the overall Y-BOCS, comparing the pre-treatment phase with those of post-treatment and follow-up (see **Supplementary Table 1**). A similar trend is found when we look at the Yale–Brown's sub-dimensions: all participants reported a reliable improvement on the compulsions dimension of the Y-BOCS after the treatment. A unique exception was participant 7, who demonstrated a reliable worsening at the follow-up. However, the same participant showed a reliable improvement on the obsessions dimension at the same phase. Regarding the obsessions dimension, the exception was instead participant 4, who did not show any improvement across phases, but showed a reliable improvement on the compulsions dimension. Moreover, most of the participants did not report a reliable change score during the two baseline intervals, further pointing out the treatment effect. The only exception was participant P6, who showed a slight but reliable improvement during the two pre-treatment assessments (T1 and T2). However, the participant was still retained in the analysis, given that the scores on the OCI-r did not corroborate such improvement and the Y-BOCS improvement was less than a 10-point decrease.

As regards the secondary outcomes, **Figure 3** graphically displays the OCD-related symptoms' severity assessed by means of the OCI-r and two other measures linked to OCD, namely, the FOGS and the BDI-II. In this case, visual inspection suggested not entirely consistent improvement for all participants on the measures of interest. Although a score reduction could be observed for most participants on the OCI-r, FOGS, and BDI-II, these reductions did not seem to be as large as the Y-BOCS improvements. Non-overlapping data analyses (**Table 4**) confirmed these visual observations, indicating overall medium beneficial intervention effects (i.e., around 85%) on OCD symptoms severity (OCI-r) and fear of guilt (FOGS), while indicating a small effect (i.e., around 68%) on depression (BDI-II). Also, the analyses pertaining to individual change score highlighted a similar pattern of results (see **Supplementary Table 1**). With regard to the OCI-r, we detected a reliable improvement only for participants 3, 5, and 6 between pre-treatment measurement time, post-treatment, and follow-up phases. Moreover, participant 3 also showed a reliable worsening within the baseline phases which, if associated with the improvement of the scores in the post-treatment phases, indicates a real turnaround. The other participants demonstrated a reduction of symptom severity even if no reliable improvements

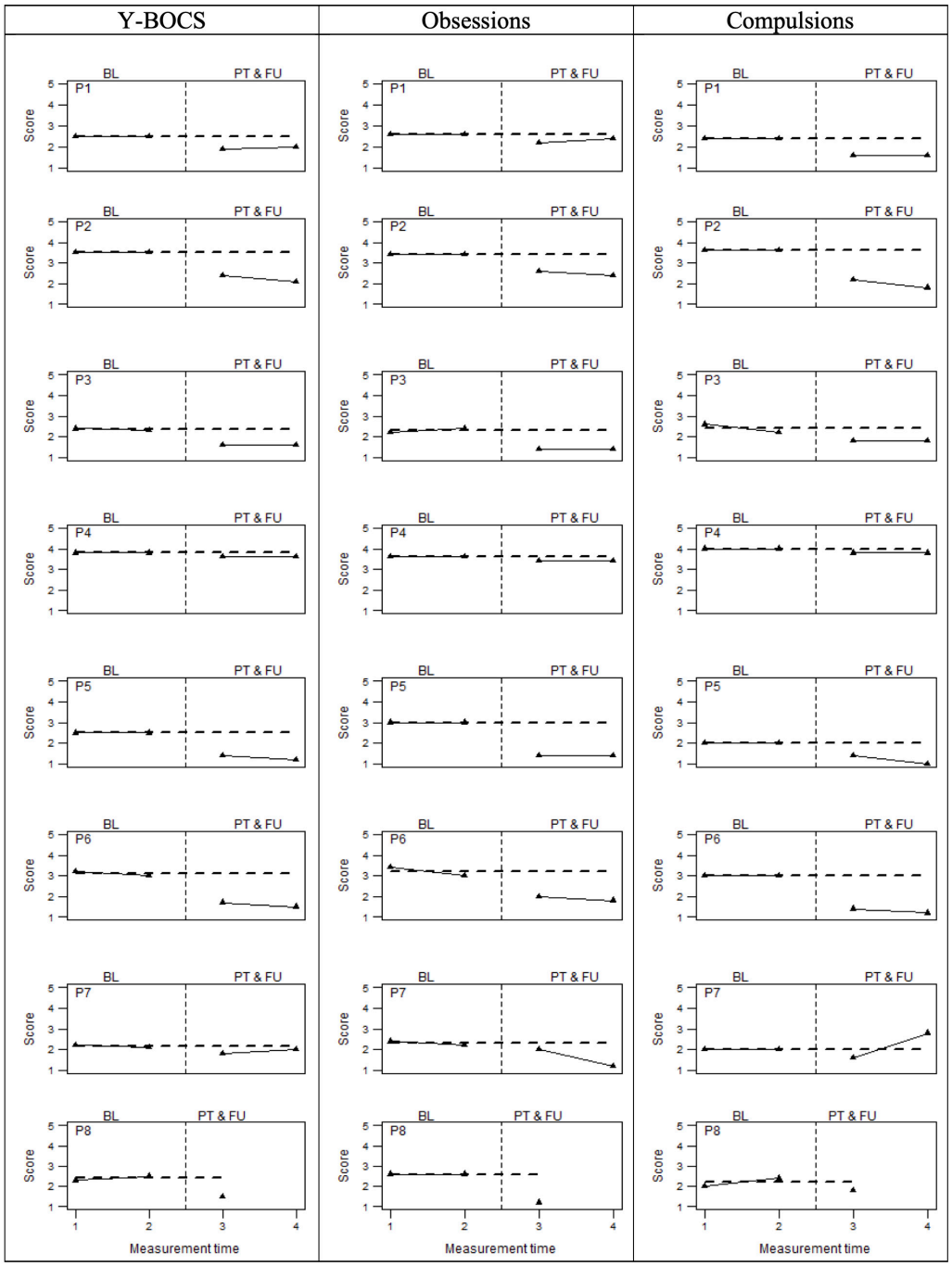


FIGURE 2 | OCD symptoms severity (Y-BOCS total score and sub-dimensions) at baseline (BL), Post-treatment (PT), and follow-up (FU). The perpendicular dotted line represents the intervention.

were observed for them when comparing these phases. Similar results emerged on the measure of fear of guilt (i.e., FOGS). We observed a reliable improvement for participants 1, 2, 5, and 7. The remaining four participants reported improvements, but they were not reliable, while participant 6 showed a reliable deterioration in the follow-up. For five participants, baseline scores were not stable and they had already begun to decrease pre-treatment. This highlighted a trend that was partially independent of the treatment. However, considering the percentage of data points exceeding the median (PEM), which takes into account the autocorrelation of the scores in the different phases, a large and beneficial effect (i.e., 93%) of the intervention on fear of guilt clearly emerged. On the BDI-II, all participants demonstrated stable or worsening depression

TABLE 4 | Non-overlapping data analyses.

Measures	PAND	NAP	PEM
Yale–Brown Total Score	100%	100%	100%
Yale–Brown Obsessions Score	100%	100%	100%
Yale–Brown Compulsions Score	93.5%	93.7%	93.7%
Obsessive–Compulsive Inventory Revised	85.5%	85.9%	87.5%
Fear of Guilt Scale	80.6%	81.2%	93.7%
Beck Depression Inventory II	66.1%	70.2%	68.7%
Common Humanity	74.2%	73.5%	75%
Self-Criticizing/Attacking	87.1%	87.5%	87.5%
Self-Reassuring	77.4%	82.9%	81.2%

during the baseline measurement interval. After the intervention, six participants reported pre- to post-treatment decreases in depression that did not overlap with baseline scores. However, only participants 3 and 5 showed an improvement that could be considered reliable in both the post-treatment and follow-up compared to the baseline. Participants 2 and 6 appeared to be reliably improved immediately post-intervention, whereas they did not report either improvement or worsening at the follow-up. Participant 1 instead showed a reliable decrease in depression at both post-treatment and follow-up, but only the latter could be considered reliable. Participant 5 was the one who benefitted the most from treatment, showing stable scores at the baselines and a reliable improvement after the intervention. Participants 4 and 7 displayed a non-reliable worsening in the post-treatment phase, with P7 showing a reliable deterioration at the follow-up. Participant 8 showed improvements, but not reliably across phases.

Finally, **Figure 4** graphically displays individual compassion-related scores assessed by means of the common humanity subscale (CHS) and self-criticism and self-reassurance (FSCRS subscales). For this latter scale, the sub-dimensions of inadequate and hated self were investigated as a unitary dimension (i.e., self-criticism), while the self-reassurance dimension was examined separately. Visual inspection of the data suggested that five participants showed a visible score increase in common humanity, whereas four participants did on the self-reassurance dimension. Six participants displayed a decrease in self-criticism. As shown in **Table 4**, the three percentage indicators of data non-overlapping (i.e., PAND, NAP, and PEM) were around 74% for common humanity, 80% for the self-reassurance, and about 87% for self-criticism, suggesting medium/large beneficial effects of the compassion-focused intervention.

Five participants (i.e., P1, P2, P5, P6, and P8) displayed a reliable improvement in common humanity, both comparing pre- to post-treatment and pre- to follow-up measurements. In turn, three of these participants evidenced stability (i.e., P8) or reliable worsening (i.e., P1 and P6) at the baselines, which substantiated their improvement. Contrastingly, participants 2 and 5 demonstrated a reliable improvement already within the prescreening observations, which indicated a trend that was partially independent of the treatment. Participants 3 and 7 did not reveal any benefits due to the intervention, showing a reliable worsening in the post-treatment phase and in the follow-up, respectively. As regards self-criticism, all participants reported a reliable improvement, except for P7 who showed a reliable worsening both at post-treatment and follow-up. Four of them (i.e., P2, P5, P6, and P8) also reported stable scores within the baseline, whereas the other three (i.e., P1, P3, and P4) already demonstrated a reliable improvement. Finally, we observed an improvement on the self-reassurance dimension for all the eight participants involved in the study. For three of them (i.e., P2, P5, and P6), these improvements could be considered reliable comparing the pre- to post-treatment, whereas for participants 3 and 5, they could be considered reliable between the pre-treatment and the follow-up. Moreover, none reported a worsening on self-reassurance after the compassion-focused intervention. Therefore, self-criticism and self-reassurance represent the compassion-related measures where we observed the greatest effect of the compassion-focused intervention.

Wilcoxon Signed Ranks Test

Given the small number of participants, we tried to provide further support and robustness to our results through another non-parametric test. Thus, we implemented a Wilcoxon Signed Ranks Test for the non-parametric comparison of the investigated constructs between the pre-compassion-focused intervention baseline, the post-intervention, and follow-up. Results were consistent with those of the non-overlapping data analyses (see **Table 5**). As regards the primary outcome, the Wilcoxon tests showed a significant decrease of the scores on the Y-BOCS and the related subdimensions both at the post-treatment and at the follow-up. Moreover, all test statistics were associated with a high effect size (r). As had emerged in the previous analyses, a unique exception was represented by a score on the compulsive dimension at the follow-up period, which was ultimately only marginally significant. Indeed, one participant (i.e., P7) reported an increase of the score at that measurement time. As regards the secondary outcomes, the Wilcoxon tests also showed a significant decrease of the scores on the OCD symptoms' severity assessed by means of the OCI-r. Thus, six participants' scores reported decreases at the post-intervention and seven at the follow-up, indicating a significant treatment effect. Also, in this case, test statistics were accompanied by medium high effects size. With regard to FOGS and BDI-II, we found only a marginally significant treatment effect (p = 0.06) for the comparison between the pre- and post-intervention scores. For both measures, six participants showed an improvement at this interval. No significant effect emerged at the follow-up measurement time, though five participants reported an improvement. This non-significant effect was due to the fact that on the FOGS and BDI-II, respectively, one and two participants demonstrated a deterioration in the follow-up.

Consistently with overlap data analyses, we found a non-significant effect on common humanity. Although five and four participants showed improvements in the post-treatment and follow-up phases, respectively, we also witnessed two and three participants who reported negative score at such phases. This limited the possibility

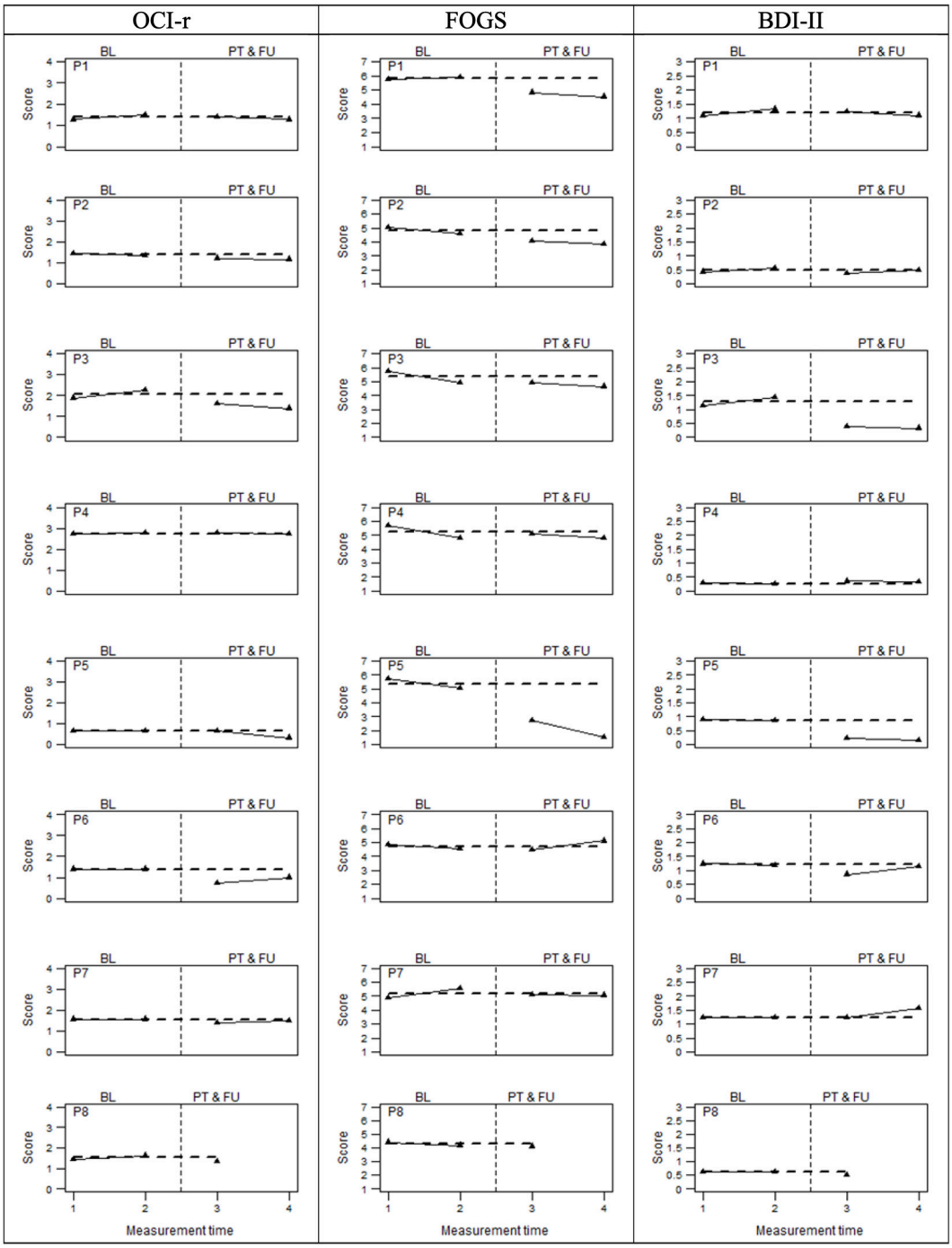


FIGURE 3 | OCD related measures at baseline (BL), Post-treatment (PT), and follow-up (FU). The perpendicular dotted line represents the intervention.

of achieving statistical significance in this test. Finally, we found significant treatment effects for both self-criticism and self-reassurance regarding the comparison between the pre-test and the post-test. Here, seven out of eight participants showed improvement in self-criticism, and five in self-reassurance. Furthermore, both of these results were associated with a medium-high effect size. However, these effects were not consistent in the comparison between pre-treatment and follow-up.

Hedges' *G* Effect Size for Single-Case Designs

Standardized mean differences (*G* with 95% CIs) were calculated to estimate the overall magnitude of the intervention effect across

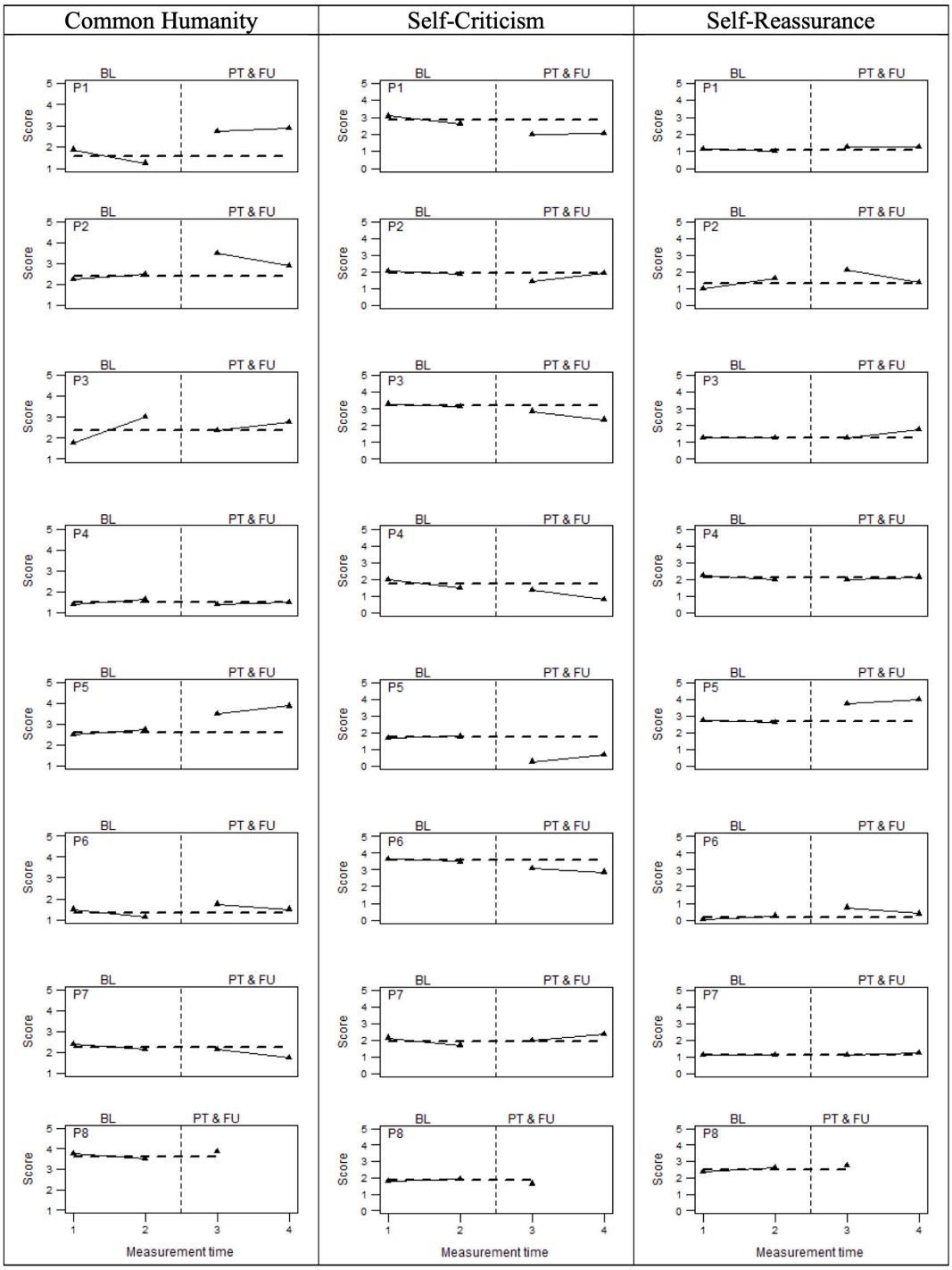


FIGURE 4 | Compassion related measures at baseline (BL), Post-treatment (PT), and follow-up (FU). The perpendicular dotted line represents the intervention.

participants. **Table 6** presents the *G*-statistic comparing post-treatment vs. baseline and follow-up vs. baseline. As regards the primary outcome, these effect sizes suggest that across participants, the compassion-focused intervention was associated with large decreases in OCD-related symptom severity assessed with the Y-BOCS. As regards the secondary outcomes, medium effect size decreases at the OCI-r were observed. Moreover, a large effect size was observed also for the fear guilt (i.e., FOGS), whereas medium effect sizes were noted for the BDI-II and compassion-related constructs. As mentioned in the "Data Analyses" Section, for each effect size, a *Z* test statistic and related 95% CIs were computed. Thus, all these effects turned out to be

TABLE 5 | Wilcoxon Signed Ranks Test for study variables.

	Comparisons	Negative ranks	Positive ranks	Ties	Total	*Z*	*p*	Observations	*r*
Y-BOCS	Pre vs. Post	8	0	0	8	−2.52	0.01	16	−0.63
	Pre vs. F-up	7	0	0	7	−2.37	0.02	14	−0.63
Obses.	Pre vs. Post	8	0	0	8	−2.53	0.01	16	−0.63
	Pre vs. F-up	7	0	0	7	−2.39	0.02	14	−0.64
Comp.	Pre vs. Post	8	0	0	8	−2.53	0.01	16	−0.63
	Pre vs. F-up	6	1	0	7	−1.78	0.07	14	−0.48
OCI-r	Pre vs. Post	6	1	1	8	−2.21	0.03	16	−0.55
	Pre vs. F-up	7	0	0	7	−2.37	0.02	14	−0.63
FOGS	Pre vs. Post	6	1	1	8	−1.86	0.06	16	−0.46
	Pre vs. F-up	5	1	1	7	−1.57	0.11	14	−0.42
BDI-II	Pre vs. Post	6	1	1	8	−1.86	0.06	16	−0.46
	Pre vs. F-up	5	2	0	7	−1.83	0.24	14	−0.48
CHS	Pre vs. Post	2	5	1	8	1.61	0.11	16	0.40
	Pre vs. F-up	3	4	0	7	1.19	0.23	14	0.32
S-C	Pre vs. Post	7	1	0	8	−2.11	0.03	16	−0.53
	Pre vs. F-up	5	2	0	7	−1.61	0.11	14	−0.43
S-R	Pre vs. Post	0	5	3	8	2.03	0.04	16	0.51
	Pre vs. F-up	1	6	0	7	1.62	0.10	14	0.43

YBOCS, Yale–Brown Obsessive–Compulsive Scale, and the obsessive (Obses.) and compulsive (Comp.) sub-dimensions, OCI-r, Obsessive–Compulsive Inventory Revised; FOGS, Fear of Guilt Scale; BDI-II, Beck Depression Inventory II; CHS, Common Humanity Subscale; S-C, Self-Criticism; S-R, Self-Reassurance. Table reports comparisons between the baseline (BL) and pre-treatment (Pre), pre-treatment and post-treatment (Post), pre-treatment (Pre), and follow-up (F-up).

TABLE 6 | Shadish et al.'s (2014) *G* effect size with 95% CIs.

					95% CI	
Measure	**Comparisons**	***G***	**SE**	***Z***	**Lower**	**Upper**
Y-BOCS	BL vs. Post	−1.10	0.36	−3.07	−1.77	−0.39
	BL vs. F-up	−1.07	0.39	−2.73	−1.85	−0.31
Obses.	BL vs. Post	−1.29	0.41	−3.12	−2.10	−0.48
	BL vs. F-up	−1.28	0.45	−2.75	−2.18	−0.38
Comp.	BL vs. Post	−0.87	0.29	−3.03	−1.43	−0.31
	BL vs. F-up	−0.78	0.29	−2.71	−1.35	−0.22
OCI-r	BL vs. Post	−0.29	0.13	−2.28	−0.55	−0.04
	BL vs. F-up	−0.34	0.15	−2.26	−0.63	−0.05
FOGS	BL vs. Post	−1.00	0.36	−2.78	−1.71	−0.29
	BL vs. F-up	−1.12	0.40	−2.79	−1.90	−0.33
BDI-II	BL vs. Post	−0.56	0.21	−2.72	−0.97	−0.16
	BL vs. F-up	−0.41	0.18	−2.24	−0.77	−0.05
CHS	BL vs. Post	0.49	0.25	2.02	0.01	0.97
	BL vs. F-up	0.57	0.31	1.83	−0.40	1.87
S-C	BL vs. Post	−0.29	0.12	−2.39	−0.52	−0.05
	BL vs. F-up	−0.63	0.25	−2.79	−1.13	−0.13
S-R	BL vs. Post	0.35	0.14	2.38	0.06	0.63
	BL vs. F-up	0.32	0.15	2.12	0.02	0.62

Table reports standardized mean differences between the average scores at the baseline vs. post-treatment and vs. follow-up scores. Test statistics and confidence intervals follow the two-tailed Z distribution.

significant following the two tailed *Z* distribution, except for that related to the Common Humanity measure at the follow-up.

Acceptability

Quantitative feedback on the intervention revealed a high level of satisfaction with CFT-OCD. On a seven-point Likert scale (from 1 = not at all useful to 7 = extremely useful), mean scores of usefulness for the different aspects of the intervention for each item were all above 5.5, with practices in pairs, visualization techniques, and psychoeducation scoring the highest among the other elements of the intervention. On a five-point Likert scale (from 1 = not at all to 5 = extremely), mean scores of

the acceptability of and satisfaction with the intervention were M = 4.25 (SD = 0.7) and M = 4.1 (SD = 0.7), respectively. It was also extremely likely that they would recommend this treatment to friends or family suffering from OCD, M = 4.5 (SD = 0.5), and they felt that the treatment had improved their quality of life, M = 4.4 (SD = 0.4). Informal feedback collected during the post-intervention assessment revealed that a number of clients reported developing a new relationship to their OCD during the treatment, seeing it as just a "scared and suffering" part of them that they could learn to treat with validation and compassion to maximize their resilience. They reported that they could use compassion as a "new language" to talk to their fears, but that it needed to be practiced (exactly like a language). The establishment of a positive, caring therapeutic relationship with the facilitators and with the other members of the group was also one of the sources of their change. The handouts and exercises were viewed as constructive, although home-practice felt at times distressing to some clients. Areas to improve in the protocol identified by clients included reshaping some handouts to be more structured, and further highlighting strategies to facilitate social reconnection and to deal with intrusive thoughts. One client (P4), whose depression slightly worsened during the treatment, still gave encouraging feedback about the treatment, identifying clear gains he/she had made, especially linked to the group climate.

DISCUSSION

This study is the first known study to evaluate the feasibility, acceptability, and potential clinical effectiveness of an 8-week compassion-focused intervention designed to reduce OCD symptoms and OCD-related constructs (fear of guilt, depression, and self-criticism), and increase compassionate self-reassurance and common humanity in a group of treatment-resistant OCD patients, using a multiple baseline design. Results showed preliminary but nevertheless promising evidence of clinical effectiveness on the primary outcome measure, substantiated by triangulation in findings across analytic methods.

In line with previous research suggesting the potential benefits of compassion-focused interventions for OCD (Barcaccia et al., 2015; Key et al., 2017; Chase et al., 2019; Didonna et al., 2019; Leeuwerik et al., 2020), this study found that all participants experienced a significant decrease in OCD symptoms as measured by the clinician-administered Y-BOCS, with large effect sizes. More specifically, during the two baseline assessments (T1 and T2), OCD symptoms remained stable or increased for 7/8 participants, irrespective of baseline duration. The only exception was participant P6, who showed a slight but reliable improvement during the two pre-treatment assessments (T1 and T2), but was still retained in the analysis given that the scores at the OCI-r did not corroborate such improvement. At post-intervention assessment (T3), 100% of participants demonstrated marked, reliable reductions in OCD symptoms, relative to their scores at baseline. Gains were mostly preserved at follow-up (T4), where 6/8 participants showed reliable reductions at Y-BOCS, relative to T2. One participant (P7) did not show improvements at follow-up. A more fine-grained analysis of the subdimensions of the Y-BOCS (obsessions and compulsions) confirmed the results: all participants reported a reliable improvement on the compulsions dimension of the Y-BOCS after the treatment. Only P7 showed a reliable worsening in compulsions (though also a reliable improvement on the obsessions) at the follow-up. Regarding the obsessions dimension, P4 was the only participant who did not highlight any improvement across phases (though there was a reliable improvement on the compulsion dimension).

The beneficial effects of the treatment on the severity of OCD symptoms were confirmed by changes on the self-administered OCI-r, which was improved in 85% of the participants. The stable or worsening baselines, the decrease in OCD symptoms only after the intervention was introduced, and the magnitude of the changes indicate that the intervention effect is not likely due to repeated assessments, self-monitoring, the passage of time, chance fluctuations, regression to the mean, or spontaneous recovery.

In trying to explain the worsening in compulsions at follow-up of P7, it is important to note that the T3 and T4 data collection were carried out, respectively, right after the announcement of the Italian lockdown due to the novel coronavirus pandemic (March 9, 2020) and after 1 month (i.e., right in the middle of the lockdown). As follows, this may have exacerbated the symptoms related to contamination, illness, and concern about accidental harm (Conrad et al., 2020), undermining the effectiveness of the intervention especially for P7, who nonetheless showed improvements in obsessions. Thus, the CFT intervention might have provided long-term resilience against mental intrusions, but not against the automaticity of compulsory behaviors (checking, washing, etc.), which, at the time of follow up, were indeed encouraged and made mandatory by the Italian government.

Interestingly, improvements at post-test were shown by all patients irrespective of the type of OCD they presented. This suggests that the CFT-OCD intervention, in line with its evolutionary transdiagnostic nature (Gilbert, 2014) has hit a core element that is shared by different types of OCD presentations. Such a significant improvement in OCD symptoms shown by all participants is a notable finding, given that none of the sessions of the intervention entailed ERP procedures, which are considered to be the first-line treatment for OCD symptoms (Wheaton et al., 2015). It is generally thought that ERP is necessary for practicing a new, more adaptive response to anxiety-provoking stimuli and for substantially improving the prognosis of OCD (Öst et al., 2015). However, although several studies have found large improvements in OCD symptoms after ERP, the outcomes are sub-optimal for the majority of patients (60% of treatment completers achieve recovery, and approximately 25% of patients are asymptomatic following treatment; Fisher and Wells, 2005). Furthermore, 30% of patients with OCD refuse ERP or drop out from treatment prematurely, suggesting that ERP might be difficult to tolerate (Whittal et al., 2005). The results of the present pilot study suggest that a relatively brief group compassion-focused intervention may be effective for reducing OCD symptoms, even without deliberately implementing ERP procedures. Future studies will have to evaluate the differential

efficacy and retention rates of introducing compassion-focused intervention before ERP, and explicitly applying compassion-focused skills to ERP.

The results of the other secondary outcomes in our study might shed some light on the mechanisms involved in the improvement of OCD symptoms reported by almost all participants. In line with our expectation, the majority of participants experienced pre- to post-treatment decreases in self-reported symptoms of depression, but overall findings suggest small-to-medium beneficial effects of the compassion-focused intervention. This might be due to the worsening in depression at the post-treatment phase reported by one participant (P7). Given that the same participant also showed a reliable worsening in compulsions (but a reliable improvement in obsessions) at the follow-up, it is plausible to assume that this deterioration in depressive symptoms might not be linked to the intervention, but to external precipitating circumstances (the pandemic lockdown in Italy). These findings are consistent with previous studies investigating the benefits of CFT for depressive symptoms (i.e., Frostadottir and Dorjee, 2019) and suggest that the adapted CFT for OCD intervention may target both OCD symptoms and symptoms of depression. At the same time, it seems that an improvement in depression was not the driving force behind OCD symptoms' reduction in the majority of participants.

In line with our expectations, a large and beneficial effect of the intervention emerged on the measure of fear of guilt. There was a reduction in symptom severity in 81% of the participants, indicating a significant treatment effect. Moreover, even though some of the participants' baseline scores already started to decrease before the intervention, the percentage of data points exceeding the median (PEM) was 93%, showing a large effect. This finding is encouraging, given the increasingly recognized centrality of fear of guilt in the etiology and maintenance of OCD (Shapiro and Stewart, 2011; Mancini, 2019). However, only few studies have tested the effectiveness of psychological interventions intended to directly impact fear of guilt, and most have used cognitive procedures like socratic dialogue, cognitive restructuring, and double standard (Cosentino et al., 2012; Perdighe and Mancini, 2012). This study provides the first empirical evidence that fear of guilt can be reduced not only by targeting it directly (asking patients not to prevent the guilt, but to expose themselves to it), but also by increasing patients' capacity to develop a compassionate attitude toward themselves (and parts of themselves, including the fear of guilt) and others.

In line with our predictions, all participants except one (P7) showed a reduction in self-criticism, and we observed an improvement in compassionate self-reassuring for all eight participants involved in the study. These findings were consistent with previous investigations of compassion-focused interventions that have been found effective in improving the self-to-self relationship (increased self-compassion and reduced self-criticism) in non-clinical samples (i.e., Matos et al., 2017; Sommers-Spijkerman et al., 2018) and in different clinical populations (Au et al., 2017; Heriot-Maitland et al., 2019; Fox et al., 2020). Findings of the present pilot study suggest that this type of intervention is effective also in improving compassionate self-reassurance and self-criticism in treatment-resistant OCD patients. They also seem to suggest potential mechanisms driving the positive change reported in OCD symptoms.

It is possible that compassion-focused practices have helped participants strengthen their capacity to build and access compassionate self-reassuring skills, dampening their chronically over-stimulated threat system and facilitating an improved physiological regulation of their overall arousal. As we know, chronically increased negative arousal modulates information processing, prompting a switch from a context-based and flexible cognitive system to a more rigid safety-focused cognitive processing, characteristic of OCD patients (Maran et al., 2018; Mancini, 2019). Instead, the switch from an avoidance/safety-focused motivation to an approach/care-focused motivation (i.e., compassion both for ourselves and others), cultivated in CFT treatments, might have promoted a felt sense of *safeness*, with resulting improved cognitive flexibility and ability to tolerate emotional disturbance (Petrocchi and Cheli, 2019).

Another possible mechanism of change is linked to the creation of a compassionate "*inner secure base and safe haven*" (Gilbert, 2017) that might have helped participants explore, face, and accept the "humanness" of making mistakes and, at times, experiencing guilt. As one participant reported: "when my doubts arrive, and I start sinking into my spirals of fear and I'm tempted to go and do my stuff (i.e., *washing*), now I know that I can ask for the help of my compassionate image. . .visualize it close to me. I see her smile, I imagine her scent of coconut, and her voice whispering. . . *I know what you are going through. . .but it's not your fault. I know it's hard, but you're not alone, I've been there before you and now I'm here with you. . .we can stay, you're not alone.* In her presence I see the comforting message that I, too, like everyone can afford my doubts. . .I'm big enough, I'm spacious enough to embrace them. . . I don't have to escape from that ocean because now I have my compassionate life-jacket that can help me navigate those dark waters. . .." As anecdotally reported in this comment, and suggested by the reduced fear of guilt participants showed, CFT practices seemed to promote an improved acceptance (not an avoidance) of threat (both internal, such as feelings of guilt, and external, such as people scolding or potentially rejecting). CFT practices also seemed to reduce (instead of increase) the typical excessive reassurance seeking that is unequivocally counter-productive in people suffering from anxiety disorders (OCD in particular), yielding short-term relief but a longer-term worsening of the original anxiety (Salkovskis and Kobori, 2015). However, further studies will have to confirm this observation.

Surprisingly, the intervention indicated non-completely coherent improvements on the dimension of common humanity, where 74% of participants improved while three participants worsened at post-intervention and follow-up (P3, P4, and P7). It is possible that the group intervention was too short (8 weeks) to generate a deep sense of inter-connection in all participants. In particular, it is possible that P4 and P7, who did not improve in both dimensions of Y-BOCS like other participants, might have perceived the improvement of others as even more isolating ("I'm the only one who does not improve"). Research is needed regarding moderators (both personality traits and amount of change during the treatment itself) of successful

CFT interventions with OCD patients. Nonetheless, this result seems to indicate that improvements in OCD symptoms seem not to be overly connected to a general and non-specific sense of common humanity that resulted from the participation in a group intervention.

The increased ability to dampen self-criticism and activate a compassionately reassuring inner self that accepts, validates, and is willing to soothe painful emotions (such as guilt) seemed to be the active ingredient of the intervention. Indeed, even if the limited sample in this study prevented the use of mediational analysis, a purely explorative correlation analysis at group level among change scores (T3 *minus* T2) showed a marginally significant correlation between improvements in self-reassurance and Y-BOCS ($r = -0.68$; $p = 0.06$), and significant correlation between improvements in fears of guilt and self-reassurance ($r = -0.83$; $p = 0.01$), and between improvements in fears of guilt and self-criticism ($r = 0.84$; $p = 0.01$). However, caution should be used in interpreting these exploratory findings, since the study design did not permit direct comparison of different treatment components. Further investigation is needed to explore the theorized potential mechanisms for change in CFT-OCD, using a larger sample and mediational analyses.

The secondary aim of the study was to assess the feasibility and acceptability of CFT-OCD and feedbacks from participants revealed a high level of satisfaction with it. Core elements of the interventions were all rated as very useful (mean scores of 5.5 out of 7), with practices in pairs, visualization techniques, and psychoeducation scoring the highest. Participants reported that CFT-OCD was acceptable, that they were satisfied with it, and that they would recommend it to friends and family. Given the high dropout rates in individual CBT for OCD (estimated to be greater than 20%; Ong et al., 2016), the retention rates in the case series are encouraging. In fact, all participants completed the intervention. This strong retention rate provides further support that participants found the intervention acceptable and feasible.

There are a number of limitations that need to be held in mind regarding the present findings.

First, the absence of an active control condition makes it impossible to discriminate between the specific CFT-DOC effect and any non-specific effects of therapy. In addition, the lead author was the treatment developer and one of the facilitators: thus, it is not possible to rule out therapist-specific effects and demand characteristics. The absence of assessments during the active phase of the intervention did not allow us to assess changes at each session and makes it impossible to evaluate the efficacy of specific elements of the intervention. Additionally, we did not collect home-practice logs, and it was not possible to estimate the impact of home practice on the reported improvements. Though we did not rely solely on self-report measures, we used a limited number of compassion-related measures as we did not want to overburden our participants. Future studies should evaluate the intervention against an active control condition, include independent therapists and ratings of therapist rapport and competency, and use additional compassion-related measures to explore potential mechanisms of change more in depth. The study is also limited in its ability to generalize the findings from a small sample to diverse populations; all participants were well educated, relatively young, and high-functioning. A critical future direction would be to test the intervention for more diverse samples and OCD types. In particular, it will be important to examine if treatment response varies as a function of intake OCD severity.

Finding from this pilot study provide preliminary evidence that CFT is associated with reductions in OCD symptoms in treatment-resistant patients. The brief nature of this intervention and the improvements observed indicate that it may be promising as either a stand-alone treatment or as an adjunct to other treatments. Even though results in some variables were not always reliable for all variables (for example, depression and common humanity) and across the different phases, we believe that they are noteworthy. Additionally, it should be taken into account that the last two data collections (i.e., the post-treatment and the follow-up) were carried out right at the beginning and in the middle of the Italian lockdown. This may have somehow altered the mental stability of participants, undermining the effectiveness of compassion-focused intervention, which nevertheless withstood the hit.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Università Guglielmo Marconi – Roma. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

NP, TC, and FM contributed to conception and design of the study. NP and AD'I conducted the intervention. GF conducted all the assessments. GF and AD'I organized the database. VP performed the statistical analysis. NP and VP wrote the first draft of the manuscript. All authors contributed to manuscript revision, and read and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2020.594277/full#supplementary-material

REFERENCES

American Psychiatric Association APA (2013). *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edn. Washington, DC: American Psychiatric Association. doi: 10.1176/appi.books

Au, T. M., Sauer-Zavala, S., King, M. W., Petrocchi, N., Barlow, D. H., and Litz, B. T. (2017). Compassion-based therapy for trauma-related shame and posttraumatic stress: initial evaluation using a multiple baseline design. *Behav. Ther.* 48, 207–221. doi: 10.1016/j.beth.2016.11.012

Barcaccia, B., Tenore, K., and Mancini, F. (2015). Early childhood experiences shaping vulnerability to Obsessive-Compulsive Disorder. *Clin. Neuropsychiatry* 12, 141–147.

Beck, A. T., Steer, R. A., and Brown, G. K. (1996). *Beck Depression Inventory Manual*, 2nd Edn. San Anonio, TX: Psychological Corporation.

Berman, N. C., Wheaton, M. G., Fabricant, L. E., and Abramowitz, J. S. (2012). Predictors of mental pollution: the contribution of religion, parenting strategies, and childhood trauma. *J. Obsessive Compuls. Relat. Disord.* 1, 153–158. doi: 10.1016/j.jocrd.2012.03.005

Boersma, K., Håkanson, A., Salomonsson, E., and Johansson, I. (2015). Compassion focused therapy to counteract shame, self-criticism and isolation A replicated single case experimental study for individuals with social anxiety. *J. Contemp. Psychother. Cutting Edge Modern Dev. Psychother.* 45, 89–98. doi: 10.1007/s10879-014-9286-8

Brakoulias, V., Starcevic, V., Belloch, A., Brown, C., Ferrao, Y. A., Fontenelle, L. F., et al. (2017). Comorbidity, age of onset and suicidality in obsessive–compulsive disorder (OCD): an international collaboration. *Compr. Psychiatry* 76, 79–86. doi: 10.1016/j.comppsych.2017.04.002

Cândea, D.-M., and Szentagotai-Tăta, A. (2018). Shame-proneness, guilt-proneness and anxiety symptoms: a meta-analysis. *J. Anxiety Disord.* 58, 78–106. doi: 10.1016/j.janxdis.2018.07.005

Chase, T. E., Chasson, G. S., Hamilton, C. E., Wetterneck, C. T., Smith, A. H., and Hart, J. M. (2019). The mediating role of emotion regulation difficulties in the relationship between self-compassion and OCD severity in a non-referred sample. *J. Cogn. Psychother.* 33, 157–168. doi: 10.1891/0889-8391.33.2.157

Chiang, B., Purdon, C., and Radomsky, A. S. (2016). Development and initial validation of the Fear of Guilt Scale for obsessive-compulsive disorder (OCD). *J. Obsessive Compuls. Relat. Disord.* 11, 63–73. doi: 10.1016/j.jocrd.2016.08.006

Conrad, R., Bousleiman, S., Isberg, R., Hauptman, A., and Cardeli, E. (2020). Uncontrolled experiments: treatment of contamination OCD during a pandemic. *Psychol. Trauma* 12, S67–S68. doi: 10.1037/tra0000806

Cosentino, T., D'Olimpio, F., Perdighe, C., Romano, G., Saliani, A. M., and Mancini, F. (2012). Acceptance of being guilty in the treatment of obsessive-compulsive disorder. *Psicoterapia Cognitiva e Comportamentale Monogr.* 18, 39–56.

Cosentino, T., Pellegrini, V., Gacomantonio, M., Saliani, A. M., Basile, B., Saettoni, M., et al. (2020). Validation and psychometric properties of the Italian version of the Fear of Guilt Scale. *Rass. Psicol.* 37, 59–70.

Di Bello, M., Carnevali, L., Petrocchi, N., Thayer, J. F., Gilbert, P., and Ottaviani, C. (2020). The compassionate vagus: a meta-analysis on the connection between compassion and heart rate variability. *Neurosci. Biobehav. Rev.* 116, 21–30. doi: 10.1016/j.neubiorev.2020.06.016

Didonna, F., Lanfredi, M., Xodo, E., Ferrari, C., Rossi, R., and Pedrini, L. (2019). Mindfulness-based cognitive therapy for obsessive-compulsive disorder: a pilot study. *J Psychiatr. Pract.* 25, 156–170. doi: 10.1097/PRA.0000000000000377

D'Olimpio, F., and Mancini, F. (2014). Role of deontological guilt in obsessive-compulsive disorder–like checking and washing behaviors. *Clin. Psychol. Sci.* 2, 727–739. doi: 10.1177/2167702614529549

Eichholz, A., Schwartz, C., Meule, A., Heese, J., Neumüller, J., and Voderholzer, U. (2020). Self-compassion and emotion regulation difficulties in obsessive–compulsive disorder. *Clin. Psychol. Psychother.* 27, 630–639. doi: 10.1002/cpp.2451

First, M. B., Spitzer, R. L., Gibbon, M., and Williams, J. B. (1994). *Structured Clinical Interview for Axis I DSM IV Disorders*. New York, NY: Biometrics Research.

Fisher, P. L., and Wells, A. (2005). How effective are cognitive and behavioral treatments for obsessive–compulsive disorder? A clinical significance analysis. *Behav. Res. Ther.* 43, 1543–1558. doi: 10.1016/j.brat.2004.11.007

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., et al. (2002). The obsessive-compulsive inventory: development and validation of a short version. *Psychol. Assess.* 14, 485–496. doi: 10.1037/1040-3590.14.4.485

Fontenelle, I. S., Fontenelle, L. F., Borges, M. C., Prazeres, A. M., Range, B. P., Mendlowicz, M. V., et al. (2010). Quality of life and symptom dimensions of patients with obsessive–compulsive disorder. *Psychiatry Res.* 179, 198–203.

Fox, J., Cattani, K., and Burlingame, G. M. (2020). Compassion focused therapy in a university counseling and psychological services center: a feasibility trial of a new standardized group manual. *Psych. Res.* doi: 10.1080/10503307.2020.1783708 [Epub ahead of print].

Fritz, C. O., Morris, P. E., and Richler, J. J. (2012). Effect size estimates: current use, calculations, and interpretation. *J. Exp. Psychol. Gen.* 141, 2–18. doi: 10.1037/a0024338

Frostadottir, A. D., and Dorjee, D. (2019). Effects of Mindfulness Based Cognitive Therapy (MBCT) and Compassion Focused Therapy (CFT) on Symptom Change, Mindfulness, Self-Compassion, and Rumination in Clients With Depression, Anxiety, and Stress. *Front. Psychol.* 10:1099. doi: 10.3389/fpsyg.2019.01099

Fyer, A. J., Lipsitz, J. D., Mannuzza, S., Aronowitz, B., and Chapman, T. F. (2005). A direct interview family study of obsessive-compulsive disorder. *Psychol. Med.* 35, 1611–1621. doi: 10.1017/s0033291705005441

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (2017). "Compassion as a social mentality: an evolutionary approach," in *Compassion, Concepts, Research and Applications*, ed. P. Gilbert (London: Routledge), 31–68. doi: 10.4324/9781315564296-3

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbert, P., and Choden. (2014). *Mindful Compassion: How the Science of Compassion can Help You Understand Your Emotions, Live in the Present, and Connect Deeply with Others*. Oakland, CA: New Harbinger Publications.

Gilbert, P., Clarke, M., Hempel, S., Miles, J. N. V., and Irons, C. (2004). Criticizing and reassuring oneself: An exploration of forms, styles and reasons in female students. *Br. J. Clin. Psychol.* 43, 31–50. doi: 10.1348/014466504772812959

Gilbert, P., and Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: overview and pilot study of a group therapy approach. *Clin. Psychol. Psychother.* 13, 353–379. doi: 10.1002/cpp.507

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., et al. (1989). The yale-brown obsessive compulsive scale: I development, use, and reliability. *Arch. Gen. Psychiatry* 46, 1006–1011. doi: 10.1001/archpsyc.1989.01810110048007

Guzick, A. G., Cooke, D. L., Gage, N., and McNamara, J. P. H. (2018). CBT-plus: a meta-analysis of cognitive behavioral therapy augmentation strategies for obsessive-compulsive disorder. *J. Obsessive Compuls. Relat. Disord.* 19, 6–14. doi: 10.1016/j.jocrd.2018.07.001

Halamová, J., Kanovský, M., Gilbert, P., Troop, N. A., Zuroff, D. C., Hermanto, N., et al. (2018). The factor structure of the forms of Self-Criticising/Attacking & self-reassuring scale in thirteen distinct populations. *J. Psychopathol. Behav. Assess.* 40, 736–751. doi: 10.1007/s10862-018-9686-2

Hénin, M. (2012). "Yale–brown obsessive–compulsive scale," in *Disturbo Ossessivo-Compulsivo. Questionari e Interviste per la Valutazione Clinica*, ed. C. Sica (Trento: Erickson).

Heriot-Maitland, C., McCarthy-Jones, S., Longden, E., and Gilbert, P. (2019). Compassion focused approaches to working with distressing voices. *Front. Psychol.* 10:152. doi: 10.3389/fpsyg.2019.00152

Jacobson, N. S., and Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *J. Consult. Clin. Psychol.* 59, 12–19. doi: 10.1037//0022-006x.59.1.12

Kazdin, A. E. (2011). *Single-Case Research Designs: Methods for Clinical and Applied Settings*, 2nd Edn. New York, NY: Oxford University Press.

Key, B. L., Rowa, K., Bieling, P., McCabe, R., and Pawluk, E. J. (2017). Mindfulness-based cognitive therapy as an augmentation treatment for obsessive-compulsive disorder. *Clin. Psychol. Psychother.* 24, 1109–1120. doi: 10.1002/cpp.2076

Kirby, J., Tellegen, C. L., and Steindl, S. R. (2015). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav. Ther.* 48, 778–792. doi: 10.1016/j.beth.2017.06.003

Leeuwerik, T., Cavanagh, K., and Strauss, C. (2020). The association of trait mindfulness and self-compassion with obsessive-compulsive disorder

symptoms: results from a large survey with treatment-seeking adults. *Cogn. Ther. Res.* 44, 120–135. doi: 10.1007/s10608-019-10049-4

Mancini, F., D'Olimpio, F., and Cieri, L. (2004). Manipulation of responsibility in non- clinical subjects: does expectation of failure exacerbate obsessive-compulsive behaviors? *Behav. Res. Ther.* 42, 449–457. doi: 10.1016/s0005-7967(03)00153-0

Mancini, F. (ed.) (2019). *The Obsessive Mind: Understanding and Treating Obsessive-Compulsive Disorder*. New York, NY: Routledge. doi: 10.4324/9780429452956

Manolov, R., Solanas, A., and Leiva, D. (2010). Comparing "visual" effect size indices for single-case designs. *Methodology* 6, 49–58. doi: 10.1027/1614-2241/a000006

Maran, T., Sachse, P., and Furtner, M. (2018). Negative arousal reduces sensitivity for processing context information. *Soc. Behav. Pers.* 46, 985–994. doi: 10.2224/sbp.6878

Matos, M., Duarte, C., Duarte, J., Pinto-Gouveia, J., Petrocchi, N., Basran, J., et al. (2017). Psychological and physiological effects of compassionate mind training: a pilot randomised controlled study. *Mindfulness* 8, 1699–1712. doi: 10.1007/s12671-017-0745-7

Melli, G., Avallone, E., Moulding, R., Pinto, A., Micheli, E., and Carraresi, C. (2015). Validation of the Italian version of the Yale–Brown Obsessive Compulsive Scale–Second Edition (Y-BOCS-II) in a clinical sample. *Compr. Psychiatry* 60, 86–92. doi: 10.1016/j.comppsych.2015.03.005

Naismith, I., Zarate Guerrero, S., and Feigenbaum, J. (2019). Abuse, invalidation, and lack of early warmth show distinct relationships with self-criticism, self-compassion, and fear of self-compassion in personality disorder. *Clin. Psychol. Psychother.* 26, 350–361. doi: 10.1002/cpp.2357

Neff, K. (2003). The development and validation of a scale to measure self-compassion. *Self Identity* 2, 223–250. doi: 10.1080/15298860390209035

Ong, C. W., Clyde, J. W., Bluett, E. J., Levin, M. E., and Twohig, M. P. (2016). Dropout rates in exposure with response prevention for obsessive-compulsive disorder: What do the data really say? *J. Anxiety Disord.* 40, 8–17. doi: 10.1016/j.janxdis.2016.03.006

Öst, L.-G., Havnen, A., Hansen, B., and Kvale, G. (2015). Cognitive behavioral treatments of obsessive–compulsive disorder A systematic review and meta-analysis of studies published 1993–2014. *Clin. Psycholog. Rev.* 40, 156–169. doi: 10.1016/j.cpr.2015.06.003

Ottaviani, C., Collazzoni, A., D'Olimpio, F., Moretta, T., and Mancini, F. (2019). I obsessively clean because deontological guilt makes me feel physiologically disgusted! *J. Obsessive Compuls. Relat. Disord.* 20, 21–29. doi: 10.1016/j.jocrd.2018.01.004

Parker, R. I., Vannest, K. J., and Davis, J. L. (2011). Effect size in single-case research: a review of nine nonoverlap techniques. *Behav. Modif.* 35, 303–322. doi: 10.1177/0145445511399147

Perdighe, C., and Mancini, F. (2012). A case report of obsessive compulsive disorder: reduce fear of guilt to reduce symptoms. *Psicoterapia Cognitiva Comportamentale* 18, 343–356.

Petrocchi, N., and Cheli, S. (2019). The social brain and heart rate variability: implications for psychotherapy. *Psychol. Psychother.* 92, 208–223. doi: 10.1111/papt.12224

Petrocchi, N., and Couyoumdjian, A. (2016). The impact of gratitude on depression and anxiety: the mediating role of criticizing, attacking, and reassuring the self. *Self Identity* 15, 191–205. doi: 10.1080/15298868.2015.1095794

Petrocchi, N., Ottaviani, C., and Couyoumdjian, A. (2014). Dimensionality of self-compassion: translation and construct validation of the self-compassion scale in an Italian sample. *J. Ment. Health* 23, 72–77. doi: 10.3109/09638237.2013.841869

Pino, M. C., De Berardis, D., Mariano, M., Vellante, F., Serroni, N., Valchera, A., et al. (2016). Two systems for empathy in obsessive-compulsive disorder: mentalizing and experience sharing. *Rev. Bras. Psiquiatria* 38, 307–313. doi: 10.1590/1516-4446-2015-1679

Roth, R. M., Baribeau, J., Milovan, D. L., and O'Connor, K. (2004). Speed and accuracy on tests of executive function in obsessive-compulsive disorder. *Brain Cogn.* 54, 263–265. doi: 10.1016/j.bandc.2004.02.053

RStudio Team (2015). *RStudio: Integrated Development for R*. Boston, MA: RStudio, Inc.

Salkovskis, P. M., and Kobori, O. (2015). Reassuringly calm? Self-reported patterns of responses to reassurance seeking in obsessive compulsive disorder. *J. Behav. Ther. Exp. Psychiatry* 49, 203–208. doi: 10.1016/j.jbtep.2015.09.002

Shadish, W. R. (2015). *Software for Meta-analysis of Single- Case Design DHPS version March 7 2015*. Available online at: http://faculty.ucmerced.edu/wshadish/software/software-meta-analysis-single-case-design/dhps-version-march-7-2015 (accessed June 13, 2020).

Shadish, W. R., Hedges, L. V., and Pustejovsky, J. E. (2014). Analysis and meta-analysis of single-case designs with a standardized mean difference statistic: a primer and applications. *J. Sch. Psychol.* 52, 123–147. doi: 10.1016/j.jsp.2013.11.005

Shapiro, L. J., and Stewart, E. S. (2011). Pathological guilt: a persistent yet overlooked treatment factor in obsessive-compulsive disorder. *Ann. Clin. Psychiatry* 23, 63–70.

Sica, C., and Ghisi, M. (2007). "The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: psychometric properties and discriminant power," in *Leading-Edge Psychological Tests and Testing Research*, ed. M. A. Lange (Hauppauge. NY: NOVA Science Publishers), 27–50.

Sica, C., Ghisi, M., Altoè, G., Chiri, L. R., Franceschini, S., Coradeschi, D., et al. (2009). The Italian version of the Obsessive Compulsive Inventory: its psychometric properties on community and clinical samples. *J. Anxiety Disord.* 23, 204–211. doi: 10.1016/j.janxdis.2008.07.001

Simpson, H., Liebowitz, M. R., Foa, E., Kozak, M. J., Schmidt, A., Rowan, V., et al. (2004). Post-treatment effects of exposure therapy and clomipramine in obsessive–compulsive disorder. *Depress. Anxiety* 19, 225–233.

Smith, J. D. (2012). Single-case experimental designs: a systematic review of published research and current standards. *Psychol. Methods* 17, 510–550. doi: 10.1037/a0029312

Sommers-Spijkerman, M. P. J., Trompetter, H. R., Schreurs, K. M. G., and Bohlmeijer, E. T. (2018). Compassion-focused therapy as guided self-help for enhancing public mental health: a randomized controlled trial. *J. Consult. Clin. Psychol.* 86, 101–115. doi: 10.1037/ccp0000268.supp

Steketee, G., Quay, S., and White, K. (1991). Religion and guilt in OCD patients. *J. Anxiety Disord.* 5, 359–367. doi: 10.1016/0887-6185(91)90035-R

Storch, E. A., De Nadai, A. S., do Rosário, M. C., Shavitt, R. G., Torres, A. R., Ferrão, Y. A., et al. (2015). Defining clinical severity in adults with obsessive–compulsive disorder. *Compr. Psychiatry* 63, 30–35.

Wheaton, M. G., Schwartz, M. R., Pascucci, O., and Simpson, H. B. (2015). Cognitive-behavior therapy outcomes for obsessive-compulsive disorder: exposure and response prevention. *Psychiatr. Ann.* 45, 303–307. doi: 10.3928/00485713-20150602-05

Whittal, M. L., Thordarson, D. S., and McLean, P. D. (2005). Treatment of obsessive-compulsive disorder: cognitive behavior therapy vs exposure and response prevention. *Behav. Res. Ther.* 43, 1559–1576. doi: 10.1016/j.brat.2004.11.012

Yalom, I. D. (2008). *The Theory and Practice of Group Psychotherapy*, 5th Edn. New York, NY: Basic Books.

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Kindness Media Rapidly Inspires Viewers and Increases Happiness, Calm, Gratitude, and Generosity in a Healthcare Setting

David A. Fryburg[1], Steven D. Ureles[2,3], Jessica G. Myrick[4], Francesca Dillman Carpentier[5] and Mary Beth Oliver[4]*

[1]Envision Kindness, East Lyme, CT, United States, [2]Children's Dental Associates of New London County, East Lyme, CT, United States, [3]School of Dental Medicine, Harvard University, Boston, MA, United States, [4]Bellisario College of Communications, Pennsylvania State University, University Park, PA, United States, [5]Hussman School of Journalism and Media, University of North Carolina, Chapel Hill, Chapel Hill, NC, United States

Background and Objectives: Stress is a ubiquitous aspect of modern life that affects both mental and physical health. Clinical care settings can be particularly stressful for both patients and providers. Kindness and compassion are buffers for the negative effects of stress, likely through strengthening positive interpersonal connection. In previous laboratory-based studies, simply watching kindness media uplifts (elevates) viewers, increases altruism, and promotes connection to others. The objective of the present study is to examine whether kindness media can affect viewers in a real-world, pediatric healthcare setting.

Methods: Parents and staff in a pediatric dental clinic were studied. Study days were randomized for viewers to watch either original kindness media or the standard televised children's programming that the clinic shows. Participants scored self-rated pre-media emotions in a survey, watched either media type for 8 min, and then completed the survey. All participants were informed that they would receive a gift card for their participation. After completion of the survey, participants were asked if they wanted to keep the card or donate it to a family in need.

Results: Fifty (50) participants completed the study; 28 were parents and 22 were staff. In comparison to viewers of children's programming, participants who watched kindness media had significant increases in feeling happy, calmer, more grateful, and less irritated ($p < 0.05$), with trends observed in feeling more optimistic and less anxious. Kindness media caused marked increases in viewers' reports of feeling inspired, moved, or touched ($p < 0.001$). No change was observed in self-reported compassion, although baseline levels were self-rated as very high. People who watched kindness media were also more generous, with 85% donating their honoraria compared to 54% of Standard viewers ($p = 0.03$).

Conclusions: Kindness media can increase positive emotions and promote generosity in a healthcare setting.

Keywords: happiness, inspiration, media, elevation, caring, prosocial, compassion, kindness

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****Correspondence:***
David A. Fryburg
david@envisionkindness.org

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INTRODUCTION

Stress, particularly psychological stress, is a prominent feature of modern life. Stress is especially high for Americans – the United States is ranked among the top 10 most stressed countries in the world (Gallup, 2019). Stressors such as personal and familial health, safety, and finances are significant concerns documented annually by the American Psychological Association (APA, 2019). Other major stressors include discrimination, loneliness, and the workplace.

Many of these stressors are intertwined and exist in combination with others. Before COVID-19, the majority of people in the United States (and elsewhere) have been subject to a lot of stress. COVID-19 has only increased the stress that people are experiencing (Park et al., 2020).

The stress or allostatic load (McEwen and Gianaros, 2011) that people shoulder is important both for quality of life and for mental and physical health. Stress is a major cause of, or contributor to, disease. From a mental health perspective, stress can cause or exacerbate anxiety, depression, sleep disturbances, and cognitive impairment. From a physical perspective, stress is linked to heart disease, stroke, asthma, hypertension, and diabetes and obesity, among others (Schneiderman et al., 2005; Cohen et al., 2007; Liu et al., 2017).

Healthcare providers are suffering from even greater stress loads, as evidenced by burnout, depression, and suicide rates approximately twice that of the general public. There are multiple reasons for this problem, which many organizations, including the US National Academy of Medicine, are trying to address (National_Academy_of_Medicine_Action_Collaborative_on_Clinician_Well-Being, n.d.).

Positive social connection has been shown to help buffer stress, likely in multifactorial ways (Cohen and Wills, 1985; Kikusui et al., 2006; Hennessy et al., 2009; Thoits, 2011). Positive interpersonal connection is generated by prosocial behavior (e.g., volunteerism, donations, and social support; Inagaki and Eisenberger, 2012; Keltner et al., 2014; Son and Padilla-Walker, 2020) or what otherwise could be called, kindness, caring, compassion, or generosity, among several related terms. Engaging in prosocial behavior also induces happiness which, in turn, can reinforce continued prosocial behavior (Aknin et al., 2012; Layous et al., 2017; Curry et al., 2018).

Part of the effect of prosocial behavior is to induce elevation, an "other-praising moral emotion" (Haidt, 2003) that is elicited when witnessing others engage in virtuous acts such as generosity, kindness, love, or selflessness. The uplifted feeling of elevation can manifest physical sensations, including tearfulness or a warm feeling in the chest (Haidt, 2003; Algoe and Haidt, 2009).

Kindness media, or media portrayals of people helping or supporting each other, has been shown previously to elevate viewers and promote interconnectedness in laboratory settings (Algoe and Haidt, 2009; Janicke and Oliver, 2017; Oliver et al., 2015, 2018). In turn, viewing kindness media can promote altruism (Schnall et al., 2010), supporting the concept that behavior as well as emotions can be affected by this type of media. Finally, kindness media has also been shown to promote greater acceptance and connection to people of other races, suggesting that the increased sense of connection can help transcend racial differences (Freeman et al., 2009; Janicke and Oliver, 2017; Krämer et al., 2017).

The gold standard of healthcare is a professional interaction that is a blended art of kindness and compassion with applied science. As such, we wanted to test whether kindness media could uplift and inspire both patients and providers in healthcare. Increasing positive emotions and expression of caring in this setting could affect both staff and patients, help with patient engagement, as well as affect the patient–provider encounter.

The aim of this first study was to test the acute impact of viewing kindness media on emotional responses and generosity in a real-world healthcare setting.

MATERIALS AND METHODS

This was a randomized, baseline- and comparator-controlled field study of the effects of kindness media on emotions and behavior in a pediatric clinical care setting. Both parents of the patients and staff of the clinic (Children's Dental Associates of New London County, CT) who were 18 years of age or older were invited to participate. After parents registered their children and completed any necessary clinic paperwork, in consecutive order they were each provided a description of the study and interest to participate was solicited by a study team member.

The staff were separately provided a description of the study. Parents and the staff were studied on different days. Participation took place on the same day individuals provided their consent.

The study was performed in the waiting room. Study days were randomized to either the "Standard" (or usual) children's commercial television programming selected by the clinic or kindness media. All viewing occurred on the same television in the waiting room. Kindness media was streamed onto the waiting room television using digital signage software (Playsignage, Inc).

The study was reviewed and approved by an independent investigational review board (IntegReview, Austin, TX).

Kindness Media

The kindness media (called EnSpire™) is the product of Envision Kindness, a not-for-profit organization that collects, creates, and shares images and stories of kindness. The objective of Envision Kindness is to inspire and uplift viewers, reduce stress, and promote kindness, compassion, joy, and love.

The kindness media contains multiple visual and story-telling components that depict different acts or aspects of kindness incorporated into a video format. At the core are culturally and geographically diverse, still images of kindness that have been shared with Envision Kindness. Beyond technical quality, images are selected for these videos using three criteria. First, do they depict a positive act of kindness, connection, or caring? Second, is the effect of the image to uplift the viewer? Finally, when brought together do these images provide a diverse perspective regarding kindness, allowing the viewer to transcend their own experiences to see how universal kindness is?

In video format, the Ken Burns effect is applied to these images, which uses a slow pan or zoom to slowly shift the perspective of the image, emphasizing key elements of the image, which is helpful to maximizing attention of the viewer (Wolfe and Horowitz, 2017). Relevant text is variably included to describe the image (using motion graphics). The videos using still images are then blended with other original, kindness-related media, including suggestions, humor, and quotes. A sample of kindness media can be seen here: https://vimeo.com/392331523/b6dfa72edb. Other examples of content can be provided on request.

The reel used in this study was 8-min long and included a mix of individual short videos of various types. All participants were informed that they would receive a $5 gift card for completion of the survey.

Study Execution

After consenting to participate, each viewer was assigned an identification number and provided a link to an online survey that they would access on their own smart devices. All surveys were anonymous and captured only demographic data (gender, age, race, patient, or staff) and no other personally identifying information.

Baseline self-assessments were solicited for general well-being and for positive and negative affect. Items were taken from a variety of literature exploring meaningful media experiences, using terms frequently employed by investigators examining self-transcendent responses to media (Oliver and Bartsch, 2010; Oliver et al., 2015; Schindler et al., 2017; Rieger and Klimmt, 2019; Zickfeld et al., 2019). Positive emotions included: happiness, feeling calm, grateful, optimistic, and compassionate. Negative emotions included: feeling sad, anxious, and irritated. Scores were on a 1–5 Likert scale with 1 defined as "not at all" and 5 defined as "a lot." Before baseline questions, all participants were asked: "Overall, how do you feel?"

Following completion of the baseline portion of the survey, participants were provided with instructions through the survey form to watch either the 8-min reel of kindness content OR the standard commercial children's programming that is pre-selected by staff. The time of watching was recorded on the survey. One study team member was present throughout.

After the 8-min viewing period, study participants completed the same set of emotion survey questions while in the waiting room. In the post-viewing period, participants also self-rated how "moved," "touched," or "inspired" they felt after watching the content (on the same 1–5 Likert scale). For those who watched the kindness content, they were asked if they wanted the clinic to continue showing kindness content.

With completion of the survey, all participants were provided instructions on collecting their $5 gift card. Within those instructions, participants were told that they could keep the $5 gift card or donate it to a needy family that attends the clinic. The number of participants who either kept or donated the gift card was captured for each viewing group.

Data Analysis

Summaries of primary data are expressed as arithmetic mean ± standard error of the mean. Data are displayed as mean (SE) or as frequency. Sub-analyses were undertaken for the parents and staff subgroups.

To examine how changes in emotion from baseline to post-media exposure differed between Kindness Media and Standard television, a mixed ANOVA was employed, with time (changes from baseline) treated as a within-subjects variable, and media condition treated as a between-subjects condition. For within media group comparisons, *post-hoc* tests were conducted using Bonferroni's adjustment for multiple comparisons.

All positive (happy, calm, optimistic, grateful, and compassionate) and negative (sad, angry, and irritated) emotions were combined and averaged for each subject with reliabilities calculated. The integrated assessments were then analyzed with a mixed ANOVA as described for each individual emotion and *post-hoc* testing with Bonferroni correction.

One-time measures such as moved, inspired or touched were contrasted between each media viewing group using an independent samples *t*-test. Donations and claims of the gift cards were tabulated for each media viewing group and analyzed using Fisher's exact test.

RESULTS

A total of 53 parents and staff participated; 50 of them completed the entire protocol. The three who did not complete the study were all parents who had to leave the clinic and were unable to finish.

The 50 participants were the analysis group and their characteristics are summarized in **Table 1**. Of the 50, 28 were parents and 22 were staff. The majority of participants were female and white. The distributions across Standard and Kindness groups were similar.

Standard viewers mean self-assessment scores of how they felt were 4.17(0.18) and Kindness viewers rated themselves 4.04(0.17; 1 = "bad"; 3 = "ok"; and 5 = "very good"). These scores indicated that participants, overall, were feeling well and that there were no significant differences between the two media groups, $t(48) = 0.52$, $p = 0.61$.

Tables 2 and **3** summarize the baseline and post-media exposure self-assessments for positive and negative emotions, respectively. As can be seen in **Table 2**, participants at baseline

TABLE 1 | Summary of participant demographics by media type.

Media type	Age (years) [mean (SE)]	Gender distribution	Race	Parents/staff (n/n)
Kindness (*n* = 26)	43 (2)	22F/4M	1A/1B/2H/20 W/2MR	15/11
Standard (*n* = 24)	45 (2)	21F/3M	22 W/2H	13/11

SE, standard error of the mean; F, female; M, male; A, Asian; B, black; H, Hispanic; W, white; MR, multi-racial.

in both viewing groups started the study in fairly positive states, feeling fairly happy, calm, optimistic, and grateful. These did not differ statistically from one another. However, for the self-report of compassion, those in the Standard viewing group had a lower baseline value than the Kindness viewing group. Most of the people in the kindness media group had indicated baseline self-assessments of 5, the maximal possible score.

As shown in **Table 2**, viewers in the Kindness media group had significantly different responses from the Standard media viewers in feeling happy, calm, and grateful (by ANOVA). Within group comparisons showed that viewing Kindness media significantly increased participants' self-reports of feeling happy, calm, and grateful (*post-hoc* testing with Bonferroni correction, **Table 2**). Feeling optimistic trended higher after viewing Kindness media ($p = 0.056$, with Bonferroni correction), although this shift was not statistically separable from the Standard viewer cohort. No change was reported in either group for compassion. Full ANOVA results can be found in **Supplementary Table 1**.

Standard TV viewers had little change in positive feelings with the exception of feeling calm. In Standard TV viewers, there was a noted, significant decrease in feeling calm ($p < 0.001$, with Bonferroni correction).

The aggregate mean changes in self-reported positive feelings were also calculated. The mean of the positive emotions (feeling happy, calm, grateful, optimistic, and compassionate) in the Standard TV viewers was unchanged in response to the 8 min of Children's television [3.72 (0.15) to 3.57 (0.18)]. In contrast, the mean positive scores for Kindness media viewers increased from 4.07 (0.15) to 4.45 (0.17). Mixed ANOVA result comparing the responses to the two media groups showed significant differences [$F(1,48) = 9.01$, $p < 0.005$, $\eta_p^2 = 0.16$]. The increase in mean positive (combined) emotions within the Kindness Media group (with Bonferroni correction) was significant ($p < 0.005$, $d = 0.90$).

Table 3 similarly displays self-reported negative feelings by each viewing group for the entire cohort. As shown in the table, baseline values for feeling sad, anxious, or irritated were

TABLE 2 | Summary of shifts in positive emotion self-assessments by viewing group.

Affect	Media type	Before	After	Change	Cohen's d	Interaction *F*	η_p^2
Happiness						4.77*	0.09
	Kindness	4.08 (0.16)	4.50 (0.17)	0.42*	0.52		
	Standard	3.63 (0.17)	3.54 (0.18)	−0.08	−0.11		
Calm						17.84***	0.27
	Kindness	3.89 (0.18)	4.35 (0.20)	0.46**	0.67		
	Standard	4.00 (0.19)	3.54 (0.21)	−0.46**	−0.55		
Grateful						8.64*	0.15
	Kindness	4.12 (0.21)	4.62 (0.21)	0.50**	0.71		
	Standard	3.88 (0.22)	3.63 (0.22)	−0.25	−0.23		
Optimistic						1.55	0.03
	Kindness	3.72 (0.22)	4.16 (0.24)	0.44	0.62		
	Standard	3.33 (0.22)	3.38 (0.17)	0.04	0.03		
Compassionate						0.00	0.00
	Kindness	4.50 (0.21)	4.58 (0.20)	0.08	0.11		
	Standard	3.75 (0.22)	3.75 (0.21)	0.00	0.00		

*Before and after reflect pre vs. post media exposure of mean values and corresponding standard error of the mean [Mean(SEM)]. Cohen's d for repeated measures was used to estimate effect sizes within each row. Results from mixed ANOVA are shown (Interaction F), with time (changes from baseline) treated as a within-subjects variable, and media condition treated as a between-subjects condition. The p value indicates statistical significance of comparisons for either changes between the Kindness and Standard TV conditions (the Interaction F) or within a viewing cohort (Bonferroni correction). *p < 0.05; **p < 0.01; ***p < 0.001. For full ANOVA results, please see* ***Supplementary Table 1****.*

TABLE 3 | Summary of shifts in negative affect self-assessments by viewing group.

Affect	Media type	Before	After	Change	Cohen's d	Interaction *F*	η_p^2
Sad						0.00	0.00
	Kindness	1.39 (0.18)	1.23 (0.17)	−0.15	−0.22		
	Standard	1.83 (0.19)	1.67 (0.17)	−0.17	−0.23		
Anxious						0.78	0.00
	Kindness	1.81 (0.22)	1.54 (0.18)	−0.27	−0.45		
	Standard	1.88 (0.23)	1.67 (0.19)	−0.21	−0.22		
Irritated						1.99	0.04
	Kindness	1.73 (0.22)	1.31 (0.19)	−0.42*	−0.43		
	Standard	1.68 (0.20)	1.64 (0.18)	−0.04	−0.11		

*Before and after reflect pre vs. post media exposure of mean values and corresponding standard error of the mean [Mean(SEM)]. Cohen's d for repeated measures was used to estimate effect sizes within each row. Results from mixed ANOVA are shown (Interaction F), with time (changes from baseline) treated as a within-subjects variable, and media condition treated as a between-subjects condition. The p value indicates statistical significance of comparisons for either changes between the Kindness and Standard TV conditions (the Interaction F) or within a viewing cohort (Bonferroni correction). *p < 0.05. For full ANOVA results, please see* ***Supplementary Table 1****.*

low and comparable in both cohorts. In the Kindness media group, after the 8-min exposure, viewers reported less irritation ($p < 0.05$) and a decrease in self-assessed anxiety that approached statistical significance ($p = 0.08$, with Bonferroni correction). No significant changes occurred in the Standard viewer group. Full ANOVA results can be found in **Supplementary Table 1**.

The mean negative scores started very low and decreased in both groups (change in Standard: −0.08 (0.13) and Kindness −0.28(0.12)). Within the Kindness media viewing group, this decrease was significant ($p < 0.01$, $d = -0.58$) but not within the Standard media viewers. The changes in aggregate negative feelings across the two groups were not statistically separable from one another ($p = 0.09$; **Supplementary Table 1**).

Inspiration, Moved, and Touched

All participants were asked in separate questions how much they were moved, touched, or inspired by what they saw. As "moved," "touched," or "inspired" are interrelated terms, a reliability analysis was performed prior to combining them into a single scale, with a Cronbach's alpha of 0.96. The scores from these three were then averaged for each participant by viewing group into a single inspiration score.

Cross media group comparison of these one-time measures were done by independent sample *t*-test. Viewers who watched Kindness media reported significantly higher inspiration scores than those who watched Standard TV [**Figure 1**; $t(48) = 8.36$, $p < 0.001$, $d = 2.37$].

Generosity

After completion of the survey, all participants were instructed how to claim their gift cards in the office at that time or informed that they could choose to donate their gift card to a needy family. **Table 4** summarizes the choices of participants in each viewing group. Approximately half (54%) of viewers of Standard TV donated their cards, whereas more participants in the Kindness media group (85%) donated theirs. This difference was significant by Fisher's exact test ($p = 0.03$).

Parents and Staff Responses

Table 5 summarizes mean positive and negative emotion scores for parents and staff. As can be seen, the patterns of responses in these subgroups were similar, with some differences noted, including a decrease in positive emotions for parents watching children's media content that approached statistical significance. Comparing the responses of the two subgroups showed no significant differences.

The responses to feeling moved, inspired, or touched were also similar across parents and staff. For parents, the mean score after the kindness media was 4.27 (0.19) and for staff was 4.33 (0.30). Following the children's media, this score was 1.56 (0.23) for parents and 2.39 (0.39) for staff. These differences were different for both subgroups ($p < 0.001$, $d = 2.36$).

Crosstabulations were conducted for parents and staff separately to examine donation behaviors. These analyses showed that a larger percentage of parents (80.0%) and staff (90.9%) donated after viewing the Kindness programming than after viewing Standard television (parents: 53.8%; staff: 54.5%). Because of the limited sample size within the parents and staff subgroups, these differences were not significant. However, they mirror the pattern of results reported for the entire sample, suggesting that the Kindness program was successful in increasing generosity among both parents and staff.

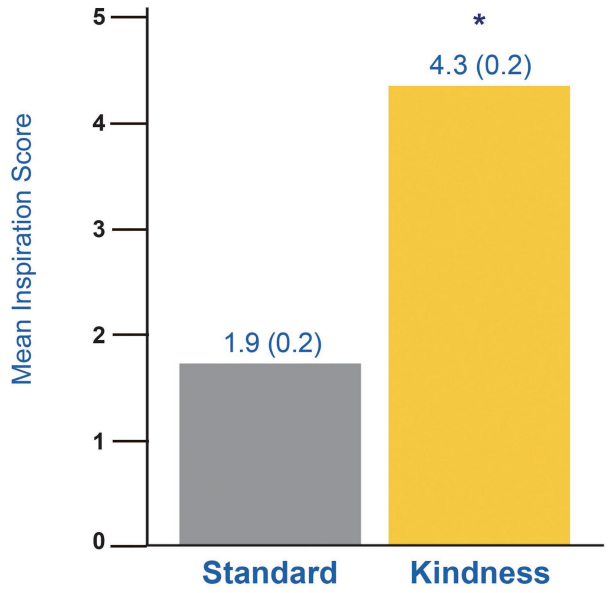


FIGURE 1 | Effect of Standard vs. Kindness Media on being inspired. Each bar reflects viewing group mean of self-reported responses to "feeling touched, moved, or inspired." *$p < 0.001$.

TABLE 4 | Participant decision to keep or donate honorarium gift card by viewing group.

Program	Keep	Donate	Total	% Donating	Fisher's exact test
Kindness	4	22	26	85	$p = 0.03$
Standard	11	13	24	54	
Total	15	35	50		

Qualitative Assessment of Kindness Media

Viewers of the kindness media were also asked if they would like the clinic to continue to show this media. Of the 26 kindness media viewers, 82% responded that they would want the clinic to continue to show it.

DISCUSSION

This study showed that it is possible to quickly and positively affect the emotional and behavioral states of people in a real-world, healthcare setting. In comparison to the effects of children's programming, people who viewed the kindness media were happier, calmer, more grateful, and less irritated. They were much more inspired and more generous.

TABLE 5 | Positive and negative affect responses in parents and staff.

	Program	Before	After	Change	Cohen's d	Interaction *F*	η_p^2
Positive emotions							
Parents						6.85*	0.22
	Kindness	4.07 (0.17)	4.44 (0.21)	0.37	0.97		
	Standard	3.89 (0.19)	3.57 (0.17)	–0.32	–0.37		
Staff						2.25	0.10
	Kindness	4.00 (0.28)	4.40 (0.31)	0.40*	0.93		
	Standard	3.51 (0.28)	3.56 (0.31)	0.05	0.09		
Negative emotions							
Parents						0.24	0.00
	Kindness	1.51 (0.19)	1.33 (0.16)	–0.18	–0.74		
	Standard	1.74 (0.19)	1.59 (0.18)	–0.15	–0.53		
Staff						6.81*	0.01
	Kindness	1.82 (0.28)	1.39 (0.28)	–0.48*	–0.90		
	Standard	1.70 (0.31)	1.74 (0.31)	–0.26	–0.28		

Before and after reflect pre vs. post media exposure of mean values and corresponding standard error of the mean [Mean(SEM)]. These are separated by participant subgroup. Results from mixed ANOVA are shown, with time (changes from baseline) treated as a within-subjects variable, and media condition treated as a between-subjects condition. The significance of change scores from before to after viewing for each program type was tested using least-significant differences tests (Bonferroni correction). Cohen's d for repeated measures was used to effect sizes within each row. For full ANOVA results, please see ***Supplementary Table 2****. The value of p indicates statistical significance of comparisons for either changes between the Kindness and Standard TV conditions (the interaction F) or within a viewing cohort (Bonferroni). *$p < 0.05$.*

It is noteworthy that there were no changes observed for compassion or for sadness due to the kindness media. Part of the difficulty for each of these variables is that baseline scores were at or very close to the maximum or minimum values, respectively. Overall, at baseline both groups were fairly happy with low levels of self-reported negative emotions in line with previous research on the positivity offset (Ito and Cacioppo, 2005). Despite that baseline state, people responded with further increases in positive emotions as well as small decreases in negative emotions, as reflected by the mean scores for all of the positive and negative emotions.

The results of the present field study are consistent with multiple laboratory-based interventions, namely that simply seeing kindness for a few minutes can elevate viewers, augment happiness (Janicke and Oliver, 2017; Oliver et al., 2015, 2018), as well as affect viewers' generosity (Schnall et al., 2010). Seeing acts of kindness in the field (as they are occurring, not in media) has also been shown to induce happiness (Rowland and Curry, 2019). The effect of kindness media is also consistent with other studies using reflection or meditation on kindness or acts of kindness to induce happiness (Otake et al., 2006; Fredrickson et al., 2008; Aknin et al., 2015; Zeng et al., 2015; Curry et al., 2018) and connection (Hutcherson et al., 2008), an effect that appears to be cross-cultural (Aknin et al., 2013).

The present study builds on these earlier investigations in several ways. First, the intervention and testing took place in a busy healthcare setting while other potentially distracting events (parents registering children, waiting to be called, watching others being called, etc.) and time pressures were also occurring.

Second, in prior studies investigators generally used publicly available commercial films or moving clips from commercial television, such as *The Oprah Winfrey* show (Schnall et al., 2010). The kindness media that was tested in the present study is an original blend of different types of approaches to express kindness, compassion, and connection. These included still images from around the world converted into video (either a single image or montage of images), motion graphics with suggestions of kindness, humorous depictions of kindness, and concepts in kindness and compassion. While distinct from children's commercial television, this approach also provides a variety of content that can appeal to a broad range of viewers beyond a single video.

Third, the demographics of participants were also different from prior studies. Most of the previously published work recruited college students as participants. In the present study, middle aged adults (mostly women) were the principal participants, showing that the responses observed in college students are also elicitable in an older group of participants.

Why would kindness media work so well, affecting emotions and behavior within minutes of exposure? Likely because it rapidly taps into or primes implicit (and perhaps explicit) memory for kindness similarly to how media that contains violence, food, sexuality, etc., affects emotions and behavior. This idea, that we are wired to respond to seeing kindness, is also supported by neuroimaging studies that have pointed to specific regions involved in compassion, kindness, and empathy (Eisenberger, 2013; Marsh, 2016; Park et al., 2017). Finally, in concert with the burgeoning literature on endocrine and autonomic changes in response to prosocial behavior (Zak et al., 2007; Goetz et al., 2010; Kok and Fredrickson, 2010; Holt-Lunstad et al., 2019; Kim et al., 2020), collectively this biology and psychology may help explain why kindness is contagious (Keltner et al., 2014).

In a busy world where people are overloaded with "information" input, the ability to elevate people quickly and simply is critical. As the brain processes images very quickly, this neuropsychology can be rapidly tapped into, which, in turn, encourages greater manifestation of the eudaimonic, self-transcendent state that promotes connection (Algoe and Haidt, 2009; Janicke and Oliver, 2017; Oliver et al., 2015). These outcomes, in turn, can help people buffer the response to new stressors. The promotion of connection through elevation also includes how people from different racial groups may view one another (Freeman et al., 2009; Oliver et al., 2015). This has much relevance today, including for health inequity.

Both patients and providers are shouldering a lot of stress. For patients, their stressors can be myriad and interrelated, including concerns over their own health or that of family or friends; how to meet the financial burden of paying for healthcare (APA, 2019), as well as other personal (family, work, etc.) and distant issues (gun control and climate change). Many, particularly those in minority groups, will face discrimination, a potent stressor tied to multiple diseases (Farmer et al., 2019).

Kindness and compassion are major motivators for people to enter the healthcare profession – that is, they want to help people (Mimura et al., 2009). On top of their own personal stressors, however, these professionals must manage a special type of workplace stress that includes solving complex social and medical problems within a short visit as well as documenting the encounter into the electronic health record (EHR). It is no surprise, therefore, that the burnout rate among providers, including both nurses and physicians, is twice that of the general public (National_Academy_of_Medicine_Action_Collaborative_on_Clinician_Well-Being, n.d.). Dentists and dental staff, like physicians and nurses, similarly suffer from a lot of stress and burnout. In 2015, approximately 80% of dentists reported experiencing moderate to severe stress in their practices (American_Dental_Association, 2015).

Although the scientific, technical, and transactional aspects of medicine and healthcare dominate its practice, both ancient wisdom and modern science have shown that compassion plays a key role in healing the sick. As compiled by Trzeciak and Mazzarelli (2019) there are multiple reasons why compassion as expressed by the provider and perceived by the patient is critical to outcomes. From a high-level view, perceived compassion (caring) creates connection and trust. That trust lowers stress and affects patient engagement in their own care, including adherence to a regimen (Greene and Hibbard, 2012; Greene et al., 2015).

There are multiple examples of the impact of burned-out providers and those who are compassionate. Burnout is associated with a greater number of medical errors (Shanafelt et al., 2010). Compassionate providers of care, on the other hand, elicit higher compliance with care, such as cancer screening, control of blood glucose in patients with diabetes, or inflammation and outcomes in patients with Crohn's disease (O'Malley et al., 2002, 2004, 2012; Hojat et al., 2011; Xu et al., 2020). Finally, compassion interventions, *per se*, may more directly affect disease, such as depression, anxiety, and pain (Mongrain et al., 2018; Austin et al., 2020). Finding ways to instill compassion and elevation in a healthcare setting could, therefore, have meaningful impact.

This study is limited in several ways, in that it was undertaken in a pediatric dental office in a middle-class area with mostly white, female participants who were fairly happy at baseline. Although not directly patients, the parent subgroup is similar to patients in that they are managing the forms that patients would and are likely experiencing concerns or anxiety regarding the outcome of the visit for their children as patients may for themselves. Defining these responses in others who are of different demographic groups as well as patient and provider types is important to understand the potential to affect different subgroups. Although the sample size for parent and provider subgroups was small, the overall indications of efficacy suggest findings would be replicable in a larger setting. In addition, this is an acute response in a modest size study, and while encouraging, needs longer-term studies to gauge its impact, including on health-related outcomes.

Another potential limitation arises from using commercial children's television in a real-world setting. That is, control participants did not likely view exactly the same set of content due to programming variation. In addition, the format of the kindness media differed somewhat from the children's commercial television, i.e., many images vs. plot-based stories. In the interest of making a real-world comparison, however, we accepted these differences, including the possibility that some stories about kindness and empathy were shown in the control group. Thus, larger differences may in fact have been observed had we deliberately chosen a more neutral comparison group and excluded pieces that would have been more uplifting.

It is important to note that medical offices for adult patients often play neutral or negative media, including home and garden programs and/or mainstream news. As mainstream news is well-known to rapidly induce stress and anxiety (Johnston and Davey, 1997), medical offices (especially emergency rooms) should carefully consider what is being shown in the waiting rooms and work areas. Beyond television to simply distract the viewer, it could be more beneficial for practices to show inspirational media that can help facilitate positive emotions and interactions for patients and staff.

Altogether, given the agreement with other studies, the potential value of the intervention is significant. Its potential is heightened further as it is low cost, does not require time for training, and can complement other interventions to promote kindness and compassion and positive clinical outcomes. By elevating both providers and patients, we hypothesize that the quality of the interaction will rise, characterized by better communication (e.g., less interruption by provider, more frank disclosure by the patient). That, in turn, can create greater satisfaction of the visit for both. Used over the long-term, it is anticipated that these shifts in the healthcare environment will lead to improvement in outcomes.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Integreview IRB (Independent IRB). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

DF contributed to the design, conducted data analysis, and wrote the first draft of the manuscript. SU contributed to the design, conduct, and analysis of the study. JM contributed to the design and data analysis of the study. FC contributed to the design of the study and performed statistical analyses. MO

contributed to the design of the study and performed statistical analyses. All authors contributed to manuscript revision, read, and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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REFERENCES

Aknin, L. B., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., et al. (2013). Prosocial spending and well-being: cross-cultural evidence for a psychological universal. *J. Pers. Soc. Psychol.* 104, 635–652. doi: 10.1037/a0031578

Aknin, L. B., Broesch, T., Hamlin, J. K., and Van de Vondervoort, J. W. (2015). Prosocial behavior leads to happiness in a small-scale rural society. *J. Exp. Psychol. Gen.* 144, 788–795. doi: 10.1037/xge0000082

Aknin, L. B., Dunn, E. W., and Norton, M. I. (2012). Happiness runs in a circular motion: evidence for a positive feedback loop between prosocial spending and happiness. *J. Happiness Stud.* 13, 347–355. doi: 10.1007/s10902-011-9267-5

Algoe, S. B., and Haidt, J. (2009). Witnessing excellence in action: the 'other-praising' emotions of elevation, gratitude, and admiration. *J. Posit. Psychol.* 4, 105–127. doi: 10.1080/17439760802650519

American_Dental_Association (2015). "Dentist well-being survey report."

APA (2019). Stress in America Annual report of American Psychological Association.

Austin, J., Drossaert, C. H. C., Schroevers, M. J., Sanderman, R., Kirby, J. N., and Bohlmeijer, E. T. (2020). Compassion-based interventions for people with long-term physical conditions: a mixed methods systematic review. *Psychol. Health*, 1–27. doi: 10.1080/08870446.2019.1699090 [Epub ahead of print]

Cohen, S., Janicki-Deverts, D., and Miller, G. E. (2007). Psychological stress and disease. *JAMA* 298, 1685–1687. doi: 10.1001/jama.298.14.1685

Cohen, S., and Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychol. Bull.* 98, 310–357.

Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., and Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *J. Exp. Soc. Psychol.* 76, 320–329. doi: 10.1016/j.jesp.2018.02.014

Eisenberger, N. I. (2013). An empirical review of the neural underpinnings of receiving and giving social support: implications for health. *Psychosom. Med.* 75, 545–556. doi: 10.1097/PSY.0b013e31829de2e7

Farmer, H. R., Wray, L. A., and Thomas, J. R. (2019). Do race and everyday discrimination predict mortality risk? Evidence from the health and retirement study. *Gerontol. Geriatr. Med.* 5:2333721419855665. doi: 10.1177/2333721419855665

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., and Finkel, S. M. (2008). Open hearts build lives: positive emotions, induced through loving-kindness meditation, build consequential personal resources. *J. Pers. Soc. Psychol.* 95, 1045–1062. doi: 10.1037/a0013262

Freeman, D., Aquino, K., and McFerran, B. (2009). Overcoming beneficiary race as an impediment to charitable donations: social dominance orientation, the experience of moral elevation, and donation behavior. *Personal. Soc. Psychol. Bull.* 35, 72–84. doi: 10.1177/0146167208325415

Gallup (2019). "Gallup global emotions survey report."

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Greene, J., and Hibbard, J. H. (2012). Why does patient activation matter? An examination of the relationships between patient activation and health-related outcomes. *J. Gen. Intern. Med.* 27, 520–526. doi: 10.1007/s11606-011-1931-2

Greene, J., Hibbard, J. H., Sacks, R., Overton, V., and Parrotta, C. D. (2015). When patient activation levels change, health outcomes and costs change, too. *Health Aff. (Millwood)* 34, 431–437. doi: 10.1377/hlthaff.2014.0452

Haidt, J. (2003). "The moral emotions" in *Handbook of affective sciences* eds. R. J. Davidson, K. R. Scherer and H. H. Goldsmith (New York, NY, US: Oxford University Press), 852–870.

Hennessy, M. B., Kaiser, S., and Sachser, N. (2009). Social buffering of the stress response: diversity, mechanisms, and functions. *Front. Neuroendocrinol.* 30, 470–482. doi: 10.1016/j.yfrne.2009.06.001

Hojat, M., Louis, D. Z., Markham, F. W., Wender, R., Rabinowitz, C., and Gonnella, J. S. (2011). Physicians' empathy and clinical outcomes for diabetic patients. *Acad. Med.* 86, 359–364. doi: 10.1097/ACM.0b013e3182086fe1

Holt-Lunstad, J., Ditzen, B., and Light, K. C. (2019). Oxytocin, social relationships, and health: an introduction to the special issue. *Int. J. Psychophysiol.* 136, 1–4. doi: 10.1016/j.ijpsycho.2018.12.008

Hutcherson, C. A., Seppala, E. M., and Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion* 8, 720–724. doi: 10.1037/a0013237

Inagaki, T. K., and Eisenberger, N. I. (2012). Neural correlates of giving support to a loved one. *Psychosom. Med.* 74, 3–7. doi: 10.1097/PSY.0b013e3182359335

Ito, T., and Cacioppo, J. (2005). Variations on a human universal: individual differences in positivity offset and negativity bias. *Cognit. Emot.* 19, 1–26. doi: 10.1080/02699930441000120

Janicke, S. H., and Oliver, M. B. (2017). Meaningful films: the relationship between elevation, connectedness and compassionate love. *J. Psychol. Pop. Media Cult.* 6, 274–289. doi: 10.1037/ppm0000105

Johnston, W. M., and Davey, G. C. L. (1997). The psychological impact of negative TV news bulletins: the catastrophizing of personal worries. *Br. J. Psychol.* 88, 85–91. doi: 10.1111/j.2044-8295.1997.tb02622.x

Keltner, D., Kogan, A., Piff, P. K., and Saturn, S. R. (2014). The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: core processes from gene to meme. *Annu. Rev. Psychol.* 65, 425–460. doi: 10.1146/annurev-psych-010213-115054

Kikusui, T., Winslow, J. T., and Mori, Y. (2006). Social buffering: relief from stress and anxiety. *Philos. Trans. R. Soc. Lond. Ser. B Biol. Sci.* 361, 2215–2228. doi: 10.1098/rstb.2006.1941

Kim, J. J., Parker, S. L., Doty, J. R., Cunnington, R., Gilbert, P., and Kirby, J. N. (2020). Neurophysiological and behavioural markers of compassion. *Sci. Rep.* 10:6789. doi: 10.1038/s41598-020-63846-3

Kok, B. E., and Fredrickson, B. L. (2010). Upward spirals of the heart: autonomic flexibility, as indexed by vagal tone, reciprocally and prospectively predicts positive emotions and social connectedness. *Biol. Psychol.* 85, 432–436. doi: 10.1016/j.biopsycho.2010.09.005

Krämer, N., Eimler, S. C., Neubaum, G., Winter, S., Rösner, L., and Oliver, M. B. (2017). Broadcasting one world: how watching online videos can elicit elevation and reduce stereotypes. *New Media Soc.* 19, 1349–1368. doi: 10.1177/1461444816639963

Layous, K., Nelson, S. K., Kurtz, J. L., and Lyubomirsky, S. (2017). What triggers prosocial effort? A positive feedback loop between positive activities, kindness, and well-being. *J. Posit. Psychol.* 12, 385–398. doi: 10.1080/17439760.2016.1198924

Liu, Y. -Z., Wang, Y. -X., and Jiang, C. -L. (2017). Inflammation: the common pathway of stress-related diseases. *Front. Hum. Neurosci.* 11:316. doi: 10.3389/fnhum.2017.00316

Marsh, A. A. (2016). Neural, cognitive, and evolutionary foundations of human altruism. *Wiley Interdiscip. Rev. Cogn. Sci.* 7, 59–71. doi: 10.1002/wcs.1377

McEwen, B. S., and Gianaros, P. J. (2011). Stress- and allostasis-induced brain plasticity. *Annu. Rev. Med.* 62, 431–445. doi: 10.1146/annurev-med-052209-100430

Mimura, C., Griffiths, P., and Norman, I. (2009). What motivates people to enter professional nursing? *Int. J. Nurs. Stud.* 46, 603–605. doi: 10.1016/j.ijnurstu.2008.07.007

Mongrain, M., Barnes, C., Barnhart, R., and Zalan, L. B. (2018). Acts of kindness reduce depression in individuals low on agreeableness. *Transl. Issues Psychol. Sci.* 4, 323–334. doi: 10.1037/tps0000168

National_Academy_of_Medicine_Action_Collaborative_on_Clinician_Well-Being. (n.d.). Available at: https://nam.edu/action-collaborative-on-clinician-well-being-and-resilience-network-organizations/

Oliver, M. B., and Bartsch, A. (2010). Appreciation as audience response: exploring entertainment gratifications beyond hedonism. *Hum. Commun. Res.* 36, 53–81. doi: 10.1111/j.1468-2958.2009.01368.x

Oliver, M. B., Kim, K., Hoewe, J., Chung, M. -Y., Ash, E., Woolley, J. K., et al. (2015). Media-induced elevation as a means of enhancing feelings of intergroup connectedness. *J. Soc. Issues* 71, 106–122. doi: 10.1111/josi.12099

Oliver, M. B., Raney, A. A., Slater, M. D., Appel, M., Hartmann, T., Bartsch, A., et al. (2018). Self-transcendent media experiences: taking meaningful media to a higher level. *J. Commun.* 68, 380–389. doi: 10.1093/joc/jqx020

O'Malley, A. J., Arbesman, S., Steiger, D. M., Fowler, J. H., and Christakis, N. A. (2012). Egocentric social network structure, health, and pro-social behaviors in a national panel study of Americans. *PLoS One* 7:e36250. doi: 10.1371/journal.pone.0036250

O'Malley, A. S., Forrest, C. B., and Mandelblatt, J. (2002). Adherence of low-income women to cancer screening recommendations. *J. Gen. Intern. Med.* 17, 144–154. doi: 10.1046/j.1525-1497.2002.10431.x

O'Malley, A. S., Sheppard, V. B., Schwartz, M., and Mandelblatt, J. (2004). The role of trust in use of preventive services among low-income African-American women. *Prev. Med.* 38, 777–785. doi: 10.1016/j.ypmed.2004.01.018

Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., and Fredrickson, B. L. (2006). Happy people become happier through kindness: a counting kindnesses intervention. *J. Happiness Stud.* 7, 361–375. doi: 10.1007/s10902-005-3650-z

Park, S. Q., Kahnt, T., Dogan, A., Strang, S., Fehr, E., and Tobler, P. N. (2017). A neural link between generosity and happiness. *Nat. Commun.* 8:15964. doi: 10.1038/ncomms15964

Park, C. L., Russell, B. S., Fendrich, M., Finkelstein-Fox, L., Hutchison, M., and Becker, J. (2020). Americans' COVID-19 stress, coping, and adherence to CDC guidelines. *J. Gen. Intern. Med.* 35, 2296–2303. doi: 10.1007/s11606-020-05898-9

Rieger, D., and Klimmt, C. (2019). The daily dose of digital inspiration: a multi-method exploration of meaningful communication in social media. *New Media Soc.* 21, 97–118. doi: 10.1177/1461444818788323

Rowland, L., and Curry, O. S. (2019). A range of kindness activities boost happiness. *J. Soc. Psychol.* 159, 340–343. doi: 10.1080/00224545.2018.1469461

Schindler, I., Hosoya, G., Menninghaus, W., Beermann, U., Wagner, V., Eid, M., et al. (2017). Measuring aesthetic emotions: a review of the literature and a new assessment tool. *PLoS One* 12:e0178899. doi: 10.1371/journal.pone.0178899

Schnall, S., Roper, J., and Fessler, D. M. (2010). Elevation leads to altruistic behavior. *Psychol. Sci.* 21, 315–320. doi: 10.1177/0956797609359882

Schneiderman, N., Ironson, G., and Siegel, S. D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annu. Rev. Clin. Psychol.* 1, 607–628. doi: 10.1146/annurev.clinpsy.1.102803.144141

Shanafelt, T. D., Balch, C. M., Bechamps, G., Russell, T., Dyrbye, L., Satele, D., et al. (2010). Burnout and medical errors among American surgeons. *Ann. Surg.* 251, 995–1000. doi: 10.1097/SLA.0b013e3181bfdab3

Son, D., and Padilla-Walker, L. M. (2020). Happy helpers: a multidimensional and mixed-method approach to prosocial behavior and its effects on friendship quality, mental health, and well-being during adolescence. *J. Happiness Stud.* 21, 1705–1723. doi: 10.1007/s10902-019-00154-2

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *J. Health Soc. Behav.* 52, 145–161. doi: 10.1177/0022146510395592

Trzeciak, S., and Mazzarelli, A. (2019). *Compassionomics: The revolutionary scientific evidence that caring makes a difference* (Pensacola, FL: Studer Group).

Wolfe, J. M., and Horowitz, T. S. (2017). Five factors that guide attention in visual search. *Nat. Hum. Behav.* 1:0058. doi: 10.1038/s41562-017-0058

Xu, X., Zhang, Y., Wang, W., Zhang, Y., and Yang, N. (2020). Effects of patients' perceptions of physician-patient relational empathy on an inflammation marker in patients with Crohn's disease: the intermediary roles of anxiety, self-efficacy, and sleep quality. *Psychol. Res. Behav. Manag.* 13, 363–371. doi: 10.2147/prbm.S221435

Zak, P. J., Stanton, A. A., and Ahmadi, S. (2007). Oxytocin increases generosity in humans. *PLoS One* 2:e1128. doi: 10.1371/journal.pone.0001128

Zeng, X., Chiu, C. P. K., Wang, R., Oei, T. P. S., and Leung, F. Y. K. (2015). The effect of loving-kindness meditation on positive emotions: a meta-analytic review. *Front. Psychol.* 6:1693. doi: 10.3389/fpsyg.2015.01693

Zickfeld, J. H., Schubert, T. W., Seibt, B., Blomster, J. K., Arriaga, P., Basabe, N., et al. (2019). Kama muta: conceptualizing and measuring the experience often labelled being moved across 19 nations and 15 languages. *Emotion* 19, 402–424. doi: 10.1037/emo0000450

Conflict of Interest: The kindness media was provided by Envision Kindness, a registered not-for-profit with a mission to reduce stress and promote kindness, compassion, joy, and love through kindness media. DF is the President and co-founder of Envision Kindness. He presently serves in that capacity as a volunteer and, as Envision Kindness is a non-profit, has no ownership stake.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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REVIEW
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Creating a Compassionate World: Addressing the Conflicts Between *Sharing and Caring* Versus *Controlling and Holding* Evolved Strategies

Paul Gilbert*

Centre for Compassion Research and Training, College of Health and Social Care Research Centre, University of Derby, Derby, United Kingdom

For thousands of years, various spiritual traditions and social activists have appealed to humans to adopt compassionate ways of living to address the suffering of life. Yet, along with our potential for compassion and self-sacrifice, the last few thousand years of wars, slavery, tortures, and holocausts have shown humans can be extraordinarily selfish, callous, vicious, and cruel. While there has been considerable engagement with these issues, particularly in the area of moral psychology and ethics, this paper explores an evolutionary analysis relating to evolved resource-regulation strategies that can be called "*care and share*" versus "*control and hold*." Control and hold are typical of primates that operate through intimidatory social hierarchies. Care and share are less common in non-human primates, but evolved radically in humans during our hunter-gatherer stage when our ancestors lived in relatively interdependent, small, mobile groups. In these groups, individualistic, self-focus, and self-promoting control and hold strategies (trying to secure and accumulate more than others) were shunned and shamed. These caring and sharing hunter-gatherer lifestyles also created the social contexts for the evolution of new forms of childcare and complex human competencies for language, reasoning, planning, empathy, and self-awareness. As a result of our new 'intelligence', our ancestors developed agriculture that reduced mobility, increased group size, resource availability and storage, and resource competition. These re-introduced competing for, rather than sharing of, resources and advantaged those who now pursue (often aggressively) control and hold strategies. Many of our most typical forms of oppressive and anti-compassionate behavior are the result of these strategies. Rather than (just) thinking about *individuals* competing with one another, we can also consider these different resource regulation strategies as *competing within populations* shaping psychophysiological patterns; both wealth and poverty change the brain. One of the challenges to creating a more compassionate society is to find ways to create the social and economic conditions that regulate control and hold strategies and promote care and share. No easy task.

Keywords: compassion, competitive, caring, evolution, strategies

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James Kirby,
The University of Queensland, Australia

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Dennis Tirch,
Center for Compassion Focused Therapy, United States
Mauro Adenzato,
University of Turin, Italy

***Correspondence:**
Paul Gilbert
p.gilbert@derby.ac.uk

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OVERVIEW

All individuals, groups, and societies have to come to terms with the reality of the suffering of life. How we do that has profound implications for the kind of individuals we become and the social communities we create. The basis of our suffering is well known: that all of us have just found ourselves here with a genetically built body and brain we never chose that is vulnerable to disease and injury, lives for a short time before decaying and dying (Dawkins, 1976). Along this journey we will experience the grief of losses of loved ones, conflicts and life setbacks and for some, be in chronic pain and disability. We have minds full of many potential emotions both helpful and harmful (Gilbert, 2018; Nesse, 2019). Our environments make many of us unable to access to clean water, vulnerable to starvation, and diseases that with sufficient resources would be preventable and curable. And one of our (and other animals) greatest sources of suffering is other human beings that go to war, torture and turn other human beings (and animals) into slaves and resources to exploit.

There are three potential responses to suffering that can be referred to as *the big three C's* (Gilbert, 2005, 2018; Gilbert and Mascaro, 2017): *Compassion* is 'a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it' (Gilbert, 2020a). C*allousness*, is an insensitivity, lack of concern and indifference to suffering sometimes associated with helping being seen as too costly. *Cruelty*, is a deliberate causing of suffering for pleasure or sense of power. This shows up in repressive regimes and our entertainments far more than we would like to admit.

This paper highlights that the evolution of caring behavior, through parent–infant investment, was a template for many forms of caring. Hormones such as oxytocin and vasopressin and a range of physiological changes such as to the autonomic nervous system and frontal cortex evolved with, and tune us into caring behavior (Porges, 2007, 2017; Mayseless, 2016; Carter et al., 2017). There is now considerable evidence that from the day we are born to the day we die the caring and sharing relationships we have with others around us effect our epigenetics, cardiovascular, immune and autonomic nervous systems, and multiple neural circuits underpinning health, prosocial behavior and happiness (for reviews Brown and Brown, 2015, 2017; Ricard, 2015; Seppälä et al., 2017). In addition, caring and sharing became the central social discourse in hunter-gatherer societies as a resource distribution strategy. In this social environment the phenotype for caring possibly became more flexible and variable and extended to the wider social relationships in which individuals matured (Spikins, 2015, 2017). Evidence for this is the fact that most forms of caring and compassionate behavior, be it toward kin, friends or strangers or even animals operate through the same physiological mechanisms (for reviews see Mayseless, 2016; Seppälä et al., 2017). If caring and sharing can be viewed as a phenotype(s) that varies in different contexts, can be linked to a particular resource distribution strategy, and impacts physiological systems, then we should see variations in the psychological and physiological manifestations of this strategy in different environments. To put this another way, some contexts will make us more oriented to caring and sharing and others more orientated to some forms of callousness, and this will show up in physiological as well as psychological processes. The evidence for this is growing as reviewed below.

The advent of COVID-19, and our local responses to it, have illuminated an outpouring of compassionate courage, a sense of interdependence, self-sacrifice and helpfulness. In addition, it has raised the issue again that many of us want a more compassionate, cooperative world, whilst recognizing the means to achieve this is unclear and fraught with problems, one being callousness. This paper will use an evolution informed, biopsychosocial lens to explore why moving to a more compassionate society would be beneficial for our physical and mental health, social justice, productivity, and prosocial behavior (Staub, 2003; Gilbert, 2009; Harari, 2014; Keltner et al., 2014; Kasser, 2016; Ekman and Ekman, 2017; Haslam et al., 2018; Piff et al., 2018; Ryan, 2019; Wilson, 2019; Biglan, 2020; Becker et al., 2021), but also the serious inhibitors to that movement (Gilbert and Mascaro, 2017; Wilson, 2019). These are partly in our evolution and partly in our cultures and history of agricultural societies.

THE CHALLENGES

To pursue caring and sharing, rooted in compassion as a public good, it is helpful to understand its facilitators and its inhibitors, which are many and various. Among the most daunting inhibitors include the facts that:

1. The human brain has been rather cobbled together over a long evolutionary timeframe with various trade-offs and compromises plugged in along the way (Gilbert, 1998; Nesse, 2019; Workman et al., 2020). Much of our decision-making and "urges" are not based on rational choices, but the pursuit of life tasks evolved over millions of years with deeply ingrained, socially trained motives and emotions (Keltner et al., 2018). This means that:
2. We are a species of extremes (Gilbert, 1989/2016, 2018; Marsh, 2019) with evolved strategies and potentials for helpful and prosocial behavior (Gilbert, 2009, 2020a; Keltner et al., 2014; Mayseless, 2016; Seppälä et al., 2017) but also extremely harmful, cruel, callous, and destructive behavior to self and others (Gilbert, 1989/2016, 1998, 2009; Black, 2016; Eisler and Fry, 2019; Zimbardo, 2008; Hobfoll, 2018; Nesse, 2019). If we consider our dispositions for war, slavery, torture, domestic violence, and violence as entertainment, and the ease by which we see other humans (and animals and nature) simply *as a resource* to be exploited, then with some exceptions, the last 5,000 years or more have been anything but compassionate (Rummel, 2002; Van Vugt and Park, 2009; Glover, 2012; Black, 2016).
3. Since the advent of agriculture and expanding wealth and group size, we have created social contexts that are punitive, intimidating and often threatening with aggressive dominant males (and their small, immediate support networks) subjugating, exploiting, suppressing

subordinates, and waging wars, along with colonial exploitation of other societies and cultures (Black, 2016).

4. As part of that legacy, the creation of storable resources and wealth expansion generated by agriculture created intense competition resulting in huge disparities in wealth distribution and social power which today is extreme and damaging (Wilkinson and Pickett, 2010; Stiglitz, 2012; Harari, 2014).
5. Since all dominant elites seek to protect their privilege and advantage, we also live in a world where today, the powerful and wealthy elites have disproportionate political power that has allowed them to undermine democracies and movements to social justice and fairness (Chomsky, 1992; Lipman-Blumen, 2005; Gilligan, 2011; MacLean, 2017) with continued use of violence and the threat of violence to maintain power, and exploit natural resources in extremely harmful ways (Pilger, 2007; Gilligan, 2011; MacLean, 2017; Hickle, 2018; Piff et al., 2018).
6. As people become wealthier, they become less compassionate not more (Van Kleef et al., 2008; Piff et al., 2018). After a certain point, wealth changes us psychologically and physiologically such that our feelings of compassion and empathy go down (in other words we become more callous). At the same time we shift to a sense of entitlement, deservingness, and self-interest competitiveness and promote *control and hold* (not care and share) attitudes to resources. Wealthier individuals are more likely to cheat and deceive (Piff et al., 2018). In fact, the cheating and manipulation of the wealthy (e.g., tax avoidance and back room deals, use of the media) is a serious issue for compassion. We are becoming more narcissist and self-focused, not less (Twenge and Campbell, 2009) and our orientations to compassion (at least before COVID-19) are reducing, not increasing (Trzeciak and Mazzarelli, 2019; Harvard Graduate School of Education, 2020).
7. Because our society needs to promote the production of goods and services as a source of employment and wealth creation we need to consume them and have become more materialistic. Materialism clearly supports the *control and hold strategies* to resource seeking and distribution but not without personal and social cost. Kasser (2016) points out "that people who place a relatively high priority on materialistic values/goals consume more products and incur more debt, have lower-quality interpersonal relationships, act in more ecologically destructive ways, have adverse work and educational motivation, and report lower personal and physical well-being. Experimentally activating materialistic aims causes similar outcomes" (p.489).
8. In a recent major meta-analysis of a large number of personality traits linked to happiness and well-being, Thielmann et al. (2020) found the top traits were: trust, social value orientation, guilt-proneness (being sensitive to hurting others), honesty-humility, pro environmentalism, and concern for others. The traits that were least associated with happiness were those typically linked into the competitive orientation to life. These were: narcissism, envy, social dominance orientation (SDO), competitiveness, greed, psychopathy, Machiavellianism, and sadism. Given that the dark triad traits of Machiavellianism, psychopathy, and narcissism are overrepresented in the higher-levels of politics and business, one can see the social-wide problems we need to deal with (Furtner et al., 2017; Peterson and Palmer, 2019).
9. While many espouse compassion as a moral value, individuals can also be fearful of it, resistant and block it (Gilbert et al., 2011; Gilbert and Mascaro, 2017; Kirby et al., 2019). Those with ruthless ambition, narcissistic traits and are hyper-competitive are particularly resistant to having compassion for others (Basran et al., 2019).
10. We remain uncertain how to address the disproportionate power of the few who have tendencies to drive the serious dark side of humanity (Bakan, 2012; Black, 2016; Gilbert, 2018; Wilson, 2019). At an evolutionary strategic level, our brains are the battle grounds for two very different reproductive and resource distribution strategies which are *caring and sharing versus controlling and holding* and even our phenotypes may be different according to which of those gains ascendancy (Lepage et al., 2020).

The bottom line is that our extraordinary potential to be a caring species (Keltner et al., 2014; Ricard, 2015; Narvaez, 2017, 2020; Spikins, 2015, 2017) evolved in small groups where everybody knew everybody, resources were relatively scarce, and caring and sharing those resources was essential for survival and cementing affiliative relationships (Fry and Söderberg, 2014; Lavi and Friesem, 2019; Wilson, 2019). There is now considerable evidence that our brains and bodies "work best" in environments where we feel cared for and about, and feel we can make a contribution that others value (Gilbert, 2009; Brown and Brown, 2015, 2017, Seppälä et al., 2017). Nothing prepared us to deal with the consequences of developing agriculture and creating environments of expanding groups, the need to work long hours tending fields and farms, and opportunities to acquire, accumulate and store vast resources. Overtime we drifted into a very different type of resource regulation strategy, giving up a caring sharing lifestyle and replacing it with a resource owning, accumulating and power seeking, hierarchical one (Harari, 2014). Tragically for our species, this facilitated the re-emergence of the aggressive dominant male hierarchies who were able to stimulate highly destructive competitive behaviors, increased dispositions to callousness and cruelty, and maintain power through threats and terrors.

If we are to create a more compassionate world, that serves the common good (Ekman and Ekman, 2017), then much depends on how we formulate, contextualize and think about two issues. (1) Be much more engaged with the suffering in the world and how to address it, and as part of this (2) Address the challenges of "resource caring and sharing" versus "competitive controlling and holding" (Piff et al., 2018). We will need new ways to think about how we can create social contexts that fit our needs for cooperation, caring and sharing to address many of

the serious problems we face; climate breakdown, disease control, economic inequality and the need for social, gender, and racial justice (Helliwell et al., 2012; Wilson, 2019). We vote for leaders who appeal to our own desires to control and hold rather than care and share and therein lies one of our difficulties (Lipman-Blumen, 2005; Mols and Jetten, 2020). Compassion, caring and sharing will require sacrifice of some of our personal material wealth for social wealth and health. To pursue this endeavor we can explore the evolution and dynamics of caring, sharing, and compassion, how we evolved the potential to be a compassionate and courageous species but also the nastiest, vicious and cruel (Gilbert, 2005, 2018; Black, 2016).

ORIGINS AND FLOWS OF CARING AND COMPASSION

Research in the field of prosocial behavior and compassion has accelerated greatly in the last 10 years (for reviews see Seppälä et al., 2017). As a result Mascaro et al. (2020) highlight the fact that there are now slightly different conceptions of compassion and different ways of measuring it. Nonetheless, all recognize compassion is about our orientation to be helpful rather than harmful, and empathically engaged rather than callously indifferent to the pain and suffering of self and others. One evolved route to our motives and competencies to be compassionate is from phylogenetically ancient forms of caring for offspring (Gilbert, 1989/2016; Geary, 2000; Gilbert, 2005, 2020a,b, Goetz et al., 2010; Brown and Brown, 2015, 2017; Mayseless, 2016; Carter et al., 2017). One function of parental caring is to be sensitive to distress and needs of offspring and try to address them. Hence, we can define one function of caring and its "derivative" *compassion* quite simply in terms of its underlying motivation and "*if* A *then* do B" algorithm where "A" would be some signal of distress, suffering or need and B would be the response and actions to address them (Gilbert, 2020a,b). This gives rise to defining care and compassion as "*a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it*" (Gilbert, 2017b,c). Needs are important in compassion because if they are not addressed suffering will clearly follow (Gilbert and Choden, 2013).

Like compassion, *callousness* can have slightly different definitions and is used in slightly different ways (e.g., in forensic settings) but here I define it as the opposite of compassion; as an *insensitivity to suffering and an indifference to its alleviation or prevention* (Gilbert, 2005, 2018). In addition, we can see these as dimensions and contextually influenced. We can be compassionate in some contexts but callous in others and the degree and intensity of compassion and callousness can vary too. Poulin (2017) also reviews evidence where we can be very sensitive to suffering but actually not do anything about it. How that falls on the compassion callous dimension is unclear.

As a motive, compassion is not dependent on emotion. Whether you are an *anxious* firefighter risking your life to save others, an *angry* fighter of injustice or experiencing *sadness* as you counsel the bereaved, all these have one motive in common: the motive to turn toward suffering or need, be prepared to develop *the courage* to experience the threat, distress or pain involved, and develop *the wisdom* of working out what would be helpful. Sometimes compassion can be a logical or moral choice as much as an emotional one (Loewenstein and Small, 2007). And our reasons for *behaving* compassionately may have multiple sources both conscious and unconscious (Böckler et al., 2016; Bargh, 2017). Despite these complexities core processes of compassion show up in physiological and psychological domains.

Physiologies of Caring

Over millions of years, in many species, care given and received evolved to have major impacts on the functioning of the autonomic nervous system, the immune and cardiovascular system, and neurophysiological (brain) circuits that play fundamental roles in self-identity and self-experience, emotion regulation, and prosocial or anti-social behavior (Gilbert, 1989/2016, 2017c; Keltner et al., 2014; Music, 2014, 2017; Brown and Brown, 2015, 2017; Mayseless, 2016; Carter et al., 2017; Porges, 2017; Seppälä et al., 2017; Stevens and Woodruff, 2018; Di Bello et al., 2020; Kim et al., 2020a,b). Relationships are physiological regulators (Hofer, 1984, 1994). Changes to the autonomic nervous system, particularly the myelination of the 10th cranial nerve of the parasympathetic system to become the vagus nerve, played a major role in how the caring relationship came to regulate threat processing (Porges and Furman, 2011; Porges, 2017). It now looks as if the parasympathetic *rest and digest system,* which regulates (sympathetic) threat and drive states, was incorporated into the systems for close-relating thereby enabling the signals emanating from a parent (caring other, close friend) to have soothing, vagal-mediated qualities on an infant (Porges, 2017). One measure of the efficiency of the vagus nerve is called heart rate variability. There is good evidence that the functioning of parasympathetic system as measured by heart rate variability plays a major role in prosocial behavior and caring and compassion in general (Keltner et al., 2014; Petrocchi and Cheli, 2019). In contrast poorer functioning of the vagus nerve and balancing of the autonomic nervous system, as measured with lower heart rate variability, is associated with less cortical control over basic emotions increased vigilance to threat, aggressiveness and decreased prosocial behavior (Lepage et al., 2020). As noted below these distinctions are important when we come to explore variations between sharing and caring strategies and controlling and holding ones.

Porges (2007, 2017) has written extensively of how the vagus nerve became part of a circuit that was very sensitive to facial expressions and voice tones, particularly those indicating friendliness and safeness. Indeed, today, the way we look at, share facial expressions and play with children all indicate our intuitive understanding of how our voices and facial expressions impact on them. We change these signals when we are engaged with adults, but nonetheless, we intuitively understand that friendship signals (and lack of it) are conveyed through voice tones and facial expressions.

The hormones oxytocin and vasopressin also played a crucial role in the evolution of caring behavior for infants, pair bonding and close friendships (Carter et al., 2017). In fact, there is now

considerable evidence that kindness and compassion from others, when we are under stress or experiencing losses have significant emotional and physiological regulating effects (Steinbeis et al., 2015; Cassidy and Shaver, 2016; Mayseless, 2016; Seppälä et al., 2017). Rockliff et al. (2011) found the nasal oxytocin made it easier for people to imagine a caring other being caring of them. Morhenn et al. (2012) found that receiving touching massage reduced stress hormones and increased oxytocin. In social mentality theory (Gilbert, 2017a), both the giving and receiving of signals impact similar systems. Hence we are biologically set up with systems designed for the giving and receiving of care.

In addition, priming people with memories of caring others or seeing caring behavior can impact on physiological systems involved with stress and the way people cope with stressful events (Norman et al., 2015). Individuals who sense themselves as living in supportive, caring communities are in different physiological states than individuals who are in threat-focused communities or see the world as "a dog eat dog" place where you cannot trust or rely on others to help you (Perry et al., 2013). The general sense of being contextualized in caring and socially safe versus socially unsafe environments may well be crucial for many psychological processes (Kelly et al., 2012; Armstrong et al., 2020). Variations in the oxytocin gene may also link to variations in compassion and prosocial behavior versus callousness (e.g., Tost et al., 2010; Marsh, 2019). If watching others being caring or being harmful has such powerful effects on us, then we really do need to take another look at our entertainments that more commonly depict characters as narcissistic, argumentative and aggressive rather than fun, loving and friendly.

The Phenotypic and Epigenetic Effects of Caring

Epigenetic science is important because it helps us understand how different contexts result in different trait phenotypes. For example, all humans are motivated to form some kind of attachment with their caregiving figures early in life. However, the way they experience them e.g., as caring, neglectful, or abusive has profound effects on the attachment phenotype(s). Some will grow to be trusting and secure in their attachments, others are anxious and vigilant to rejection; yet others become dismissive and avoidant of close interdependent relationships. In other words, social experiences shape phenotypes via epigenetic effects which in turn impacts the maturation of numerous physiological systems (Cowan et al., 2016; Slavich, 2020). So important is received caring behavior that it actually impacts epigenetic profiles even in fish. McGhee and Bell (2014) studied three-spined sticklebacks where fathers provide the care and protection. They note that:

> During the approximately two weeks that fathers provide care, they defend their nest from predators, fan the nest with their pectoral fins to provide fresh oxygen to the embryos and once the embryos hatch, retrieve fry that stray from the nest. During this period, offspring rely on yolk reserves provisioned by their mother prior to fertilization. Fathers do not feed offspring, but there is evidence that offspring antipredator behavior . . .., mate preference . . .. and morphology . . .. can be sensitive to the effects of fathers. (p. 2)

They go onto discuss how paternal caring influences traits, such as anxiety in offspring, that impact on their survival and how paternal caring influences the epigenetics of their offspring. Indeed, it is now known that across many different species the quality of parental caring impacts epigenetics and can attenuate or amplify vulnerabilities to threat sensitivity and sociality (Cowan et al., 2016; Music, 2017; O'Donnell and Meaney, 2020; Slavich, 2020). But it is not just the care received in the parent infant dyad. There is also increasing evidence that social contexts, particularly contexts of poverty and stress, can have long-terms epigenetic effects (McDade et al., 2019). Rightly or wrongly those favoring intense lockdowns have paid little attention to the epigenetic effects on children growing up in stressed families, social disengagement, and lacking education. Concerning too is increasing evidence that epigenetic changes can be inherited and passed to subsequent generations (Cowan et al., 2016; O'Donnell and Meaney, 2020). The implications of this are profound and still to be fully acknowledged because it means that the societies that we have been creating since agriculture may well have been affecting our epigenetic profiles. We are faced with the possibility that different cultures create different phenotypic patterns in the individuals living within them. Hence, for example, it is possible that Roman societies that accepted gladiatorial games and the harsh use of slaves were indeed phenotypically different to us.

A Challenge: The Expense

There is however, a rather a big hitch to the evolution of caring and sharing. They work well in reciprocating groups of familiar others but did not evolve as a general giveaway. The problem with all motives, including caring motives, is that they are "energy" expensive and costly. Evolution has therefore built in its own criteria for dispensing it, sometimes referred to as different forms of altruism (Burnstein et al., 1994) and reciprocal altruism (Gintis et al., 2003; Colqhoun et al., 2020). Mothers of most species will only care for their own infants, not for others. In the case of sheep, for example, it can be very difficult to get a mother to adopt an orphan. While adoption does occur in mammalian species, it is rare; humans, who foster and carry out other forms of caring, are exceptional in this regard (Spikins, 2015). The evolution of the genetics of caring predisposes us to focus on those closest to us. For example, imagine we go to maternity to have our baby delivered and they take our baby away to weigh it and come back and say, "we have some good news and some bad news." The bad news is we have lost the name tags and are not sure whose baby belongs to which parents. But the good news is the babies born this morning are in perfect health, so please feel free to choose the one you fancy." Clearly, this would be a source of immense distress because we are programmed to care for our own genes, not strangers. Furthermore, if we have an opportunity to save our own children or 40 children down the road, who are we going to save? Also if we have opportunities to lavish vast resources on our own children at Christmas or send that money to children who are starving or lack clean water, who are we going to choose? It is not impossible for us to overrule these evolutionary preferences, but we need to understand them and what we need to do if we want to overcome them (Geary, 2000).

Although oxytocin is often regarded as a hormone important for bonding, it is also a hormone that makes mothers aggressive to potential threats to their offspring (Carter et al., 2017) and can power outgroup (defensive) aggression too (De Dreu et al., 2011). Evolution has built-in tendencies for us to be interested in caring and sharing with those that we are likely to know and have a reciprocal relationship with, those we like or trust, rather than those we do not. In addition, oxytocin can make us more sensitive to suffering for in-group members, but this has a potentially tragic downside. It can also make us more vengeful to those who have harmed our group (Han et al., 2020), and group vengeance is responsible for considerable violence. Physiologies do not point to simple solutions.

If we are going to create a more sharing, caring and compassionate world, we need to understand these inhibitors blocking our orientation to compassion (Gilbert and Mascaro, 2017). This is where we need to use our intelligence and override emotional dispositions or prejudices. Loewenstein and Small (2007) argue that if we rely solely on our emotions of sympathy and ability to empathize, we will exercise only limited compassion. Compassion has to be powered in part by moral values and understanding its value, not just our innate reactions. It also has to be socially valued and socially reinforced through cultural norms and expectations. Just as we can have a sense of biological kinship, so we can have a sense of psychological kinship. We are more likely to be caring to those who we see in that category. Importantly, as some spiritual traditions encourage, we can train our brains to conceptualize humanity as part of our "kin group" (Bailey, 2002). Right wing politicians however are more interested in splitting and setting one group up against another.

Another aspect of compassion is that it is linked to altruism. Altruism requires individuals to be prepared *to make sacrifices* to help people. Helping people that does not have a cost or can benefit you in the long term is questionable as to how altruistic it is (Colqhoun et al., 2020). Interestingly, therefore although helpful behavior has been observed repeatedly in young children Green et al. (2018) investigated how helpful they would be if there were a cost. They found that children would help a hand puppet achieve a goal of completing a task (e.g., puzzle) if there was no cost to them, but helping fell away significantly when they had to give up something to help the puppet. Even when the puppet made appeals and was clearly distressed, the child still would not give up their own resources or rewards to help the distressed puppet.

THE PSYCHOLOGICAL FUNCTIONS OF CARING

Having looked at the physiological and epigenetic effects linked to evolved caring motives, we can now turn to the *psychological functions of caring*. Parents provide many resources to their infants including food, thermoregulation and protection. In addition, they offer major psychological supports. One of the major models for understanding these supports has been attachment theory (Bowlby, 1969, 1973, 1980, Cassidy and Shaver, 2016; Music, 2017). This describes how parents provide their offspring with a *secure base* from which the young can begin to play, explore, and return to for guidance and support. Second, they provide a *safe haven* acting as soothing and comforting stimuli when the young are distressed or needy, thus helping to regulate the infant's need/frustrations, arousal and emotions. Third, the child and parent seek to maintain proximity to each other and when separated become concerned and seek each other out (Cassidy and Shaver, 2016). As noted, these experiences can also profoundly influence the maturation of physiologies and epigenetic profiles.

Every time the child experiences others as caring, encouraging or soothing to them, they learn to turn to others when in distress. The regular experience of these means that children develop trust in others and an interest in relating to others. In addition, when caring parents show pleasure and joyfulness in their child, the child experiences themselves existing positively in the mind of others and becomes attuned to the environments their parents provide. These processes carry powerful epigenetic and physiological effects as noted above (Cozolino, 2014; Music, 2014, 2017). To put this another way, evolution has created organisms, such as ourselves, who fine tune their epigenetics and physiologies (phenotypes) according to the niche they are going to have to operate within. Put crudely, developing affiliative, trust, and dispositions to be sharing will not be helpful if the environment is going to be competitive, callous, full of down rank threats, and cheats.

Tragically when these important *brain nutrients* of care, compassion, and love are not received, and children are on the receiving end of low warmth, neglect, or abuse, it has devastating impacts on the brain, epigenetics, and subsequent development (Lippard and Nemeroff, 2020). The suffering of the Romanian children in orphanages tragically brought home just how important affectionate caring was to the development of the brain (Chugani et al., 2001). In fact, there is now considerable evidence that our basic strategic orientation (particularly on the dimensions of "helping and concern for others" *versus* "lack of concern for others") is partly set in our life histories (Del Giudice, 2016). This is set out in **Figure 1**.

Figure 1 is referring to dimensions, not absolutes which can be fluid and change over a person's life or from situation to situation. On the left-hand side, cared for children experience their brains and minds developing and orientating to a range of motives, emotion, dispositions, and competencies to pursue a caring and sharing lifestyle. On the right hand are children growing up under threat (lacking a secure base and safe haven). They find their minds developing strategies for a very different type of life and social niche; for a more "hard fought" life; a competitive lifestyle where one is wary of people and certainly cannot trust others to be helpful, sharing or caring. In this social niche, there are two strategic options (Del Giudice, 2016). Many primates (although much less so bonobos) living in hierarchical groups show that under competitive pressure there is a branching into two different strategies. One is to adopt a 'damage limitation, lower risk of injurious conflict, better safe than sorry, a down rank type strategy of submissiveness, and lack of confidence.' This increases the risk

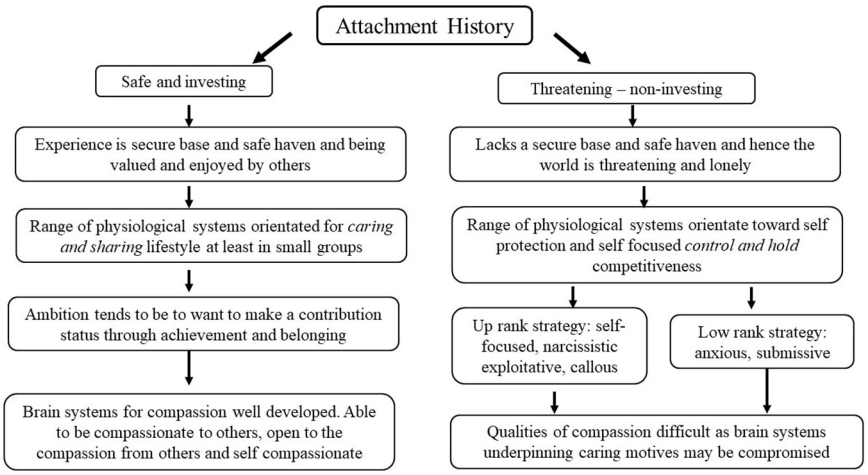


FIGURE 1 | Early life background and strategic orientation: Adapted from Gilbert (2005).

of depression and anxiety. It may fluctuate somewhat depending on how secure and safe subsequent relationships are, but these individuals can be very sensitive to feeling failures and inferior compared to others, socially marginalized and often carry a sense of loneliness and disconnection (Gilbert, 2000, 2020a). These individuals can be caring, but this can be because they want to be liked and avoid rejection (Catarino et al., 2014; Böckler et al., 2016).

The other strategy in contexts of low care is a riskier up rank strategy, to really push one's luck, display confidence (perhaps even grandiose), seek power and accumulate resources, foregoing sharing caring strategies. These are linked to certain types of narcissism and psychopathy both of which involve toning down caring and sharing motives (Del Giudice, 2016). One version links to a sense of entitlement to treat others as a resource, and in the extreme regulate their relationships through fear. Many of the people in our prisons did not have good starts and their capacities for empathic connectedness to others is limited. It is also the same for some of our politicians and the higher up you go in business, the more you will find the rank focused callous folk who can be superficially charming, but have little interest in caring and sharing (Furtner et al., 2017; Peterson and Palmer, 2019). Can these individuals be turned to change these fundamental evolved strategies that are running their show? It is unclear, but there are glimmers that compassion training, which involves specific techniques to stimulate care-focused social mentalities, by helping people process some of the neglect and harshness they themselves experienced, is proving an exciting potential intervention for forensic youth (e.g., Ribeiro da Silva et al., 2019, 2020). Shirtcliff et al. (2009) show that individuals who are callous are not emotionally in tune or physiologically responsive with their own emotional pain. Hence, physiological systems involved with "sensitivity to emotional suffering" are "offline," meaning that because they are not in tune with or responsive to their own emotional suffering they unable to be sensitive to any signals of pain including those they cause others. However, keep in mind that mentalities are co-regulating and therefore if individuals can start to process their own pain and their unmet needs to have been cared for, this *might* open up that social mentality. It does not open up unless those *inner care receiving systems* are worked with; trying to help them feel a sense of remorse or guilt when their own emotional pain systems are closed down may fail. Indeed Compassion Focused Therapy (Gilbert, 2010, 2020a), is less focused on changing basic beliefs and much more interested in motivational and phenotypic switching, along with building physiological pathways and networks that facilitate the caring social mentalities (Gilbert, 2017a, 2020a,b). The degree to which that is possible is the next major challenge in psychotherapy development and research (Cozolino, 2017; Gilbert, 2019b,c, 2020a).

There is however a twist to this and that is that being born into wealthy parents is also associated with the forms of narcissism that can make individuals unsuited as leaders (Martin et al., 2016). It is unclear if this is a direct effect of wealth or the fact that wealthy parents have different types of relationships with their children. There is some evidence to suggest that wealthy parents find parenting less meaningful and maybe less emotionally engaged with it preferring money making (Kushlev et al., 2012). Wealthy parents are more likely to send their children to boarding schools with negative consequences (Schaverien, 2015). Parental emotional distancing maybe the issue. Then there is the well-known narcissism that comes from simply being spoilt and having few boundaries put on them; growing up completely disengaged from the experiences and the realities of poorer people for example. Living in a world of plenty may not support developing empathy for suffering because one rarely encounters it; or if one does, it tends to be trivial, like having a tantrum because one cannot have the size of birthday party one wanted. Wealth may be a hindrance to developing empathy for suffering (Piff et al., 2018).

Whatever the origins of narcissism, the human brain *needs considerable stimulation of feeling safe and cared for along with developing respect and concern for others to mature into the kind of ethical caring and sharing individual we so need as a species*

(Gilbert, 1989/2016; Slavich, 2020). Nothing is inevitable and of course people from difficult backgrounds can become wonderful examples of compassion and people from good backgrounds can become villains. Nonetheless, the extraordinary way in which our bodies, genetic profiles and minds are so linked to our environments is a message that politicians are still ignoring probably because the cost of really taking this on board is evaluated by them to be high. Tax cuts rather than children's brains are more important. Prosocial and antisocial tendencies are potentials within all humans to some degree or other, give or take a little genetic variation here and there. *Individuals simply find themselves maturing into these strategies in response to the relationships in which they are embedded.* Children do not wake up one Saturday morning and choose which one they are going live by; that they could be an altruist but then think "that is boring I will train to be a narcissist." It is all about how our brains and epigenetic profiles *automatically pattern* themselves in different environments (Del Giudice, 2016).

From Caring to Compassion

Species with high levels of parental caring *evolve complex cognitive competencies,* whereas those that do not, do not (Uomini et al., 2020). Over time, these cognitive competencies change the way basic motivations are experienced and expressed. Certainly, by the time of homo sapiens, the potential to use our reasoning minds for inhibiting or accentuating a motive is extraordinary (Byrne, 1995; DeFelipe, 2011). We become capable of orientating caring toward medicine, developing anesthetics, antibiotics, ridding the world of smallpox, and extraordinary keyhole surgery. Unfortunately, the same competencies can be used for planning wars, building nuclear weapons and designing new tortures.

We have at least three different types of cognitive competencies that give rise to different insights and wisdoms (Gilbert, 2019a, 2020a).

1. **Reasoning insights:** First, we have certain *types of reasoning* that enable us to understand and have insights into complex causalities, system relations and 'how things work.' We can imagine and run what if. . . and suppose/imagine that. . . simulations in our mind. We can think about the past and future and plan, not just days, but years ahead (Suddendorf, 2018; Baron-Cohen, 2020). And we accumulate knowledge at an increasingly exponential speed so that we can anticipate that our science will be very different in 100 years to what it is now. This is the basis of the scientific mind that put people on the moon.
2. **Empathic insights:** Empathy is a competency, not a motive (Gilbert, 1989/2016; Decety and Ickes, 2009; Baron-Cohen, 2011). It can be used by any motive. If you want to manipulate somebody, if you want to be good at developing new relationships or dating, you are much more likely to be successful if you are empathic, than if you are not. While empathy certainly helps caring behaviors we may not need to understand the exact nature of somebody's suffering to want to help them. Whether men and women can understand what it is like to be the other gender (e.g., have a baby) is uncertain; the degree to which white middle class people understand experiences of racism is also uncertain; the degree to which white middle and upper class politicians understand the real daily struggles, fears and despairs of the poor is uncertain. Nonetheless, in these situations we can be empathic to the fact that we might struggle with empathy and therefore we need to listen and learn and not make assumptions about our understanding. It is the motivation to be caring that is crucial. Without a caring motive empathy can be used for selfish, deceptive, and manipulative goals (Bloom, 2017).
3. **Consciousness of consciousness insights:** Third, we have a new type of *consciousness of consciousness:* we can be aware and know that we are aware. This facilitates extensive self-awareness and opportunities *to become mindful and observant of our own minds* (Gilbert and Choden, 2013; Brown et al., 2015). Learning to pay attention to what is going on in our minds, so that we can gain more control over its outputs is one of the great challenges of humanity. Unfortunately, without care, self-awareness can also be a curse and the source of egoism, shame, depression and narcissism and considerable harmfulness to ourselves and others (Leary, 2007).

People can be good at some of these competencies, but not others. For example, some individuals are brilliant scientists, but are very poor at empathy. Indeed, talented scientists or business people can also be somewhat lacking in empathy or be on what is called the Asperger's spectrum, which has implications for how they understand social needs (Baron-Cohen, 2011, 2020). Some politicians may have these tendencies too. Others can have excellent empathy skills, but they will never be able to win a Nobel Prize for physics, be entrepreneurs or make good politicians. Some individuals can be very bright, but not have much insight into their own minds or an ability to be mindful; whereas mindful people are not necessarily the most empathic, intelligent or caring. Indeed, recent research has shown that mindfulness, empathy and compassion skills can be trained differently and influence different brain systems (Singer and Engert, 2019). Training our minds for global compassion, therefore, is going to be a multi-focused task (Dalai Lama, 1995; Ekman and Ekman, 2017).

Collectively these competencies give rise to what we can call *knowing intentionality* (Gilbert, 2018, 2020a). It is doubtful whether any other species can engage motives knowingly in this way. Lions clearly intend to hunt and kill their prey, but not with self-aware *knowing* awareness. They cannot suddenly decide *not* to do it, become vegetarians or to lose weight. *Knowing intentionality* has probably been one of the most important human competencies that have powered science and built the cultures we have. It is *knowing intentionality* and the use of these human cognitive competencies that turns basic caring motives into compassion. This is depicted in **Figure 2**.

The domain of *knowing intentionality*, however, is also tricky because many of the reasons we behave in the ways that we do are partly unconscious (Huang and Bargh, 2014; Bargh, 2017). Nonetheless, humans do have opportunities to gain insight into

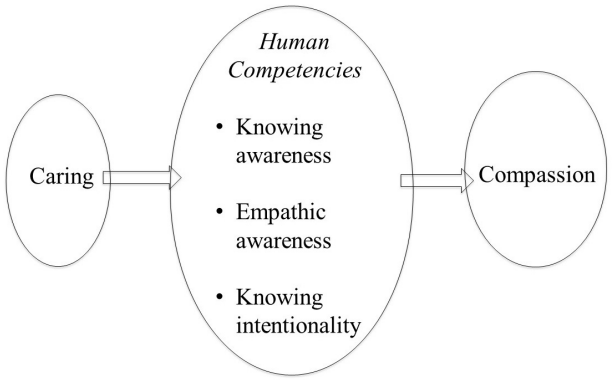


FIGURE 2 | From caring to compassion: from Gilbert (2018). Living like crazy with permission Annwyn house.

the nature of "mind" (Baron-Cohen, 2011; Siegel, 2016) and then choose to develop compassion motives and a compassionate identity; to live to be helpful, not harmful (Dalai Lama, 1995; Gilbert, 2009; Ricard, 2015).

A further distinction should be made. Caring can be used for many non-sentient objects and beings, whereas compassion cannot. For example, we can talk about caring for our gardens, homes, cars or prized possessions, or our planet, but we do not use the term compassion for that type of caring because these are not sentient and do not experience suffering. Hence, the root of compassion is in the caring motives, textured by our unique minds (DeFelipe, 2011) and *awareness of suffering* (Gilbert, 2009). So, this brings us back to the fact that compassion is the *intentional* desire to be "sensitive to suffering in self and others with a commitment to try to alleviate and prevent it" (Gilbert, 2017a). Many animals may care for their young or others, and ants may carry their injured colleagues back to the nest (Kessler, 2020), but only humans as far as we know have this *knowing intentional awareness* and can develop deep wisdom of how to be helpful – can develop science and medicine or seek the politics of caring. This is profoundly important because it means that compassion is an intentional desire to bring caring into our relationships, into our world, into our politics, into our businesses, and we can use science and research of how best to do those. Using our new intelligence can change our social discourses and thereby over time change our phenotypes.

The Flows of Compassion

Importantly too compassion has a three-way orientation. In addition to giving care to others, being compassionate with oneself and *being the recipient of compassionate care,* resource sharing and support has many profound impacts on us psychologically, physiologically and our social behavior. The quality of caring we receive, from the day we are born to the day that we die, has a huge impact on many indicators of physical and mental health, longevity, and prosocial behavior (for major reviews see Thayer et al., 2012; Seppälä et al., 2017). Being the recipient of, and open to, emotional and compassionate support from others has long been linked to a buffer against mental health problems (Hermanto et al., 2016). Remembering or bringing to mind individuals who are caring and supportive helps people cope with stress (for review see Norman et al., 2015; Gilbert, 2020a). Although there are different definitions of self-compassion there is now substantial evidence that self-compassion and self-reassurance buffer against depression and facilitate coping with setbacks and life difficulties and promote wellbeing. In contrast, harsh self-criticism, fears of being self-compassionate and fear of accepting compassion are associated with increased mental and physical health problems (Kirby et al., 2019).

Last but not least, as emphasized repeatedly in Buddhist teachings (Ricard, 2015), and confirmed by considerable research, the more we orientate ourselves to be helpful to others rather than self-focused, the happier and healthier we are (see Crocker et al., 2017; Seppälä et al., 2017). In addition, general fears and resistances to being compassionate to others is associated with hyper competitiveness, narcissism and ruthless self-ambition (Basran et al., 2019); traits not untypical of power seekers (Peterson and Palmer, 2019). In a major review on what they call motivated "otherness" or "selfishness" Crocker et al. (2017) highlight how being compassionate to others, and feeling one has a contribution to make, has major emotional and physical benefits in comparison to self-focused competitiveness. Hence, the evidence for all three flows of compassion is that they are profoundly important for our physical, mental and social well-being.

Despite this, many individuals perceive compassion as a weakness or softness and rather than promote compassionate values for society, promote competitive self-interest (Sachs, 2012). We are at a point now where it is not a matter of political opinion or preference but creating our societies for the common good should be based upon the science of what creates it. One of the problems with understanding compassion and how we miss its fundamental attributes of complex variations according to context, and the central role of *courage and wisdom* is that it is often confused with other prosocial behaviors. For example, compassion is not the same as kindness because compassion involves degrees of courage and wisdom in ways that kindness does not; the emotions associated with kindness tend to be positive whereas those associated with compassion are more difficult; and compassion often involves sacrifice (Ricard, 2015). For example, this is not a religious point but we talk about the compassion of Christ not the kindness of Christ (Gilbert et al., 2019). Nor is compassion the same as the western concept of love with which it is sometimes confused. The strongest forms of compassion are for people we do not love or even like. And compassion is sometimes confused with submissiveness that we simply have to accept or give in to harmful behavior. Nothing could be further from the truth. Indeed, in a well-functioning society one would have a well-functioning "compassionate" police force and an agreed set of laws. Without agreement on what we mean by compassion it is going to be tricky to have it widely adopted particularly for those individuals who think it is somehow a costly nicety, soft or weak when in reality it is the most morally wise and courageous of all of our motives (Lampert, 2005).

Summary

With these insights and concepts on compassion we can see how compassion *is profoundly important to so many aspects of our lives;* texturing epigenetic profiles, multiple physiological systems and psychological values plus how we relate to each other. Consider the passions of people engaged in charity work all over the world, building wells for freshwater, making medicines available to the poor, or in international peace efforts trying to end the conflict and release perhaps millions of people from the intense suffering of the conflict. Consider a recent movement of "compassion in politics" which seeks to stop politicians passing laws that are known to cause suffering to the least able to cope (see below). Note too that some people can be very impassioned for some domains of caring and compassion but not all; motives can be specific. And some people can be very good in some aspects of compassion but not others. Our courageous firefighter might not make the most empathic partner or parent and an empathic counselor may not make the best firefighter or international negotiator. Many different talents therefore can be utilized to work in different contexts and with different types of suffering.

A MULTI-MIND OF CONFLICT AND UNCERTAINTIES

Motives, Emotions, and Algorithms

One theme of this paper is that to understand and promote compassion requires us to step back in time, look into how the brain evolved and gain insight into its multiple motives and algorithms that can conflict and be difficult to regulate in the modern world. We can start by noting that organisms evolve because they confront and adapt to the two challenges of life of *survival and reproduction* (Buss, 2019; Workman et al., 2020). These challenges give rise to all living things that face *three basic life tasks*. They have to be able to identify and *defend themselves against threats* in their domain of existence. They have to be able to seek out the *resources that will sustain them* and help them to reproduce. Third, they have to be able to identify when they are *not* under threat and have sufficient resources to allow them to *rest and digest*. Ways of *building a compassionate society will have to address how we go about all three basic life tasks and motives* because they are the ones that are involved in both control and hold and care and share. To state it briefly and somewhat simply, control and hold have both elevated threat linked to losing control over resources and elevated drive to obtain them putting their own security in their own hands. Care and share are seeking a more hunter gatherer lifestyle where the joys of life and security are in the hands of others. Especially important will be helping people experience emotional states of contentment and connectedness rather than feeing a need for 'more and more' (Naish, 2008). We can look at each of these in turn.

Threat, protection/defense motives are run by threat based algorithms of, *if* a threat is detected *then* (for example) stimulate the sympathetic nervous system, increase heart rate, focus attention and then run like hell (or perhaps engage in a fight). We now know quite a lot about the physiology of the threat algorithms and how they can be primed, textured and regulated through early life experience and social context. In addition, there are specific emotions that support this motive. These are: anger (fight), fear/anxiety (flight), and disgust (expel). When threats are overwhelming and cannot be controlled animals and humans can go into shutdown depressed states (Gilbert, 1992/2016, 2020c). Our thoughts, beliefs and values can also regulate our sensitivity to threats and the actions we take. We can greatly amplify, ruminate and stimulate our threat systems by what we think but we can also attenuate and override them. We might feel very anxious taking a driving test, but we overrule that anxiety and take it because we have a high motive/desire to drive. Indeed, the regulation of emotion, particularly potentially harmful emotions, is crucial to maturation and wellbeing. So we might feel desires to be selfish or even harmful but we can override them with sufficient insight and compassionate intention (Loewenstein and Small, 2007; Ricard, 2015).

One of our most important insights is that the threats we are faced with today are very different from the hunter-gatherer threats. Those threats, of having sufficient to eat for example, were solved with caring and sharing. Today however, we are unable to hunt and gather and are totally dependent on work, the making of objects and things that may have very little personal relevance only to provide money to gain access to resources. And we have to work to please our bosses or to meet the requirements of the job (deadlines and work flows) which puts us under constant vigilance of judgment by others who may deem us worthy of promotion or demotion. Agriculture increased the amount of time spent in work (Harari, 2014) and so today we have far less time for family and socializing than working (Bunting, 2004). So today our lives are considerably more chronically stressful and threat focused but in very different ways to a hunter gatherer lifestyle. For many centuries the threat and stress of trying to survive in these artificial environments has been intense and we now know that these types of stresses had major impacts on physiological systems. In addition they make us less charitable, less compassionate and more self-focused with group favoritism and aggressive defenses (Steinbeis et al., 2015).

Indeed, there is increasing evidence that those on the right wing of the political spectrum see the world through the lens of the threat system. Right wing authoritarianism (RWA) is associated with highly threat sensitive perception of the world even a slightly paranoid view (Wodak, 2015). We have not the space to review this literature here but can refer to one study that captures important themes of this threat. Shaffer and Duckitt (2013) found that an exploratory factors analysis identified five distinct fear–threat factors linked to RWA. These were:

> Harm to Self, Child, or Country; Personal and Relationship Failures; Environmental and Economic Fears; Political and Personal Uncertainties; and Threats to Ingroup. All the fear–threat factors were correlated with RWA, with the strongest correlations being for Threats to Ingroup, and with stronger effects for social than for personal fears (p. 6).

Although the data on early attachment experiences and these fear based orientations to the world is a little thin, it is probable that some of them were set up for this fear-focused phenotypic

orientation because of problematic backgrounds. One of the most salient dimensions underpinning shifts into control and hold (and away from share and care, in both the poor and the wealthy but for different reasons) is the perception of threat. In the wealthy it is the threat of losing what they have, and in the poor is the threat of not having enough. Both types of threat sensitivity can make us manipulable to threat messages and tribal aggression (Hobfoll, 2018). Many authors have also highlighted how both politicians and the media seek to stimulate these threats as the sea for them to sail into power and create *complex interactions* between the minds of leaders and the minds of those supporting them (Mols and Jetten, 2020).

Competitive resource seeking motives focus on obtaining and gaining resources conducive to flourishing, survival and reproduction. The orientation is approach rather than avoidance and the associated emotions tend to be positive with the desire to repeat the actions. Fredrickson (2013) suggests the evolved function of positive emotions is to *broaden and build* one's resource base. Given that, then positive drive emotions will work quite differently in hunter-gatherer societies compared to western, high resource, competitive societies. Most animals and early humans do not store or accumulate resources. Hence drive emotions were very much to secure resources for immediate use and therefore "turn off" when what is needed is obtained. The level of need was the regulator of drive and once basic needs had been met one could then focus on other *rest and digest activities,* play, creativity and socializing (Lavi and Friesem, 2019). Today we are still very motivated to socialize and to share positive (smiles and jokes) emotion, be at parties, celebrations, and to come together for joint tasks (e.g., as observers of sport, music, cinema, and so forth; hence the tragedies of lockdown). However, we are also very preoccupied with our access to wealth and resources.

The general consensus is that unlike us today, stressed out by work and the need to maintain ourselves in work, hunter-gatherers worked less, spent more time socializing, were relatively peaceful and affiliative in their relationships and more likely to experience contentment (Fry and Söderberg, 2014; Harari, 2014; Ryan, 2019; Hunt, 2020). These living styles have their own physiological profiles and supports health (Cordaro et al., 2016). In these states, the body is able to repair itself, and long term is associated with health (Thayer et al., 2009) and prosocial "care and share" behavior (Keltner et al., 2014). Agriculture however was to change all this because it introduced storage and that meant that there was no limit to drive behaviors because there is no limit to how much one could store and gain control over; "working to acquire" took on a whole new time consuming process (Bunting, 2004). And it was not long before more dominant individuals enticed more subordinate individuals to work for them. We were on an exponential curve to resource accumulation and the beginnings of the hierarchies of wealth and power. Overtime, the wealthy turned other human beings into slaves and continually drove down 'wages' to ensure dependency, but also excessive hours of toil to survive. Nothing like this existed before agriculture. Last but not least some of this excessive pursuit of resources is threat based, the fear of losing or falling behind (Basran et al., 2019; Jetten et al., 2020).

Social Mentalities, Caring and the Conflicts of the Mind

It is clear that caring behavior is only one basic social motive amongst many others. Social motives have been called social mentalities because they are different to non-social motives, and can only be satisfied within an interaction; that is you need a partner to co-create them with you (Gilbert, 1989/2016, 2017a). This means they have to co-evolve. Now, of course, much in evolution is actually a process of co-evolution, such as predator-prey, disease-host. However, for social behavior, co-evolution occurs because there are benefits to that interaction *for both parties*. Sexual behavior can only evolve if individuals can both send signals and be responders to signals sent to them. There is not much point of male Robins evolving a red breast if the females are more interested in shades of purple. Sending a signal and receiving a signal in a specific mentality, in this case sexuality, stimulates the reciprocal physiological systems in participants whether the individual was first a receiver or sender. This is not to deny that nature also has a lot of coercive sex. Dominant subordinate behaviors can only evolve if dominant individuals threaten in a particular kind of way and subordinates have evolved the inner algorithms for submissive behavior, which when expressed turns off the attack in the dominant. Indeed, it is generally accepted now that it is the subordinates that regulate the hierarchies through their preparedness to submit under threat (Gilbert, 2000). Importantly, animals do not learn *how to submit,* that is part of their algorithm, but as they grow, they test the waters and increasingly, as they get stronger and bigger, fight back and challenge for resources.

An evolved social mentality that can block caring, and pattern the mind in a completely different way in terms of what it pays attention to, what it aspires to, what activates positive emotions and turns off empathy and concern for others, *is self-focused competitiveness*. This is particularly the case because part of the competitive algorithm is to suppress and inhibit the competitive behavior and claims (resource seeking, and needs) of others. Competitive behaviors vary according to whether contestants are in-group or out-group. When many primate groups meet, they can engage in war like behavior and injure each other (Bonobos are different, Tan et al., 2017). In intergroup violence submissive behavior is not that effective. We see this in humans as well. We can be vicious to out-group members regardless of whether they are showing signs of submission or not (Staub, 2003; Zimbardo, 2008). In centuries past, the vanquished were executed sometimes brutally or sold into slavery; they become an enemy to be removed or a resource to be used. As noted below, competitive behavior has that disposition to turn any other lifeforms including humans into resources to be used and exploited.

Along with care and share another counter to unregulated competitiveness is *cooperative behavior*, something humans excel at Wilson (2019), but there are different dimensions to it (Gilbert, 1989/2016). For example, the way we cooperate in our intimate relationships utilizes different physiological systems than when cooperating with strangers to produce a particular outcome or to regulate a conflict. In humans, cooperation also emerges

out of an empathic understanding of intentionalities linked to intersubjectivity and trust. I climb the tree to bend the branch so you can get the apples but trust you not to "cheat" and run off with all of them! The issue of *cheating* where individuals take far more than their fair share of resources in the pursuit of *control and hold* would have been a major problem in hunter-gatherers and was very definitely shunned. However, it is quite the opposite in capitalist societies where not only is there no criteria for deciding "fairness" because that has been abandoned as a human endeavor in capitalist societies, but wealth differentials are actually status symbols and aspired to Wilkinson and Pickett (2010); Wilson (2019). Indeed, the legitimization and justification for taking far more than one's fair share is a hallmark of capitalist societies (Sachs, 2012).

What is common to all these processes is that when we engage in social behavior, we are engaging in reciprocal, dynamic dances that are physiologically powerful and regulating, and stimulating different evolved algorithms in the mind. These "dances of our physiologies," choreographed through our verbal and non-verbal expressions and communications, are regulated by different processing systems with different feature detectors. As we will note later, these dances are also socially contextualized and choreographed.

Figure 3 gives a brief overview of one way to conceptualize social mentalities. Each social mentality has specialist feature detectors to attend to different arrays of stimuli, picking up cues that are important and relevant to that particular motive and social mentality. For example, for sexual behavior we need specific *sexual detectors,* but for food, we need specific *food detectors.* We are not necessarily conscious of how our feature detectors are attuned to the environment (Bargh, 2017). Hence, each motivational system has its own algorithm with feature detectors that links into both specific and general physiological patterns. These are not Lego-like, but pertain to different combinations of different neurotransmitters, hormones, brain circuits and so on; different *patterns* of activation. For example, imagine your child is distressed and you are engaging caring behavior. Consider how your mind is patterning itself: what you are paying attention to, what you are rehearsing and imagining (what could the distress be?), what your impulses for actions are, what is happening in your body, to your heart rate, and are you remembering ways to be helpful? You would also be monitoring the degree to which what you are doing *is* addressing your child's distress/need. If, on the other hand, you are the child, so you are the one distressed or needing and seeking care, then those processes will be different. For the moment by moment dance of your interactions to have an impact, there will be an attunement of interactions such that the caring behavior given is appropriate and the child physiologically responds in a way that is helpful to the child. Some of these co-regulating interactions of physiological systems are microseconds. Because of the way the human face has evolved, even an eye flash or slight smile can have quite a profound effect on an individual's perception of friendliness or not. In fact, there is now a growing and fascinating literature on what is called interpersonal synchrony and this synchrony emerges out of the dances of communications and are physiologically synchronous. Child parent synchrony predicts altruistic behavior later in life (Cirelli et al., 2014).

Essentially then, social mentalities have co-evolved such that individuals can be receptive to the signals indicating a person's motivation intent and then respond appropriately. This is the basis of role-sensitive empathy (Liotti and Gilbert, 2011). Some individuals can be very sensitive to say critical or hostile cues, but do not pick up particularly on emotional distress in others, whereas some people are the other way around. While social mentalities evolved for direct interactions, humans have also adapted them for use in wider groups including with strangers. The issue then becomes the degree to which a stranger is perceived as irrelevant, a threat, a potential resource, co-operator or requiring assistance.

These interactions are contextualized in social and cultural patterns that impact in complex ways on these interpersonal interactions and have a major influence on the manifestation of different social mentalities. At its simplest, in caring and sharing environments, individuals are orientated toward friendly, caring and sharing interactions, whereas in competitive environments the way we pay attention in our social milieu, how we reason, the way we wish to present ourselves to others, and the fear of how other people may see us, will be quite different (Gilbert, 2018). These concepts enable us to see how different social mentalities, that form the basis of interpersonal dances, and thereby physiological regulation, are culturally contextualized. Indeed,

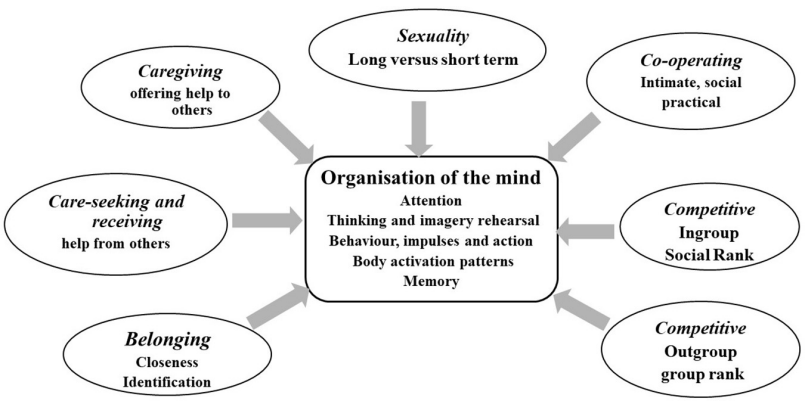


FIGURE 3 | The social mentality organization of minds.

one of the major choreographers of the kinds of interpersonal dances created by our social environment in general is linked to the *resource competition strategies* that promote or demote either control and hold strategies or caring and sharing ones.

Conflicts

A central driving process of evolution is conflict (Buss, 2019; Wilson, 2019; Workman et al., 2020). Right now, many species are in conflict with us because of how we use them for food, experiment on them, even deliberately altering their genes, and driving others to extinction. Whether it be it in parent–child, romantic partners, friendship hierarchies, and groups, it is the handling of *conflicts of interest and conflicts of desires* that is essential for how that relationship works. Here the quality of the relationship is important. For example, the way we care for our own children is quite different from how we care for the children of strangers. How we compete with our friends will be quite different to how we compete with those seen as competitors or enemies. Crucially then, the major sources of conflict throughout evolution are over *resources and resource availability and access*. Here, social contexts play a huge role. How conflicts of self-interest are dealt with in hunter-gatherer societies is very different from how they are dealt with in highly competitive, hierarchical, resource-rich societies such as ours (Ryan, 2019; Wilson, 2019). The ancient care and share versus control and hold strategies not only create *different contexts* for conflict but also indicate the means of resolving them. Put crudely, in caring and sharing environments it is to reach an equitable arrangement, in a hierarchical environment it is "the most powerful wins" and suppresses the needs of the subordinates.

Importantly too, in order to deal with conflict, different strategies have to turn on some motives, algorithms and emotions and turn off others. For example, if we want to go to war, then we have to turn off caring motivation and concern with the suffering toward these other human beings seen as a threat or the enemy we want to kill and maim. We can actually be pleasured and excited by their pain; have a rush of dopamine when we "take them out." Clearly, in contrast to everyday forms of relating or with friends, if we are in a caring social mentality and saw that we had caused pain to another, that would be distressing. Generally speaking, much is done to stop us becoming aware of the intense misery we cause others in our wars, callous competitive behaviors, in sweatshops in far off countries and factory farms. Highly competitive motives tone down caring social mentalities (Piff et al., 2018; Basran et al., 2019). In addition, they inhibit empathy and being distress sensitive and steer us toward callousness, becoming insensitive to the suffering of others or even seeing them more as a resource to be exploited than to be nurtured or empathically connected to.

Even before Freud, we knew that the mind was riddled with conflict, with some motives and emotions able to suppress others. This is because different motives have different priorities and different physiological systems of activation (Ornstein, 1986; Huang and Bargh, 2014). Importantly then, motives and social mentalities can conflict and inhibit each other. This is important when we think about the social contexts that suppresses compassionate motivation and create brain states in interacting individuals that tone compassion down.

Summary

The essence of the story so far then is that we are biologically designed with a whole suite of potential motives and social mentalities which organize our minds and bodies. We think these are all under our control, but in reality, they have been designed and evolved to be sensitive to the social contexts and niches we grow up in and have to function in Wilson (2019). While we are hard-wired for caring and sharing (Keltner, 2009; Ricard, 2015; Narvaez, 2017, 2020), we are also hard-wired with potentials to be a much nastier species. We now have insight that a major choreographer of these potentials that affect us all, right down to our epigenetic profiles and physiological organization, is resource allocation strategies and the management of the conflicts of interest. Just as we know we have phenotypic plasticity in the sense that any evolved motive can manifest in different ways, we know that cultures can have phenotypic variation too. While some cultures can support caring and sharing, others clearly do not (Black, 2016).

HUNTER-GATHERERS AND THE EMERGENCE OF THE CARING AND SHARING LIFESTYLES

The caring social mentality (to provide care and support and be responsive to the needs of others) has been evolving over hundreds of millions of years, traceable in many ancient species and with the lineage of physiological processes increasingly well understood. The next piece in the puzzle, of how we became potentially one of the most compassionate species that have ever existed, and became highly regulated through our social relationships and need for connectedness, is the emergence of the hunter-gatherer group (Harari, 2014; Spikins, 2015; Lavi and Friesem, 2019). How the caring social mentality became recruited as a social focus and a basic cultural form for interactions, resulting in elevating sharing and caring relating, and offsetting earlier dominant male and aggressive hierarchies as ways of distributing and gaining control over resources, is one of our salient questions (Boehm, 1999; Lavi and Friesem, 2019). Not only that, but compassion was very much part of this with the archeological record showing that early humans were very concerned with the suffering of others and cared for the sick and injured (Spikins, 2015, 2017). It seems there were many factors that came together that shifted us into a caring sharing species and for the most part suppressing aggressive competitiveness. Below are some of them.

Childcare

The way in which the caring social mentalities became a prominent form of social relating in humans occurred in various and curious ways. One of our human adaptions was upright walking, but this was to narrow the birth canal right at the time when the baby's head was evolving to get bigger. Two things happened. One was that birth became dangerous and painful, and indeed hunter-gatherers had/have high mortality. Second, human infants require considerably longer parenting and socially interactive parenting that facilitates huge transformations during

development. The way we adapted to these realities played a role in the shift toward our caring and sharing style of living. Narvaez (2017, 2020) has written extensively on how the social contexts of human parenting and provisions of parents to their children are very different from today (see also Hrdy, 2009; Music, 2014; Ryan, 2019). Although hunter-gatherers parenting styles differed, there is general agreement what the common characteristics were.

Care of the Mother and Alloparenting

Unlike any other animal, a woman trying to give birth by herself could easily run into problems. In parts of the world where medical services are scant, infant mortality can be tragically high, and indeed was high in hunter-gatherers. Birthing and subsequent caring, therefore, requires extensive support, commonly given by female relatives (Hrdy, 2009). Mothers would exist in these supportive networks of kin relatives before and after pregnancy.

Networks of women would also act as protectors and infants were passed around between grandparents, aunts and sisters, thus, the infants' brain was responding to multiple social interactions; seeing many smiling faces and hearing kind voices. These would all be stimulating care focused physiologies (Porges, 2017). Throughout the child's life many individuals would be a source of comfort and guidance. This is called alloparenting which is defined by parental functions (care, protection, provision of food, comfort play) as provided by those other than parents (Hrdy, 2009). Indeed, it is possible for children to seek out others in preference to their own parents if the parent relationship is not such a good one. Alloparenting is not unique to humans, but it was during our hunter gatherer stage that it became a highly adapted, even essential trait (Narvaez, 2017). Not only did it provide the infant/child with multiple interactions that facilitates complex social learning, a sense of social safeness and social engagement, but it provided resources to the parents particularly the mother, giving her time to pursue social activities and rest. A less stressed mother will have better interactions with her offspring than a stressed 'coping alone' mother. In essence the basis of our social brain would have been highly supported through the ecology's of hunter gatherer alloarenting.

Contrast Alloparenting With Today

Many women today do not have access to these important kin/community supportive networks that would have been available 24/7. They are more likely to have midwives that visit them occasionally or deliver their children in impersonal hospitals by strangers. After birth if there is no close family nearby, women will lack extensive female support and may spend many hours alone waiting for partners to return from work; and not all partners are that supportive or adequate replacement for female kin networks. This is grossly abnormal and robs both infant and mother of important, multiple sources of support (providing both with a secure base and safe haven).

Mother and infant should be seen as a co-regulating couple who both require care in contextualized supported networks. Depression among mothers is much lower in societies that operate strong kin supportive networks (Hagen, 1999). To put it in another way, isolation and lack of caring support increases risk of depression. A depressed mother, coupled with a lack of alternative sources of care and stimulation, can have serious consequences for her maturing infant. To build a society focused on the common good *would prioritize childcare as fundamental to our societies* to cultivate prosocial minds. It is truly a tragedy that so many children grow up, trapped in homes with frightened, frightening and disengaged parents that will profoundly affect the maturation of their brains. COVID lock downs have made this *much worse*, the consequences of which will not be known for some years and probably never fully will.

Extensive Breastfeeding and Cohabiting

In hunter-gatherer societies, infant mortality was high, but those who survived childbirth would then experience extensive breastfeeding for up to 5 years. They would be carried – having skin-to-skin contact with the mother – and sleep with or close to the parents. The key issue is the caring physical contact that impacts physiologies (Mayseless, 2016).

The Importance of Touch

For many primates, touch, particularly in the form of grooming, has soothing effects (Dunbar, 2014). Indeed, touching massage impacts on oxytocin and reduces stress hormones (Morhenn et al., 2012). For the most part, close physical contact with mothers is common, but for humans, so too was contact with other members of the group (Hrdy, 2009). This meant a child had multiple sources of joy, physical comfort, and play. For infants, children, and adults, physical contact from trusted and loving others is one of the most important sources of soothing (Carter et al., 2017). Sadly, in modern society, teachers are warned off physical contact for comforting children for fear of prosecution – to the extent that they cannot even rub in protective sun cream or hug them when they are distressed. The fear of pedophilia is shocking and tragic. Western society has become almost touch averse. When my wife had our daughter Hannah 38 years ago (unfortunately by cesarean because of a breech) she would lie on the bed with Hannah on her chest. On a number of occasions, the nurse warned us not to do that because Hannah would "get used to it" and "become demanding."

Paternal Behaviors

In birds, both parents often co-operate and take on the task of feeding and protecting. Not so with primates. For most primates, males play very little role in the care of offspring and do not know who theirs are. However, humans are a notable exception. Changes in the facial morphology of evolving humans suggest a trend toward feminization, and a changing role of testosterone, associated with increased caring and social affiliation behavior within groups (Cieri et al., 2014). Muller et al. (2009) compared two African groups showing that high and low parental investment groups differed in testosterone levels in predicted directions. Laboratory studies of human fathers have also shown complex relationships between oxytocin, testosterone and paternal caring (Weisman et al., 2014). Crucially the way testosterone affects male behavior and status seeking is linked to context. In some contexts, testosterone is linked to status by aggression, but in others, by altruistic caring (Sapolsky, 2017). Varela et al. (2018) found that skin to skin contact with their newborn babies significantly reduced stress hormones in fathers.

While avian species share parental caring and therefore are likely to be mutually physiologically influenced by contact with their infants, this is not the case for primates and is probably a specific human adaptation. Indeed primate mothers will not allow any other to hold their infants and in this regard humans are unique (Hrdy, 2009).

One obvious implication is that human males evolved to interact with infants and children differently to other primates. Therefore men should be provided greater opportunity to care and interact with their children *and* other children *and* interact with supportive female networks, as would have been typical for many hunter-gather groups. Pair bonding in hunter-gather society is uncertain and males would often not know who their children were (Diogo, 2019; Ryan, 2019), but many showed high interest in and care for children, although the ecology influences this (Gilmore, 1990). Today, we are still exploring the important role fathers have on child maturation. The same goes for siblings, aunts, and uncles. The idea that a male should be absent for most of a child's upbringing, returning home from an office tired and grumpy to an isolated mother and child, is a gross abnormality (Narvaez, 2020). For some fathers, COVID lockdown has given them new opportunities to interact with children and discover new ways of relating.

Lack of Harsh Punishment

Individuals are socialized according to the demands of the ecology. In dangerous ecologies, where men have to be relatively fearless, the social organization tends to be harsh, including to children (Gilmore, 1990). However, when in a benign environment, it is a different story. Many anthropologists believe that hunter-gatherers were averse to physically punishing or threatening children (Music, 2014; Narvaez, 2017, 2020; Ryan, 2019). Yet in post hunter-gatherer societies, and not very long ago, slave, wife and child-beating were allowed and legitimized and even promoted as a method for control (Gilbert, 2018). Even today, corporal punishment is still allowed in some countries. Caning was a regular practice in my boarding school of the 1960s.

Cooperation and Sharing and Caring

Cooperation makes hunting more efficient and this is true for various predators such as wolves, hyenas, monkeys and dolphins as well as humans. Humans extended cooperation into many domains of activity including cooking, building and making, and sharing of knowledge, which were facilitated through language. The most important driving force for language would be the sharing of information and knowledge. Indeed, *teaching,* which language facilitates extraordinary well, is phenomenally important to humans (Gilbert, 1989/2016). As noted below, status was not given to narcissistic self-accumulations, but altruistic sharing. What stands out too is the *enjoyment of shared activities* such as cooking and eating, which remains one of our greatest joys. In fact, hunter-gatherers worked far less than we do now and had happier lives (Ryan, 2019; Hunt, 2020).

In general, early human egalitarian behavior seems to have evolved under a number of conditions (Lavi and Friesem, 2019). First, rather small groups (150 or less that advantages reciprocity and other social processes; Dunbar, 2014). Second, a relative absence of storing, holding and controlling resources in favor of mobility and obtaining and sharing resource for immediate use (Lavi and Friesem, 2019; Ryan, 2019). Third, a sense of social belonging and social safeness was linked to displays of altruism, caring and sharing. Status was gained by being useful to others. Narcissistic, aggressive and exploitive forms of competitiveness were shunned. What became important was *competing for attractiveness* – to have a reputation as an altruist. This would make you attractive to others as a friend, ally, reciprocating partner and desired sexual mate. It is the domain of audience choice (Barkow, 1989; Gilbert, 1997, 2007). Fourth, as noted above, evolved changes to the birth canal from upright walking meant human birthing necessitated help and care through pregnancy and beyond (Hrdy, 2009). There was a significant shift in child-caring practises. Child care was highly interactive, non hostile, gave children a sense of interpersonal security and taught respectfulness, emotion regulation skills and the 'joys' of sharing.

It was the extensive kin networks that provided for children the opportunities to grow up with a secure base and safe haven, rather than being dependent on single parents that was crucial and different to other primates (Hrdy, 2009). Tragically today, many children are growing up bereft of these extended caring social contexts and indeed can be subjected to their polar opposites: neglect, hostility, criticism, and abuse (Lippard and Nemeroff, 2020). It is well known that many people who go on to have mental health problems and/or become power-seekers, anti-social or criminal often come from troubled and non-supportive or threatening backgrounds. Given that we have known about this for so long why, we might ask, have we allowed this *pandemic of poor caring* that generates millions of damaged minds to continue to operate? One reason (as we will see) is because control and hold strategies focus on individuals as "units unto themselves" who have to look after themselves and cannot turn to the community for support. It is a tragedy and a disaster because frankly, the world has been and is being run by quite damaged minds (Green, 2005; Lipman-Blumen, 2005; Owen, 2008, 2020; Black, 2016).

Summing Up

Evidence suggests that humans adapted their physiological and cognitive systems for extended and extensive parent-infant caring (Hrdy, 2009) and these became a template for a range of social relationships, particularly in small groups. While caring and sharing in hunter-gatherer societies had a number of sources including conflict resolution and prevention, compassion as "the desire to intentionally help others in need and care for them" was certainly one of them (Spikins, 2015, 2017; Kessler, 2020). The basis of this is partly because the same hormones and patterns in the autonomic system underpin all forms of caring. Indeed, many argue that we are hard-wired for caring and sharing even, in certain contexts, with strangers (Keltner et al., 2014); that our basic nature is caring and sharing (Ricard, 2015). This was partly honed in hunter-gatherer groups where it works well and is a source of joy, social safeness and meaning. We can plot the genetics, epigenetics, physiologies, and brain patterns of caring and how caring became the rich textures for compassion. Indeed, if you think of how compassion can operate to steer us to risk our lives to save others, it is probably one of the most courageous and

potentially wise of motives. Caring and sharing has a phenotypic profile that is choreographed in caring environments. In non-caring environments however the caring and sharing phenotypes are very different Here phenotypes orientate the brain toward the opposite of sharing caring and compassion that is callousness and the dark side. One note of caution should be added here. This is that we have been talking about the *biological* evolution of caring, but when the Buddhists talk about 'compassion as our basic nature' they are much more into the nature of consciousness itself and transpersonal realities rather than biological ones.

PARADISE LOST: CONTEST COMPETITION AND THE PURSUIT OF POWER

The Development of the Terrorist State and Hierarchical Societies

Many researchers recognize that we have created social and ecological contexts that are very different to those in which we evolved, and in many ways we are quite mismatched to our new environments with unfortunate costs (Li et al., 2017). The more laidback and socially integrative lifestyle of the hunter gatherers can be very tragically contrasted with the 10,000 years or so which have not gone so well (Glover, 2012; Harari, 2014; Black, 2016). Armed with our amazing cognitive competencies and intelligences, that we honed in hunter-gatherer, caring and sharing environments, we turned these against ourselves to become the nastiest, most vicious, cruel and violent species to have ever existed on this planet. One of the great challenges for compassion *is not to be naive about humanity* and to recognize that we have a truly terrifying dark side. Hence, we need to keep in mind the challenges we face in turning our societies around and recognizing just where they have come from.

The basic story is relatively straight forward and one that many researchers agree on; it was the advent of agriculture that drove us a little crazy (Harari, 2014; Black, 2016; Gilbert, 2018). Our intelligence allowed us to recognize that rather than eat all our seeds, we could plant and cultivate them and could herd and cage animals. Resource availability spiraled but also, we became locked into areas of pasture, reliant on grown crops not gathered ones, letting go of the mobility and immediate use lifestyle. One of the most salient issues was that we went from an immediate use to a storage way of living and that changed the drive system as well as raised issues of who controlled what was stored. And if I can store things for myself then maybe I do not need to rely on reciprocation quite so much. So, agriculture changed our hunter-gathering lifestyles of relative immediate consumption, reciprocity and status via altruism into *stay put, create and store surplus and enable power hierarchies to control surplus. Humans themselves become trapped in completely new social ecologies* (Mann, 1986), which in many ways have driven us a little crazy and we do not really know how to get out of the trap our minds are now caught in Gilbert (2018). The work-time demands of agriculture and the social consequences of it almost certainly changed our bodies, brains and phenotypes. One of the major consequences was to promote the emergence of intense callousness and cruelty, as outlined below.

Terrorism as Means of Control

As group size and resource value expanded, there was a re-emergence of aggressive, dominant (mostly) male hierarchies, the suppression of subordinates, and at times the vicious suppression of subordinate alliances against the hierarchy. The elites increasingly devised terror to suppress opposition internally and to terrorize enemies. Many leaders have left the defeated vanquished, tortured, executed, raped, and sold into slavery. The Geneva Convention is recent and sadly as conflicts in Syria and other places have shown rarely followed! Today we think that terrorism is relatively new, but throughout a lot of our history we have been ruled by terrorists and terrorism. Consider the Roman Empire. If you were born a slave, your life was horrendous and certain crimes were punishable by crucifixion, forced to fight in the "games" or torture. Around 72–71 BC Spartacus, who had been sold into slavery, instigated a slave revolt. Although the historical record is understandably hazy, it is generally believed that a particularly vicious and psychopathic Roman commander one Marcus Licinius Crassus defeated Spartacus and crucified all 6000 combatants lining the road with their crosses. He would often utilize a typical terror tactic within the army, such that soldiers seen as cowards or who had committed some other crimes would be beaten to death by their colleagues. Julius Caesar, another rather unpleasant character, instigated basic genocide throughout Europe. Indeed, the history of the Roman Empire is riddled with leaders and political schemers who were bad and mad. However, many European countries have been the same. Many Kings and Queens of England have been tyrants (Green, 2005). It was only a few hundred years ago that, you could be picked up off the streets and chain ganged into the Navy and if you committed a crime, you could be forced to make your own cat-o-nine tails that would be used to flay you, often to death, or Keelhauled (Rogers, 2007). Just two months earlier, you were with your family in Plymouth! There was also a time when you could be hung for simply stealing food. Over the centuries, *vast numbers* of people were hung for relatively minor crimes (Gilbert, 2018). The history of slavery is a vicious and callous one; perpetrated by minds that saw another human being as nothing other than a resource. Tragically, there are still many humans that view other humans like this. Today, we have discourses on colonialism and patriarchy, but these pale in comparison to human institutionalized terrorism, which up until recently has been endemic and in some states still exists; in governments and criminal gangs alike. There are still far too many governments with leaders who find it acceptable to lock up, torture and make political opponents disappear and the numbers are sometimes terrifying.

Many leaders have had quite serious mental health problems and personality disorders that have had major consequences for their leadership and what they enticed countries to do (Green, 2005). This is true for modern leaders as well (Freeman, 1991; Owen, 2008). Today too, there are powerful leaders showing signs of serious personality and mental health problems (Owen, 2020). Individuals who come from brutal backgrounds engage in control and hold strategies in very brutal ways and have changed the course of history and even the genetic complexion of humanity. Genghis Khan (1155–1227), who became the leader of the Mongol Empire was one such. He had a cruel and particularly brutal upbringing that filled him with rage and vengeance and

would have left his phenotype for caring and sharing severely undeveloped. He became one of the most ruthless, vicious, sadistic leaders in history; responsible for the most horrendous deaths and rapes of many millions. His primary motivation was vengeance and absolute power so that no one could ever threaten or hurt him again. "Hurt people hurt people" as they say and he and many like him show that on a grand scale. However, as an evolutionary strategy, he was a success. He sired many children, quite possibly thousands by his many wives and others he raped. Such activity may well have affected gene frequencies in populations today. Consider one study by genetic researchers (Zerjal et al., 2003):

> The Y chromosome of a single individual has spread rapidly and is now found in ∼8% of the males throughout a large part of Asia. Indeed, if our sample is representative, this chromosome will be present in about 16 million men, ∼0.5% of the world's total. The available evidence suggests that it was carried by Genghis Khan. (p. 720)

Now, I am not a geneticist and this is an extremely complex area, but again, we need to take seriously the possibility that since the advent of agriculture and the rise of aggressive males (and their kin) who came to dominate resource holding strategies, certain alleles have been spreading through human populations. What, one wonders, has the history of wars done to our phenotypes given that so many with gentler temperaments, suited for hunter gatherer groups, were frequently slaughtered by invading armies. As just one example, for hundreds of years, the Romans regularly engaged in genocide wiping out many peaceful groups. Does this increase the frequency of potentially ruthless ambitious phenotypes getting control of power and then causing havoc, which they have throughout history and are now still doing (Wrangham and Peterson, 1996)? Groups that adopt control and hold strategies and competition for control are ideal breeding grounds for psychopathic tendencies (Black, 2016). We need to come to terms with the fact that there have been many leaders in history that have changed the world (and us) for the worst and still are.

We often draw our thoughts of terrorism quite narrowly but actually terrorism can be defined as the way power is used to frighten, intimidate, bully, hurt, even torture others to control them. Abusive parents can terrorise their children, abusive religions can terrorise their followers with threats of punishment in hell or other nasties; burning heretics etc. Terror using states allow leaders to imprison and at times torture political opponents. Stalin was an obvious recent example who did this on a huge scale, but tragically there are many states in the world today where leaders use terror tactics to control the population and quell opposition. The freedom to control and hold can create problems, but the freedom of free speech is essential to promote a compassionate world. Once again compassion has to address the dark side of humanity and recognise how closely it stalks us.

Group Violence

Much has been written on group violence and the nature and origins of war (Black, 2016; Sidanius et al., 2017; Hobfoll, 2018). In many primate groups (but not Bonobos; Tan et al., 2017), aggressive clashes occur at the boundaries, so group on group violence is relatively endemic in primate groups where they meet each other. Humans have been different, to the extent that hunter-gatherers developed networks over large geographical areas. In addition, rather than being aggressive and war like, before the advent of agriculture, for the most part the evidence suggests that hunter-gatherers did not encounter each other that often and when they did preferred peaceful coexistence with each other (Fry and Söderberg, 2014). It used to be thought that we exterminated Neanderthals, but now it turns out we have got Neanderthal DNA (apparently 4% of mine is Neanderthal) meaning that we engaged them sexually and part of their demise was possibly climate change,

Again, many researchers suggest that it was expanding group size (facilitated by agriculture) that created large(r) tribes who in turn began to encounter one another and covet each other's land and resources; or at least their dominant elites did. Group on group violence has been the source of some of the worst atrocities and most extraordinary cruelties, particularly in how the vanquished are treated (Black, 2016; Hobfoll, 2018). It is also the source of what may eventually extinguish humanity if we do not control it. Today, truly *vast* resources are spent on maintaining and building local and national armies, weapons, and weapon research (including the horrific prospect of robot armies), far more than on medicine. Some countries literally bankrupt their country in the pursuit of arms! Margaret Thatcher an archetypal 'hold and control' politician was a great advocate of the arms trade (Gilbert, 2018).

Over many years Sidanius, Pratto and colleagues (Sidanius et al., 2017) have been studying an orientation to resource distribution, which they called SDO. This measures the tendency to favor hierarchical and unequal rather than egalitarian forms of social organization within groups and between groups. Ho et al. (2012) offer a major overview of the important findings from this research tradition as well distinguishing two dimensions of SDO:

> The dominance dimension is characterized by support for overt oppression and aggressive intergroup behaviors designed to maintain the subordination of one or more groups, whereas the anti-egalitarianism dimension entails a preference for intergroup inequalities that are maintained by an interrelated network of subtle hierarchy-enhancing ideologies and social policies. (p. 1004)

Ho et al. (2012) point out that SDO leaders in both politics and religion are very common, and tend to be socially divisive, and seek to privilege their own group. As leaders they gain support through two common tactics: one is to elevate the sense of threat from other groups and second is to promote a sense that one's own group (be it based on ethnicity, religion, class, gender, etc.) is special and entitled to unequal access to resources and thus to exploit other groups for one's own benefit. SDO is associated with the belief that it is okay to drop nuclear bombs on people and blame them for doing so (Slovic et al., 2020). Indeed, humans are well known to enjoy seeing others suffer if they are perceived to be the threat or "the enemy."

Callousness and Cruelty

In order to behave cruelly and callously to others, you have to either not develope, or at least not activate mechanisms in the

brain such as concerned empathy. Indeed, competitiveness does exactly that (Piff et al., 2018). Hein et al. (2010) have shown clearly that when we see one of our colleagues experiencing pain, various brain areas linked to empathy light up. However, these areas do not light up in the same way when we see someone who is in an opposing group or team receiving pain. Sidanius et al. (2013) found that SDO was marked by reductions in empathy. If leaders want to turn off peoples caring and empathic orientation, all they need to do is to classify the other as a threat or an enemy and the brain will do the rest. Our preparedness to support the dark side of humanity is one of our biggest challenges (Hobfoll, 2018). Even the scriptwriters of Star Wars or Game of Thrones recognize these archetypal patterns are serious dangers to all of us if we do not control them. Currently, some political leaders and the right-wing media alliance fuel them rather than quell them (Sachs, 2012; Owen, 2020).

The story of power-seeking "control and hold," not uncommonly fueled by leaders from troublesome backgrounds and at times serious mental health and personality disorders (Green, 2005; Black, 2016) is the (ongoing) story of tribes and empires crashing through the world leaving a havoc of tortured and mutilated bodies behind it. Less than 100 years ago, we had the Holocaust, and before that, in World War I an example not of a political leader but a scientific one. Fritz Haber was enthusiastic about the war and inventing mustard gas, knowing perfectly well the horrors of the death on a vast scale it would cause. However, it was not just the fact he invented mustard gas, it is the fact that so many were prepared to manufacture, deliver and spread it. It is not just the fact that the Nazis came up with Holocaust, it is the fact that so many were pulled into supporting it. Many took part in the denunciation, arrest and humiliation of Jewish people. Educated doctors and nurses experimented on children; many soldiers and even local people rounded up people and simply machine gunned them (Glover, 2012). Similar in many wars including Rwanda and the Balkans. So, unsurprisingly, around the world today many governments are corrupt, secretive, deceptive, manipulative, and yet gain support and orientate their henchmen in the police or army to threaten and suppress their populations. This is sometimes egged on by the sections of the media (Mulgan, 2006; Sachs, 2012). Indeed, as Gilligan (2011) reveals, some politicians are 'more dangerous' than others. Many right wing policies, which are basically invigorated control and hold strategies, tend to increase mental health difficulties, crime, social inequalities and social division and increase a sense of threat. So, it is not only the politician that is problem, but also the strategies they ignite to ripple through the groups they lead.

Consider two key themes in our entertainments, "protection and vengeance," which justify our enjoyment of cruelty. A typical story is of bad guys doing horrible things to women and children or threatening to poison the world and then the good guys, from James Bond onward, rush in to wreak their vengeance and protection; the more horrible the deaths of the baddies the better, and everybody goes home happy. All these narratives are subtle, but constantly coaxing us into competitive social mentalities and group differentiations; constantly fueling simplistic ideas of concepts of good and bad people, them and us and bad people should be punished. Worst still is that not uncommonly so-called evil is presented as a disease; so for example, in Lord of the Rings, the evil ones always look very ill, sick, and ugly! The fact is, of course, that control and hold strategies seek the best, the most beautiful, the most luxurious not the most ugly; it is that kind of greed that is the problem. But it is a very useful (often non-conscious) tactic to manipulate our minds. We are not coaxed into understanding that we are all part of the human race pursuing strategies we never chose; that we are all struggling with the realities and the suffering and miseries of life; we are all hoping to be happy and to flourish; see our children flourish, grow and marry and not to have their bodies splattered against walls in bombing raids or legs blown off from land mines. Those leaders that get power because they have damaged minds that make them ruthlessly ambitious can entice us to continue to damage each other and be proud of it. We are constantly being misguided in understanding the nature of our own minds.

Subservience

This means that understanding the emergence and appeal of toxic leaders is part of the human story (Lipman-Blumen, 2005; Owen, 2020). We also need to understand how a potentially caring and sharing primate like us, gets pulled into behaving in the most extraordinary and atrocious ways on a vast scale. Crucial, is how we become so compliant in our own oppressive cultures. We are a species of mixed phenotypic potentials and mentalities that can take control of the mind and make us heroes of resistance or highly subservient. The serious problem we have as a species is with our potential for callousness, cruelty and harmfulness. These have been the central focus of many spiritual traditions and scientific scrutiny (Baumeister, 1996; Staub, 2003, Zimbardo, 2008). Bandura (2012) suggests 12 possible reasons for our hostilities to others including vengeance, righteousness, protection, belief in a cause, justification and shifting responsibility. The contemplative traditions Jainism, Buddhism and others understood very clearly our potential for callousness and highlighted the importance of training the mind in forms of compassion to stand against it (Ricard, 2015). Concepts of reincarnation were partly instigated as threats against behaving harmfully in this life. For the most part, religions like Christianity also appeal to their followers to "love thy neighbor as thy self" and yet it was turned into a persecuting religion that was to see the Crusades, the Inquisition, and other wars in the name of Christ. Some of the tragedies of the Catholic Church include inducing fear in women over the right to choose their own birth control, and right-wing Christians cheering economic policies that promote deep inequality.

For the most part, western philosophical and psychological traditions have endorsed two basic views to explain the dark side of human nature. One is a kind of Hobbesian view that humans are out for themselves and will do anything to advance themselves and can only be constrained by an authoritarian state. Others argue that we are hard-wired and born to be (and need) caring and sharing and that it is combinations of culture and perhaps poor early life experiences that deviate us off that path (Keltner, 2009; Narvaez, 2017, 2020). There are two basic causes for that deviation. One is that we can be enticed into behaving harmfully because we are compliant and subservient to authority. In the 1960s, Milgram's (1974) famous experiments enticed people to deliver painful and potentially

dangerous shocks in learning experiments. He highlighted the human potential to be compliant and submissive in carrying out orders (Milgram, 1974). Zimbardo's Stanford experiments at the same time implied that, give people a role (like a prison guard) and they will gradually adopt the (callous) behaviors of that role. Later, Zimbardo went onto explore a whole range of processes that facilitate good people doing *very* bad and cruel things that he labeled *the Lucifer effect* (Zimbardo, 2008). He was one of the investigators of some of the tortures that happened at Abu Ghraib during the Iraq war. Zimbardo (2008) and Sapolsky (2017) both highlight *the contextual and social conditions* that stimulate the worst in us and that we cannot understand humans as autonomous beings – a treasured but completely erroneous belief of the right-wing. We are an evolved species that adapts to its social niche for good and for bad. Having said that, it is also important to recognize that even in the Milgram's experiments around 35% did not comply and the issue of rebellion is as important to study as the issue of compliance. Indeed, in psychotherapy, working on peoples' ability to rebel against internalized authority or hostile others is essential (Gilbert and Irons, 2005).

Haslam and Reicher (2012), however, argued that compliance is complex because it is not just about fear of authority or passive subservience. It is also about identifying with values and goals and at times, being prepared to carry out harmful behavior. Indeed, people can become very enthusiastic about being harmful. There is a shopping list of reasons from compliance, protection-defense, coercion, greed, vengeance, personality, enjoyment, and physiological processes (Baumeister, 1996; Staub, 2003, Zimbardo, 2008). Consider that some religions have worshiped gods that required people to sacrifice their own children (The Aztecs). In 1978, Jim Jones, a famous cult leader, got more than 1000 people to kill themselves and their children. Consider what would entice or enable men to run at each other with swords and spears watching their friends around them being killed horribly? How many billions have died this way in agony? (Kelman and Hamilton, 1989; Shay, 2010). We can also consider that for 1000 years Chinese mothers broke the feet of their young daughters sentencing them to a life of pain. Still today, genital circumcision continues within communities around the world.

Not just in war, the dominant elites have operated terror regimes to maintain power. However, this has only been possible because it has been *accepted, even endorsed* by the subordinates and the oppressed themselves! In Europe, if you got convicted of certain crimes, you could be hung drawn and quartered for public spectacle. The public often did not object to this type of terror, rather it became entertainment. And there are forms of execution such as stoning, where the public are invited to take part! These historical process attest to the complex link between leaders and those who support them and this interaction is increasingly important to understand in right wing populism which can sow the seeds of harmful strife and conflict (Mols and Jetten, 2020).

GULLIBILTY

Related to subservience is the issue of *gullibility* (Mercier, 2017). This is the degree to which people can be enticed to believe things that are not only untrue but are also against their own interests. While researchers believe that humans have capacities for identifying truth in messages (Mercier, 2017), it is also recognised that the modern media and ways in which leaders present themselves can easily overwhelm this competency. Some believe our 'gullibility' is one of the most serious challenges to democracy. To offer just two examples, some of President Trump's supporters genuinely believed that the election had been stolen; others genuinely believe that the COVID-19 vaccine is either not needed or potentially dangerous. Part of the problem is the degree to which individuals identify with a social group, pick up the beliefs and concerns of that social group and reinforce them through sharing messages, for example on social media. To change ones view is therefore to change one's group identity and sense of social belonging. We come again to the fact that humans do not make decisions purely on the basis of rationality but many other factors (Shu et al., 2019). It is therefore very easy to see how a deliberate false messaging of other people as dangerous, irresponsible or inferior can undermine compassion. The point is how we are complicit in the acceptance and peddling of false information. We are subservient to the distortions of our group.

Competing for Attractiveness and Status: The Pros and Cons

One of our major transitions from a more aggressive primate past to hunter-gatherer care and share lifestyle was the movement of competition by aggression to competition by attraction (Barkow, 1989; Gilbert et al., 1995). Like so much in evolution, this has had some good effects, but also some downsides. Competition by attraction means one cannot simply impose ones will on others; one has to stimulate an audience to bestow status and share access to resources. The "group" decides what is attractive and worth giving status to. Indeed, it is now known that competing for status, with experiences of pride or shame, is a major common dimension of human social behavior (Gilbert, 2007; Durkee et al., 2019) and linked to reputation (Sznycer et al., 2016). Many on the right-wing argue that competition is important because it drives enterprise, and you cannot share resources unless you create them. While this is true, this confounds two quite distinct processes. First, over what and how people compete. Second, once created, if material resources do flow to winners, how should they be distributed? The control and hold mind sees competitiveness, mostly with regard to material resources and "the status of wealth," not status via appreciation and gratitude, or altruistic reputation (Kasser, 2016). Wealth buys access to many privileged positions including opportunities to meet other wealthy elites, to partake of the fineries of life and to make those into an aspiration for the many. Altruism and non-holding of personal wealth as a status marker, that was so central to hunter-gatherers, has been reversed.

Competition is very important to humans and care and share strategies do not seek to suppress it but focus it. Central is how and what we compete for and how and what we do with the "winnings." While some in the pharmacology industry are seeking to create the new COVID-19 vaccine in order to profit, many of the scientists working to create the vaccine are not motivated by the prospects of material resources (although they would not shun them if offered). Interviews with the

scientists suggest that they are working from the sadness of the suffering, joy of being successful and the excitement and personal satisfaction of success; and of course status within that field. Volunteers who are subjecting themselves to vaccine research are not seeking material resources, but simply to be of value and to feel a sense of pride because of what they have contributed. The availability of potentially large sources of wealth has significantly changed the dynamics of human competition from our hunter-gatherer ancestry, which was mostly for social recognition, gratitude, appreciation, a sense of being valued and wanted in relationships of reciprocity, to self-focused control and hold and making that a status marker. Hence, individuals who can "stand on their own feet" and make money are regarded as higher status than those who cannot.

If you see the world as a constant competition for resources, then you can be "inferior" compared to others in your reference group; we rarely compare ourselves to people living in shanty towns but to other people like ourselves. Millionaires can be driven to compete because others have got more millions than they have; this is competition out of *envy and fear of inferiority* (Basran et al., 2019). Second, when it comes to taxation, wealthy folk (understandably) seek to defend their position and resources and pay the least including trying to hide what society requires them to pay (Jetten et al., 2020). So in creating a world of riches, rather than making us feel safer, it has a paradoxical effect of making us more threat focused, socially comparing to our local reference groups, and as a result, callous to the less well off (Piff et al., 2018; Basran et al., 2019).

Competing for status has other problems. Shame and stigma are the underside of competing for attractiveness (Gilbert, 1998, 2007). Status competition is also linked to the *suppression of competitors* which is the function of shaming and denigrating (a major problem in social media). When our minds are organized by the competitive mentality, the drive for fame and the fear of shame textures our minds, leaving us more disconnected than ever. Buss and Dedden (1990) refer to this process as the derogation of competitors and highlighted the fact that shaming and stigmatizing focus on different attributes in men and women. One of the ways in which class and caste hierarchies are maintained is through the process of down rank shaming and stigmatizing.

The issue of competing by attractiveness can also create extraordinary stigmatizing hierarchies. For example, countries with a caste system assign groups to be as untouchables and excluded from the benefits the higher castes. Regardless of the origins of the Indian caste in the 15th century, it was the British Raj system, which intensified these divisions because it facilitated their capacity to divide and rule, as well as offering favored positions to certain individuals from the higher castes. All kinds of class system carry with it judgments of "attractiveness" and "social worth' – with those who are in the higher classes believing they are worth more than those in the lower. SDO which would certainly involve the desire to maintain class and cast distinctions goes with lack of empathy for those below; or as Sidanius et al. (2013) call in their paper "you are inferior and not worth our concern."

Another dark side of competing for attractiveness is the issue of honor and the acclaimed right to defend one's honor with violence. Cohen et al. (1998) show that in different countries and even different states in America, people can take different views to the use of violence to defend honor, particularly in men over women (Vandello and Cohen, 2003). More tragically is how some communities have created systems of honor, where parents are able to kill their own daughters if they have in some way dishonored the family (Sanghera, 2009). Consider what must be happening in one's brain to want to do that? Face saving and vengeance over social shaming can be tragic. And groups can also inflict horrific deaths, stoning of women being one.

CONTROL AND HOLD. THE PURSUIT OF POWER AND THE THE DARK SIDE

While some competitive behaviors can be beneficial, unregulated competitive behavior that seeks to suppress others can have a terrible dark side. Indeed, it *is the use of power* to suppress and exploit or act out the traumas of childhood (as people such as Genghis Khan, Hitler, Stalin, and co have) rather than to help, that is the issue. In a hunter-gatherer group, aggressively competing for power would have been shamed and even have got you killed. However, that is exactly the survival and reproductive strategies followed by most mammalian groups. The distribution of resources emerges from contest (rather than scramble) competition, especially but not only over sexual/reproductive opportunities where usually the strongest will try and inhibit subordinates from mating. Hierarchies of this type exist for both males and females (Sapolsky, 2017). While males are more aggressive, and can evolve traits that are designed for intrasexual fighting (e.g., size, consider the thick skulls of the long-horned mountain goat), female primates will certainly try to inhibit subordinates in their resource seeking behaviors (Gilbert and Basran, 2019).

Indeed, many researchers have drawn attention to the way contest competition has generated a range of motives and psychological processes. For example, Price (1972) and Gilbert (1989/2016, 1992/2016, 2020b), and Sloman and Gilbert (2000) explored how the psychology of social competition, linked to social comparison, dominant-subordinate interplay, and shame proneness underpin vulnerabilities to a range of mental health and anti-social problems. Johnson et al. (2012) suggest we have a "dominance behavior system" that can be detected in social behavior, peoples' psychological focus and physiological organization. They suggest that:

> Despite the variability in the terminology used by different authors and in different fields of study, there is agreement regarding the existence of such a system in all mammals and regarding the ultimate goal this system serves: namely, *control over social and material resources* or what we call power. (p. 693, italics added)

Eisler and Fry (2019) suggest similar, but with a different focus on what they call *a domination system*, with a four-component system that links evolved motive with cultural practices. First is

rigid top-down impositions of power. Second is the tendency to see one group as superior to another and fair game for exploitation, suppression or even removal. This is close to the concept of SDO, which again is about control and hold strategies for resource competition (Sidanius et al., 2017). Third is the cultural acceptance of the means to maintain the social hierarchy, typically through power plays, acceptance of the elites and the use of violence and the threat of violence. Indeed, as noted, humans have been very prepared to watch and endorse the most horrific cruelty of individuals deemed undesirable via crucifixion, burning, flogging, stoning, and so forth (Gilbert, 2018). The crucial issue, however, is not power itself, but how power is gained and how it is used and in particular how it is used to deal with inherent conflicts and issues of resource distribution (Mulgan, 2006).

The creation of hierarchies, especially power hierarchies, impacts on how subordinates and the powerful relate to each other. Essentially if you are pursuing power and going up the ranks, you need a mind that is orientated to facilitate that behavior. This is not a mind you choose. This is a mind evolution and culture has built for you. Hence, it will tend to orientate your attention and thinking in a certain kind of way and it will also have an impact on your use of empathy and desires for sharing (Decety and Ickes, 2009). For example, Keltner et al. (2003) offered a major review of the psychology of power. To quote from their clear summary, they note that:

> Power is associated with (a) positive affect, (b) attention to rewards and to features of others that satisfy personal goals, (c) automatic information processing and snap judgments, and (d) disinhibited social behavior. In contrast, reduced power is associated with (a) negative affect, (b) attention to threat and punishment, to others' interests, and to those features of the self that are relevant to others' goals, (c) controlled information processing and deliberative reasoning, and (d) inhibited social behavior. (p. 265)

These issues are closely related to a personality dimension called *narcissism*. Although somewhat controversial, there is a general view that these individuals are dulled down when it comes to compassion and empathy for others and very activated when it comes to the competitive social mentality, self-promotion, self-absorption, sense of entitlement, and willingness to exploit others for one's own benefit (Zeigler-Hill et al., 2019). Basran et al. (2019) also found that people who endorsed hyper-competitive, narcissistic and ruthless self ambitious views also endorsed anti compassionate attitudes and resistance to being helpful to others. While we can understand these as individual and personality issues, it is important to also see that cultures stimulate these phenotypic potentials quite automatically; these are not chosen. In addition, one can see the theme of SDO as a form of social, cultural narcissism.

On the Nature of Threat and the Fear of Losing

Different strategies will recognize different threats to their enactments. The threats in agricultural-based, high resource-storing environments, with individuals pursuing competitive resource control and hold strategies are quite different from the threats in hunter-gatherer societies. Their threats are to their immediate survival and for all members to pull their weight and share their resources (Lavi and Friesem, 2019). These are also reflected very much in how threats are represented in different political philosophies. There is increasing evidence for example that right-wing individuals, who tend to endorse the control and hold strategies, are threat sensitive to themes such as national identity and the freedom to *control and hold* personal resources (Perry et al., 2013). Fear and anger are more easily triggered if one is concerned and vigilant that others are trying to take one's resources away, compared to believing others will share theirs with you.

So, these strategies drive very different attention and defensive emotions. The wealthy may fear the claim of subordinates taking their resources in demands for equality, whereas the subordinates can feel impoverished, let down, excluded and neglected and want their share of the pie (Gilligan, 2011). There is now considerable evidence that in competitive environments that create disparities, there emerges the fear of failing, falling and losing. (Jetten et al., 2020). Those who are especially competitive, ruthlessly ambitious, and narcissistic have a high fear of inferiority and losing out (Basran et al., 2019). In children and young people, perfectionism and the fear of failure has intensified under neoliberalism, driving mental health problems (Twenge and Campbell, 2009; Twenge et al., 2014; Curran and Hill, 2019; Becker et al., 2021). As reviewed elsewhere, this is associated with self-preoccupation, self-criticism, and less interest in the welfare of others (Gilbert et al., 2020). In competitive societies, when the future looks less rosy or opportunities less viable rather than seeing this as a reason to pull together, it can intensify control and hold thinking. Jetten et al. (2020) highlight this as one of the reasons for what is called the wealth paradox whereby the wealthier individuals become, the less they want to be helpful to others (Van Kleef et al., 2008; Piff et al., 2018).

Note too, that poverty prevents talent from coming forward and competing for social share. The wealthy can pay for education and advantageous social networks (Murray and Frijters, 2017) in ways the poor cannot (Galbraith, 1993). In addition, poverty creates the social divisions for some forms of criminality and mental health problems, hence maintaining low subordinate "power." So these *control and hold* and *care and share* strategies tune attention, motives, emotions, ways of thinking and physiologies in quite different ways. The strategy of control and hold requires individuals to believe in it, thereby support the importance of competitiveness, hierarchy, inequality and self-determination and attend to and defend against threats to it. If the strategy cannot create minds that are patterned that way, then it would gradually be reduced or be suppressed as a meme in the population. The strategies for care and share will try to orientate minds in very different ways.

The Problems in Lack of Regulation of Exploitative and Cheating Hierarchies

While individuals can be trained for compassion and cultivate compassion, social and global compassion involves the

recognition that human behaviour also needs to be regulated through social contexts and sanctions. We need to find compassionate ways to regulate cheaters, exploiters, power seekers and so forth; unregulated they can do and have done immense harm (Black, 2016; Murray and Frijters, 2017; Sidanius et al., 2017; Hickle, 2018). As noted above, Boehm (1999, 2000) argues that a shift into egalitarian ways of living might partly come in the ways alliances between the more subordinate individuals could depose bullies.

> I made the case that humans can remain egalitarian only if they consciously suppress innate tendencies that otherwise would make for a pronounced social dominance hierarchy. In effect, it is necessary for a large power-coalition (the rank and file of a band) to dominate the group's would-be "bullies" if egalitarianism is to prevail – otherwise, the group will become hierarchical with marked status differences and strong leadership.
>
> On this basis, it can be argued that humans are innately disposed to despotism in Vehrencamp's ethological sense of the word. My point is that humans are not just naturally egalitarian: if we wish to keep social hierarchy at a low level, we must act as intentional groups that vigilantly curtail alpha-type behaviors. This curtailment is accomplished through the cultural agency of social sanctioning . . .., so political egalitarianism is the product of morality. (p. 84)

Further support for this idea came in a strange and unexpected way. In the mid-1980s, a group of baboons that Sapolsky and his team (Sapolsky and Share, 2004) had been studying were affected by tuberculosis that, for various reasons, took out the most aggressive dominant males leaving a cohort of mostly females and less aggressive subordinates. The group settled into a very different pattern of low aggression, relaxed, caring, and sharing; what Chance (1988) might call a "hedonic mode." Since males leave their group and new males enter, it is fascinating that a decade later, the same relaxed style persisted: incoming males were learning and co-creating a social context for more relaxed relating.

Gintis et al. (2003) also indicated that what they call "strong forms of reciprocity" can evolve under these contexts – but it will be associated with punishment for cheaters (Boehm, 2000). Hence, both the regulation of exploitative, hierarchy-orientated individuals and the regulation of reciprocal altruism probably arose together and both of them involved punishing those who would exploit or take advantage of others in a group. Interestingly, many commentators have pointed out that today this now benefits the elites: they punish the less well-off if they are deemed to exploit "benefits," yet they are allowed to get away with extraordinary levels of tax avoidance and the harmful exploitation of the environment (MacLean, 2017; Murray and Frijters, 2017; Hickle, 2018). It is well known that unregulated competition invites cheating. Consider any major sport, particularly when there is a lot of money involved, the prevalence of cheating increases and the need for refereeing and policing is essential. Cheating can take the form of using drugs to promote performance or finding ways to undermine the opposition. In business too, unregulated competition enables multinationals to hide vast sums from taxation; some believe that there is more unpaid tax than actual paid tax. Some car companies have been discovered to be cheating on the information on how polluting their cars are. Many companies are not known for their ethics.

Part of the problem is that although Boehm (1999) is correct, we are not sure how to do this in big groups. In our mega groups of strangers, as we become wealthier, we begin to endorse ideas that we deserve our wealth. Be it film stars with talents to act, footballers to kick balls or bankers to move monies around stock markets, their multi-million pound salaries are deemed acceptable and deserved. The environment of control and hold has to generate minds that think like this otherwise as a strategy it would quickly fail; people could be burdened with guilt. In addition, we have a mind such that giving up resources as in taxation, feels as if things are being stolen from us; and our brains are particularly attuned to seeing the loss of resource as a threat (Jetten et al., 2020). Ensuring egalitarianism in a hunter-gatherer group, where one is in direct contact with the beneficiaries, one experiences reciprocity and gains appreciation, is very different from paying taxes, especially when we do not agree with how those taxes should be spent (e.g., on nuclear weapons). We are constantly battling with the nature of the evolved human brain and unless we take this on board, moving forward will be difficult.

Economics

We need new economic models and science, not just to study the forces of demand and supply. We need to figure out how to create economic systems that directly *impact the brain and the mind* for the common good that involves more caring and sharing to address inequalities. We know that economic disparities and in particular poverty have major impacts on brain development, function and epigenetics (Shonkoff, 2011) and mental health (Becker et al., 2021). The issue is going to be whether we will turn a blind eye to the problems of *control and hold* and simply continue to allow these strategies freedom to express and spread themselves in populations (like a virus) or learn how to inhibit them in favor of *caring and sharing* ways of living. Doing so would mean coming to terms with evolved strategies that have been battling it out in our minds and groups and genes for millions of years. Unregulated capitalistic models that seek to create free markets are utilizing strategies *for resource competition* where the strongest or most able gain access to resources and can also put in place strategies for the inhibition of competitors (and subordinates). This has seen elites throughout history exerting extraordinarily callous and cruel regimes of oppression against the poor and still do (Perry et al., 2013; Black, 2016; Murray and Frijters, 2017; Sidanius et al., 2017). Resource competition is at the root of all this.

Many western philosophers have also taken very different views about the nature of rights to accumulate power and resources and exploit them for personal benefit. John Locke (1632–1704) believed "in the right" to accumulate and exploit. Some of his ideas landed in the American constitution, shaped by the fight to rid themselves of British external control. Arthur Schopenhauer (1788–1860) on the other hand was very taken with Buddhist philosophy. Regarded as a pessimist, he saw the world as an unpleasant place full of suffering and for which compassion was the main antidote, including the

basis for economics. For him, accumulation could not be a right, because my accumulation is your loss. Such debates based on whether people should *hold and control* and be allowed to accumulate or whether people should *care and share* orchestrated by the state have been given many new twists and turns with both sides claiming that their strategy improves the common good [as between Nozick (1989) and Rawls (1999)].

Recently, Mark Carney, ex head of the Bank of England gave the 2020 BBC Reith lectures called *how we get what we value*. His basic premise is that we have increasingly fallen into a world where things are decided on the basis of financial value rather than human value or that which will sustains us. Many of the crises we face, including climate crisis, cannot be solved by market economies focused on financial value. He notes that businesses are now beginning to think about sustainability and also that profit should be 'with purpose' not for its own sake. These are fascinating and important discourses arising within the business world. However, economics tends to make the assumption that each individual's brain is pretty similar without accounting for individual variation. One problem with these discourses then is that they tend to be detached from the processes of how economic and social conditions shape the kinds of brains we have – right down to our epigenetic profiles. It is also important to consider that different economic systems and cultures privilege different personalities as well. Competitive cultures are fertile grounds for narcissistic and psychopathic personalities to prosper and gain power. Not only do they gain control of businesses and the media, but they then create social discourses that entice many into the control and hold way of living. We are definitely not the masters of our own minds despite the illusions of being so (Bargh, 2017).

Turning Humans (and Animals) Into Resources

One of the mental processes *of control and hold* is to change our relationship with nature, other species and each other. The basic view of the first book of the Bible – Genesis – is that God created the world for humans *to use*. And use them we have. Our cruelty to animals is shocking both in terms of our factory farming and extensive, unnecessary and environmentally harmful use of them for food, and our whaling, hunting these highly sentient beings almost to extinction.

As for turning each other into resources, Genesis tells us that Eve was partly created for the benefit of Adam. This mindset is also captured in psychological concepts as *the objectification of others*. Many of the major problems that humans have with each other are precisely because we treat "the other" as a resource to fulfil our wants and needs or as a threat. Slavery is an obvious, horrific example. In fact, all the major civilizations are built on slavery (Black, 2016). The Vikings and Romans had a flourishing slave trade, as did the Chinese who used them to build their walls, and the Egyptians who used them to build pyramids. In all these societies, little attention was given to the plight or suffering of slaves or the less fortunate because the empathy and caring systems in the brain, necessary for that, are switched off in favor of control and hold shaping phenotypes. Again and again, we see that it is the culture that is regulating the brain and its phenotypes.

Consider objectification in sexuality. In a famous chapter called *The Man Who Mistook His Wife for a Chattel,* Wilson and Daly (1992) explore how males can *treat females like property* and a usable resource. Anything people desire, like sex, can become an exploitable resource. However, with the nature of human sexuality (it can last much longer than most primates engage with it) the enjoyment of sexuality, the bonding and friendship of sexuality, all point to human sexuality being different in hunter-gatherer societies (Diogo, 2019). Women were not simply resources, but had egalitarian choices. Bonobos too are matriarchal and use sexual contact quite differently, not as a resource, but as a way of dealing with conflicts and social bonding. Change the culture and you change these dispositions.

Another area where the *objectification of natural resources* has been a disaster is in land use. One of the effects of the emergence of hierarchies was that people sought to "lay claim to own" the land, which over time would lead to the policy of enclosure – forcing people off their lands and prohibiting access or use (Mann, 1986; Hickle, 2018). Land ownership not only came with prohibiting access and establishing monitoring patrols, but also poaching became a hanging offense. Such punishments, instigated by the elites to protect their interests, left the poor no means to stop or resist them. The idea that people should be entitled to control and hold and do whatever they want with their resources stretches back many hundreds of years. As a consequence, natural resources (from mines to forests to fisheries) have now been claimed as the property of the elites and exploited in very damaging ways. Hickle (2018) says that

> . . .. Since the 1950s there has been an extraordinary increase in global GDP (often referred to as the "Great Acceleration"), but this growth in "private riches" has come at the expense of an extraordinary depletion of the living world, given the tight coupling between GDP and material and energy throughput. The majority of the planet's tropical forests have been destroyed, agricultural soils are largely degraded, rates of species extinction are now 1000 times faster than the background rate prior to the Industrial Revolution, while CO_2 emissions have caused climate change and ocean acidification, destabilizing terrestrial and marine ecosystems and threatening food chains. This is the ultimate price of the longstanding plunder of "free" value from nature. And by destabilizing the biosphere on which human life depends, it becomes clear that the greatest public wealth of all – the integrity of the planetary biosphere – has been sacrificed for the sake of private riches. (p. 55)

The Tragedies of "Labor as a Resource"

There are other serious anomalies too. Individuals in hunter-gatherer societies had to dedicate time to the processes of living-surviving such as hunting, gathering, cooking, preparing shelters and rudimentary clothes and so forth. Evidence from studies of bone density suggests that hunter-gathers were very mobile and active. They were in direct contact with "nature," the products of their labor, and the process of their labor was social. The activities of hunter-gathering built strong social ties. The effects of

hold and control strategies shattered that into highly specialized divisions of labor where many individuals were turned into salves and servants or left with soul-destroying jobs simply to maintain some kind of hold on life. The industrial revolution may have marked progress in technology, but did exactly the opposite in terms of human dignity, happiness and social fairness. Although many commentators like Marx and Engels had highlighted the misery of the working classes, today we are beginning to wonder why we esteemed those entrepreneurs that created such dark Satanic Mills, the coal mines and factories and who drove colonial exploitation which devoured the human spirit and spiraled it into such a miserable existence. Yet, we have inherited these same forces that trap us, so that now we have become what Madeline Bunting (2004) calls *willing slaves*. We cannot easily survive without being part of a production process that eats deeply into our lives. And many have a need-hate relationship with it in the sense that we need to work in the factories or wherever but we hate having to spend such a large percentage of our lives doing so. Yet without that opportunity we would not have the resources to be free of poverty. Everyday we have to spend hours in traffic jams and doing things we do not want to do. Some feel so disengaged from the joys of living, sacrificed on the altar of routinized working, that we live in varying states of frustrative, envious and helpless anger, and emotionally dissociated states (Bunting, 2004). Many dream of winning lotteries that will release them.

To distribute resources and create opportunities to contribute to a sharing and caring world has never been the desire of competitive, neoliberal politics or the right-wing (Gilligan, 2011; Sachs, 2012). It is competitive self-interest *to control and hold* as much of the resources as one can. Resource control buys freedom from hunger, comforts, pleasures, and medical care; ways to make the world more enjoyable and safe for oneself and kin (Galbraith, 1993). It is sold under the banner of liberty and freedom to secure as much personal wealth as we so wish, but this is exactly what would have been shamed in hunter-gatherers! And commonly, it comes with shedding of responsibility for others and extraordinary justifications for exceptional wealth (Galbraith, 1993). Indeed, as history shows so clearly this so-called "freedom and liberty" also involves freedom and liberty to exploit and use others as a resource if you possibly can. This is why we have had colonialism, slavery and companies that drive down wages and can behave in psychopathic ways (Bakan, 2012; Black, 2016). There is a difference in freedom from and freedom to. In addition, the pursuit of wealth is addictive and the more one has, the more one wants (James, 2008; Piff et al., 2018). Without insight into how these evolved strategies can "run" our minds and be addressed at a deep, archetypal and evolutionary level, the desire for global compassion may remain simply a wishful desire (Ekman and Ekman, 2017; Gilbert, 2018).

COVID-19 has reminded us of two essential life realities: Firstly that this life is incredibly short and fragile and in any moment we can suffer sudden changes in our ecologies, the flushing through of a major virus or other diseases that can decimate whole populations (human and non-human alike), and the vicious eruptions of tribal violence. Yet secondly, what we have always intuitively understood is that when people are given the chance to contribute, and the closer we get to a hunter-gatherer type social group, the more caring and sharing people become, the happier and healthier they become. The great challenge for us is to now support that basic motivation to be a contributor (rather than a taker) in a caring and sharing world, even when the recipients of our help may never be known to us (Loewenstein and Small, 2007). That starts with an understanding that while we all want some comforts, after a certain point, wealth does not add to happiness or life's meaning. Hence, we can come to see the value of letting go of a need to pursue excessive accumulation and replace it with a desire for contributing and personal contentment (Cordaro et al., 2016). Indeed, various commentators have highlighted the importance that contentment, rather than striving for more, is a way to long-term happiness for all (Naish, 2008). Contentment does not drive capitalist economics and if it started to flourish, marketeers would try to find ways to undermine it to keep us on wanting. Our challenge is how to find a way of creating a world where people are enthusiastic about developing and using their skills and talents and are facilitated in doing so, but in ways that support the common good. One of the most extraordinary things about the Internet is the number of individuals who are making available all kinds of educational material from how to grow vegetables, fix cars, play the piano, learn a language, and cook fairy cakes. They do this purely for the joy of sharing and wanting other people to benefit from their knowledge. It is these motivational systems we need to find ways to harness because there are many entrepreneurs who simply love inventing and creating and do not need multi-million pound yachts to do it (Toynbee and Walker, 2009). We need to find ways to help as many as possible find the love of creativity, the joy of contribution rather than the love of money.

THE MIND GAMES OF THE ANCIENT STRATEGIES

These kinds of strategies need to create receptive minds. As noted above, this is because social motives co-evolved. Individuals who expressed caring will need individuals who are responsive to caring. Individuals pursuing sharing and cooperation need to stimulate those strategies in the minds of others and suppress control and hold strategies. Individuals who express dominant behavior need individuals with evolved mechanisms for submitting themselves, who are willingly to do so rather than fight back. Control and hold strategies need to create a climate where a number of individuals have those strategies stimulated and engage them, and as indicated above, stimulate fear for one's own livelihoods. Hence, these strategies will (simply because of how they are built, not because of any conscious intent) try to stimulate minds around them to create an information "flow between minds" that supports them. This information flow does not need to be accurate, it just has to 'push the right buttons' in the minds of others. For those strategies to work, they will also have to organize the human brain in a certain pattern. For example, hold and control strategies also have to cover their

tracks, so they switch off empathy and guilt, so people will not experience emotions that might make them rethink their actions. Just as Romans would not have found anything unusual about using slaves as they did or going to the gladiatorial games, so the industrialists of previous centuries would not have thought of their colonial behavior as callous exploitation; and in fact, some of them were esteemed back home for their behavior. The British exploits of India are but one example. Indeed, the past appalling behavior of the Europeans in the Americas and the abject suffering, misery, and destruction of whole cultures all display examples of when people have viewed their behavior as worthy of esteem rather than condemnation. The culture is crucial in the acceptance and adoption of the strategies of resource control. Looked at this way, it is not power hierarchies that is the issue, it is how power is used in the pursuit of resources and who and what is *made into a resource* (Lee-Choi and Bargh, 2001).

SUMMARY OF COMPARISONS

Table 1 brings together some of the themes addressed above in terms of how different strategies organize the brain. Of course, minds do not operate Lego-like systems but complex networks of dissipated circuits that produce patterns of electrochemical activity underpinning motives and behaviors. Hence, it is preferable to think of these as *multiple dimensions* that we can all move along to some degree according to context and life stresses. This is why it is useful to practise mindfulness and notice (without criticism) when these strategies are operating through oneself (Gilbert, 2009, Gilbert and Choden, 2013; Ricard, 2015).

Figure 4 illustrates how social and culturally endorsed and promoted resource distribution strategies impact on the social mentalities, including their physiological profiles and phenotypic forms. For example, consider caring behavior in hunter-gatherer groups, which were (commonly) child-focused compared to the factory workers of the 18th century. The variation in these two environments would have a huge impact on the maturation of a child's brain and epigenetic profiles. Consider how competition and the propensity to develop highly narcissistic self-focused orientations emerge in competitive cultures compared to caring and sharing ones. Again, the social and ecological environments will have major impact on the phenotypes of competitive and caring behavior. This is important because these phenotypes will be regulating motives and competencies, turning some up and others down (e.g., compassion and empathy).

Figure 4 indicates an interaction between what culture and political system privilege, the regulation of individual minds and then how those minds support the accepted resource distribution strategies.

TABLE 1 | Differentiating biopsychosocial processes according to evolved resource regulation strategies Distinguishing minds.

Hunter gatherers –pre-agriculture care and share	Modern post agriculture control and hold
• Egalitarianism	• Hierarchical
• Inhibit strong competitiveness	• Heighten competitiveness
• Support respectfulness	• Allows exploitation
• Supports caring empathy	• Limits caring empathy
• Suppress narcissism	• Reward and promote narcissism
• Strong group bonds	• Weaker groups bonds (the elites)
• Group parenting	• Limited parenting
• Expansive play	• Constrained play
• Relatively open sexuality	• Controlled sexuality
• Child-focused	• Adult focused
• *Sharing and caring*	• *Controlling and holding*

CREATING COMPASSIONATE WORLDS: THE HOPE AND DISAPPOINTMENT

Amongst the wars and atrocities, the state use of punishment, torture and (at times truly horrific forms of) execution, and the abject poverty and misery of the poor, humans have also tried to find better ways to live together (Sachs, 2012; Wilson, 2019; Biglan, 2020). Sometimes it is two steps forward and one step back, but nonetheless, many might agree that we would prefer to live now, with our modern medicine, comforts, and greater freedoms than even just a few centuries ago. Political landmarks in the West might be the ending of industrialized slavery, introduction of child and labor employment laws, education, expanding democracy votes for women, freedoms of speech, and freedom in sexuality. Tragically World War II reminded us what a vicious and dangerous species we are with the Holocaust, the (fire) bombing of cities and the dropping of nuclear weapons along with the typical viciousness of local killings, tortures, and mass rapes (Glover, 2012). Surely, we can do better than this.

Concerns to create fairer and more humane societies are of course many centuries old. In the modern era, before World War II, British Prime Minister Lloyd George championed a range of social welfare policies and later American President Franklin Roosevelt set up the new deal focusing on the three Rs: relief from unemployment, recovery of an economy, and reform of the financial system. Wilson (2019) notes that the motives for such might have been mixed; partly compassionate but also concern with increasing social unrest from the poorest sections of society that threatened the welfare of the elites and these efforts were needed to soothe them. Germany, on the other hand, lumbered with the economic reparations from the Treaty of Versailles, signed on the June 28, 1919. This caused such unemployment and social unrest that it became the breeding ground of anger and revenge and support for one of the world's most destructive tyrants and the rise of fascism. To this day, self-identification with a group that feels threatened or excluded can be problematic and a lever for political manipulation (Sidanius et al., 2017). After the war, there was the Marshall Plan to rebuild Europe to try to avoid the same mistakes and for opportunities for business. Never humiliate a defeated enemy. To show some compassion *and* develop business with them is a useful idea to prevent subsequent conflict; sad that so many conflicts have not learnt that simple lesson of how to stop cycles of vengeance; partly because leaders gain from maintaining the conflicts.

Compassionate motives were part of the United Kingdom efforts to rebuild a better world and get economies moving. So,

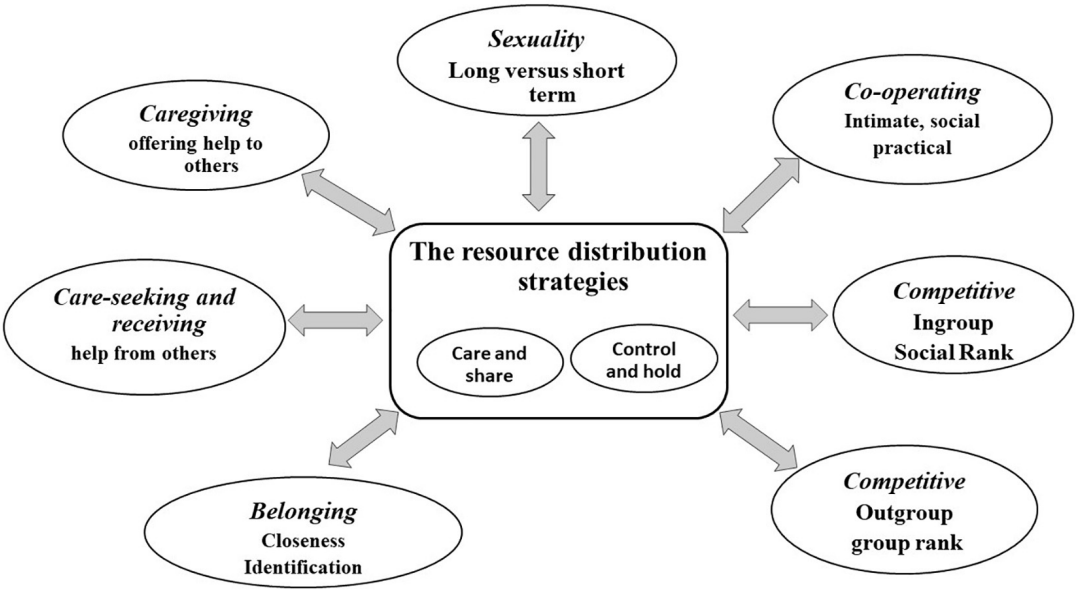


FIGURE 4 | Resource distribution strategies in social mentalities.

from 1946 the United Kingdom built a National Health Service spearheaded by the passions of *Aneurin Bevan*, who argued that no society can be called civilized if sick people cannot get medical care because they did not have the money to buy it. It was a major disappointment that led to his resignation when the Atlee government later started to introduce prescription charges on certain items and funneling money toward rearmament. Once again, fear-based tribal psychology began to soak up resources. Nonetheless, the United Kingdom expanded education and created a range of other services (rail, water and electricity) for the public good. Taxes were high especially on the wealthy. It was a phase where we focused *on caring and sharing,* at least to a degree, wanting to raise the opportunities, services and health support for all and make some effort at redistribution of wealth. Again, part of this was compassionate, but there was also a recognition that having a sick and uneducated population and poor transport services was not good for business.

It was not long before these benefits created wealth and wealth settled into expectation for more. The uneven accumulation of wealth, along with fears generated by inflation re-ignited a more self-focused and less welfare focused politics. Changes in the social discourse, peddled by an increasing right-wing media that wanted to invigorate competitive behavior and "the market" regardless of the "fallout for the losers," refocused governments on what they should aspire to do (Gilligan, 2011; Sachs, 2012; MacLean, 2017). The theme became "less is best" and the promotion of enterprise by facilitating "controlling and holding" onto the fruits of one's enterprise. The problems of sink or swim free market economies producing vast inequalities of resources in power, back room deals and stifling social welfare was neatly ignored (Bakan, 2012; Stiglitz, 2012; Murray and Frijters, 2017; Biglan, 2020; Becker et al., 2021). Threat focused right-wing discourses and narratives began to stimulate different motives in our minds, not to care and share, but *to try to hold and control* our own claim on resources (Wilkinson and Pickett, 2010). This was not just greed based but fear based. Moreover, as divisions between the haves and have nots widen, with a media increasingly selling the idea that *wealth creates happiness and freedom from anxiety*, competition and fear of being one of the "have nots" or more recently 'have less' grew. Companies that needed to sell their products and compete in the marketplace came up with increasingly slick advertising campaigns linking their products to status, happiness and security. Until very recently, humans have never been bombarded with such constant stimulants of the drive system, social comparison and the aspiration to have more. For these and other reasons appeals to gain more freedom and control over one's earnings, seek personal advantage and greater comforts, take responsibility for oneself and opt out of responsibility for others, flourished.

Through multiple channels, then the social discourses focused on what we should aspire to, how to set our core *personal values* and sense of self-judgment and entitlements: and the message was clear – personal wealth. While poverty creates misery, and degrees of wealth can afford protections from the challenges of life, partly because how our drive and resource seeking systems work, people wanted to *control and then hold* on to more and more, a process labeled affluenza (James, 2008) and materialism (Kasser, 2016). Consequently, there was a gradual shift away from the post world war II interest in the common good, and a caring and sharing of our collective wealth, to a system that fits and advantages money markets, short-term opportunism, unregulated, self-focused competitiveness, narcissism, psychopathic tendencies, and secret deals between the elites to maintain privilege (Bakan, 2012; Sachs, 2012; Hanson and Baker, 2017; Murray and Frijters, 2017; Biglan, 2020). Alarmed by the spiraling costs of the National Health Service,

the Thatcher government of the 1980s began to find ways to start to privatize "Health" to reduce government responsibility and taxation and make health a "profit offering business" (Gilmour, 1993). In America, the sentiments for care and share were gradually unpicked by the Reagan government (Sachs, 2012). In the United Kingdom, it was Thatcher who believed that society is a collection of individuals pursuing self-interest, not a process of caring and sharing to be nurtured in and of itself. As Gilmour (1993) noted:

> Margaret Thatcher wanted, through her economic policies, to change the heart and soul of the nation. She did achieve a transformation, but not presumably the one she intended. Britain did not change to an enterprise society. The change was in sensibility. British society became coarser and more selfish. Attitudes were encouraged which would even have undermined the well-being of a much more prosperous society. (p. 340)

Lost in the Aladdin's cave of material resources we became dazzled by the ownership of things (and not having or losing them) or what has been called materialism. The problem with materialism is that it is addictive for "want more" (James, 2008; Wang et al., 2020). Wealth actually creates mind states that are less compassion orientated not more (Van Kleef et al., 2008). This is always the big problem, that as resource availability increases so does self-focused competitive behavior (Piff et al., 2018). Kasser (2016) sums up some of the key findings about the problems of materialism in his important paper.

> Substantial evidence shows that people who place a relatively high priority on materialistic values/goals consume more products and incur more debt, have lower-quality interpersonal relationships, act in more ecologically destructive ways, have adverse work and educational motivation, and report lower personal and physical well-being. Experimentally activating materialistic aims causes similar outcomes. (p. 498)

After a certain point wealth does not increase happiness. In their introduction to the World Happiness Report, Helliwell et al. (2012) state

> As one key example, the world's economic superpower, the United States, has achieved striking economic and technological progress over the past half century without gains in the self-reported happiness of the citizenry. Instead, uncertainties and anxieties are high, social and economic inequalities have widened considerably, social trust is in decline, and confidence in government is at an all-time low. Perhaps for these reasons, life satisfaction has remained nearly constant during decades of rising Gross National Product (GNP) per capita.

There is also considerable evidence that materialism and self-focus competitiveness has increased social narcissism (Twenge and Campbell, 2009) along with unhappiness, anxiety, depression, social distrust, fear of failing and loneliness (Becker et al., 2021). Curran and Hill (2019) conducted a major meta-analysis of 41,641 participants across 164 samples on the increasing pressures of perfectionism between 1989 and 2016. They found that the levels of self-orientated perfection (feeling one has to be perfect), socially prescribed perfection (thinking others want perfection from the self) and other-orientated perfection (wanting others to be perfect) along with expectations and sense of entitlement have increased over the study. They argue that what sits behind this is: (1) the emergence of neoliberalism and competitive individualism; (2) belief in meritocracy, that success is all down to effort and competitive striving; and (3) anxious and controlling parenting. The latter increases as the competitive pressures within a society increase. They also note the role schools play in supporting neoliberal and striving ideals linking status and wealth-seeking to personal values which causes trouble "…., because individuals cannot avoid being sorted, sifted, and ranked by schools, universities, and the workplace, neoliberal meritocracy places a strong need to strive, perform, and achieve at the center of modern life." (p.413). At the same time, leaving aside peoples compassionate behaviors during the COVID crisis, western societies have also become less compassionate, not more (Trzeciak and Mazzarelli, 2019) and entertainment has become more violent and vengeful as ways to excite minds that are already over stimulated by threat (Gilbert, 2018).

The great challenge to humanity at the moment is to regulate the runaway self-focused competitiveness which often happens in environments of high resource opportunity. Unregulated competitiveness has generated societies of haves, have nots and have lots and our distribution of inequality is extreme and economically and socially harmful (Toynbee and Walker, 2009; Gilligan, 2011; Stiglitz, 2012; Wilson, 2019; Becker et al., 2021). Wilkinson and Pickett (2010) have written extensively on the relationship of income inequality with crime and mental health difficulties and founded the Equality Trust to promote awareness and ways of addressing these issues. It is estimated that just 25 billionaires own over 50% of the world's wealth (Elliott, 2019; Mathews, 2019). Not only this, but some of the wealthiest individuals in the world use their wealth to run industries which are damaging our ecology (fossil fuels, the making and using of plastics) and for political advantage undermining democratic processes in their favour (Pilger, 2007; Toynbee and Walker, 2009; Gilligan, 2011; MacLean, 2017; Murray and Frijters, 2017; Hickle, 2018). It is now recognized that although it was the deregulation (that Roosevelt had warned against in the 1930s) and the callous self-interest of the banking system that partly caused the 2008 financial crash, it was the least-well off that shouldered the burden of both the immediate fallout and the reparations paid subsequently. Rather than taxing the wealthy, we had austerity. The unfairness of such measures was clearly articulated in the recent *United Nation's Human Rights Office of the High Commissioner* report (2018). Tragically not that much has changed. What politicians call "tough decisions" are more commonly callous decisions aimed to protect the wealthy and elites, with little regard for the affect they have on poorer communities (Gilligan, 2011; Curl and Kearns, 2015; Torjesen, 2016; Tooze, 2019). Recently, Observer journalist Rupert Neate (2020) noted that among the richest people in the world their collective profits over the COVID crisis have probably risen to over a trillion dollars. He quotes Frank Clemente of Americans for Tax Fairness who says "Their pandemic profits are so immense that America's billionaires could pay for a major

COVID relief bill and still not lose a dime of their pre-virus riches. Their wealth growth is so great that they alone could provide a $3,000 stimulus payment to every man, woman and child in the country, and still be richer than they were nine months ago". While these individuals will be paying taxes, there seems no movement by most wealthy countries to seek increased taxes or even ask for voluntary contributions!

Many commentators have recognized that it was the austerity measures and efforts at privatization of the last 10 years that left the British NHS in such a state of underfunding, barely able to cope with everyday demands, let alone the crisis we have now that added to the COVID-19 death rates (McCoy, 2020). Estimates of increased deaths from untreated cancers and other conditions are tragic. United Kingdom governments had received numerous warnings from simulations and medical advisers that the country was not able to cope with any pandemic that would inevitably arrive and yet they chose to do nothing (Hopkins, 2020). This highlights again that recent political shifts have not focused on caring and sharing, but on supporting individuals to *control and hold resource*s for personal use which they believe will enable people to make decisions that advantage all of us. The evidence for a long time however, has been that there is little trickle down and it is mostly gushing up (Sachs, 2012; Carney, 2020). It is not clear if trickle down was ever really believed or was more of a political justification for low tax rates (Toynbee and Walker, 2009; Gilligan, 2011). So with the passing of the years, Western societies have become more self-focused, narcissistic, demanding (Curran and Hill, 2019; Twenge et al., 2014), and less compassionate (Trzeciak and Mazzarelli, 2019).

Can Compassion Help?

Against the political movements of the last few decades, the tragedies of COVID-19 have illuminated many ways in which humans can be extraordinarily compassionate. In countries throughout the world, medical and other people have risked their lives to save strangers and vast numbers of people have provided help individually and or created "mutual aid" networks and groups to volunteer to help others and test vaccines, all common compassionate behaviors. At the time of beginning to write this paper in April 2020, many in the media suggested that COVID-19 could prove to be the turning point for Western society – the moment when we recognize our interdependency and the need to turn away from our neo-liberal, competitive self-interest past, toward a future built on recognizing we are a species of short, vulnerable lives with common desires to be happy and avoid suffering; to create a world rooted in our capacities for cooperation, caring and sharing (Sachs, 2012; Wilson, 2019; Carney, 2020). Writing in the Lancet, Professor of Public Health, Galea (2020) argues that compassion should be the focus for a future healthcare system which values our interdependency and desire to create good and effective healthcare and social justice for all, a sentiment many agree with (Gilbert, 2009; Sachs, 2012; Ricard, 2015; Ekman and Ekman, 2017).

If we are to begin to create a world that moves toward the common good, it will help to understand the processes that are underpinning these economic and political maneuvres (Biglan, 2020; Sachs, 2012; Wilson, 2019; Carney, 2020). There are powerful *evolved strategies* we need to be aware of if we are to create social contexts that support caring and sharing rather than unregulated, self-focused, competitive, controlling and holding resources.

What to Do?

One of the key elements of compassion is to take a deep interest and look into the *causes* of suffering. Long term prevention cannot be addressed without understanding causes. One of the greatest dangers and illusions is to believe that political pursuits and values are somehow based on basic beliefs or are rationally chosen, when in reality, they emerge from conscious and unconscious sensitivity to threat and opportunity and the phenotypic activation of phylogenetically old strategies that pattern the brain. If it were a matter of basic beliefs, then providing people with clear evidence that caring and sharing will create a better world for all of us, change would be easy. What this paper has sought to do is to indicate processes that can be traced back to the evolution of resource competition strategies, and how different social and cultural contexts regulate these strategies. Neoliberalism has produced contexts that create minds and brains that are not well suited to the challenges of humanity, that needs urgently to move toward caring and sharing and intensify cooperative communities, nationally and internationally (Wilson, 2019). We have seriously allowed freedom to *control and hold* at the expense of social responsibility and indeed any form of responsibility including for our environment (Perry et al., 2013). What COVID-19 has illuminated is the extraordinary importance of context and focus in enabling different (i.e., invigorated caring) strategies to flow through communities. We are still basically hunter-gatherers who have a great interest in caring and sharing and are biologically capable of the most extraordinary acts of courageous and wise compassion, but also these can be easily turned off.

Hence, the most serious issue for humanity *is what is the fairest way for the distribution and use of wealth that is created everyday by the hundreds of billions of labor hours of human effort.* In his insightful evolution informed work on how to create cooperative communities and societies, Wilson (2019) echoes Boehm (1999) above:

> One conclusion is that for any group to function as a corporate unit, the potential for disruptive self-serving behaviors within the group must be suppressed. This conclusion is so basic that it applies . . . to groups of any size. It is remarkable that the core problem confronting America in the early 20th century and today is the same problem that confronted the tiny Jamestown colony in the early 1600s: an extractive social organization that allows some to gain at the expense of others and the group as a whole. This is the human society equivalent of cancer. (p. 193)

Wilson also points out the well-known fact that every system in the universe is regulated and regulation itself needs to be regulated, because too tight and it constricts the process of change, too loose and it produces chaos. For those who seek deregulation, Wilson (2019) notes – "show me a deregulated organism and I will show you a dead one" (p. 193). In fact, many major economists now recognize that the crucial problems with

capitalism are not so much competition but for what and how we can compete and what we do with the products of competition. The lack of regulation of competitive self-interest and at times pure callousness that values finance rather than human needs requires urgent attention (Stiglitz, 2012; Carney, 2020).

Constricting the power of others to 'control and hold' is only part of the solution because long term we want to create the conditions in our families, schools, economic pursuits and environments to feel safe, flourish and take an interest in each other – *to actually change the phenotypic profiles of humanity.* We are only going to do that if we create the cultures, including the childcare and education and resource distribution strategies accordingly. If we look at humanity as a whole, there are billions of brains in the world right now who could become wonderful doctors, scientists, composers and world changers who will never know they had such latent talents. They will not get a chance to develop their potential because they are locked into poverty and lack of opportunity. Many desire to find new ways of generating compassionate, cooperating communities, schools and nations, international sciences and businesses, working together to pool their knowledge, mutually supporting each other (Abel and Clarke, 2020). To do this however, we must not be naive about the evolved nature of the human mind because unless we recognize and engage with the serious inhibitors of caring, sharing and compassion, and the ease of shifting into callousness even cruelty, we will fail (Gilbert and Mascaro, 2017).

We also need urgent changes in how we govern ourselves at local and international levels. Many political theorists and commentators recognize that western political systems have run their course and not fit for purpose. We have voting systems rather than true democracies. In many elections, few politicians get endorsed by a majority of eligible voters, and in multi-party states, many will have more voting against them than for them, hence why many people opt out of participating. In addition, people are often asked to make decisions on complex questions without any depth of insight. Policies require complex knowledge. When the British people were asked to vote on leaving the European Union few understood what a customs union actually was and instead some voted on more media fueled fears of immigration and issues of sovereignty. We have created societies that actually are increasingly complex and technical. For this and other reasons, individuals are looking toward different ways of engaging "democracies" such as the concept of *crowdocracy* (Watkins et al., 2016). Watkins et al. noted that there are many vested, powerful interests in maintaining the *status quo* that we do not know how to address. They also argue that many of our problems are what they call 'wicked problems' in the sense that they are multi-factorial, multi-causal and the solutions are going to be multidimensional. Not so easy.

Many have suggested taking the business financing of politics out of the game as a start. In addition although collaborative work happens behind the scenes in the select committees and at other places it is obvious that competitive politics has degenerated, where the main purpose of debate is to ridicule the other, stirred on by the media who like to sell the blood on the carpet. To paraphrase consider how common it is to hear the media talking about the need for a leader who could "damage and land blows on the opposition." Commentators have sometimes referred to the political debates between leaders as "no one was able to land the knockout blow." At times politicians seem unaware of the kinds of minds that are being stimulated in their interactions with each other. The moment a politician comes on the television or the radio, you know exactly what they will start off with, which is an attack on the other side and where possible make them appear incompetent, immoral or dangerous. This not only drives diverseness but as recent events with the Trump administration shows is increasingly dangerous. This is not a psychology that the world needs.

Indeed, it is very hard to be aware of how much our minds are puppets to the social discourses we are embedded in. From families to cults to social groups, religious or political movements, it is not uncommon for people to need to get out of a toxic environment before they are able to reflect on how the environment controlled 'their minds'. One of the key proposals should therefore be that politicians need far more psychological support and opportunities to stand back, understand and reflect on these processes and ideally agree to build cultures that bring out the best of discussion, debate and decision-making. As new president Joe Biden has recently highlighted it is possible to disagree without being disagreeable; to be respectful rather than ridiculing; to promote cooperation rather than a winner takes all.

The fact is that left and right are now old tribal labels of little value. In reality we are having to manage two profoundly powerful resource regulation strategies that are operating at *phenotypic levels*. Politics is not just about the management of values. It is the management of brains and bodies too; and in particular the dark side of humanity. There is now considerable evidence that when we feel safe we are biologically different to when we feel threatened (Slavich, 2020). It is important then to recognize that capitalism actually generates high stress and threat because of the continued process of change, of jobs appearing and disappearing and the fear of losing is partly what drives it; you have to be better than your competitors or you don't get the job (Becker et al., 2021). Whether picked up in childhood or from culture, threat drives right wing control and hold strategies.

Another problem is that in our ancestral groups our drive and resource seeking motives were regulated by resource shortage and their immediate use. There is no natural regulator now for resource seeking drive motives. The desire for "more and better" is partly what made us the species we are with our advanced science but unregulated it is addictive, destructive and turns everything and everyone into a resource; it drives the criminal mind as much as it drives to the ruthlessly ambitious. Wanting more and better is of course a natural psychology and the psychology of contentment and sufficiency is tricky, particularly when people socially compared to their own reference group (Naish, 2008; Cordaro et al., 2016).

Nonetheless there are many things we can do to promote caring and sharing and offset affluenza! Hence there are some obvious, commonly suggested, steps to explore (Ryan, 2019; Wilson, 2019; Abel and Clarke, 2020). What is exciting and inspiring is that there is an increasing bubbling cauldron of many fascinating and exciting ideas that are emerging on

how to create a better world. Researchers are looking at the complex interactions between leaders and voters that stimulate fear and divisiveness because it is a two-way process of some challenge (Mols and Jetten, 2020). Politicians are looking at how to reform political systems, because competitive politics is obviously failing us and attracting the wrong type of minds. We need minds to address the challenges of cooperative problem solving. Businesses are just beginning to engage with the moral dimension of their profession and recognize that they should not support colleagues who create businesses that are harmful to the ecology, exploit workers and hide taxes and where profit is the only judgment of success. There are increasing calls for "moral business" as internet searches will reveal. All of us then can play a role in changing the world for our grandchildren.

The Individual

- We are desperately in need of better psychoeducation on the nature of the human mind, in particular, its ease of turning to the "dark side," and that we have brains and minds built for us by our genes and social contexts. Much, of what we become and what we believe in is not chosen in the first instance, but are products of an evolved brain choreographed by its social environment. It is a serious narcissistic blow to realize that we are a short-lived, evolved entity etching out its hopes, fantasies and desires according to its programming. This was Siddhartha's insight on his road to Buddhahood enlightenment, although of course, he used different concepts and language. Over 2000 years ago the contemplative traditions, particularly but not only Buddhism highlighted the fact that we are different from other animals because we have competencies to be mindful, to become an observer of our own mind and mind aware. This gives us the potential to "wake up" to the ways in which we can be regulated by passions and desires in unhelpful and destructive ways. Compassion training is a way of retraining and reprogramming our minds. If on our short stay in this life, we want to be more than a puppet to the above strategies that flow through us, then this requires us to gain insight into our programming, learning mindful awareness and what we can do to facilitate more compassion focused states of being. Hence, mind awareness, mindfulness and compassion training need to be textured in our education system, from schools to universities, businesses and work places (Ricard, 2015; Coles and Gent, 2020). The classic film, the Matrix and science fiction series Westworld played with this idea; "waking up" is not necessarily an easy solution, but one with huge dividends (Ricard, 2015).
- Caring and compassion are potential strategies, wired into us with their own physiological architecture (Keltner et al., 2014; Mayseless, 2016; Carter et al., 2017). Hence, we need clearer and invigorated psychoeducation about how a compassionate orientation to self and others has profoundly important impacts on the brain and physiology including the autonomic nervous system, cardiovascular system, immune system and various frontal cortical circuits that regulate emotion (Seppälä et al., 2017). It promotes ethics, but also physical and mental health (Brown and Brown, 2015, 2017). Our research on how to train our brains to stimulate compassion systems is improving all the time and these trainings need to be made increasingly available in schools, businesses and other places. Compassion is not just about soothing, but it is also about energizing for courageous and wise action.
- While compassion is about sensitivity to suffering, it is also about the prevention of suffering. Compassion is based on a sense of personal and collective responsibility (as in COVID-19). The basis of altruism is that we are prepared to make sacrifices for the benefit of others and when we do that, the overall effect turns out to be beneficial for all of us (Ricard, 2015).
- Around the world, there has been an explosion of interest in mind training. Mindfulness and compassion are the main focus with increasing evidence of their person benefits. The degree to which such practices will indeed stimulate a will to see care and share strategies permeate their cultures is unclear. It is well known that there are many narcissistic business leaders who adopted mindfulness, but had not really engaged compassion. Unless compassion motivation becomes the intention behind mindfulness, there is no guarantee that it will produce movement toward the common good.

Social

- Although lacking an evolutionary lens, many political philosophers, psychologists, sociologists anthropologists, and other commentators recognize that democracies, as currently formed, are unhelpfully competitive focusing on the undermining, shaming and suppression of competitors not the promotion of the best (Mulgan, 2006; Sachs, 2012; MacLean, 2017). Many recognize the need for socially sensitive politics with compassionately sensitive individuals that seek to create social contexts and narratives that focus on desires to *live to be helpful, not harmful*. COVID-19 has shown that this is possible, and is desired by many, but it needs to be harnessed. This compassion motto *of live to be helpful, not harmful* can be taken up by business, politics and many other processes (see the "compassion in politics' movement"). Imagine if this motive, not just the profit motive, was adopted by shareholders and businesses alike. Wouldn't it be amazing if organizations like Confederation of British Industry adopted that motto for its members as the equivalent of the Hippocratic Oath: *that all businesses will seek to contribute to humanity not to harm it*. In fact, my experience of working with some of the younger business people is that this is exactly what many want to bring into the world, while recognizing that there are also many in business who would oppose it because they want to continue with their plastic and fossil fuels productions, deforestations, and stock market gambling to make money regardless of long term harm. Indeed, COVID-19 revealed how callous some very wealthy business people were in how they supported their workers or used the situation

to profit.[1] Care-focused social mentalities just seem to be "unavailable"; the algorithm does not seem to be working for these individuals. But, there are also many business individuals who really stepped up to the mark. Indeed, putting "moral or ethical business" into a search engine reveals some truly inspiring efforts at compassionate and ethical business. If talented entrepreneurial minds make compassion, appropriate cooperativeness, fairness, respectfulness and ethics centre to their mission, not *just* profit, the future could be rosy, especially if they insist on the media and politics provide them the contexts to do it (Carney, 2020). There are many potential innovative ways of bringing a more caring and sharing orientation to the world; we just have to put our minds to it.

- Repeatedly, we have understood that we need to develop forms of social, economic and political regulation, and this includes having monitoring systems not only for preventing criminality, but also the distorting aspects of resource accumulation in the hands of the few. This will include careful monitoring of the ecological harm some companies do and the importance of appropriate taxation. There are many different types of taxation, such as the Tobin tax, carbon tax that need to be revisited. We need to recognize that through the lens of a hunter-gatherer mind, individuals who accumulate vast wealth are being allowed to cheat. It is only natural that we want the best for ourselves, not the worst. So, it is important not to confuse the desire for the comforts of life (I love mine), with the issue of the regulation of resource distribution and the pursuit of wealth. Humans will always compete and regulated competition can be very helpful; unregulated it becomes harmful.
- There are increasing movements, such as the movement to develop compassion in politics[2] with increasing (and always have been) younger politicians, very committed to trying to regulate conflicts of interest to produce a more caring and sharing culture, and recognize that the aggressive rivalry and competitiveness of politics are harmful.
- Moreover, that political discourse is overly influenced by a media who are interested in stimulating the emotions of conflict (Mulgan, 2006; Sachs, 2012; MacLean, 2017). Changing the tone of the media is essential (Sachs, 2012). The media could stop peddling the fantasy that they report the news, they don't make it. In fact, there is considerable evidence that the media can shape our emotional reactions to the events around us for better or for worse. Reporting 'what sells papers' is not the same as reporting objectively and with the desire to avoid stimulating harmful divisiveness. Important too is reporting on the good in the world and on hope. Again there is no simple view or solution but it starts with the *desire and motive to try* to create a media that will build towards a fairer, more compassionate, caring and sharing world. This can start from the inside but also what we buy and attend to. This is urgent now with the multiple information flows and the peddling of false news, conspiracies, fears and divisions.
- While this paper has focused on the inhibitors of compassion, we also need to celebrate and take hope from the fact that there are many wonderful facilitators. Today we see more open discussion of the problems we face. There are entrepreneurs working to improve farming and soil quality, alternatives to meat, alternatives to plastics, find ways to create more green energies and replace fossil fuels for aircraft. There are exciting reforesting projects and how to get the plastics out the sea. Recent changes in online training has opened many areas of the world that would previously have been excluded by distance. And of course, medical science continues to astound. While pushing for efficiencies can be heartless and cold, building cheaper and faster can also be a source of great benefit to all. In the prevention of suffering compassion seeks to build on the good.
- Create more opportunities for people to be contributors to their community, which may require government action to facilitate compassionate community care programs, for example, supporting sports programs, music or literary skills in poor communities. Support policing programmes of community befriending, because compassionate policing is an essential part of a compassionate society. As we see throughout the world today, police can easily be turned against the population and become oppressors. Governments can facilitate street parties to celebrate the ending of the virus for example and do that every year. Create visions of a caring and sharing within the international community, recognizing that this will have a major impact not only on values, but also on brains and even our epigenetics over the long term. However, as the history of the United Nations show despite high ideals, good intentions and some success this is going to be no easy task because of the enormous inhibitors and desires for control and hold at the level of leaders and countries that we are up against.

Finally, we need to find ways to promote individuals into positions of power who are bright, but also show they have the talents for empathic co-operation because a world run by narcissistic, competitive leaders with 'dark triad personality traits' has been, and will continue to be a disaster. In other words, we should not underestimate the dynamics of, and regulation of, those who have access to power (Gilligan, 2011; Owen, 2020). This is actually quite tricky and needs considerable thought and research because they know how to present their 'caring and protection' credentials to attract followers. Yet the evidence is that when we have prosocial leaders our social contexts can change for the good, whereas when we have anti-social leaders (Basran et al., 2019) we enter the dark realms of competition, tribalism and division. Gilligan (2011) makes the point that even when people know a leader is dangerous and unfit for office, there are few ways they can be removed on that basis. From Hitler

[1] https://www.veracitysearch.co.uk/insights/2020/3/4/coronavirus-compassion-or-callousness

[2] www.compassioninpolitics.org

to Stalin (and others today), it was very obvious to many that these individual were callous, ruthless and dangerous and would do great harm—but there was, and still are, few mechanisms to stop them from gaining power. Indeed, others around them can be complicit and feed off their ruthlessness for personal gain themselves.

CONCLUSION

This paper began by highlighting the realities of life; that all biological life forms are vulnerable to injury, decay and die. Human suffering is greater, because we know that we suffer, we know that we die, we know we can be in pain, we know that everything is impermanent and in a constant state of flux and change. As individuals, as societies and as a species, we need to seriously consider how we address the reality that biological life is about suffering and how this challenges us. A civilized society must first and foremost seek to address suffering and not cause it. Caring and compassion are the principle motives by which to address suffering, but it is very easy for us to dissociate or be in denial of suffering, distracted by the modern comforts and the threats of economic loss and inferiority.

Evolution has created both many forms of suffering, but also potential solutions. At the root of evolution is the management of conflict. The idea that the only way to engage in conflict is to create "nature red in tooth and claw" or the sink or swim fates of unregulated markets is wrong, because conflict can be dealt with cooperatively and with sharing (Wilson, 2019). However, Van Kleef et al. (2008) and the extensive work of people like Paul Piff (Piff et al., 2018) have shown that as people become wealthier, they become less compassionate. This is because in competitive (in contrast to sharing) environments, the control and hold strategies can become more "adaptive" and influence the psychophysiological organization of the mind. As indicated all the way through, this is related to how our very ancient, evolved gene-built, mental algorithms and programming interacts with the modern world creating particular kinds of brains and phenotypes. As part of this, there is the need to understand the *inhibitors* of cooperative and caring and sharing behavior (Gilbert and Mascaro, 2017). There is an old saying from a galaxy long ago and far away "beware the power of the dark side."

We increasingly understand more about the human mind than at any time in history, including our genes, evolutionary history, and the emergence of different phenotypes in different cultures. Crucially too research is revealing more and more ways in which compassion impacts our brains, bodies and communities. This is gradually filtering through into education and into businesses, which is inspiring. However, if we do nothing about these ancient *control and hold* resource distribution strategies, that since the advent of agriculture has wreaked havoc in the world, then unregulated we run into the well-known risks that as the wealth of the world increases, our ecologies will become increasingly poisoned and stripped bare, the divisions and disparities of wealth will get worse, empathic concern for the less well-off will drift away into populist movements, conflicts will intensify and as today rage will increasingly replace argument. The arms industry will blindly strip vast resources to fuel research and the manufacture of new weapons and artificial intelligent robot soldiers likely to be sold to narcissistic leaders to suppress their own population. Narcissistic leaders with bombs in their pockets, are not focused on peaceful forms of coexistence, but the need to build ever great defenses and present themselves as protectors. Groups will continually fracture into subgroups, possibly populist ideals of self and group importance and entitlements or around religions that offer protection and a source of specialness and well defined group identity. Some will become terrorist groups because damaged narcissistic leaders will spread fear in the group. The media that trades on conflict and tragedies will get worse. The backroom deals of the elites will get tighter, become more secretive and seek to cheat on their responsibilities. We would be heading for Blade Runner worlds.

At the end of the day, the solutions to all this has to be informed by science; to understand the facilitators and inhibitors of what we desperately need i.e., cooperation, care and compassion (Ricard, 2015; Gilbert, 2018; Wilson, 2019). We can use science for research and the generation of new ideas to find new forms of sharing and caring that reaches humanity as a whole; keeping in mind that this was not the evolutionary context for caring and sharing. Evolution has handed us a mind that is capable of great compassion, but also in the context of large groups and storable and accumulable wealth, absolute demonic terror. Whether we follow spiritual beliefs or not, that is the battle that goes on in our individual minds, in our communities and our societies. It is not a battle between good and evil, it is a battle between two resource distribution strategies that are millions of years old. As we come to understand how we are programmed (against our awareness) and how our minds are emotionally and motivationally orchestrated by these strategies, we may decide enough is enough. We have a degree of intelligence and mindfulness and can decide to take control of the steering wheel. Compassion turns out to be the most courageous and wise of all of our motives.

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The author confirms being the sole contributor of this work and has approved it for publication.

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REFERENCES

Abel, J., and Clarke, L. (2020). *The Compassion Project. A Case for Hope and Human Kindness from the Town that Beats Loneliness*. Delhi: Aster Publishing.

Armstrong, B. F. III, Nitschke, J. P., Bilash, U., and Zuroff, D. C. (2020). An affect in its own right: investigating the relationship of social safeness with positive and negative affect. *Pers. Individ. Differ.* 168:109670. doi: 10.1016/j.paid.2019.109670

Bailey, K. (2002). Recognising, assessing and classifying others. Cognitive bases of evolutionary kinship therapy. *J. Cogn. Psychother. Intern. Q.* 16, 367–383. doi: 10.1891/jcop.16.3.367.52516

Bakan, J. (2012). *The Corporation: The Pathological Pursuit of Profit and Power*. New York, NY: Hachette.

Bandura, A. (2012). "Moral disengagement," in *The Encyclopaedia of Peace Psychology*, 1st Edn, ed. D. J. C. Christie (Hoboken, NJ: Blackwell Publishing), 15. doi: 10.1002/9780470672532.wbepp165

Bargh, J. (2017). *Before You Know It: The Unconscious Reasons We Do What We Do*. New York, NY: Simon and Schuster.

Barkow, J. H. (1989). *Darwin Sex and Status*. Toronto: Toronto University Press. doi: 10.3138/9781442673724

Baron-Cohen, S. (2011). *Zero Degrees of Empathy: A New Theory of Human Cruelty*. London: Penguin.

Baron-Cohen, S. (2020). Our restless minds. *New Sci.* 248, 34–39. doi: 10.1016/S0262-4079(20)32134-5

Basran, J., Pires, C., Matos, M., McEwan, K., and Gilbert, P. (2019). Styles of leadership, fears of compassion, and competing to avoid inferiority. *Fron. Psychol.* 9:2460. doi: 10.3389/fpsyg.2018.02460

Baumeister, R. F. (1996). *Evil: Inside Human Violence and Cruelty*. Dallas, TX: Freeman Press.

Becker, J. C., Hartwich, L., and Haslam, S. A. (2021). Neoliberalism can reduce well-being by promoting a sense of social disconnection, competition, and loneliness. *Br. J. Soc. Psychol.* doi: 10.1111/bjso.12438 [Epub ahead of print].

Biglan, A. (2020). *Rebooting Capitalism: How Behavioral Science Can Forge a Society that Works for Everyone*. New York, NY: Barnes & Noble Booksellers, Inc.

Black, W. (2016). *Psychopathic Cultures and Toxic Empires*. Tokyo: Frontline Noir.

Bloom, P. (2017). *Against Empathy: The Case for Rational Compassion*. London: Random House.

Böckler, A., Tusche, A., and Singer, T. (2016). The structure of human prosociality: differentiating altruistically motivated, norm motivated, strategically motivated, and self-reported prosocial behavior. *Soc. Psychol. Pers. Sci.* 7, 530–541. doi: 10.1177/1948550616639650

Boehm, C. (1999). *Hierarchy in the Forest: The Evolution of Egalitarian Behavior*. Cambridge, MA: Harvard University Press.

Boehm, C. (2000). Conflict and the evolution of social control. *J. Conscious. Stud.* 7, 79–101.

Bowlby, J. (1969). *Attachment: Attachment and Loss*, Vol. 1. London: Hogarth Press.

Bowlby, J. (1973). *Separation, Anxiety and Anger (Attachment and Loss)*, Vol. 2. London: Hogarth Press.

Bowlby, J. (1980). *Loss: Sadness and Depression (Attachment and Loss)*, Vol. 3. London: Hogarth Press.

Brown, K. W., Creswell, J. D., and Ryan, R. M. (eds) (2015). *Handbook of Mindfulness: Theory, Research, and Practice*. New York, NY: The Guilford Press.

Brown, S. L., and Brown, R. M. (2015). Connecting prosocial behavior to improved physical health: contributions from the neurobiology of parenting. *Neurosci. Biobehav. Rev.* 55, 1–17. doi: 10.1016/j.neubiorev.2015.04.004

Brown, S. L., and Brown, R. M. (2017). "Compassionate neurobiology and health," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron, and J. R. Doty (New York, NY: Oxford University Press), 159–420. doi: 10.1093/oxfordhb/9780190464684.013.13

Bunting, M. (2004). *Willing Slaves: How the Overwork Culture is Ruling Our Lives*. London: Collins.

Burnstein, E., Crandall, C., and Kitayama, S. (1994). Some neo-darwinian rules for altruism: Weighing cues for inclusive fitness as a function of biological importance of the decision. *J. Pers. Soc. Psychol.* 67, 773–807. doi: 10.1037/0022-3514.67.5.773

Buss, D. M. (2019). *Evolutionary Psychology: The New Science of the Mind*, 6th Edn, London: Psychology Press. doi: 10.4324/9780429061417

Buss, D. M., and Dedden, L. A. (1990). Derogation of competitors. *J. Soc. Pers. Relationsh.* 7, 395–422. doi: 10.1177/0265407590073006

Byrne, R. (1995). *The Thinking Ape: Evolutionary Origins of Intelligence*. Oxford: Oxford University Press.

Carney, M. (2020). *How we get What we Value*. BBC Reith lectures.

Carter, S., Bartal, I. B., and Porges, E. (2017). "The roots of compassion: an evolutionary and neurobiological perspective," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, and M. C. Worline (New York, NY: Oxford), 178–188. doi: 10.1093/oxfordhb/9780190464684.013.14

Cassidy, J., and Shaver, P. R. (2016). *Handbook of Attachment: Theory, Research and Clinical Applications*, 3rd Edn, New York, NY: Guilford.

Catarino, F., Gilbert, P., McEwan, K., and Baião, R. (2014). Compassion motivations: distinguishing submissive compassion from genuine compassion and its association with shame, submissive behaviour, depression, anxiety and stress. *J. Soc. Clin. Psychol.* 33, 399–412. doi: 10.1521/jscp.2014.33.5.399

Chance, M. (1988). *Social Fabrics of the Mind*. London: Lawrence Erlbaum.

Chomsky, N. (1992). *Deterring Democracy*. Brooklyn, NY: Verso Books.

Chugani, H. T., Behen, M. E., Muzik, O., Juhász, C., Nagy, F., and Chugani, D. C. (2001). Local brain functional activity following early deprivation: a study of postinstitutionalized Romanian orphans. *Neuroimage* 14, 1290–1301. doi: 10.1006/nimg.2001.0917

Cieri, R. L., Churchill, S. E., Franciscus, R. G., Tan, J., Hare, B., Athreya, S., et al. (2014). Craniofacial feminization, social tolerance, and the origins of behavioral modernity. *Curr. Anthropol.* 55, 419–443. doi: 10.1086/677209

Cirelli, L. K., Wan, S. J., and Trainor, L. J. (2014). Fourteen-month-old infants use interpersonal synchrony as a cue to direct helpfulness. *Philos. Trans. R. Soc. B Biol. Sci.* 369:20130400. doi: 10.1098/rstb.2013.0400

Cohen, D., Vandello, J., and Rantilla, A. K. (1998). "The sacred and the social: cultures of honor and violence," in *Shame Interpersonal Behaviour, Psychopathology, and Culture*, eds P. Gilbert and B. Andrews (Oxford: Oxford University Press), 261–282.

Coles, M. I., and Gent, B. (eds) (2020). *Education for Survival the Pedagogy of Compassion*. London: Institute of Education Press.

Colqhoun, L., Workman, L., and Fowler, J. (2020). "The problem of altruism and future directions," in *Cambridge Handbook of Evolutionary Perspectives on Human Behavior*, eds L. Workman, W. Reader, and J. H. Barkow (Cambridge: Cambridge University Press), 125–138. doi: 10.1017/9781108131797.011

Cordaro, D. T., Brackett, M., Glass, L., and Anderson, C. L. (2016). Contentment: perceived completeness across cultures and traditions. *Rev. Gen. Psychol.* 20, 221–235. doi: 10.1037/gpr0000082

Cowan, C. S. M., Callaghan, B. L., Kan, J. M., and Richardson, R. (2016). The lasting impact of early-life adversity on individuals and their descendants: potential mechanisms and hope for intervention. *Genes Brain Behav.* 15, 155–168. doi: 10.1111/gbb.12263

Cozolino, L. (2014). *The Neuroscience of Human Relationships: Attachment and the Developing Social Brain (Norton Series on Interpersonal Neurobiology)*, 2nd Edn, New York, NY: WW Norton & Company.

Cozolino, L. (2017). *The Neuroscience of Psychotherapy: Healing the Social Brain, (Norton Series on Interpersonal Neurobiology)*, 2nd Edn, New York, NY: WW Norton & Company.

Crocker, J., Canevello, A., and Brown, A. A. (2017). Social motivation: costs and benefits of selfishness and otherishness. *Annu. Rev. Psychol.* 68, 299–325. doi: 10.1146/annurev-psych-010416-044145

Curl, A., and Kearns, A. (2015). Financial difficulty and mental wellbeing in an age of austerity: the experience in deprived communities. *Soc. Policy Soc.* 14, 217–240. doi: 10.1017/S1474746414000475

Curran, T., and Hill, A. P. (2019). Perfectionism is increasing over time: a meta-analysis of birth cohort differences from 1989 to 2016. *Psychol. Bull.* 145:410. doi: 10.1037/bul0000138

Dawkins, R. (1976). *The Selfish Gene*. London: Paladin.

Decety, J. E., and Ickes, W. E. (2009). *The Social Neuroscience of Empathy*. Cambridge, MA: MIT Press. doi: 10.7551/mitpress/9780262012973.001.0001

De Dreu, C. K., Greer, L. L., Van Kleef, G. A., Shalvi, S., and Handgraaf, M. J. (2011). Oxytocin promotes human ethnocentrism. *Proc. Natl. Acad. Sci. USA* 108, 1262–1266. doi: 10.1073/pnas.1015316108

DeFelipe, J. (2011). The evolution of the brain, the human nature of cortical circuits, and intellectual creativity. *Front. Neuroanat.* 5:29. doi: 10.3389/fnana.2011.00029

Del Giudice, M. (2016). The life history model of psychopathology explains the structure of psychiatric disorders and the emergence of the p factor: a simulation study. *Clin. Psychol. Sci.* 4, 299–311. doi: 10.1177/2167702615583628

Di Bello, M. D., Carnevali, L., Petrocchi, N., Thayer, J. F., Gilbert, P., and Ottaviani, C. (2020). The compassionate vagus: a meta-analysis on the connection between compassion and heart rate variability. *Neurosci. Biobehav. Rev.* 5:16. doi: 10.1016/j.neubiorev.2020.06.016

Dalai Lama. (1995). *The Power of Compassion*. New York, NY: HarperCollins.

Diogo, R. (2019). Sex at dusk, Sex at dawn, Delfish genes: how old-dated evolutionary ideas are used to defend fallacious misogynistic views on sex evolution. *J. Soc. Sci. Hum.* 5, 350–367.

Dunbar, R. (2014). *Human Evolution: A Pelican Introduction*. London: Penguin.

Durkee, P. K., Lukaszewski, A. W., and Buss, D. M. (2019). Pride and shame: key components of a culturally universal status management system. *Evol. Hum. Behav.* 40, 470–478. doi: 10.1016/j.evolhumbehav.2019.06.004

Eisler, R., and Fry, D. P. (2019). *Nurturing Our Humanity How Domination in Partnership Shaped Our Brains, Lives, and Future*. Oxford: Oxford University Press. doi: 10.1093/oso/9780190935726.001.0001

Ekman, P., and Ekman, E. (2017). "Is global compassion achievable," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron, and J. R. Doty (New York, NY: Oxford University Press), 41–49. doi: 10.1093/oxfordhb/9780190464684.013.4

Elliott, L. (2019). *World's 26 Richest People Own as Much as Poorest 50%, says Oxfam*. London: Guardian.

Fredrickson, B. L. (2013). "Positive emotions broaden and build," in *Advances on Experimental Social Psychology*, Vol. 47, eds E. Ashby Plant and P. G. Devine (Burlington: Academic Press), 1–53. doi: 10.1016/B978-0-12-407236-7.00001-2

Freeman, H. (1991). The human brain and political behaviour. *Br. J. Psychiatry* 159, 19–32. doi: 10.1192/bjp.159.1.19

Furtner, M. R., Maran, T., and Rauthmann, J. F. (2017). "Dark leadership: the role of leaders' dark triad personality traits," in *Leader Development Deconstructed*, Vol. 15, *Ann. Theor. Psychol.*, eds M. Clark and C. Gruber (Berlin: Springer), 75–99. doi: 10.1007/978-3-319-64740-1_4

Fry, D. P., and Söderberg, P. (2014). Myths about hunter-gatherers redux: nomadic forager war and peace. *J. Aggress. Confl. Peace Res.* 6, 255–266. doi: 10.1108/JACPR-06-2014-0127

Galbraith, J. (1993). *The Culture of Contentment*. London: Penguin.

Galea, S. (2020). The art of Medicine: compassion in a time of COVID. *Lancet* 395, 1897–1898. doi: 10.1016/S0140-6736(20)31202-2

Geary, D. C. (2000). Evolution and proximate expression of human parental investment. *Psychol. Bull.* 126, 55–77. doi: 10.1037/0033-2909.126.1.55

Gilbert, P. (1997). "The biopsychosociology of meaning," in *The Transformation of Meaning: Reconciling Theory and Therapy in Cognitive, Behaviour and Related Therapies*, eds M. Power and C. Brewin (Chichester: Wiley), 33–56.

Gilbert, P. (1998). Evolutionary psychopathology: why isn't the mind better designed than it is? *Br. J. Med. Psychol.* 71, 353–373. doi: 10.1111/j.2044-8341.1998.tb00998.x

Gilbert, P. (2000). "Varieties of submissive behaviour: their evolution and role in depression," in *Subordination and Defeat. An Evolutionary Approach to Mood Disorders*, eds L. Sloman and P. Gilbert (Hillsdale, NJ: Lawrence Erlbaum), 3–46.

Gilbert, P. (2005). "Compassion and cruelty. A biopsychosocial approach," in *Compassion: Conceptualizations, Research and Use in Psychotherapy*, ed. P. Gilbert (London: Routledge), 11–74.

Gilbert, P. (2007). *Psychotherapy and Counselling for Depression*, 3rd Edn, London: Sage. doi: 10.4135/9781446279830

Gilbert, P. (2009). *The Compassionate Mind: A New Approach to the Challenge of Life*. London: Constable & Robinson.

Gilbert, P. (2010). *Compassion Focused Therapy*. London: Routledge. doi: 10.4324/9780203851197

Gilbert, P. (2017a). "Compassion as a social mentality: an evolutionary approach," in *Compassion: Concepts, Research and Applications*, ed. P. Gilbert (London: Routledge), 31–68. doi: 10.4324/9781315564296-3

Gilbert, P. (2017b). *Compassion: Concepts, Research and Applications*. London: Routledge. doi: 10.4324/9781315564296

Gilbert, P. (2017c). "Compassion: definitions and controversies," in *Compassion: Concepts, Research and Applications*, ed. P. Gilbert (London: Routledge), 3–30. doi: 10.4324/9781315564296-1

Gilbert, P. (2018). *Living Like Crazy*. New York, NY: Annwyn House.

Gilbert, P. (2019a). "Distinguishing shame, humiliation and guilt: an evolutionary functional analysis and compassion focused interventions," in *The Bright Side of Shame*, eds C.-H. Mayer and E. Vanderheiden (New York, NY: Springer), 413–432. doi: 10.1007/978-3-030-13409-9_27

Gilbert, P. (2019b). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbert, P. (2019c). Psychotherapy for the 21st century: an integrative, evolutionary, contextual, biopsychosocial approach. *Psychol. Psychother. Theory Res. Pract.* 92, 164–189. doi: 10.1111/papt.12226

Gilbert, P. (2020a). Compassion: from its evolution to a psychotherapy. *Front. Psychol.* 11:3123.

Gilbert, P. (2020b). "Evolutionary functional analysis: the study of social mentalities, social rank and caring and compassion," in *Making an Impact on Mental Health*, eds J. N. Kirby and P. Gilbert (London: Routledge), 4–42. doi: 10.4324/9780429244551-2

Gilbert, P. (2020c). "The evolution of prosocial behavior: from caring to compassion," in *Cambridge Handbook of Evolutionary Perspectives on Human Behavior*, eds L. Workman, W. Reader, and J. H. Barkow (Cambridge: Cambridge University Press), 419–435. doi: 10.1017/9781108131797.035

Gilbert, P., and Basran, J. (2019). The evolution of prosocial and antisocial competitive behavior and the emergence of prosocial and antisocial leadership styles. *Front. Psychol.* 10:610. doi: 10.3389/fpsyg.2019.00610

Gilbert, P., Basran, J., MacArthur, M., and Kirby, J. N. (2019). Differences in the semantics of prosocial words: an exploration of compassion and kindness. *Mindfulness* 10, 2259–2271. doi: 10.1007/s12671-019-01191-x

Gilbert, P., and Choden (2013). *Mindful Compassion*. London: Constable Robinson.

Gilbert, P., and Irons, C. (2005). "Focused therapies and compassionate mind training for shame and self-attacking," in *Compassion: Conceptualisations, Research and Use in Psychotherapy*, ed. P. Gilbert (London: Routledge), 263–325.

Gilbert, P., and Mascaro, J. (2017). "Compassion: fears, blocks, and resistances: an evolutionary investigation," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron, and J. R. Doty (New York, NY: Oxford University Press), 399–420. doi: 10.1093/oxfordhb/9780190464684.013.29

Gilbert, P., Matos, M., Wood, W., Matatos, K., and Maratos, F. (2020). *Education for Survival the Pedagogy of Compassion*, eds M. I. Coles and B. Gent (London: Institute of Education Press), 44–76.

Gilbert, P., McEwan, K., Matos, M., and Rivis, A. (2011). Fears of compassion: development of three self-report measures. *Psychol. Psychother.* 84, 239–255. doi: 10.1348/147608310X526511

Gilbert, P., Price, J. S., and Allan, S. (1995). Social comparison, social attractiveness and evolution: how might they be related? *New Ideas Psychol.* 13, 149–165. doi: 10.1016/0732-118X(95)00002-X

Gilbert, P. (1989/2016). *Human Nature and Suffering*. London: Routledge. doi: 10.4324/9781315564258

Gilbert, P. (1992/2016). *Depression: The Evolution of Powerlessness*. London: Lawrence Erlbaum Associates. doi: 10.4324/9781315564319

Gilligan, J. (2011). *Why Some Politicians are More Dangerous than Others*. New York, NY: Polity press (and see https://youtu.be/1uJv22DGefA).

Gilmore, D. D. (1990). *Manhood in the Making: Cultural Concepts of Masculinity*. London: Yale University Press.

Gilmour, I. (1993). *Dancing with Dogma. Britain under Thatcherism*. London: Simon and Schuster.

Gintis, H., Bowles, S., Boyd, R., and Fehr, E. (2003). Explaining altruistic behavior in humans. *Evol. Hum. Behav.* 24, 153–172. doi: 10.1016/S1090-5138(02)00157-5

Glover, J. (2012). *Humanity a Moral History of the 20th Century*, 2nd Edn, London: Yale University press.

Goetz, J. E., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Green, M., Kirby, J. N., and Nielsen, M. (2018). The cost of helping: an exploration of compassionate responding in children. *Br. J. Dev. Psychol.* 36, 673–678. doi: 10.1111/bjdp.12252

Green, V. (2005). *The Madness of Kings*. London: Sutton Publishing.

Hagen, E. H. (1999). The functions of postpartum depression. *Evol. Hum. Behav.* 20, 325–359. doi: 10.1016/S1090-5138(99)00016-1

Han, X., Gelfand, M. J., Wu, B., Zhang, T., Li, W., Gao, T., et al. (2020). A neurobiological association of revenge propensity during intergroup conflict. *eLife* 9:e52014. doi: 10.7554/eLife.52014.sa2

Hanson, L., and Baker, D. L. (2017). Corporate psychopathsin public agencies? *J. Public Manag. Soc. Policy* 24, 21–41.

Harari, Y. N. (2014). *Sapiens: A Brief History of Humankind*. London: Random House.

Harvard Graduate School of Education (2020). *The Children We Mean to Raise: The Real Messages Adults Are Sending About Values*. Available online at: https://mcc.gse.harvard.edu/reports/children-mean-raise

Haslam, C., Jetten, J., Cruwys, T., Dingle, G. A., and Haslam, A. S. (2018). *The New Psychology of Health: Unlocking the Social Cure*. London: Routledge. doi: 10.4324/9781315648569

Haslam, S. A., and Reicher, S. D. (2012). Contesting the "nature" of conformity: what Milgram and Zimbardo's studies really show. *PLoS Biol.* 10:e1001426. doi: 10.1371/journal.pbio.1001426

Hein, G., Silani, G., Preuschoff, K., Batson, C. D., and Singer, T. (2010). Neural responses to ingroup and outgroup members' suffering predict individual differences in costly helping. *Neuron* 68, 149–160. doi: 10.1016/j.neuron.2010.09.003

Helliwell, J., Layard, R., and Sachs, J. (2012). *World Happiness Report 2012*. New York, NY: UN Sustainable Development Solutions Network.

Hermanto, N., Zuroff, D. C., Kopala-Sibley, D. C., Kelly, A. C., Matos, M., and Gilbert, P. (2016). Ability to receive compassion from others buffers the depressogenic effect of self-criticism: a cross-cultural multi-study analysis. *Pers. Individ. Differ.* 98, 324–332. doi: 10.1016/j.paid.2016.04.055

Hickle, J. (2018). Degrowth: a theory of radical abundance. *Real World Econ. Rev.* 87, 54–68.

Ho, A. K., Sidanius, J., Pratto, F., Levin, S., Thomsen, L., Kteily, N., et al. (2012). Social dominance orientation: revisiting the structure and function of a variable predicting social and political attitudes. *Pers. Soc. Psychol. Bull.* 38, 583–606. doi: 10.1177/0146167211432765

Hobfoll, S. E. (2018). *Tribalism: The Evolutionary Origins of Peer Politics*. London: Palgrave. doi: 10.1007/978-3-319-78405-2

Hofer, M. A. (1984). Relationships is regulated: a psychobiologic perspective on bereavement. *Psychosom. Med.* 46, 183–197. doi: 10.1097/00006842-198405000-00001

Hofer, M. A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatr.* 83, 9–18. doi: 10.1111/j.1651-2227.1994.tb13260.x

Hopkins, N. (2020). *Revealed: UK Ministers Were Warned Last Year of Risks of Coronavirus pandemic*. London: Guardian.

Hrdy, S. B. (2009). *Mothers and Others the Evolutionary Origins of Mutual Understanding*. Cambridge, MA: Harvard University Press.

Huang, J. Y., and Bargh, J. A. (2014). The selfish goal: autonomously operating motivational structures as the proximate cause of human judgment and behavior. *Behav. Brain Sci.* 37, 121–175. doi: 10.1017/S0140525X13000290

Hunt, E. (2020). *Blue Sky Thinking: Is it Time to Stop Work Taking Over Our Lives?*. London: The Observer.

James, O. (2008). *The Selfish Capitalist: Origins of Affluenza*. New York, NY: Random House.

Jetten, J., Mols, F., and Steffens, N. K. (2020). Prosperous ut fearful of falling: the wealth paradox, collective angst, and opposition to Immigration. *Pers. Soc. Psychol. Bull.* 2020:4112. doi: 10.1177/0146167220944112

Johnson, S. L., Leedom, L. J., and Muhtadie, L. (2012). The dominance behavioral system and psychopathology: evidence from self-report, observational, and biological studies. *Psychol. Bull.* 138:692. doi: 10.1037/a0027503

Kasser, T. (2016). Materialistic values and goals. *Annu. Rev. Psychol.* 67, 489–514. doi: 10.1146/annurev-psych-122414-033344

Kelly, A. C., Zuroff, D. C., Leybman, M. J., and Gilbert, P. (2012). Social safeness, received social support, and maladjustment: testing a tripartite model of affect regulation. *Cogn. Therapy Res.* 36, 815–826. doi: 10.1007/s10608-011-9432-5

Kelman, H. C., and Hamilton, V. L. (1989). *Crimes of Obedience: Toward a Social Psychology of Authority and Responsibility*. London: Yale University Press.

Keltner, D. (2009). *Born to be Good: The Science of a Meaningful Life*. New York, NY: WW Norton & Company.

Keltner, D., Gruenfeld, D. H., and Anderson, C. (2003). Power, approach, and inhibition. *Psychol. Rev.* 110:265. doi: 10.1037/0033-295X.110.2.265

Keltner, D., Kogan, A., Piff, P. K., and Saturn, S. R. (2014). The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: core processes from gene to meme. *Annu. Rev. Psychol.* 65, 425–460. doi: 10.1146/annurev-psych-010213-115054

Keltner, D., Oatley, K., and Jenkins, J. M. (2018). *Understanding Emotions*. Hoboken, NJ: Wiley Global Education.

Kessler, S. E. (2020). Why care: complex evolutionary history of human healthcare networks. *Front. Psychol.* 11:199. doi: 10.3389/fpsyg.2020.00199

Kim, J. J., Cunnington, R., and Kirby, J. N. (2020a). The neurophysiological basis of compassion: an fMRI meta-analysis of compassion and its related neural processes. *Neurosci. Biobehav. Rev.* 8, 11–23. doi: 10.1016/j.neubiorev.2019.10.023

Kim, J. J., Parker, S. L., Doty, J., Cunnington, R., Gilbert, P., and Kirby, J. N. (2020b). Neurophysiological and behavioural markers of compassion. *Sci. Rep.* 10:6789. doi: 10.1038/s41598-020-63846-3

Kirby, J. N., Day, J., and Sagar, V. (2019). The 'Flow' of compassion: a meta-analysis of the fears of compassion scales and psychological functioning. *Clin. Psychol. Rev.* 70, 26–39. doi: 10.1016/j.cpr.2019.03.001

Kushlev, K., Dunn, E. W., and Ashton-James, C. E. (2012). Does affluence impoverish the experience of parenting? *J. Exper. Soc. Psychol.* 48, 1381–1384. doi: 10.1016/j.jesp.2012.06.001

Lampert, K. (2005). *Traditions of Compassion: From Religious Duty to Social Activism*. New York, NY: Palgrave Macmillan. doi: 10.1057/9780230503755

Lavi, N., and Friesem, D. E. (eds) (2019). *Towards a Broader View of Hunter-Gatherer Sharing*. Cambridge, MA: McDonald Institute Press. doi: 10.3828/hgr.2017.18

Leary, M. R. (2007). *The Curse of the Self: Self-Awareness, Egotism, and the Quality of Human Life*. New York, NY: Oxford University Press.

Lee-Choi, A. Y., and Bargh, J. A. (2001). *The Use and Abuse of Power. Newt Multiple Perspectives on the Causes of Corruption*. London: Psychology Press.

Lepage, J., Bègue, L., Zerhouni, O., Dambrun, M., Vezirian, K., Besson, T., et al. (2020). Authoritarian attitudes are associated with higher autonomic reactivity to stress and lower recovery. *Emotion* 2020:775. doi: 10.1037/emo0000775

Li, N. P., van Vugt, M., and Colarelli, S. M. (2017). The evolutionary mismatch hypothesis: implications for psychological science. *Curr. Direct. Psychol. Sci.* 27, 38–44. doi: 10.1177/0963721417731378

Liotti, G., and Gilbert, P. (2011). Mentalizing, motivations and social mentalities: theoretical considerations and implications for psychotherapy. *Psychol. Psychother.* 84, 9–25. doi: 10.1348/147608310X520094

Lipman-Blumen, J. (2005). *The Lure of Toxic Leaders: why We Follow Destructive Bosses and Corrupt Politicians – and How We Can Survive Them*. Oxford: Oxford University Press.

Lippard, E. T., and Nemeroff, C. B. (2020). The devastating clinical consequences of child abuse and neglect: increased disease vulnerability and poor treatment response in mood disorders. *Am. J. Psychiatr.* 177, 20–36. doi: 10.1176/appi.ajp.2019.19010020

Loewenstein, G., and Small, D. A. (2007). The scarecrow and the tin man: the vicissitudes of human sympathy and caring. *Rev. Gen. Psychol.* 11, 112–126. doi: 10.1037/1089-2680.11.2.112

MacLean, N. (2017). *Democracy in Chains the Deep History of the Radical Rights Stealth Plans for America*. New York, NY: Scribe.

Mann, M. (1986). *The Sources of Social Power: A History of Power from the Beginning to AD 1760.-1986*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511570896

Marsh, A. A. (2019). The caring continuum: evolved hormonal and proximal mechanisms explain prosocial and antisocial extremes. *Annu. Rev. Psychol.* 70, 347–371. doi: 10.1146/annurev-psych-010418-103010

Martin, S. R., Côté, S., and Woodruff, T. (2016). Echoes of our upbringing: how growing up wealthy or poor relates to narcissism, leader behavior, and leader effectiveness. *Acad. Mana. J.* 59, 2157–2177. doi: 10.5465/amj.2015.0680

Mascaro, J. S., Florian, M. P., Ash, M. J., Palmer, P. K., Frazier, T., Condon, P., et al. (2020). Ways of knowing compassion: how do we come to know, understand, and measure compassion when we see it? *Front. Psychol.* 11:547241. doi: 10.3389/fpsyg.2020.547241

Mathews, D. (2019). *Are the 26 Billionaires Worth More than Half the Planet the Debate, Explained*. Available online at: https://www.vox.com/future-perfect/2019/1/22/18192774/oxfam-inequality-report-2019-davos-wealth

Mayseless, O. (2016). *The Caring Motivation: An Integrated Theory*. Oxford: Oxford University Press. doi: 10.1093/acprof:oso/9780199913619.001.0001

McCoy, D. (2020). *Coronavirus has Exposed The Dangerous Failings of NHS Marketisation*. London: The Guardian.

McDade, T. W., Ryan, C. P., Jones, M. J., Hoke, M. K., Borja, J., Miller, G. E., et al. (2019). Genome-wide analysis of DNA methylation in relation to socioeconomic status during development and early adulthood. *Am. J. Phys. Anthropol.* 169, 3–11. doi: 10.1002/ajpa.23800

McGhee, K. E., and Bell, A. M. (2014). Paternal care in a fish: epigenetics and fitness enhancing effects on offspring anxiety. *Proc. R. Soc. B Biol. Sci.* 281:20141146. doi: 10.1098/rspb.2014.1146

Mercier, H. (2017). How gullible are we? a review of the evidence from psychology and social science. *Rev. Gen. Psychol.* 21, 103–122. doi: 10.1037/gpr0000111

Milgram, S. (1974). *Obedience to Authority: An Experimental View*. New York, NY: Harper and Row.

Mols, F., and Jetten, J. (2020). Understanding support for populist radical right parties: toward a model that captures both demand-and supply-side factors. *Front. Commun.* 5:557561. doi: 10.3389/fcomm.2020.557561

Morhenn, V., Beavin, L. E., and Zak, P. J. (2012). Massage increases oxytocin and reduces adrenocorticotropin hormone in humans. *Altern. Ther. Health Med.* 18:11.

Mulgan, G. (2006). *Good and Bad Power The Ideals and Betrayals of Government*. London: Penguin.

Muller, M. N., Marlowe, F. W., Bugumba, R., and Ellison, P. T. (2009). Testosterone and paternal care in East African foragers and pastoralists. *Proc. R. Soc. B Biol. Sci.* 276, 347–354. doi: 10.1098/rspb.2008.1028

Murray, C., and Frijters, P. (2017). *Game of Mates: How Favours Bleed the Nation*. Canberra: Australian cataloguing library.

Music, G. (2014). *The Good Life While Being an the New Science of Altruism, Selfishness and Immorality*. London: Routledge. doi: 10.4324/9781315849393

Music, G. (2017). *Nurturing Natures: Attachment and Children's Emotional, Sociocultural and Brain Development*, 2nd Edn, London: Routledge. doi: 10.4324/9781315564296-10

Naish, J. (2008). *Enough: Breaking Free from the World of More*. Wilmington, NC: Holder and Stratton.

Narvaez, D. (2017). "Evolution, child raising and compassionate morality," in *Compassion: Concepts, Research and Applications*, ed. P. Gilbert (London: Routledge), 31–68.

Narvaez, D. (2020). Ecocentrism: resetting baselines for virtue development. *Ethic. Theory Moral Pract.* 23, 1–16. doi: 10.1007/s10677-020-10091-2

Neate, R. (2020). *Ten Billionaires Reap $400bn Boost to Wealth During Pandemic. Observer*. Available online at: https://www.theguardian.com/technology/2020/dec/19/ten-billionaires-reap-400bn-boost-to-wealth-during-pandemic?CMP=Share_AndroidApp_Other (accessed December 19).

Nesse, R. M. (2019). *Good Reasons for Bad Feelings: Insights from the Frontier of Evolutionary Psychiatry*. New York, NY: Dutton.

Norman, L., Lawrence, N., Iles, A., Benattayallah, A., and Karl, A. (2015). Attachment-security priming attenuates amygdala activation to social and linguistic threat. *Soc. Cogn. Affect. Neurosci.* 10, 832–839. doi: 10.1093/scan/nsu127

Nozick, R. (1989). *The Examined Life*. New York, NY: Simon and Schuster.

O'Donnell, K. J., and Meaney, M. J. (2020). Epigenetics, development, and psychopathology. *Annu. Rev. Clin. Psychol.* 16, 327–350. doi: 10.1146/annurev-clinpsy-050718-095530

Ornstein, R. E. (1986). *Multimind*. New York, NY: Houghton Mifflin Company.

Owen, D. (2008). *In Sickness and in Power Illness in Heads of Government During the Last 100 Years*. London: Methuen.

Owen, D. (2020). *Hubris. The Road to Donald Trump*. London: Methuen.

Perry, R., Sibley, G., and Duckitt, J. (2013). Dangerous and competitive worldviews: a meta-analysis of their associations with social dominance orientation and right-wing authoritarianism. *J. Res. Pers.* 47, 116–127. doi: 10.1016/j.jrp.2012.10.004

Peterson, R. D., and Palmer, C. L. (2019). The dark triad and nascent political ambition. *J. Elect. Public Opin. Part.* doi: 10.1080/17457289.2019.1660354

Petrocchi, N., and Cheli, S. (2019). The social brain and heart rate variability: implications for psychotherapy. *Psycho. Psychother.* 92, 208–223. doi: 10.1111/papt.12224

Piff, P. K., Kraus, M. W., and Keltner, D. (2018). Unpacking the inequality paradox: the psychological roots of inequality and social class. *Adv. Exper. Soc. Psychol.* 57, 53–124. doi: 10.1016/bs.aesp.2017.10.002

Pilger, J. (2007). *Freedom Next Time*. Hyderabad: Black Swan.

Porges, S. W. (2007). The polyvagal perspective. *Biol. Psychol.* 74, 116–143. doi: 10.1016/j.biopsycho.2006.06.009

Porges, S. W. (2017). "Vagal pathways: portals to compassion," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, and M. C. Worline (New York, NY: Oxford University Press), 189–202.

Porges, S. W., and Furman, S. A. (2011). The early development of the autonomic nervous system provides a neural platform for social behaviour: a polyvagal perspective. *Infant Child Dev.* 20, 106–118. doi: 10.1002/icd.688

Poulin, M. J. (2017). "To help or not to help; Goal commitment and the goodness of compassion," in *The Oxford Handbook of Compassion Science*, eds E. M. Seppälä, E. Simon-Thomas, S. L. Brown, M. C. Worline, L. Cameron, J. R. Doty, et al. (New York, NY: Oxford University Press), 355–367.

Price, J. S. (1972). Genetic and phylogenetic aspects of mood variation. *Intern. J. Ment. Health* 1, 124–144. doi: 10.1080/00207411.1972.11448570

Rawls, J. (1999). *A Theory of Justice. Revised Edition*. Cambridge: Harvard University Press, 1999.

Ribeiro da Silva, D., Rijo, D., Castilho, P., and Gilbert, P. (2019). The efficacy of a compassion-focused therapy-based intervention in reducing psychopathic traits and disruptive behavior: a clinical case study with a juvenile detainee. *Clin. Case Stud.* 18, 323–343. doi: 10.1177/1534650119849491

Ribeiro da Silva, D., Rijo, D., Salekin, R., Paulo, M., Miguel, R., and Gilbert, P. (2020). Clinical change in psychopathic traits after the PSYCHOPATHY. COMP program: preliminary findings of a controlled trial with male detained youth. *J. Exper. Criminol.* doi: 10.1007/s11292-020-09418-x

Ricard, M. (2015). *Altruism. The Power of Compassion to Change Itself and the World*. London: Atlantic Books.

Rockliff, H., Karl, A., McEwan, K., Gilbert, J., Matos, M., and Gilbert, P. (2011). Effects of intranasal oxytocin on compassion focused imagery. *Emotion* 11, 1388–1396. doi: 10.1037/a0023861

Rogers, N. (2007). *The Press Gang: Naval Impressment and Its Opponents in Georgian Britain*. Bloomsbury Publishing.

Rummel, R. (2002). *20th Century of Democide*. Available online at: http://www.hawaii.edu/powerkills/20TH.HTM

Ryan, C. (2019). *Civilized to Death: The Price of Progress*. New York, NY: Avid Reader Press/Simon & Schuster.

Sachs, J. D. (2012). *The Price of Civilization: Reawakening American Virtue and Prosperity*. New York, NY: Random House.

Sanghera, J. (2009). *Daughters of Shame*. London: Hachette.

Sapolsky, M. R. (2017). *Behave: The Biology of Humans at Our Best and Worst*. London: Vintage.

Sapolsky, R. M., and Share, L. J. (2004). A pacific culture among wild baboons: its emergence and transmission. *PLoS Biol.* 2:e106. doi: 10.1371/journal.pbio.0020106

Schaverien, J. (2015). *Boarding School Syndrome the Psychological Trauma of the Privileged Child*. London: Routledge. doi: 10.4324/9781315716305

Seppälä, E. M., Simon-Thomas, E., Brown, S. L., Worline, M. C., Cameron, C. D., and Doty, J. R. (eds) (2017). *The Oxford Handbook of Compassion Science*. New York, NY: Oxford University Press. doi: 10.1093/oxfordhb/9780190464684.001.0001

Shaffer, B., and Duckitt, J. (2013). The dimensional structure of people's fears, threats, and concerns and their relationship with right-wing authoritarianism

and social dominance orientation. *Intern. J. Psychol.* 48, 6–17. doi: 10.1080/00207594.2012.696651

Shay, J. (2010). *Achilles in Vietnam: Combat Trauma and the Undoing of Character*. New York, NY: Simon and Schuster.

Shirtcliff, E. A., Vitacco, M. J., Graf, A. R., Gostisha, A. J., Merz, J. L., and Zahn-Waxler, C. (2009). Neurobiology of empathy and callousness: implications for the development of antisocial behavior. *Behav. Sci. Law* 27, 137–171. doi: 10.1002/bsl.862

Shonkoff, J. P. (2011). Protecting brains, not simply stimulating minds. *Science* 333, 982–983. doi: 10.1126/science.1206014

Shu, K., Bernard, H. R., and Liu, H. (2019). "Studying fake news via network analysis: detection and mitigation," in *Emerging Research Challenges and Opportunities in Computational Social Network Analysis and Mining* (Cham: Springer), 43–65.

Sidanius, J., Cotterill, S., Sheehy-Skeffington, J., Kteily, N., and Carvacho, H. (2017). "Social dominance theory: explorations in the psychology of oppression," in *The Cambridge Handbook of the Psychology of Prejudice*, eds C. G. Sibley and F. K. Barlow (Cambridge: Cambridge University Press), 149–187. doi: 10.1017/9781316161579.008

Sidanius, J., Kteily, N., Sheehy-Skeffington, J., Ho, A. K., Sibley, C., and Duriez, B. (2013). You're inferior and not worth our concern: the interface between empathy and social dominance orientation. *J. Pers.* 81, 313–323. doi: 10.1111/jopy.12008

Siegel, D. J. (2016). *Mind: A Journey into the Heart of Being Human*. New York, NY: Norton.

Singer, T., and Engert, V. (2019). It matters what you practice: differential training effects on subjective experience, behavior, brain and body in the ReSource Project. *Curr. Opin. Psychol.* 28, 151–158. doi: 10.1016/j.copsyc.2018.12.005

Slavich, G. M. (2020). Social safety theory: a biologically based evolutionary perspective on life stress, health, and behavior. *Annu. Rev. Clin. Psychol.* 16, 265–295. doi: 10.1146/annurev-clinpsy-032816-045159

Sloman, L., and Gilbert, P. (2000). *Subordination and Defeat. An Evolutionary Approach to Mood Disorders*. Mahwah, NJ: Lawrence Erlbaum. doi: 10.4324/9781410605207

Slovic, P., Mertz, C. K., Markowitz, D. M., Quist, A., and Västfjäll, D. (2020). Virtuous violence from the war room to death row. *Proc. Natl. Acad. Sci. U.S.A.* 117, 20474–20482. doi: 10.1073/pnas.2001583117

Spikins, P. (2015). *How Compassion Made us Human. The Evolutionary Origins of Tenderness Trust and Morality*. Barnsley: Spear and Sword Books.

Spikins, P. (2017). "Prehistoric origin: the compassion of distant strangers," in *Compassion: Concepts, Research and Applications*, ed. P. Gilbert (London: Routledge), 16–30. doi: 10.4324/9781315564296-2

Staub, E. (2003). *The Psychology of Good and Evil Why Children, Adults and Groups Help and Harm Others*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511615795

Steinbeis, N., Engert, V., Linz, R., and Singer, T. (2015). The effects of stress and affiliation on social decision-making: investigating the tend-and-befriend pattern. *Psychoneuroendocrinology* 62, 138–148. doi: 10.1016/j.psyneuen.2015.08.003

Stevens, J., and Woodruff, C. C. (2018). *The Neuroscience of Empathy, Compassion and Self-Compassion*. London: Academic Press.

Stiglitz, J. E. (2012). *The Price of inequAlity: How Today's Divided Society Endangers Our Future*. New York, NY: WW Norton & Company.

Suddendorf, T. (2018). Two key features created the human mind: inside our heads. *Sci. Am.* 319, 42–47.

Sznycer, D., Tooby, J., Cosmides, L., Porat, R., Shalvi, S., and Halperin, E. (2016). Shame closely tracks the threat of devaluation by others, even across cultures. *Proc. Natl. Acad. Sci. U.S.A.* 113, 2625–2630. doi: 10.1073/pnas.1514699113

Tan, J., Ariely, D., and Hare, B. (2017). Bonobos respond prosocially toward members of other groups. *Sci. Rep.* 7:14733. doi: 10.1038/s41598-017-15320-w

Thayer, J. F., Åhs, F., Fredrikson, M., Sollers, J. J. III, and Wager, T. D. (2012). A meta-analysis of heart rate variability and neuroimaging studies: implications for heart rate variability as a marker of stress and health. *Neurosci. Biobehav. Rev.* 36, 747–756. doi: 10.1016/j.neubiorev.2011.11.009

Thayer, J. F., Hansen, A. L., Saus-Rose, E., and Johnsen, B. H. (2009). Heart rate variability, prefrontal neural function, and cognitive performance: the neurovisceral integration perspective on self-regulation, adaptation, and health. *Ann. Behav. Med.* 37, 141–153. doi: 10.1007/s12160-009-9101-z

Thielmann, I., Spadaro, G., and Balliet, D. (2020). Personality and prosocial behavior: a theoretical framework and meta-analysis. *Psychol. Bull.* 146:30. doi: 10.1037/bul0000217

Tooze, A. (2019). *Crash: How a Decade of Financial Crises Changed the World*. London: Penguin.

Torjesen, I. (2016). Austerity cuts are eroding benefits of Sure Start children's centres. *BMJ* 532:i335. doi: 10.1136/bmj.i335

Tost, H., Kolachana, B., Hakimi, S., Lemaitre, H., Verchinski, B. A., Mattay, V. S., et al. (2010). A common allele in the oxytocin receptor gene (OXTR) impacts prosocial temperament and human hypothalamic-limbic structure and function. *Proc. Natl. Acad. Sci. U.S.A.* 107, 13936–13941. doi: 10.1073/pnas.1003296107

Toynbee, P., and Walker, D. (2009). *Unjust Rewards: Ending the Greed that is Bankrupting Britain*. London: Granta Books.

Trzeciak, S., and Mazzarelli, A. (2019). *Compassionomics: The Revolutionary Scientific Evidence that Caring Makes a Difference*. New York, NY: Studer Group.

Twenge, J. M., and Campbell, K. (2009). *The Narcissism Epidemic: Living in the Age of Entitlement*. London: Free Press.

Twenge, J. M., Miller, J. D., and Campbell, W. K. (2014). The narcissism epidemic: commentary on modernity and narcissistic personality disorder. *Pers. Disord. Theory Res. Treat.* 5, 227–229. doi: 10.1037/per0000008

Uomini, N., Fairlie, J., Gray, R. D., and Griesser, M. (2020). Extended parenting and the evolution of cognition. *Philos. Trans. R. Soc. B* 375:20190495. doi: 10.1098/rstb.2019.0495

Van Kleef, G., Overis, A., Lowe, C., LouKogan, L., Goetz, A. J., and Keltner, D. A. (2008). Power, distress, and compassion: turning a blind eye to the suffering of others. *Psychol. Sci.* 19, 1315–1322. doi: 10.1111/j.1467-9280.2008.02241.x

Van Vugt, M., and Park, J. H. (2009). Guns, germs, and sex: how evolution shaped our intergroup psychology. *Soc. Pers. Psychol. Compass* 3, 927–938. doi: 10.1111/j.1751-9004.2009.00221.x

Vandello, J. A., and Cohen, D. (2003). Male honor and female fidelity: implicit cultural scripts that perpetuate domestic violence. *J. Pers. Soc. Psychol.* 84:997. doi: 10.1037/0022-3514.84.5.997

Varela, N., Tessier, R., Tarabulsy, G., and Pierce, T. (2018). Cortisol and blood pressure levels decreased in fathers during the first hour of skin-to-skin contact with their premature babies. *Acta Paediatr.* 107, 628–632. doi: 10.1111/apa.14184

Wang, Z., Jetten, J., and Steffens, N. K. (2020). The more you have, the more you want? higher social class predicts a greater desire for wealth and status. *Eur. J. Soc. Psychol.* 50, 360–375. doi: 10.1002/ejsp.2620

Watkins, A., Stratenus, I., and Wilber, K. (2016). *Crowdocracy: The End of Politics*. London: Urbane Publications.

Weisman, O., Zagoory-Sharon, O., and Feldman, R. (2014). Oxytocin administration, salivary testosterone, and father-infant social behavior. *Prog. Neuropsychopharmacol. Biol. Psychiatry* 49, 47–52. doi: 10.1016/j.pnpbp.2013.11.006

Wilkinson, R., and Pickett, K. (2010). *The Spirit Level. Why Equality is Better for Everyone*. London: Routledge.

Wilson, D. S. (2019). *This View of Life: Completing the Darwinian Revolution*. Paris: Pantheon.

Wilson, M., and Daly, M. (1992). "The man who mistook his wife for a chattel," in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*, eds J. H. Barkow, L. Cosmides, and J. Tooby (New York, NY: Oxford University press), 289–322.

Wodak, R. (2015). *The Politics of Fear: What Right-Wing Populist Discourses Mean*. Thousand Oaks, CA: Sage. doi: 10.4135/9781446270073

Workman, L., Reader, W., and Barkow, J. H. (2020). *The Cambridge Handbook of Evolutionary Perspectives on Human Behaviour*. Cambridge: Cambridge university press. doi: 10.1017/9781108131797

Wrangham, R. W., and Peterson, D. (1996). *Demonic males: Apes and the origins of human violence. Houghton Mifflin*. Boston, MA: Harcourt.

Zeigler-Hill, V., Vrabel, J. K., McCabe, G. A., Cosby, C. A., Traeder, C. K., Hobbs, K. A., et al. (2019). Narcissism and the pursuit of status. *J. Pers.* 87, 310–327. doi: 10.1111/jopy.12392

Zerjal, T., Xue, Y., Bertorelle, G., Wells, R. S., Bao, W., Zhu, S., et al. (2003). The genetic legacy of the mongols. *Am. J. Hum. Genet.* 72, 717–721. doi: 10.1086/367774

Zimbardo, P. (2008). *The Lucifer Effect: How Good People Turn Evil*. London: Rider.

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CONCEPTUAL ANALYSIS
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Cultivating the Interpersonal Domain: Compassion in the Supervisor-Doctoral Student Relationship

Oskar Lundgren[1,2]* *and Walter Osika*[3,4]

[1]*Division of Children's and Women's Health, Crown Princess Victoria Children's Hospital, Linköping, Sweden,* [2]*Department of Biomedical and Clinical Sciences, Faculty of Medicine and Health Sciences, Linköping University, Linköping, Sweden,* [3]*Department of Neurobiology, Care Sciences and Society, Center for Social Sustainability, Karolinska Institute, Stockholm, Sweden,* [4]*Department of Clinical Neuroscience, Center for Psychiatry Research, Karolinska Institute & Stockholm Health Care Services, Stockholm, Sweden*

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***Correspondence:**
Oskar Lundgren
oskar.lundgren@liu.se

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The long-term and complex supervisor-doctoral student relationship is often characterised by tension and frictions. In higher education research, models, and interventions that take the potential beneficial interpersonal effects of compassion into account seem to be scarce. Hence, the aim of this study was to conceptualise the potential role compassion could have in the cultivation of an affiliative and sustainable supervisor-doctoral student relationship. The concept of compassion was investigated and analysed in relation to a contemporary model of supervisor behaviours. Furthermore, a systematic literature search in the scientific databases PubMed, PsychInfo, ScienceDirect, and Google Scholar was performed. The conceptual analysis revealed that the interpersonal domain, in which compassion could afford a shared sense of warmth, is neglected in previous definitions. Furthermore, the integration of compassion into a model of adaptive supervisor behaviour indicates a strong case for a salutary role for compassion in the supervisor-doctoral student relationship. However, the literature review showed that empirical data are lacking, and more studies are needed. The role of compassion deserves to be investigated empirically in this particular interpersonal context.

Keywords: doctoral student supervision, compassion, interpersonal relationship, conceptual paper, post graduate student

INTRODUCTION

The Supervisor-Doctoral Student Relationship

From the outside, doctoral studies might look like a dream come true for the lucky students who walk the academic path to a doctorate degree. What could be the downside of getting paid for reading, experimenting, thinking, and writing about a favourite subject, and then getting rewarded with a PhD title in the end? Well, it is actually possible to imagine that the

long-term and complex relationship between students and their supervisors could turn into a source of friction. Indeed, research within the field of higher education show that relational pitfalls, disagreements, conflict, and other ethical issues are some of the main hindrances for progress with the academic work, and sometimes even contribute to mental health issues (Bergnéhr, 2013; Gunnarson et al., 2013; Moxham et al., 2013; Holbrook et al., 2014; Löfström and Pyhältö, 2014; Levecque et al., 2017; Corcelles et al., 2019). On the other hand, supervision experienced as supportive is associated with less emotional exhaustion among students (Devine and Hunter, 2017). From the supervisor's point of view, interpersonal difficulties are commonly experienced, although this facet of the relationship seems to be less well studied (Lindén, 1999).

As such difficulties are rather common, a variety of courses and development programmes for supervisors as preventive measures have been provided, and some also investigated (Lindén, 1999; Pearson and Brew, 2002). Among these, only a few have included the relational dimension of the supervisor role, and courses that use the latest tools and findings from clinical and social psychology seem to be rare (Lindén, 1999). One such example is a program developed by Manathunga (2005) called "Compassionate Rigour". However, the programme uses "compassion" as an umbrella term for being supportive in general and does not contain more specific aspects of compassion (Manathunga, 2005). Hence, findings from the recently sprouting literature on the influence of compassion on health and well-being (Gilbert, 2017; Seppelä et al., 2017; Kirby, 2017), and its potential to cultivate trust and cooperation in the workplace (Lilius et al., 2008), as well as to improve the classroom milieu in schools (Jazaieri, 2018) is not yet integrated into higher education curricula. This might reflect a substantial gap in knowledge.

The Concept of Compassion

The concept of compassion has played an essential role in diverse traditions such as Greek philosophy, Buddhist psychology, ethics, and contemporary moral philosophy (Fröding and Osika, 2015; Gilbert, 2017; Seppelä et al., 2017; White, 2017). Furthermore, the roots of compassion and its precursor empathy have been investigated and debated from evolutionary and biological perspectives (Gilbert, 2005; Keltner, 2009; De Waal, 2010; Goetz et al., 2010; Zaki and Cikara, 2015; Strauss et al., 2016; Klimecki, 2019; Kim et al., 2020).

Singer and Klimecki (2014) suggest that an empathic response to suffering can result in two kinds of reactions: *empathic distress*, which is also referred to as personal distress, and *compassion*, which they also referred to as empathic concern. Empathy refers to our general capacity to detect and resonate with others' emotional states irrespective of their valence. Empathic distress refers to a strong aversive and self-oriented response to others' suffering, accompanied by the desire to withdraw from an unpleasant situation to protect oneself from excessive negative feelings. On the other hand, compassion is conceived as an openness and connection to a feeling of concern for another person's suffering – also referred to as *sympathy* – accompanied by the motivation to help (Liotti and Gilbert, 2011). Consequently, it is associated with approach and prosocial motivations (Feldman and Kuyken, 2011; Singer and Klimecki, 2014; Gilbert et al., 2017). For our purpose, it is notable that the field of psychology has seen a surge in compassion research with theoretical, clinical, and educational facets (Strauss et al., 2016; Gilbert, 2017, 2020; Seppelä et al., 2017).

In clinical psychology, the ability to experience oneself as worthy of compassion, and mastering the interpersonal skills that enable one to act compassionately towards others, have become corner stones in novel therapeutic models, such as Compassion Focused Therapy (Gilbert, 2014, 2020). Grounded in evolutionary functional analysis, Gilbert (2019) has conceptualised compassion as sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it. In his simplified model of emotional regulation, he gives the compassionate mind a central role in dealing with both the restless achievement-focused part and the threat focused and safety-seeking part of the human mind (Gilbert, 2014). According to Gilbert (2014), compassion can generate affiliative experiences, which in turn generate courage to face and engage with difficult, even feared, emotions – including fear of compassion, which has been shown to be related to shame, self-criticism, and depression (Kirby et al., 2019). The academic milieu, in which the supervisor-doctoral student relationship is embedded, is well known for being competitive and hierarchical (Biron et al., 2008; Levecque et al., 2017). Thus, it is very likely that compassion could prevent the eroding effects of this context, perhaps by a jointly creating a *safe base* for the supervisor-student dyad to work from. Furthermore, in an interpersonal space characterised by trust and safety, supervisors and students may be less likely to act unethically and stay true to their values (Dutton et al., 2007; Ozawa-de Silva et al., 2012). Indeed, Gilbert (2014) argues that competencies that generate compassion towards self and others helps us function at our optimum.

The aim of this paper was thus to conceptualise the role of compassion in the supervisor-doctoral student relationship. In the remaining parts of this text, the word *student* will be used with a tacit limitation to a discussion of doctoral students.

MATERIALS AND METHODS

To conceptualise the role of compassion in the supervisor-student relationship, we performed a stepwise inquiry of firstly; a search of the literature, secondly; an adaptation of a conceptual model of the supervisor-student relationship, thirdly; an expanded definition and description of the concept of compassion, and fourthly; an analysis of the application of compassion to the conceptual model of the supervisor-doctoral relationship. Lastly, implications for theoretical elaborations and future empirical investigations are discussed.

Literature Search

The first step of our inquiry into the role of compassion in the supervisor-doctoral student relationship was to perform a

literature search. It was performed with systematic use of the following terms in the scientific databases Pubmed, PsychInfo, ScienceDirect, and Google scholar; "compassion and supervision" (+/− "doctoral student" and "PhD student") "compassion and supervisor and interpersonal relationship". This search resulted in no empirical articles on the subject. However, we found four references that commented on the topic, which was included as background and context for the analysis.

The Supervisor-Student Relationship: A Conceptual Model

There is evidence that supervisors' and doctoral students' interpersonal relationships have implications for the progress of the work and the satisfaction of the student (Moxham et al., 2013). In the literature of higher education research, there are several models that explicitly or implicitly take interpersonal aspects into account. For example, Gatfield (2005) investigated supervisor "styles" using the two dimensions of structure and support, and Lindén (1999) focused on more narrow factors of freedom vs. control.

For our purpose here, where the challenges and complexities of the relationship are of primary interest, it could be useful to consider the model of Mainhard et al. (2009), which uses a framework from teacher behaviours and evaluates degrees of behaviours on the two independent axes of influence and proximity. The two axes contain eight types of behaviours; leadership, helpfulness/friendliness, understanding, freedom/responsibility, uncertain, dissatisfied, admonishing, and strict (see **Figure 1** below). The theoretical underpinnings of this model highlight that the supervisor-student relationship is characterised by bi-directional influences, and that the eight behavioural dimensions are dynamically interdependent. Some behaviours might provoke opposite behaviours, while others provoke similar, creating positive feedback loops. Thus, we view Maynard's model as a suitable vehicle for a further inquiry into how compassion and compassionate behaviours fit into this framework.

Compassion: An Operational Definition

One attempt to define compassion and operationalise it in the form of a practical intervention comes from Jazaieri et al. (2014). Compassion, according to the authors, is a multidimensional construct with four facets; (1) An awareness of suffering (in self or others) – a cognitive facet, (2) Sympathetic concern; being emotionally moved by suffering – an affective facet, (3) A wish to see the relief of the suffering – an intentional facet, and (4) A responsiveness or readiness to help relieve that suffering – a motivational facet. Other authors have presented a different order of the facets of compassion. Ozawa-de Silva et al. (2012), for example, placed the affective facet before the subsequent split of cognitive- and attentional facets. Initial studies of a compassion intervention developed by Jazaieri et al. (2014) have lent support to the hypothesis that training in compassion can influence both cognitive and emotional factors that support psychological flexibility and adaptive functioning.

The model from Jazaieri et al. (2014) represents the phenomenon of compassion in an individual, and it requires some extension to be fully applicable to the bi-directional interpersonal relationship between supervisor and student. Gilbert (2014) has argued that prosocial behaviours are sometimes neglected as an important goal for therapeutic change. In addition to overt expressions of compassion, the model also needs a facet that represent what the interaction does to the relationship and what is happening in the interpersonal space shared by supervisor and student. Thus, we suggest that the following two facets should be added for a complete model: (5) Displays of compassion, e.g., facial expressions and prosocial behaviours – a behavioural facet, and (6) A shared sense of warmth and trust – an experiential and relational facet **Table 1**.

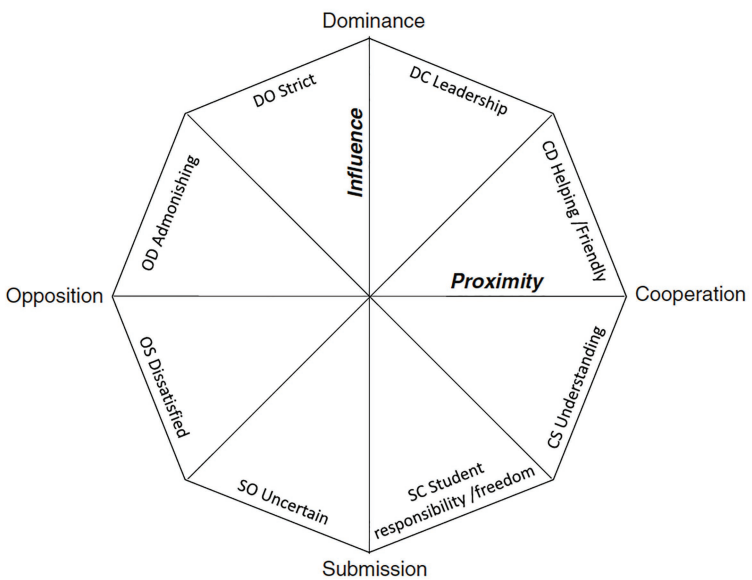


FIGURE 1 | Mainhard et al. (2009) model for supervisor interpersonal behaviour.

TABLE 1 | Analysis: the application of compassion onto a model for supervisor interpersonal behaviour.

Individual dimensions
(1) **Awareness of suffering** (cognitive) →Increased ability to recognise emotions and catch early warning signs of stress in self and student foster *understanding* (CS). →More sensitive to the consequences of harsh or blunt negative feedback can prevent *admonishing* behaviours (OD).
(2) **Sympathetic concern – being emotionally moved by suffering** (affective) →More accurate empathetic assessment of student's needs and challenges could calibrate the inner compass for *leadership* style (DC). →Modelling common humanity and being human could foster bi-directional *understanding* (CS). →Precursor to signalling a caring attitude could facilitate *trust* (see also 6 below) and *friendliness* (CD).
(3) **A wish to see the relief of the suffering** (intentional) and (4) **A responsiveness or readiness to help relieve that suffering** (motivational) →Motivating supportive and *helping* measures and directive *leadership* behaviours (CD, DC). →Possibly a higher threshold for irritation over students' shortcomings, increased forgiveness, and less *dissatisfied* (DS). →Prevention of maladaptive reactions against student distress could prevent a drift towards *uncertain* and *dissatisfied* behaviours (OS, SO).
Interpersonal dimensions
(5) **Displays of compassion and overt compassionate behaviours** (behavioural) →Signalling a caring attitude could facilitate *trust*, which could catalyse processes related to creativity and productivity (CD). →Create an atmosphere of security that could foster student creativity, productivity, and *responsibility* (SC). →Inspiring (by model) students to develop *self-compassion*, which could foster *self-leadership* and *responsibility* (DC, SC).
(6) **A shared sense of warmth and trust** (experiential/relational) →Less depressive symptoms, anxiety, and mind wandering would increase supervisor and student stress resilience, improve *friendliness* and *understanding* (CD, CS), and possibly also decrease self/other *strict criticism* and *dissatisfied* behaviours (DO, OS).
The hypothesised cumulative positive changes in supervisor behaviours are visualised in **Figure 2**.

Compassion and the Supervisor-Student Relationship

The literature search resulted in no empirical references, and only four articles with comments on the subject were deemed of interest for our analysis and discussion. One intriguing finding was the work of Manathunga (2005), mentioned in the introduction. The author presents a program for teaching supervisors called "compassionate rigour", that seeks to go beyond the administrative framing of supervision into the cognitive and pedagogical domain. However, Manathunga (2005) uses the term *compassion* as a synonym for support, encouragement, and empathy, and does not develop any theoretical framework for the implications of introducing compassion in this context.

A second result from the literature search was a recently published anthology called "The Pedagogy of Compassion at the Heart of Higher Education" (Gibbs, 2017). The book covers a wide variety of topics related to compassion and the challenges of contemporary academic life, including the cultivation of compassion in the classroom (Koutselini, 2017) and faculty leadership (Bresciani-Ludvik, 2017). However, none of the chapters address the topic of student-supervisor-relationship.

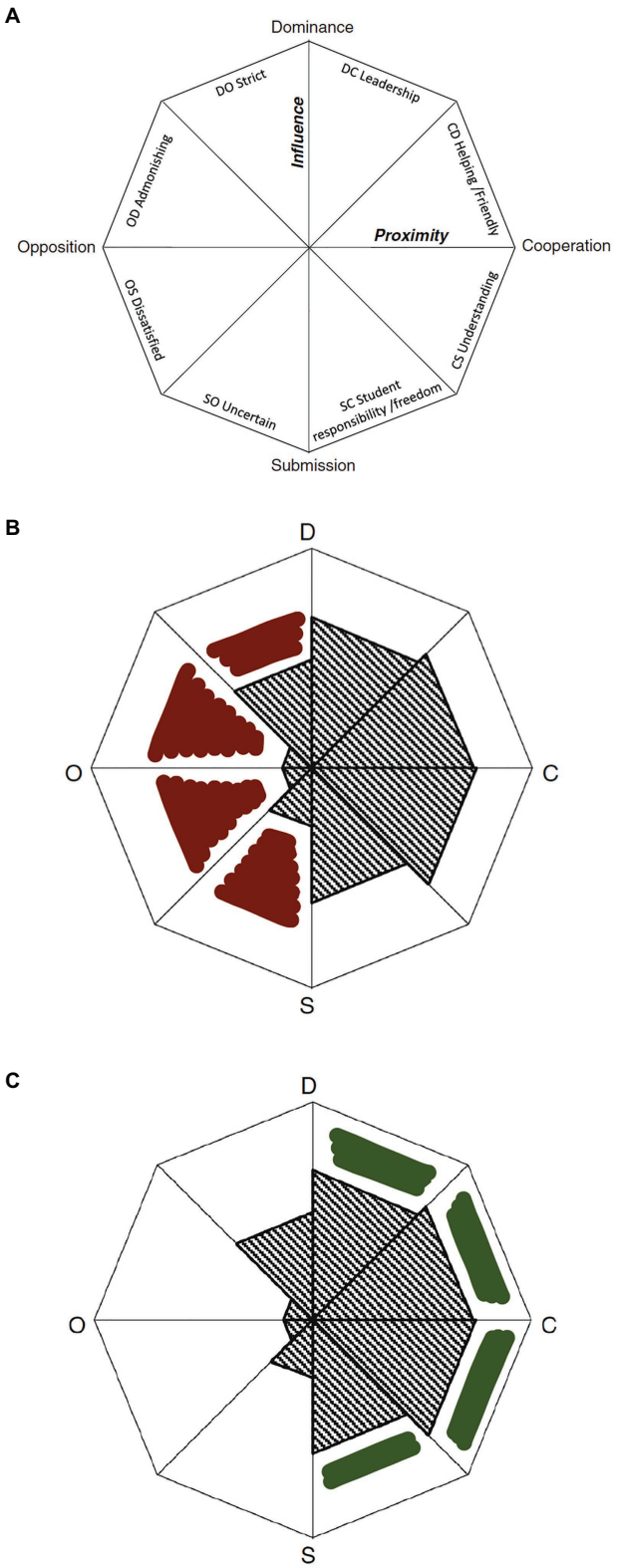


FIGURE 2 | (A) Mainhards model of supervisor behaviour. **(B,C)** Profiles of average supervisor behaviours in an earlier study (grey) and behaviours hypothetically linked to a lack of compassion (red) and behaviours that theoretically could be enhanced by compassion (green). Adapted from Mainhard et al. (2009).

A fourth finding was an article termed "Postgraduate supervision: For better or worse", in which an experienced supervisor in the field of educational research critically elaborates about his changes in behaviours after a systematic and critical self-reflection (Olivier, 2007). The author identifies his directive values as *compassion* and *commitment*, although doubts his ability to live out these stated values. Furthermore, he is not convinced that his students subscribe to the same values and principles. Based on group-discussions with students and written reflections, Olivier (2007) found out that during meetings, both individual sessions, and group meetings, a positive relationship was forged. Based on these unsurprising observations and findings from the literature, Olivier (2007, p. 1138), provides a list of recommendations to fellow supervisors. His fourth advice; "A relationship characterised by mutual love, respect, and obligation should be developed to propagate a less 'top-down approach'", validates our interest for the role of compassion in the supervision process. However, neither his observation nor his recommendation elucidates how the two processes are related and mutually influenced by each other. Overall, this limited outcome from the literature search indicates a knowledge gap regarding the role of compassion in the supervisor-doctoral student relationship and that empiric studies are very few or non-existent to date.

The Potential of Compassion in the Supervisor-Student Relationship

Here, we proceed with an analysis of the potential role of compassion in the supervisor-student relationship through a theoretical comparison of Mainhard's model with the extended Jazaieri (2018) definition of compassion. It could be of value to note that a supervisor with low capacity for compassion could not only fail to respond adaptively, he or she could also react with behaviours that are deleterious to the interpersonal relationship and increase the risk of ethical issues and even transgressions (Löfström and Pyhältö, 2014). Examples of such behaviours could be strict or admonishing behaviours, opposition or withdrawal of support, and an increase in submissive behaviours. **Figure 2** shows the original Mainhard model and areas of unhelpful and helpful supervisor behaviours that might be influenced by compassion.

In addition to the theoretical basis of compassion as a pro-social phenomenon, that is generally considered a catalyst for closeness, cooperation, and well-being, our analysis includes recent evidence of compassion training's psychological effects. Interestingly, a review of this literature, which in many aspects is in its infancy, reveal that most studies to date are focused on outcome in the individual and very few report findings in the relational domains (Kirby, 2017; Condon, 2019; Condon et al., 2019; Klimecki, 2019). Considering the pro-social nature of compassion, it is somewhat surprising that the interpersonal domain seems to be understudied. For our purpose here, meaningful outcomes on the individual level represent the starting point, and informed reasoning is then used to bridge the knowledge gap of how these changes translate into the interpersonal space. The following positive and negative outcomes, summarised by Kirby (2017) are influenced by compassion interventions:

- Self-criticism and shame.
- Mind-wandering to unpleasant topics.
- Depressive symptoms and anxiety.
+ Readiness for health behaviour change.
+ Well-being and life satisfaction.
+ Ability to recognise emotions in others.

DISCUSSION

The objective of this paper was to conceptualise the phenomenon of compassion in the sometimes strained supervisor-doctoral student relationship. Overall, the literature review revealed that empirical data is largely missing regarding this specific context. We proceeded with our inquiry by analysing possible ways in which compassion could be used to improve supervision, using a theoretical framework based on teacher behaviour (Mainhard et al., 2009). The resulting conceptual framework provides theoretical support to the assumption that compassion may have significant positive impact on the supervisor-doctoral student relationship, both through increases in adaptive supervisor behaviours and decreases in maladaptive behaviours. Although Maynard's model does not include behaviours that are explicit examples of ethical issues in the relationship, e.g., admonitions, withdrawal of support, and strict behaviours could represent ethical trespasses in specific contexts. The model does also not include outright harmful behaviours such as insulting communication and sexual misconduct. However, since compassion is viewed as a pro-social process, it is plausible to suspect that supervisors with high levels of compassion would be less likely to engage in unethical behaviours (Ozawa-de Silva et al., 2012; Halperin, 2014; Fröding and Osika, 2015; Klimecki et al., 2016; DeSteno et al., 2018). Indeed, based on its central role in many systems of moral thought, and since compassion has been suggested to be an evolved and hardwired moral compass, it has recently been coined "the highest ethics" by researchers in the field of contemplative psychology (Kirby et al., 2017). Perhaps one of the major advantages of a focus on compassion in the supervisor role could be its potential to offer a guiding principle that could radically simplify an immensely complex responsibility.

The literature review revealed that the interpersonal space and relational experiences seem to represent understudied domains of outcome in compassion research. Recently, Gu et al. (2020) developed a tool for assessing compassion, and their definition of the construct overlaps with the extended Jazaieri et al. (2014) model used in our analysis. However, the sixth *interpersonal dimension* (a shared sense of warmth and trust) is not included in the definition or measurement of Gu et al. (2020), and perhaps this dimension needs its own measurement if we are to deepen our empirical understanding. When Gilbert (2014, 2019, 2020) developed Compassion Focused Therapy, he extended the definition of compassion beyond the individual level and described it as an integrated *flow* of compassion. In addition to compassion for others, this model also included becoming receptive to compassion, and compassion towards oneself. However, this model

of the tri-directional flow of compassion neglects the interpersonal space domain, in which shared experiences of warmth, trust, and belonging are the fruits of an unimpeded flow of compassion.

Further research in this largely uncharted terrain may force scientist to confront philosophical and empirical questions stemming from different views of mind, consciousness, and by extension what constitutes and influence the shared interpersonal space (Varela et al., 2016; Jacobs, 2017; Andriopoulou and Prowse, 2020; Condon and Makransky, 2020). Taking a calculated risk of simplifying complex processes, we propose a model that visualises some crucial differences between western- and Buddhist views on the interpersonal space, which could stimulate future research and reasoning. While western psychology views the individual selves as building blocks in relationship models, a view grounded in Buddhist philosophy would consider the interpersonal space as a process that emerges from two interdependent and fluid selves, that co-arise partly from the interaction (Varela et al., 2016; Jacobs, 2017; **Figure 3**). Indeed, these differences could have extensive implications for how to conceptualise and measure interpersonal processes and the implications of more or less compassion in the shared space of an ongoing relationship.

One such conceptual challenge is the differences between Western dualism of separate processes of self- vs. other-focused compassion and Buddhist non-dual views, which have implications for both intervention design and choices of assessments in studies with interpersonal processes as outcomes (Quaglia et al., 2020). These philosophical issues might also provide challenges in the empirical investigation of sub-facets of social perception, appraisal, motivation, and action (e.g., emotion regulation), which relate to compassion (Ozawa-de Silva et al., 2012).

Distinctions between compassion and empathy are crucial to have in mind, but there are also lessons to be drawn from empathy research. Despite the limits of empathy (Västfjäll et al., 2014; Bloom, 2017), decades of empirical work have shown a positive association between empathy and pro-social behaviour. In preparation for future studies, researchers should be aware of some of the risks and pitfalls that are often discussed in regard to empathy. One such caveat is that surplus empathy can lead to significant cognitive bias in situations with complex moral dimensions (Västfjäll et al., 2014; Bloom, 2017; Cameron et al., 2019). Increased empathy could also lead to an increased risk of burnout as it might sensitise the individual to suffering without providing the ability to handle the emotional contagion (Singer and Klimecki, 2014). A second common critique is that too much closeness in this specific work relationship could become a burden that distracts from the central academic work (Hockey, 1995).

If researchers of higher education pedagogy would conduct intervention trials, perhaps by sending pairs of supervisors and students to compassion training seminars or retreats, they should consider measuring positive change and also register adverse events (Lindahl et al., 2017; Rozenthal et al., 2018). Future research should also investigate which contextual factors, at the team- (including potential interpersonal challenges with co-supervisors) and management levels of an organisation, could represent obstacles for the growth of compassion in the student-supervisor relationship (Rupprecht et al., 2019). This perspective is highly relevant since the embrace of contemplative practices, such as mindfulness and compassion training programmes, has been criticised for focusing on individual psychological factors, while neglecting contextual factors such as organisational structure and culture (Purser et al., 2016). Indeed, one can assume that organisational factors in the hierarchical, strict, and sometimes penalising academic environment, including harsh competition for limited resources, could hamper supervisor's capacity for compassion (Biron et al., 2008;

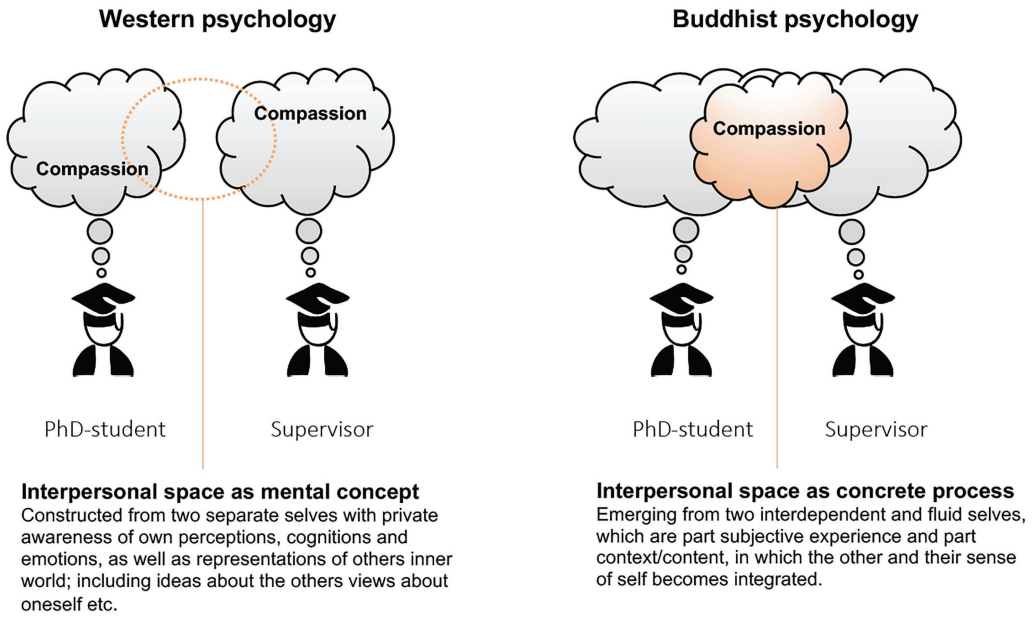


FIGURE 3 | Western- and Buddhist views on the psychology of interpersonal space. Future measurements of e.g., a shared sense of warmth, as fruits of compassionate interactions, will have to address differing views of self and mind.

Levecque et al., 2017). However, it also seems necessary to study individual differences and predisposing factors for the ability to generate a flow of compassion in the supervisor-student relationship, such as various blocks to compassion (Kirby et al., 2019) and early developed attachment patterns (Mikulincer and Shaver, 2005). Future research should also benefit from a sound scepticism of the current hype surrounding compassion interventions and other contemplative initiatives, and this could be attained by comparing interventions to other methods for cultivating resilience and prosocial functioning (Van Dam et al., 2017).

There are also instances where maladaptive motives and behaviour might simulate genuine compassion that should be studied in this hierarchal context. Catarino et al. (2014) described an important distinction between submissive compassion and genuine compassion, where the submissive kind can be explained as behaving in a helpful way, but where the intention solely is to prevent disruption of the connection to the other person or to be liked, and not from a compassionate motivation. Submissive compassion was associated with shame, depression, anxiety, and stress in the study by Catarino et al. (2014).

This conceptual article certainly raises more questions than it answers, which it is supposed to do. Among the most intriguing questions, that remain to be investigated, is whether supervisor's and student's compassion could be influenced through training and how beneficial changes in the relational domain translate into an improvement in student well-being and performance. Indeed, questions about how and what to measure as outcomes from compassion training in this context are of great importance. Perhaps both supervisors and students experience of engagement and sense of meaning should be included.

Interestingly, Whitelock et al. (2008) have shown that a positive interpersonal climate was experienced as one of the chief factors to foster creativity among students and supervisors. Perhaps, in the downstream currents of increased compassion, supervisors and students could find themselves becoming more inventive and original in their thinking and writing.

AUTHOR CONTRIBUTIONS

OL conceived the presented idea, including theoretical background regarding supervisor behaviour and performed the systematic literature search. OL and WO provided input on the role of compassion in supervisor-doctorate student relationship, and contributed to the analysis of the results and writing of the manuscript. All authors contributed to the article and approved the submitted version.

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REFERENCES

Andriopoulou, P., and Prowse, A. (2020). Towards an effective supervisory relationship in research degree supervision: insights from attachment theory. *Teach. High. Educ.* 25, 648–661. doi: 10.1080/13562517.2020.1731449

Bergnéhr, D. (2013). Att handleda en doktorand: en relationell balansgång som fordrar flexibilitet och struktur. *Högre Utbildning* 3, 173–185.

Biron, C., Brun, J. P., and Ivers, H. (2008). Extent and sources of occupational stress in university staff. *Work* 30, 511–522.

Bloom, P. (2017). Empathy and its discontent. *Trends Cogn. Sci.* 21, 24–31. doi: 10.1016/j.tics.2016.11.004

Bresciani-Ludvik, M. (2017). "Learning About Consequences, Community, Creativity and Courage: Cultivating Compassion in Higher Education Leadership," in *The Pedagogy of Compassion at the Heart of Higher Education*. ed. P. Gibbs (Cham: Springer Nature), 155–172.

Cameron, C. D., Hutcherson, C. A., Ferguson, A. M., Scheffer, J. A., Hadjiandreou, E., and Inzlicht, M. (2019). Empathy is hard work: people choose to avoid empathy because of its cognitive costs. *J. Exp. Psychol. Gen.* 148, 962–976. doi: 10.1037/xge0000595

Catarino, F., Gilbert, P., McEwan, K., and Baião, R. (2014). Compassion motivations: distinguishing submissive compassion from genuine compassion and its association with shame, submissive behavior, depression, anxiety and stress. *J. Soc. Clin. Psychol.* 33, 399–412. doi: 10.1521/jscp.2014.33.5.399

Condon, P. (2019). Meditation in context: factors that facilitate prosocial behavior. *Curr. Opin. Psychol.* 28, 15–19. doi: 10.1016/j.copsyc.2018.09.011

Condon, P., Dunne, J., and Wilson-Mendenhall, C. (2019). Wisdom and compassion: a new perspective on the science of relationships. *J. Moral Educ.* 48, 98–108. doi: 10.1080/03057240.2018.1439828

Condon, P., and Makransky, J. (2020). Recovering the relational starting point of compassion training: a foundation for sustainable and inclusive care. *Perspect. Psychol. Sci.* 15, 1346–1362. doi: 10.1177/1745691620922200

Corcelles, M., Cano, M., Liesa, E., Gonnzáles-Ocampo, G., and Castelló, M. (2019). Positive and negative experiences related to doctoral study conditions. *High. Educ. Res. Dev.* 38, 922–939. doi: 10.1080/07294360.2019.1602596

De Waal, F. (2010). *The Age of Empathy: Nature's Lessons for a Kinder Society*. New York: Broadway Books.

DeSteno, D., Lim, D., Duong, F., and Condon, P. (2018). Meditation inhibits aggressive responses to provocations. *Mindfulness* 9, 1117–1122. doi: 10.1007/s12671-017-0847-2

Devine, K., and Hunter, K. H. (2017). PhD student emotional exhaustion: the role of supportive supervision and self-presentation behaviours. *Innov. Educ. Teach. Int.* 54, 335–344. doi: 10.1080/14703297.2016.1174143

Dutton, J. E., Lilius, J., and Kano, J. (2007). "The Transformative Potential of Compassion at Work," in *Handbook of Transformative Cooperation: New Designs and Dynamics*. ed. S. K. Piderit (Stanford: Stanford University Press), 107–126.

Feldman, C., and Kuyken, W. (2011). Compassion in the landscape of suffering. *Cont. Buddhism* 12, 143–155. doi: 10.1080/14639947.2011.564831

Fröding, B., and Osika, W. (2015). *Neuroenhancement: How Mental Training and Meditation Can Promote Epistemic Virtue*. New York: Springer International Publishing.

Gatfield, T. (2005). An investigation info PhD supervisory management styles: development of a dynamic conceptual model and its managerial implications. *J. High. Educ. Policy Manag.* 27, 311–325. doi: 10.1080/13600800500283585

Gibbs, P. (2017). *The Pedagogy of Compassion at the Heart of Higher Education*. Cham: Springer Nature.

Gilbert, P. (ed.) (2005). "Compassion and Cruelty: a Biopsychosocial Approach," in *Compassion: Conceptualisations, Research and Use in Psychotherapy*. New York: Routledge.

Gilbert, P. (2014). The origin and nature of compassion focused therapy. *Br. J. Clin. Psychol.* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (ed.) (2017). *Compassion: Concepts Research and Applications*. New York: Routledge.

Gilbert, P. (2019). Explorations into the nature and function of compassion. *Curr. Opin. Psychol.* 28, 108–114. doi: 10.1016/j.copsyc.2018.12.002

Gilbert, P. (2020). Compassion: from its evolution to a psychotherapy. *Front. Psychol.* 11:586161. doi: 10.3389/fpsyg.2020.586161

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., et al. (2017). The development of compassionate engagement and action scales for self and others. *J. Compass. Health Care* 4, 1–24. doi: 10.1186/s40639-017-0033-3

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Gu, J., Baer, R., Cavanagh, K., Kuyken, W., and Strauss, C. (2020). Development and psychometric properties of the Sussex-Oxford compassion scales (SOCS). *Assessment* 27, 3–20. doi: 10.1177/1073191119860911

Gunnarson, R., Jonasson, G., and Billhult, A. (2013). The experience of disagreement between student and supervisors in PhD education: a qualitative study. *BMC Med. Educ.* 13:134. doi: 10.1186/1472-6920-13-134

Halperin, E. (2014). Emotion, emotion regulation, and conflict resolution. *Emot. Rev.* 6, 68–76. doi: 10.1177/1754073913491844

Hockey, J. (1995). Getting too close: a problem and possible solution in social science PhD supervision. *Br. J. Guid. Couns.* 23, 199–210. doi: 10.1080/03069889508253005

Holbrook, A., Shaw, K., Scevak, J., Bourke, S., Cantwell, R., and Budd, J. (2014). PhD candidate expectations: exploring mismatch with experience. *Int. J. Doct. Stud.* 9, 329–346. doi: 10.28945/2078

Jacobs, B. (2017). *The Original Buddhist Psychology: What the Abhidharma Tells Us About How We Think, Feel and Experience Life*. Berkley, California: North Atlantic Books.

Jazaieri, H. (2018). Compassionate education from pre-school to graduate school: bringing a culture of compassion into the classroom. *J. Res. Innov. Teach. Learn.* 11, 22–66. doi: 10.1108/JRIT-08-2017-0017

Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., and Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: effects on mindfulness, affect and emotion regulation. *Motiv. Emot.* 38, 23–25. doi: 10.1007/s11031-013-9368-z

Keltner, D. (2009). *Born to Be Good: The Science of a Meaningful Life*. New York: WW Norton & Company.

Kim, J. J., Parker, S. L., Doty, J. R., Cunnington, R., Gilbert, P., and Kirby, J. N. (2020). Neurophysiological and behavioural markers of compassion. *Sci. Rep.* 10:6789. doi: 10.1038/s41598-020-63846-3

Kirby, J. N. (2017). Compassion interventions: the programmes, the evidence, and implications for research and practice. *Psychol. Psychother.* 90, 432–455. doi: 10.1111/papt.12104

Kirby, J. N., Day, J., and Sagar, V. (2019). The 'flow' of compassion: a meta-analysis of the fears of compassion svales and psychological functioning. *Clin. Psychol. Rev.* 70, 26–39. doi: 10.1016/j.cpr.2019.03.001

Kirby, J. N., Steindl, S. R., and Doty, J. M. (2017). "Compassion as the Highest Ethics," in *Practitioner's Guide to Ethics and Mindfulness-Based Interventions*. ed. L. M. Monteiro (Cham: Springer International Publishing), 253–275.

Klimecki, O. M. (2019). The role of empathy and compassion in conflict resolution. *Emot. Rev.* 11, 310–325. doi: 10.1177/1754073919838609

Klimecki, O. M., Mayer, S. V., Jusyte, A., Scheeff, J., and Schönenberg, M. (2016). Empathy promotes altruistic behavior in economic interactions. *Sci. Rep.* 6:31961. doi: 10.1038/srep31961

Koutselini, M. (2017). "The Reflective Paradigm in Higher Education and Research: Compassion in Communities of Learning" in *The Pedagogy of Compassion at the Heart of Higher Education*. ed. P. Gibbs (Cham: Springer Nature), 203–212.

Levecque, K., Anseel, F., De Beuckelaer, A., Van der Heyden, J., and Gisle, L. (2017). Work organization and mental health problems in PhD students. *Res. Policy* 46, 868–879. doi: 10.1016/j.respol.2017.02.008

Lilius, J. M., Worline, M. C., Maitlis, S., Kanov, J., Dutton, J. E., and Frost, P. (2008). The contours and consequences of compassion at work. *J. Organ. Behav.* 29, 193–218. doi: 10.1002/job.508

Lindahl, J. R., Fisher, N. E., Cooper, D. J., Rosen, R. K., and Britton, W. B. (2017). The varieties of contemplative experience: a mixed methods study of meditations-related challenges in Western Buddhists. *PLoS One* 12:e0176239. doi: 10.1371/journal.pone.0176239

Lindén, J. (1999). The contribution of narrative to the process of supervising PhD-students. *Stud. High. Educ.* 24, 351–369. doi: 10.1080/03075079912331379945

Liotti, G., and Gilbert, P. (2011). Mentalizing, motivation, and social mentalities: theoretical considerations and implications for psychotherapy. *Psychol. Psychother.* 84, 9–25. doi: 10.1348/147608310X520094

Löfström, E., and Pyhältö, K. (2014). Ethical issues in doctoral supervision: the perspectives of PhD-students in the natural and behavioural sciences. *Ethics Behav.* 24, 195–214. doi: 10.1080/10508422.2013.830574

Mainhard, T., van der Rijst, R., and van Tartwijk, J. (2009). A model for the supervisor-doctoral student relationship. *High. Educ.* 58, 359–373. doi: 10.1007/s10734-009-9199-8

Manathunga, C. (2005). The development of research supervision: "turning the light on a private space". *Int. J. Acad. Dev.* 10, 17–30. doi: 10.1080/13601440500099977

Mikulincer, M., and Shaver, P. R. (2005). Attachment security, compassion, and altruism. *Curr. Dir. Psychol. Sci.* 14, 34–38. doi: 10.1111/j.0963-7214.2005.00330.x

Moxham, L., Dwyer, T., and Reid-Searl, K. (2013). Articulating expectations for PhD candidature upon commencement: ensuring supervision/student 'best fit'. *J. High. Educ. Policy Manag.* 35, 345–354. doi: 10.1080/1360080X.2013.812030

Olivier, M. A. J. (2007). Postgraduate supervision: for better or worse? *South Afr. J. High. Educ.* 21, 1126–1141. doi: 10.4314/sajhe.v21i8.25765

Ozawa-de Silva, B. R., Dodson-Lavelle, B., Raison, C. L., and Negi, L. T. (2012). Compassion and ethics: scientific and practical approaches to the cultivation of compassion as a foundation for ethical subjectivity and well-being. *J. Healthcare Sci. Hum.* 2, 145–161.

Pearson, M., and Brew, A. (2002). Research training and supervision development. *Stud. High. Educ.* 27, 135–150. doi: 10.1080/03075070220119986c

Purser, R. E., Forbes, D., and Burke, A. (2016). *Handbook of Mindfulness: Culture, Context and Social Engagement*. Switzerland: Springer International Publishing.

Quaglia, J. T., Soisson, A., and Simmer-Brown, J. (2020). Compassion for self versus other: a critical review of compassion training. *J. Posit. Psychol.* 1–16. doi: 10.1080/17439760.2020.1805502

Rozenthal, A., Costanguayu, L., Dimidjan, S., Lambert, M., Shafran, R., Andersson, G., et al. (2018). Negative effects in psychotherapy: commentary and recommendations for future research and clinical practice. *BJPsych. Open* 4, 307–312. doi: 10.1192/bjo.2018.42

Rupprecht, S., Koole, W., Chskalson, M., Tamdjidi, C., and West, M. (2019). Running too far ahead? Towards a broader understanding of mindfulness in organisations. *Curr. Opin. Psychol.* 28, 32–36. doi: 10.1016/j.copsyc.2018.10.007

Seppelä, E. M., Simon-Thomas, E., Brown, S. L., Worline, M. C., Cameron, M. C., and Doty, J. R. (eds.) (2017). *The Oxford Handbook of Compassion Science*. Oxford: Oxford University Press.

Singer, T., and Klimecki, O. M. (2014). Empathy and compassion. *Curr. Biol.* 24, R875–R878. doi: 10.1016/j.cub.2014.06.054

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., et al. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clin. Psychol. Rev.* 47, 15–27. doi: 10.1016/j.cpr.2016.05.004

Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C., Olendsky, A., et al. (2017). Mind the hype: a critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspect. Psychol. Sci.* 13, 36–61. doi: 10.1177/1745691617709589

Varela, F. J., Thompson, E., and Rosch, E. (2016). *The Embodied Mind: Cognitive Science and Human Experience. 2nd Edn*. Cambridge MA: MIT press.

Västfjäll, D., Slovic, P., Mayorga, M., and Peters, E. (2014). Compassion fade: affect and charity are greatest for a single child in need. *PLoS One* 9:e100115. doi: 10.1371/journal.pone.0100115

White, R. (2017). "Compassion in Philosophy and Education," in *The Pedagogy of Compassion at the Heart of Higher Education*. ed. P. Gibbs (Cham: Springer Nature), 19–31.

Whitelock, D., Faulkner, D., and Miell, D. (2008). Promoting creativity in PhD supervision: tension and dilemmas. *Think. Skills Creat.* 3, 143–153. doi: 10.1016/j.tsc.2008.04.001

Zaki, J., and Cikara, M. (2015). Addressing empathic failures. *Curr. Dir. Psychol. Sci.* 24, 471–476. doi: 10.1177/0963721415599978

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Compassion-Focused Technologies: Reflections and Future Directions

Jamin Day[1], Joel C. Finkelstein[2], Brent A. Field[3], Benjamin Matthews[4], James N. Kirby[5] and James R. Doty[2]*

[1] College of Health, Medicine and Wellbeing, Family Action Center, The University of Newcastle, Newcastle, NSW, Australia, [2] School of Medicine, The Center for Compassion and Altruism Research and Education (CCARE), Stanford University, Stanford, CA, United States, [3] Princeton Neuroscience Institute, Princeton University, Princeton, NJ, United States, [4] School of Creative Industries, College of Human and Social Futures, The University of Newcastle, Newcastle, NSW, Australia, [5] School of Psychology, Faculty of Health and Behavioral Sciences, The University of Queensland, Brisbane, QLD, Australia

Compassion is a prosocial motivation that is critical to the development and survival of the human species. Cultivating compassion involves developing deep wisdom, insight, and understanding into the nature and causes of human suffering; and wisdom and commitment to take positive action to alleviate suffering. This perspective piece discusses how compassion relates to the context of modern technology, which has developed at a rapid pace in recent decades. While advances in digital technology build on humankind's vast capacity to develop practical tools that promise to enrich our lives and improve our social connections, in reality the effects are often far from benign. The motives underlying the development of many contemporary digital platforms seem rooted in competitiveness and capitalism; while modern social media and online platforms are having a profound and pervasive impact on the mental health and wellbeing of humans around the globe. Nonetheless, digital technology holds considerable potential to promote compassionate insight, wisdom, and prosocial behavior. We reflect on the current state of technology within human society and examine the notion of *compassionate technologies*; discuss how contemporary paradigm shifts such as the inclusive design movement may be harnessed to build tools and platforms that promote collective good and increase prosocial behavior; and highlight examples of initiatives that are harnessing modern technology to advance democracy, collective knowledge, and personal freedoms and agency.

Keywords: compassion, digital technology, perspective, extended reality, human society, social media

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****Correspondence:***
Jamin Day
jamin.day@newcastle.edu.au

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INTRODUCTION

According to the Dalai Lama, "Love and compassion are necessities, not luxuries. Without them, humanity cannot survive" (as cited in Powys, 2011). In recent decades, compassion researchers have increasingly recognized that compassion is not merely an ideological virtue, but a complex feature of our socio-biology that is critical to our survival as a species. Compassion is motivated by

powerful neural pathways that are stimulated by suffering, with corresponding neurological reward centers stimulated by alleviating suffering. When compassion is cultivated, the mind takes on characteristics of openness, courage and understanding (Gilbert, 2014).

With few exceptions, a central tenant of the evolution of complex biological systems has been one of cooperation. This has never been more evident than in the human species where there is an absolute requirement that our offspring are nurtured, cared for and protected for well over a decade before they are capable of functioning independently. To ensure that such effort is expended in terms of energy and resources, a complex reward system evolved in our nervous systems. Compassionate behavior stimulates areas of the brain associated with pleasure and carries profoundly positive effects in our peripheral physiology (Goetz et al., 2010). During humanity's hunter-gatherer phase, the capacity to recognize emotional states in others fostered greater nurturance, cooperation, regulation and collective defense (Gilbert, 2019). Compassion, the fundamental ability to recognize suffering and be motivated to alleviate it, has been demonstrated to be necessary for the long-term survival of human life (Williams, 2018).

In this paper, we discuss the future of compassion in relation to technology. A critical question for the current age is: Can technology be used to further our scientific understanding of compassion; and to steer us toward greater personal autonomy, collective agency, empathy, and compassionate action? In the following sections, we discuss how modern technology has been a defining feature of the 21st Century, shaping humanity at multiple levels including the social, behavioral, cultural, and ethical. Technological proliferation has increased connectivity, lowered global barriers, and provided new avenues for trade and livelihood; while also fomenting greed, competitiveness and comparative individuals and societies. We contend that compassionate technologies are those that harness contemporary advances to actively restore, humanize and strengthen our relationships with one another as well as ourselves, and discuss examples of new mechanisms, modalities and emerging fields that support these aims.

The Role of Technology in the 21st Century

Technology has long played a significant role in the evolution of the human species. In the 21st Century, we have witnessed an explosion of data and digitization. The pace of technological evolutions has occurred rapidly, by orders of magnitude and with seeming exponential growth. From advances in nanotechnology, bioengineering, neuroscience, information technology, artificial intelligence and intelligence augmentation, to 3D printing and virtual reality, technology continues to permeate every part of our society. Broadly speaking there are few signs that thoughtful care and consideration has been given to the socio-technical implications of this growth, at least not to a degree that is commensurate with the rapid pace of technological development. Between financial firms, social networks and digital vendors, we live in the shadow of a computational arms race to obtain, analyze, and model as much information as possible, with increasing impacts to our daily lives. As technology has gradually shifted from production and industrial output to the organizing of information and complex social systems, a complex web of interconnected services has emerged that encompasses a wide range of domains: from search to social life, finance and digital health. The majority of citizens in Western society now regularly straddle between digital and "analog" lives, usually with little knowledge of the degree of behind-the-scenes information gathering that takes place in the digital sphere regarding our collective behavior, friendships, spending, and interests.

The networks that power these daily interactions tend to abstract resources and information away from the public eye for commercial or political benefit, rather than making those resources (i.e., data and information) openly accessible and available. Across many areas, this has fostered an underlying winner-takes-all zeitgeist that confers increasing advantages as scale increases. Nick Srnicek (2017) has described this as a shift toward "platform capitalism," allowing those platforms with the largest user-bases to provide a foundation from which others emerge and operate across a range of sectors. By virtue of this, a defining characteristic of the current era is that organizations with the greatest informational and computational resources exhibit growing dominance; while these in turn contend for an ever-increasing number of users in a bid to influence and shape consumer behavior.

These digital networks are having a profound effect on our actions and decision making (Lessig, 1999). Our daily activity, financial spending, browsing history, and social lives have each succumbed to a pervasive new culture of technological voyeurism and influence. Similarly, modern luxuries including GPS, wearables and smart-home devices acutely study users' daily habits. Via these mechanisms, governments and commercial industries have increasingly sought to map out society through statistical representations and "big data," embracing large-scale infrastructure and machine learning algorithms that can predict personal consuming habits and classify social identities, habits and preferences. This type of modeling has become a lynchpin of modern commercialism. Even brick and mortar stores increasingly rely on Wi-Fi signals and sophisticated video surveillance offerings to track individual customer's dwell time, gender, mood, return rate, and other personal information. Networks progressively link data on the user's behavior with other personal information that can be obtained relatively cheaply from companies that specialize in data aggregation. Through expanding databases of personal information, predictive analytics have already improved in accuracy enough to precisely assign an individual's age, gender, financial status, purchasing habits, political opinions, as well as many other dimensions of their personality and habits. They then aim, with laser precision, to deliver custom tailored incentive offerings, advertisements and suggested purchases at the exact times and places that such feedback will maximize impact in a decision process (see Sadowski, 2020 for a more in-depth discussion).

In the information age – what Stiegler (2019) has called "the age of disruption" – and the era of social media, the impacts

of constant technology use have grown more pervasive. Virtual networks profoundly influence our perception of time (Kweon et al., 2011), and give a sense of simultaneous connectedness and instantaneous feedback that make it difficult to distance ourselves from the distraction of the digital sphere (Kraushaar and Novak, 2010; Rosen et al., 2013). As Lanier (2014) argues, under this arrangement we tend to forfeit what we would thoughtfully wish for ourselves, to gain distraction through personalized, interactive desires. Our decisions become constrained by both herd-mentality and a bevy of ranking and clustering algorithms that model our choices before we make them. Furthermore, the richness and reciprocity available to us during offline interactions can become compressed by virtual networks down to a unidimensional portrayal of society and the individuals that occupy it. Relative to digital space, the affective dimension of in-person, embodied experience of others provides a very different opportunity to model and test our world making and decisions through intimate communication with trusted others. The full impact of a diminution of such offline interaction is beyond the scope of the current discussion, but certainly includes a flattening of not just our independent capacity to engage in decision making, but also our access to the sociality of direct human interaction where these decisions can be tested against the subjective experience of others.

Each day, individuals communicate instantaneously and are inundated by unprecedented floods of digital information, yielding what Fries (2012) describes as "information asymmetry"; overwhelming access to information, the veracity and implications of which most cannot discern. Indeed, the emerging consensus has been that the time spent in virtual interactions is beginning to eclipse face-to-face communication (Bureau of Labor Statistics, 2014). All this, while staring down existential threats of virus pandemics, nuclear or mechanized warfare, and environmental catastrophes. Recently, with worldwide events including the global COVID-19 pandemic, these widespread sociological shifts have become even more entrenched within modern society.

Social networks such as Facebook, Instagram, Twitter and others have heralded a new age of connectivity, with a two-way flow of information that bridges historical barriers associated with class, country, race and status. Individuals now have direct access to opinions, insights and images from thought leaders, world leaders, and celebrities. The dispersion of information undoubtedly carries some putative benefits for producing more compassionate societies. For example, first-hand access to information from those embedded in war zones, or in countries ravaged by famine or social injustice, alongside the promotion of online campaigns and petitions, may prompt greater individual care, awareness and compassionate action than would have been previously possible through traditional media only. Yet concerningly, in Western society at least we have witnessed an alarming reduction in humanity's capacity to understand and empathize with ourselves and one another (Konrath et al., 2011; Twenge et al., 2012); a trend that worryingly corresponds to the growth of virtual social networks and smartphones. This poses a significant threat to the collective wellbeing of modern societies, and promises to continue alienating and fragmenting our broader social selves. The experience of virtual sociality, depending on its use, has proven fertile ground for habitual narcissism (Gentile et al., 2012; Horton et al., 2014), with our worst indulgences often decoupled from immediate consequences and feedback (Turkle, 2011). It is disconcerting that this relative anonymity seemingly mutes many of the perceived consequences of violent or aggressive social communication, birthing an epidemic of cyberbullying and hostile "trolling" (Villines, 2015). Indeed, literature shows a correlational link between excessive use of virtual sociality and a cavalcade of negative psychological outcomes, including loss of well-being (Kross et al., 2013), poor relationship outcomes (Morgan et al., 2016), such as cheating, divorce and breakups (Clayton et al., 2013), increases in narcissistic aggression (Carpenter, 2012), poor academic performance (Junco, 2015), and envy (Verduyn et al., 2015).

Looking forward, major research programs from industry and scholarly settings are increasingly emphasizing virtual sociality as playing a vital role within our daily lives and routines. As wearables and mobile technologies grow more sophisticated, this raises complex ethical challenges. For instance, an "AR Cloud," which is in the simplest sense a contemporaneous digital copy of the world most commonly implemented via augmented reality (AR), has become the latest mechanism by which connected services gain personalized access to users' lives and data. Meanwhile, the European Commission funded VRTogether project and Facebook's Reality Labs have developed photo-realistic 3D avatars for use in virtual reality (VR) conferencing and other shared social experiences (De Simone et al., 2019; Gunkel et al., 2019; Li et al., 2019; Rubin, 2019; VRTogether, 2020). Facebook call these "Codec Avatars": photorealistic computer-generated avatars based on high resolution image gathering and machine learning that builds a model of how our clothing and bodies move that can react dynamically to the sound of a voice (Rubin, 2019). The high fidelity of these technological advances holds exciting potential, presenting new opportunities for the future of remote work, social connectedness, and even psychotherapy (e.g., Bertrand et al., 2018; Kothgassner et al., 2019). Conversely, left unchecked, the potential for misuse is great, exposing new mechanisms for dangers such as identity theft or trauma for those individuals who relate deeply through immersive virtual experiences.

Compassionate Technologies

We acknowledge this synopsis of the current state of technology sounds downcast, perhaps even ominous. Of course, modern advances in digital technology offer far more positives than we have alluded to here, including universal, real-time access to global information; new labor market opportunities; meaningful and creative contributions to digital and actual society; and platforms that foster connection and community. Nonetheless, we harken back to one of the central tenets of compassion, defined as "the sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it" (Gilbert, 2014). In other words, before we can identify and commit to a way forward that seeks to prevents human suffering, we must demonstrate wisdom and insight to *recognize and understand* the cause of suffering (Sternberg, 2012)—and the role of

technology in preventing, alleviating or exacerbating it. Clearly, technology has the potential to engender global threats and collectively deteriorate compassionate and humanistic thinking. Fortunately, technological evolution, unlike biological evolution, is not dictated merely by circumstance. The values we wish to engender and the human identity we wish to foster, can influence technological evolution itself. We argue that technology has significant potential to foster collective agency, empathy, and mutual understanding. The crucial distinction is one of design, intent, and the repercussions of design choices. The culture of innovation we create now will determine which of these contending eventualities will prevail.

An example of this in action can be found in the principles of inclusive design. People having difficulty accessing and/or using products and services are frequently excluded from consideration in design processes with the effect of limiting the design output's efficacy, versatility, lifespan, and commercial potential (Amin, 2019). Inclusive design approaches, alternatively, consider diverse users in an effort to drive innovation and improve experiences for all participants. Here, inclusive design is defined as "a human centered or user centered design methodology that provides a framework to understand the needs, wants, and limitations of end users" (Amin, 2019). The goal is to increase both the human and commercial potential of a product or service. From a human centered perspective, therefore, we might frame inclusive design as an ethical approach that considers the needs, wants, and limitations of end users within various contexts as separate and unique challenges, with an aim to deliver discrete solutions that demand consideration of diverse perspectives. The argument on behalf of an inclusive approach to design, therefore, not only promotes greater access; it also attends to the quality and implications of that access for all.

There are now critical opportunities for new technologies within a space we nominally refer to as "compassionate technologies." Compassionate technologies seek to restore and humanize our relationships with one another, and to our sense of self. We suggest that compassionate technologies might achieve this through two key aims. The first key aim for these technologies is *to democratically reconstitute access and control of digital and physical networks through platform cooperativism so as to foster greater freedom and compassion in groups.* We define platform cooperativism to be the collective ownership of and citizenship in digital platforms. These platforms serve to share resources cooperatively, sustainably, and automatically. They can democratically facilitate a wide range of community and social functions, such as ridesharing and room sharing, to energy sharing and neighborhood security.

These platforms are not to be confused with the so-called "sharing economy." Companies such as Uber for ridesharing, Spotify for music, and Airbnb for room sharing, have the capacity for similar resource distribution and cooperation. But, as Scholz points out, these hierarchical organizations centrally commodify the act of sharing so that the company becomes its chief financial beneficiaries (Scholz, 2016). The sharing economy flouts labor protections and asymmetrically extracts benefits, profit and information from the network.

Platform cooperatives instead seek to decentralize ownership, democratize access to information, and protect the benefits of its workers and content producers alongside its users. There are already examples of such platforms around the world that have demonstrated significant social benefits. For example, *prod-user* owned platforms, wherein producers co-own the platforms to which they are selling their work, yield careers and returns for their content producers. Examples include platforms for photographers (*Stocksy*)[1], filmmakers (The Film-Makers' Cooperative)[2] and musicians (*Resonate*)[3]. Additionally, cooperative online marketplaces are emerging, such as *Fairmondo*[4], a fast-growing, user-owned service similar to Ebay, which has taken hold in Germany. Other platform coops exist such as the *Loconomics* movement[5], a community-owned cooperative labor brokerage offering services from babysitting to car-repair[6]. In the context of modern neoliberal capitalist societies, decentralized platforms such as these are not immune from challenges. Ensuring long-term viability depends on sufficient economic returns and the capacity to grow the user base to a critical mass that affords sustainability and attracts content creators or distributors; while other potential pitfalls such as disentangling intellectual property rights or balancing commercial interests with user interests must be navigated (e.g., Bruns, 2007).

Experiments in more human-centric, agile, and distributed political governance also promise to re-define and expand the adaptability of governance. Experimental governmental organizations such as the United Kingdom's Nudge Unit (Behavioural Insights, 2016) and Denmark's Mind Lab (2016) promote policy based on "open city" and big data stores in combination with corresponding behavioral economics. These groups use data-intensive methods. They couple these to insights into human behavior to construct a more benign society. Others, such as Finland's Design for Government Initiative (Annala et al., 2015), take the process of iterative design further by encouraging massively cooperative feedback from citizens in experimental policy trials. Here, citizens are participants in both data collection and suggestions for new hypotheses. Meanwhile, new initiatives focusing on massively distributed governance, or "deep democracy," provide new opportunities for technological experiments in public and participatory decision-making. For example, *Liquid Democracy* ruptures the historical ties of governance to the elite and seeks to overcome impediments to community engagement in decision-making (Ramos, 2015). This cloud platform permits groups or organizations to collectively deliberate and decide on relevant issues pertaining to their common purpose. "Liquid Feedback" (Behrens et al., 2014) combines both representative and direct deliberation systems and allows any user to act as both political representative and voter. Members can deliver their own voting authority as a proxy vote to

[1]https://www.stocksy.com/
[2]https://film-makerscoop.com/
[3]https://resonate.is/
[4]https://www.fairmondo.de/global
[5]http://coop.loconomics.com.au/
[6]https://platform.coop/

one another, supplanting the need for career politicians. They can delineate these proxies to specific members. They can constrain that mandate to explicit policy categories and for specific time spans. These proxies are highly flexible and rescindable. They permit a "liquid" flow of power through a network where anyone can make a proposition, have an exchange, engage in deliberation or delegate authority rapidly.

This type of human-centric governance has potential to achieve policy and design breakthroughs through deep collaboration with local citizenry. Participatory technologies could empower our collective stewardship of our environments through sharing of knowledge resources and assisting services (Ahn et al., 2004). Enabling access to diverse views and opinions is useful where conflict, negotiation and compromise must ensue to share resources or make collective decisions. Through distributed collaboration, access to open data and civic records, capacity for instantaneous feedback, and collectivized decision making, these new forms of compassionate technologies can make empathetic concern for one another the basis of their functioning. The data they generate becomes a possession of the communities they serve: a data store of our collective needs. However, such self-governance requires a culture of civic engagement. For an organization or community to exercise a sense of self and a commitment to shared courage and compassion, a shared sense of self needs to emerge with common ideals, ethics and values.

A second critical aim of compassionate technologies is *to use technology to advance, rather than hinder, cognitive liberty; to foster greater freedom and compassion in relation to ourselves.* There are two chief ways that technology can aid the preservation of agency. First, technology can help us better understand and regulate our moment-by-moment emotions, thoughts, and feelings. It can help us create a more textured and compassionate representation of our own needs and the needs of others. Second, technology can help us defend our "soulfulness," agency and considered goals against distraction and mindlessness. Compassionate technology must also seek to transform the dilemma of surveillance and control into an empathetic fixture for greater compassion and awareness. As Harris (2016), argues the hidden, algorithmic influences that subvert our agency often do so by modeling our impulses. They then confine our attention to a menu of highly personalized, and often distracting options. What if we could instead imbue our environment with values that promote what we "want to want" for ourselves? Here, the same tools that provide influential capabilities to marketers may be subverted into tools for self-reflection and compassion in a closed loop – facilitating a greater capacity to understand ourselves. Virtual assistants in this scenario may incorporate a mindful and compassionate context, to algorithmically steer users toward motivated empathy, solitude and reflection through emotional analytics that provide deep insights into our state of mind on a moment-by-moment basis. For example, these tools may reinforce how our tone of voice, our posture and word choice are reaching others and how others, in turn, are affecting us.

Finally, development in compassionate technology must seek to imbue virtue within virtual interactions. How can we develop digital formats that better engender heartfulness and pro-social behavior? Pro-social cues and contexts in virtual interaction are now being studied to see how they might enhance compassion. This is especially relevant for virtual reality, which draws on innate heuristics such as presence, closeness and social connection while instantaneously bridging time and space in ways that have previously been out of reach, opening up new opportunities for individuals to engage with experiences that build empathy, compassion and prosociality (e.g., Bertrand et al., 2018). For example, contemporary practices such as loving-kindness and compassion meditations are increasingly being recognized for their benefits through both clinical research as well as brain imaging and neuroendocrine studies (Hofmann et al., 2011). Typically, individuals engage with these activities on a personal level, or perhaps in a clinical setting with guidance from a therapist. With recent advances in technology, numerous, untapped possibilities now abound in this space, including novel mechanisms for integrating therapeutic activities within socially connected, digital spaces; though little is yet known about the potential benefits—or drawbacks—from utilizing such practices in this way.

Conclusion

A wealth of evidence suggests we can enhance the likelihood of compassionate states and prosocial behavior via modern digital technology. Armed with advances in the science and technology of compassion, the acceleration of technological evolution may be steered to achieve a greater emphasis on positive feedback cycles of trust, reciprocal interaction and self-discovery. In the face of the explosive growth of technological power in the 21st century, compassion calls on us to courageously revisit our social contract. A new vista has opened in technological design which, for the first time, permits us to participate more fully and immediately in our own lives and those of others. The courage to participate and engage with our conditions, and the new technologies that catalyze this effort, together portend the possibility of a new social contract for the 21st century – enacted reciprocally, with one another and for mutual benefit. To this end, significant legal and economic reform, "venture cooperatives" for financing, and willing communities will be needed. As will a design philosophy that is human centered, and oriented by inclusivity. Most of all, it requires advocates for these reforms who recognize the centrality of compassion to the historical arc of human evolution and, ultimately its requirement for our survival.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

All authors contributed to the drafting, editing, and reviewing of this manuscript and approved the submitted version.

REFERENCES

Ahn, T. K., Janssen, M. A., and Ostrom, E. (2004). "Signals, symbols and human cooperation," in *Origins and Nature of Sociality*, eds R. W. Sussman and A. R. Chapman (New York: Aldine De Gruyter), 122–139.

Amin, M. (2019). *The Benefit of Designing for Everyone*.

Annala, M., Kaskinen, T., Lee, S., Leppanen, J., Mattila, K., Neuvonen, A., et al. (2015). *Design for Government: Human-centric governance through experiments*. Retrieved from https://www.demoshelsinki.fi/wp-content/uploads/2015/09/Design-for-Government-%E2%80%93-Governance-through-experiments.pdf

Behavioural Insights. (2016). *Prabha*. Retrieved from: http://www.behaviouralinsights.co.uk/

Behrens, J., Kistner, A., Nitsche, A., and Swierczek, B. (2014). *The principles of LiquidFeedback*. Berlin: Interaktive Demokratie e. V.

Bertrand, P., Guegan, J., Robieux, L., McCall, C. A., and Zenasni, F. (2018). Learning Empathy Through Virtual Reality: Multiple Strategies for Training Empathy-Related Abilities Using Body Ownership Illusions in Embodied Virtual Reality. *Frontiers in Robotics and AI* 5:26. doi: 10.3389/frobt.2018.00026

Bruns, A. (2007). "The future is user-led: The path towards widespread produsage," in *Proceedings of PerthDAC 2007: The 7th International Digital Arts and Culture Conference*, ed. A. Hutchinson (Perth: Curtin University of Technology), 68–77.

Bureau of Labor Statistics. (2014). *American time use survey*. Washington, DC: Bureau of Labor Statistics.

Carpenter, C. (2012). Narcissism on Facebook: Self-Promotional and Anti-Social Behavior. *Personality and Individual Differences* 52, 482–486. doi: 10.1016/j.paid.2011.11.011

Clayton, R. B., Nagurney, A., and Smith, J. R. (2013). Cheating, Breakup, and Divorce: Is Facebook Use to Blame? *Cyberpsychology, Behavior, and Social Networking* 16, 717–720. doi: 10.1089/cyber.2012.0424

De Simone, F., Li, J., Debarba, H. G., El Ali, A., Gunkel, S. N., and Cesar, P. (2019). "Watching videos together in social virtual reality: An experimental study on user's QoE," in *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, (Piscataway, NJ: IEEE), 890–891.

Fries, T. (2012). "Introduction," in *The Data Journalism Handbook*, eds L. Gray, J. Bounegru, and L. Chambers (Cambridge: Open Knowledge Foundation).

Gentile, B., Twenge, J. M., Freeman, E. C., and Campbell, W. K. (2012). The effect of social networking websites on positive self-views: An experimental investigation. *Computers in Human Behavior* 28, 1929–1933.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology* 53, 6–41. doi: 10.1111/bjc.12043

Gilbert, P. (2019). Psychotherapy for the 21st century: An integrative, evolutionary, contextual, biopsychosocial approach. *Psychology and Psychotherapy: Theory, Research and Practice* 92, 164–189. doi: 10.1111/papt.12226

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychological Bulletin* 136, 351. doi: 10.1037/a0018807

Gunkel, S. N., Dohmen, M. D. W., Stokking, H., and Niamut, O. (2019). "360-Degree Photo-realistic VR Conferencing," in *Proceedings of the 2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, (Osaka), 946–947. doi: 10.1109/VR.2019.8797971

Harris, T. (2016). *How Technology Hijacks People's Minds—from a Magician and Google's Design Ethicist*. Retrieved from: https://medium.com/swlh/how-technology-hijacks-peoples-minds-from-a-magician-and-google-s-design-ethicist-56d62ef5edf3#.ijsr977pq.

Hofmann, S. G., Grossman, P., and Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clin. Psychol. Rev.* 31, 1126–1132. doi: 10.1016/j.cpr.2011.07.003

Horton, R. S., Reid, C. A., Barber, J. M., Miracle, J., and Green, J. D. (2014). An experimental investigation of the influence of agentic and communal Facebook use on grandiose narcissism. *Computers in Human Behavior* 35, 93–98. doi: 10.1016/j.chb.2014.02.038

Junco, R. (2015). Student Class Standing, Facebook Use, and Academic Performance. *Journal of Applied Developmental Psychology* 36, 18–29. doi: 10.1016/j.appdev.2014.11.001

Konrath, S. H., O'Brien, E. H., and Hsing, C. (2011). Changes in dispositional empathy in American college students over time: a meta-analysis. *Personality and Social Psychology Review* 15, 180–198. doi: 10.1177/1088868310377395

Kothgassner, O. D., Goreis, A., Kafka, J. X., Van Eickels, R. L., Plener, P. L., and Felnhofer, A. (2019). Virtual reality exposure therapy for posttraumatic stress disorder (PTSD): a meta-analysis. *European Journal of Psychotraumatology* 10, 1654782. doi: 10.1080/20008198.2019.1654782

Kraushaar, J. M., and Novak, D. C. (2010). Examining the effects of student multitasking with laptops during the lecture. *Journal of Information Systems Education* 21, 241–251.

Kross, E., Verduyn, P., and Demiralp, E. V. P. (2013). Facebook use predicts declines in subjective well-being in young adults. *PLoS One* 8:e69841. doi: 10.1371/journal.pone.0069841

Kweon, S.-H., Hwang, K.-H., and Do-Hyun, J. (2011). Time and space perception on media platforms. *Proceedings of the Media Ecology Association* 12, 25.

Lanier, J. (2014). *Who owns the future?*. New York, NY: Simon & Schuster.

Lessig, L. (1999). *Code and Other Laws of Cyberspace*. New York, NY: Basic Books.

Li, J., Kong, Y., Röggla, T., De Simone, F., Ananthanarayan, S., De Ridder, H., et al. (2019). "Measuring and understanding photo sharing experiences in social virtual reality," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, (New York, NY: Association for Computing Machinery), doi: 10.1145/3290605.3300897

Mind Lab. (2016). *Prabha*. Retrieved from http://mind-lab.dk/en/

Morgan, T., Mackenzie, S., Katjana, S., and Thomas, J. R. (2016). *When more information does not help: the connection between Facebook monitoring behavior, relationship uncertainty, and relationship quality*. Retrieved from: http://scholarworks.umt.edu/communications_students/1/

Powys, J. C. (2011). *The art of happiness*. London: Faber & Faber.

Ramos, J. (2015). "Liquid Democracy and the Futures of Governance," in *The Future Internet*, eds J. Winter and R. Ono (Cham: Springer International Publishing), 173–191.

Rosen, L., Carrier, M., and Cheever, N. A. (2013). Facebook and texting made me do it: media-induced task-switching while studying. *Computers in Human Behavior* 29, 948–958. doi: 10.1016/j.chb.2012.12.001

Rubin, P. (2019). *Facebook can make VR avatars look—and move—exactly like you*. San Francisco, CA: WIRED.

Sadowski, J. (2020). *Too smart: how digital capitalism is extracting data, controlling our lives, and taking over the world*. Cambridge, MA: MIT Press.

Scholz, T. (2016). *Platform cooperativism - challenging the corporate sharing economy*. Berlin: Rosa Luxemburg Foundation.

Srnicek, N. (2017). *Platform capitalism*. Cambridge: Polity Press.

Sternberg, R. J. (2012). "The science of wisdom: Implications for psychotherapy," in *Wisdom and compassion in psychotherapy: Deepening mindfulness in clinical practice*, eds C. K. Germer and R. D. Siegel (New York, NY: The Guilford Press), 154–162.

Stiegler, B. (2019). *The age of disruption: technology and madness in computational capitalism*. Cambridge: Polity Press.

Turkle, S. (2011). *Alone together: why we expect more from technology and less from each other*. New York: Basic Books.

Twenge, J. M., Campbell, W. K., and Freeman, E. C. (2012). Generational differences in young adults: life goals, concern for others, and civic orientation, 1966–2009. *Journal of Personality and Social Psychology* 102, 1045–1062. doi: 10.1037/a0027408

Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., et al. (2015). Passive Facebook usage undermines affective well-being: experimental and longitudinal evidence. *Journal of Experimental Psychology: General* 144, 480–488. doi: 10.1037/xge0000057

Villines, Z. (2015). *Cyberbullying: a global trend*. Needham, MA: IDG Connect.

VRTogether. (2020). *About VRTogether*. Retrieved June 11, 2020, from https://vrtogether.eu/about-vr-together/.

Williams, G. C. (2018). *Adaptation and natural selection: A critique of some current evolutionary thought*, Vol. 75. Princeton: Princeton University Press.

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Benevolence – Associations With Stress, Mental Health, and Self-Compassion at the Workplace

Christina Andersson[1,2], Cecilia U. D. Stenfors[3,4], Peter Lilliengren[5], Stefan Einhorn[2,6] and Walter Osika[2,7]*

[1] Center for Psychiatry Research, Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden, [2] Center for Social Sustainability, Department of Neurobiology, Care Sciences and Society, Karolinska Institute, Stockholm, Sweden, [3] Department of Psychology, Stockholm University, Stockholm, Sweden, [4] Aging Research Center, Department of Neurobiology, Care Sciences and Society, Karolinska Institute, Stockholm, Sweden, [5] Department of Health Care Sciences, St. Lukas Educational Institute, Ersta Sköndal Bräcke University College, Stockholm, Sweden, [6] Department of Oncology-Pathology, Karolinska Institute, Stockholm, Sweden, [7] Stockholm Health Care Services, Center for Psychiatry Research, Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden

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Dacher Keltner, University of California, Berkeley, United States

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****Correspondence:***
Christina Andersson
Christina.andersson@ki.se

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Objective: Benevolence is an emerging concept in motivation theory and research as well as in on pro-social behavior, which has stimulated increasing interest in studying factors that impair or facilitate benevolence and effects thereof. This exploratory study examines the associations between benevolence, stress, mental health, self-compassion, and satisfaction with life in two workplace samples.

Methods: In the first study n = 522 (38% = female, median age = 42) participants answered questionnaires regarding self-reported stress symptoms (i.e., emotional exhaustion), depressive symptoms and benevolence. In the second study n = 49 (female = 96%) participants answered questionnaires regarding perceived stress, self-compassion, anxiety, depression symptoms, and benevolence.

Results: In study 1, measures of emotional exhaustion (r = −0.295) and depression (r = −0.190) were significantly negatively correlated with benevolence. In study 2, benevolence was significantly negatively correlated with stress (r = −0.392) and depression (r = −0.310), whereas self-compassion (0.401) was significantly positively correlated with benevolence. While correlations were in expected directions, benevolence was not significantly associated with Satisfaction with Life (r = 0.148) or anxiety (r = −0.199) in study 2.

Conclusion: Self-assessed benevolence is associated with levels of perceived stress, exhaustion, depression, and self-compassion. Future studies are warranted on how benevolence is related to stress and mental ill health such as depression and anxiety, and if benevolence can be trained in order to decrease stress and mental ill health such as depression and anxiety in workplace settings.

Keywords: benevolence, stress, self-compassion, well-being, workplace, mental health

INTRODUCTION

Stress-related problems are global phenomena (OECD, 2013; Vigo et al., 2016) and stress-related health problems (OECD, 2010) and sick-leave (The Swedish Social Insurance Agency, 2017) are also common in Sweden. It entails substantial individual costs in terms of reduced wellbeing and functioning, as well as societal costs in terms of lost productivity, provision of health care and economic support (Ekman et al., 2013; Jonsdottir et al., 2017).

Many employees report high levels of stress in the workplace, which affects the business as well as the working environment (Ishtiak-Ahmed et al., 2014; Savic et al., 2017; The Swedish Social Insurance Agency, 2020). Stress in the workplace is connected to e.g., levels of demand and control (Karasek et al., 1982), support (Turner et al., 2012), effort reward imbalance (Siegrist, 1996), high work pace, constant change, increasing expectations for self-actualization, increasing reliance on interpersonal coordination in the execution of work tasks, and increasing job insecurity (Seidler et al., 2014). Hence, the psychosocial conditions in an organization plays a crucial role on the individuals' mental health and productivity (Magnusson Hanson et al., 2008; Stenfors et al., 2013).

Stress affects people in different ways, and several definitions of stress have been proposed (Folkman et al., 1986; McEwen, 1998, 2007; Lupien et al., 2009). For example, Lazarus and Folkman (1987) defined stress as a perceived imbalance between demands and resources. Ursin and Eriksen (2010) further argued that the stress response is a healthy and necessary response to something that is perceived as a threat or a challenge, in the cognitive activation theory of stress (CATS). Brosschot et al. (2005) highlighted the detrimental effects regarding prolonged activation of the stress response. They argue that prolonged physiological stress activity can be noticed in (1) Anticipatory responses to potential stressors, (2) Slow recovery from stressors, and (3) Recurrent activity related to past stressors. The stress response can hence be a reaction to something that happens in a specific situation, but it can also be a response to a (sometimes unconscious) ongoing mental process, over a long time period. Brosschot et al. (2018) further argue that it is not the stressor that triggers the stress response, but instead that all humans have a default stress response which is inhibited when safety is perceived generalized unsafety theory of stress (GUTS).

Benevolence is an emerging concept in e.g., motivation theory and research on altruism, pro-social behavior and psychological wellness. One definition of benevolence is the sense of *being able to give* (Martela and Ryan, 2015). Martela and Ryan (2015) developed and studied a new sub-scale comprising four items about benevolence in relation to well-being and mood, in four different sub-studies. It is a complement to the already established three dimensions of internal motivation; autonomy, competence, and relatedness, according to Self Determination Theory (Deci and Ryan, 1985; Ryan and Deci, 2000).

Research is still lacking regarding what factors are of importance for benevolence and how it is related to other aspects of mental health. According to prior research on stress and burn-out, employees are reporting emotional exhaustion, depersonalization, and reduced personal accomplishment when they reach a level of work-related burnout (Maslach and Jackson, 1981; Maslach et al., 2001; Maslach and Leiter, 2017), which hypothetically could decrease benevolence. It has been suggested but is not known if benevolence may act as a buffer against stress-related problems.

The ability to share the feelings of others is often referred to as empathy, and the ability to care for and show concern for others is the core aspect of compassion (Goetz et al., 2010; Singer and Klimecki, 2014). Recent descriptions and research on compassion includes, e.g., evolutionary theory, affective and cognitive neuroscience and attachment psychology, where all humans are thought to have an innate caring motivation to respond to the ones, they are close to, if they are in need (Gilbert, 2010). In a prior study (Andersson et al., 2020 submitted), a self-compassion intervention was shown to have a significant impact on decreasing stress. One definition of self-compassion is how you relate to yourself in a time of suffering (Neff, 2003b) and it is related to a decrease in stress and psychological ill-health, as anxiety and depression (MacBeth and Gumley, 2012; Muris et al., 2016; Kirby et al., 2017; Cuppage et al., 2018). Also, compassion directed toward others have been found to have a buffering effect against stress (Cosley et al., 2010). Experiencing stress or burnout is associated with compassion fatigue (Joinson, 1992) and empathy fatigue (Singer and Klimecki, 2014) and these mental states (that in themselves are related to stress) could have an impact on benevolence.

Aim of Study

The aim of study 1 was to investigate how benevolence, measured by a newly developed short scale, was associated with stress in terms of emotional exhaustion and depression in a large workplace sample.

The aim of study 2 was to examine if the results from study 1 was replicated in an additional sample, as well as to explore additional associations with self-compassion and satisfaction with life.

Research Questions and Hypotheses

Is there a relationship between the levels of benevolence, perceived stress, emotional exhaustion, depression, and self-compassion? Based on theory and previous research we expect benevolence to be negatively associated with measures of stress and mental health and positively associated with self-compassion.

MATERIALS AND METHODS

Design

Two cross sectional studies were performed on two independent samples from two different populations.

Participants

Study 1

The sample included office workers in four Swedish organizations. All employees (1,194) were invited to answer

an online survey including questions about their work situation, health and wellbeing (MBI-EE and SCL-CD6), out of which 44% responded to the survey, with, n = 522, responding to the benevolence questions (BS) (female = 40% age: 24–66, median age = 42).

Study 2

This study involved 47 (97% female) participants that were recruited from a public office Social Insurance Agency and a commercial bank to participate in an intervention study evaluating the effects of a compassion training program (Andersson et al., in preparation). When entering the trial, the participants answered questionnaires (using paper and pen) regarding perceived stress (PSS14), self-compassion (SCS), anxiety and depression (HADS), satisfaction with life (SWLS), and benevolence (BS).

Materials/Instruments

Description of the Benevolence Subscale (BS)

Martela and Ryan (2015) developed a brief scale to assess beneficence satisfaction, or the feeling that one has been benevolent. This was to capture what has been called the immediate "warm glow" associated with acts of kindness (Andreoni, 1990). Benevolence is evaluated on a scale ranging from 1 (not at all true) to 7 (very true) and the items are the following (1) *"I feel that my actions have a positive impact on the people around me,"* (2) *"The things I do contribute to the betterment of society,"* (3) *"I have been able to improve the welfare of other people,"* (4) *"In general, my influence in the lives of other people is positive."*

The translation of the scale from English to Swedish was conducted according to Streiner and Norman (2008). Two different bilingual (Swedish/English) persons with Swedish as a mother tongue translated the scale to Swedish from its original English version (Martela and Ryan, 2015). The translations were then back-translated into English by two other bilingual persons who were not familiar with the original BS measure or its purpose. An analysis group then compared the original and the two back-translated scales, aiming at eliminating any differences between the separate versions. Cronbach's alpha in study 1 was 0.85 and in study 2 was 0.84.

Symptom Checklist, Core Depression Subscale (SCL-CD6)

This scale is a subscale of the SCL-90, which measure core psychological and physical symptoms of depression during the last week. It has been validated against other comprehensive measures of clinical depression and found to have good validity and psychometric properties (Magnusson Hanson et al., 2014). The level of depressive symptoms is rated on a 5-point Likert scale ranging from 1 to 5, reflecting the perceived impact of symptoms in the previous week. Examples of items from the scale includes *"blaming yourself for things"* or *"worrying too much about things."* Reliability in the current sample of study 1 is a Cronbach's alpha of 0.88.

Maslach Burnout Inventory, Emotional Exhaustion Subscale (MBI-EE)

The scale is a subscale from the Maslach Burnout Inventory general survey (MBI-GS) (Schaufeli et al., 1996; Schutte et al., 2000). The subscale has five items, and two examples are *"My job makes me feel emotionally drained"* or *"I feel burned out by work."* The score is from 1 (a few times a year or less/never) to 6 (every day). The scale has good internal consistency with a reliability of 0.86 (Cronbach's alpha) in the current sample of study 1.

Perceived Stress Scale (PSS14)

Perceived Stress Scale is a widely used instrument to assess perceived stress. It is developed by Cohen et al. (1983). The original version of 14 items (Cronbach's α = 0.75). The scale consists of questions regarding thoughts and feelings over the last month, rated on a 5-point Likert scale (0 = *Never,* 4 = *Very often*). An example question is *"In the last month, how often have you felt that you were unable to control the important things in your life?"* The maximum total score is 56, the minimum total score is 0. The scale includes reversed items. The Swedish translation used here has been developed by Eskin and Parr (1996). Reliability in the current sample in study 2 was 0.92.

Satisfaction With Life Scale (SWLS)

The satisfaction with life scale is developed by Diener et al. (1985). It's a 5-item questionnaire to measure subjective well-being in one's life as a whole. Each item is rated on a 7-point Likert scale (1–7), with 1 = *strongly disagree* and 7 = *strongly agree*. The scale has good psychometric properties with internal consistency reliability (Cronbach's α = 0.88) Kobau et al. (2010). Reliability in the current sample of study 2 is 0.87.

The Hospital Anxiety and Depression Scale (HAD-S)

The Hospital Anxiety and Depression Scale was developed by Zigmond and Snaith (1983) and is a 14-item questionnaire to measure self-reported anxiety and depression scores. Seven items target anxiety (HADS-A) and seven items depression (HADS-D). Each item is rated on a 4-point Likert scale (0–3) with 0 = *never* to 3 = *very often*. The total score on each respective subscale is 21. A score over 15 is interpreted as severe depression or anxiety. A score above 11 is interpreted as the individual likely having a problem related to anxiety or depression and a score around 8–10 is seen as threshold value. Test-retest reliability has been found to be strong, 0.84 for anxiety and 0.71 for depression (Andersson et al., 2003) and internal consistency (Cronbach's alpha) between 0.68 and 0.93 for the anxiety scale and between 0.67 and 0.90 for the depression scale. Reliability in the current sample of study 2 is 0.93 for HADS total and 0.86 for the anxiety scale and 0.89 for the depression scale.

Self-Compassion Scale (SCS)

This 26-items scale assesses levels of self-compassion (Neff, 2003a). There are three factors of positive self-compassion: Self-kindness, Common humanity and Mindfulness, and three factors that focus on a lack of self-compassion: Self-judgment, Isolation,

and Over-identification. Participants indicate how often they engage in these ways of self-relating in times of distress rated on a Likert scale 1–5. The scale includes reversed items. The scale has good reliability (Cronbach's alphas ranging from 0.75 to 0.81). Reliability in the current sample of study 2 is 0.92.

Ethical Considerations

Both studies were approved by the regional Ethical Review Board in Stockholm, Sweden (Dnr 2014/1300-31/5 and Dnr 2015/1589-31/5).

Statistical Analyses

The statistical analyses in study 1 and 2 were performed in SPSS 25. Bivariate Pearson *r* correlations were calculated between study measures. Listwise deletion was applied in the analyses. Before analyses, all variables were screened for normality. Due to the exploratory aim of the study (Bender and Lange, 2001), the two-way significance level was set to 0.05 without correction for familywise error rate (e.g., Bonferroni).

RESULTS

Study 1

Results are displayed in **Table 1**. Benevolence was associated with measures of psychological functioning and well-being, in that higher levels of benevolence were related to significantly less emotional exhaustion ($r = -0.295$, $p < 0.01$) and less depressive symptoms ($r = -0.190$, $p < 0.01$). Partial correlations with adjustment for age and gender showed similar results.

Study 2

Results are displayed in **Table 2**. In this sample, we found that higher levels of benevolence were significantly associated with lower levels of perceived stress ($r = -0.392$, $p = 0.006$) depression ($r = -0.310$, $p = 0.034$) and higher levels of self-compassion ($r = 0.401$, $p = 0.005$). The association with anxiety was negative ($r = -0.199$) but did not reach significance ($p = 0.180$). Similarly, the association with Satisfaction with Life was positive, but not significant ($r = 0.148$ $p = 0.322$).

DISCUSSION

The aim of this study was to investigate the associations between stress, mental health, self-compassion and benevolence in two independent samples recruited from several Swedish workplaces. In study 1, a negative correlation between levels of self-rated stress, depression and benevolence was found. This was corroborated in the second study, where a similar pattern of associations between measures of perceived stress, depression, anxiety and benevolence were seen. Significant correlations were in the "moderately strong" range (e.g., 0.30–0.50) according to Cohen (1992), suggesting meaningful connections between concepts. While the correlations between benevolence, anxiety and satisfaction with life were not significant in Study 2, they were in the expected directions and non-significance may reflect limited power.

In study 2, we also found a positive relationship between benevolence and self-compassion, which also exhibited negative correlations with stress, depression and anxiety. Hence, self-compassion was associated with psychological well-being, which confirms earlier findings (Neff, 2003b; Kirby et al., 2017). Benevolence does not target suffering explicitly as self-compassion but being benevolent has been suggested to be an innate quality in all humans (Keltner et al., 2010). Self-compassion has been described to target, e.g., self-criticism and subsequent suffering (Gilbert and Procter, 2006), and it might be easier to access a state of benevolence if one has self-compassion, not being so hard on oneself and being able to see the positive impact one has on others. The results also suggest that benevolence could have an impact on the mental health and wellbeing outcomes. One could argue that there may be a reciprocal/bidirectional relationship. For example, stress and depression could reduce benevolence, but high benevolence could also have a reducing and/or buffering effect on stress and depression (Piliavin and Siegl, 2007). Acting benevolent involves both the giving end and the receiving end of the flow of pro-social and compassion behavior. Therefore, it would be of interest to study how it relates to the fears in each direction of the compassionate flow and see if decreasing the fears and blocks (Kirby et al., 2019) will have a positive impact on benevolence.

The results in study 2 were in line with the results in study 1. In both studies the Benevolence scale was used, while different measures of stress and depression were used in the two studies due to the different study settings (i.e., workplace setting in study 1 and a psychological intervention trial in study 2 where HAD-S is more frequently used in clinical settings). The correlations between benevolence and depression (in study 1 measured by SCL-CD6 and in study 2 measured by HAD-S) were however similar. Furthermore, prior works have found the two depression measures to correlate highly (Bjelland et al., 2002). The results from study 1 and 2 together thus provide robust support to benevolence being negatively associated with depressive symptoms. Different and complimentary aspects of stress were investigated in study 1 and 2. Symptoms of chronic stress were investigated in study 1 in terms of emotional exhaustion symptoms (MBI-EE), while perceived stress (PSS14) was investigated in study 2 which tap the experience of stressors in terms of stressful situations and ability to cope with those stressors. The results from study 1 and 2 are thus complimentary and suggest that a higher degree of benevolence is associated with a lower level

TABLE 1 | Study 1: Descriptive statistics and correlations.

				Correlations		
	n	*M*	*SD*	1	2	3
1. Benevolence	522	3.75	0.79	–		
2. SCL-CD6	522	1.84	0.77	−0.190**	–	
3. MBI-EE	521	2.15	1.04	−0.295**	0.619**	–

*SCL-CD6, symptom checklist, core depression subscale; MBI-EE, Maslach Burnout Inventory, emotional exhaustion subscale. **p < 0.01 (two-tailed).*

TABLE 2 | Study 2: Descriptive statistics and correlations.

				Correlations					
	n	*M*	*SD*	1	2	3	4	5	6
1. Benevolence	47	15.7	2.6	–					
2. PSS14	47	27.3	10.2	−0.392**	–				
3. SWLS	47	24.3	6.30	0.148	−0.557**	–			
4. HADS-D	47	4.60	4.13	−0.310*	0.689**	−0.690**	–		
5. HADS-A	47	7.45	4.96	−0.199	−712**	−0.575**	0.758**	–	
6. SCS	47	79.8	18.1	0.401**	−0.652**	0.337*	−0.457**	−0.570**	–

*PSS14, perceived stress scale; SWLS, satisfaction with life scale; HADS-D, the hospital anxiety and depression scale, depression; HADS-A, the hospital anxiety and depression scale, anxiety; SCS, self-compassion scale. *$p < 0.05$; **$p < 0.01$ (two-tailed).*

of both perceived stressors and ability to cope (PSS14) as well as symptoms of chronic stress in the form of emotional exhaustion symptoms.

Neff and Vonk (2009) highlight the difference between self-compassion and self-esteem, the latter being more unstable and often including the comparison of oneself against others, which can affect a person's self-worth. Hallsten et al. (2005) also connects the same aspect of a performance-based self-esteem relationship to emotional exhaustion. Even if acute stress has been described to trigger pro-social behavior (Raposa et al., 2016) chronic stress on the other hand have been shown in several studies to increase the risk for both mental (Grossi et al., 2015) and e.g., cardiovascular diseases (Steptoe and Kivimäki, 2012).

According to the Self Determination Theory (SDT), individuals are motivated by extrinsic and intrinsic factors. Extrinsic motivation refers to behaviors driven by external rewards like money, praise or fame. Intrinsic motivation refers to behaviors driven by growth and internal satisfaction (Deci and Ryan, 1985; Kasser and Ryan, 1996). The SDT recognizes three basic psychological needs which drives our behavior, autonomy, competence and relatedness. Martela and Ryan (2015, 2020) investigated if benevolence could be categorized as an additional basic psychological need, but concluded that it didn't qualify as such, but rather as a psychological factor which e.g., could enhance wellbeing. Another aspect of benevolence and its association to stress and motivation is Kaufman (2018) description of the concept of self-actualization, which involves helping others and not only seeing self-actualization as an individual project. The role of benevolence as a mental state, and if it relates to e.g., actual pro-social behavior still needs to be clarified.

Limitations

Some limitations do apply to the current study: First, both studies were cross-sectional and hence correlational, and thus, no causal inferences can be made. Secondly, both samples were limited to certain populations—office workers in four different organizations in study 1, and self-selected participants from different workplaces to an intervention program in study 2. Future studies that use experimental designs would be needed to any establish causal links between these factors, e.g., by investigating the effects of increased benevolence on stress and other mental health outcomes in interventions studies. Third, all the participants were from Sweden and were recruited either from a survey targeted at specific workplaces (study 1) or from intervention studies targeted at specific working populations (study 2). In order to validate the results from the current study, more studies including samples from e.g., other countries and cultural backgrounds are needed. Fourth, age was not registered in study 2, which limits the generalizability. All the participants were in the age range 25–65 years. Finally, the outcome measures were limited to self-assessment scales, and in order to further investigate the validity of the associations, it would be valuable to add measures of behavioral and physiological variables.

CONCLUSION

This is the first study to our knowledge to show that there is an association between self-reported stress levels and benevolence, as well as between self-compassion and benevolence. Future intervention studies should investigate if it is possible to change levels of benevolence and its effect on outcomes such as collaboration, innovation and performance (Condon, 2019). Future studies could also look at the concept of organizational virtuousness and benevolence and its effect on creating a positive organizational culture but also how it affects turnover rate and well-being (Cameron and Caza, 2004). In future studies it would also be of interest to include the "reduced personal accomplishment" aspect of burnout from the MBI scale, to investigate its relationship with the benevolence scale.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the regional Ethical Review Board in Stockholm,

Sweden (Dnr 2014/1300-31/5 and Dnr 2015/1589-31/5). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CA, WO, and SE designed study 1. CA sampled the data. PL analyzed the data, in collaboration with CA. CS and WO designed study 2 and selected the study measures. CS sampled the data and analyzed the data in study 2. All authors contributed to the article and approved the submitted version.

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REFERENCES

Andersson, C., Bergsten-Lindert, K., Lilliengren, P., Norback, K., Rask, K., Einhorn, S., et al. (2020). The effectiveness of smartphone compassion training on stress among university students: a pilot randomized trial. *J. Clin. Psychol.* 77, 927–945 doi: 10.1002/jclp.23092

Andersson, G., Kaldo-Sandström, V., Strömma, L., and Strömgren, T. (2003). Internet administration of the hospital anxiety and depression scale in a sample of tinnitus patients. *J. Psychosom. Res.* 55, 259–262. doi: 10.1016/S0022-3999(02)00575-5

Andreoni, J. (1990). Impure altruism and donations to public goods: a theory of warm glow giving. *Econ. J.* 100, 464–477. doi: 10.2307/2234133

Bender, R., and Lange, S. (2001). Adjusting for multiple testing - when and how? *J. Clin. Epidemiol.* 54, 343–349. doi: 10.1016/S0895-4356(00)00314-0

Bjelland, I., Dahl, A. A., Haug, T. T., and Neckelmann, D. (2002). The validity of the hospital anxiety and depression scale: an updated literature review. *J. Psychosom. Res.* 52, 69–77. doi: 10.1016/S0022-3999(01)00296-3

Brosschot, J. F., Pieper, S., and Thayer, J. F. (2005). Expanding stress theory: prolonged activation and perseverative cognition. *Psychoneuroendocrinology* 30, 1043–1049. doi: 10.1016/j.psyneuen.2005.04.008

Brosschot, J. F., Verkuil, B., and Thayer, J. (2018). The Generalized Unsafety Theory of Stress (GUTS) and why the stress response is fundamentally unconscious. *Psychosom. Med.* 80, A155–A155.

Cameron, K. S., and Caza, A. (2004). Introduction: contributions to the discipline of positive organizational scholarship. *Am. Behav. Sci.* 47, 731–739. doi: 10.1177/0002764203260207

Cohen, J. (1992). A power primer. *Psychol. Bull.* 112, 155–159. doi: 10.1037/0033-2909.112.1.155

Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *J. Health Soc. Behav.* 24:385. doi: 10.2307/2136404

Condon, P. (2019). Meditation in context: factors that facilitate prosocial behavior. *Curr. Opin. Psychol.* 28, 15–19. doi: 10.1016/j.copsyc.2018.09.011

Cosley, B. J., McCoy, S. K., Saslow, L. R., and Epel, E. S. (2010). Is compassion for others stress buffering? Consequences of compassion and social support for physiological reactivity to stress. *J. Exp. Soc. Psychol.* 46, 816–823. doi: 10.1016/j.jesp.2010.04.008

Cuppage, J., Baird, K., Gibson, J., Booth, R., and Hevey, D. (2018). Compassion focused therapy: exploring the effectiveness with a transdiagnostic group and potential processes of change. *Br. J. Clin. Psychol.* 57, 240–254. doi: 10.1111/bjc.12162

Deci, E. L., and Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum. doi: 10.1007/978-1-4899-2271-7

Diener, E., Emmons, A. R., Larsen, J. R., and Griffin, S. (1985). The satisfaction with life scale. *J. Personal. Asses.* 71–75.

Ekman, M., Granström, O., Omérov, S., Jacob, J., and Landén, M. (2013). The societal cost of depression: evidence from 10 000 Swedish patients in psychiatric care. *J. Affect. Disord.* 150, 790–797. doi: 10.1016/j.jad.2013.03.003

Eskin, M., and Parr, D. (1996). *Introducing a Swedish Version of an Instrument Measuring Mental Stress*. Stockholm: University Department of Psychology.

Folkman, S., Lazarus, R. S., Gruen, R. J., and DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *J. Pers. Soc. Psychol.* 50, 571–579. doi: 10.1037/0022-3514.50.3.571

Gilbert, P. (2010). *The Compassionate Mind: A New Approach to Life's Challenges*. London: Constable & Robinson.

Gilbert, P., and Procter, S. (2006). Compassionate mind training for people with high shame and self−criticism: overview and pilot study of a group therapy approach. *Clin. Psychol. Psychother.* 13, 353–379. doi: 10.1002/cpp.507

Goetz, J. L., Keltner, D., and Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychol. Bull.* 136, 351–374. doi: 10.1037/a0018807

Grossi, G., Perski, A., Osika, W., and Savic, I. (2015). Stress−related exhaustion disorder–clinical manifestation of burnout? A review of assessment methods, sleep impairments, cognitive disturbances, and neuro−biological and physiological changes in clinical burnout. *Scand. J. Psychol.* 56, 626–636. doi: 10.1111/sjop.12251

Hallsten, L., Josephson, M., and Torgén, M. (2005). Performancebased self-esteem: a driving force in burnout processes and its assessment. *Work and Health*. 4, 1–40.

Ishtiak-Ahmed, K., Perski, A., and Mittendorfer-Rutz, E. (2014). Risk markers of all-cause and diagnosis-specific disability pension – a prospective cohort study of individuals sickness absent due to stress-related mental disorders. *BMC Public Health* 14:805. doi: 10.1186/1471-2458-14-805

Joinson, C. (1992). Coping with compassion fatigue. *Nursing* 22, 116–120. doi: 10.1097/00152193-199204000-00035

Jonsdottir, I. H., Nordlund, A., Ellbin, S., Ljung, T., Glise, K., Währborg, P., et al. (2017). Working memory and attention are still impaired after three years in patients with stress−related exhaustion. *Scand. J. Psychol.* 58, 504–509. doi: 10.1111/sjop.12394

Karasek, R. A., Theorell, T. G., Schwartz, J., Pieper, C., and Alfredsson, L. (1982). Job, psychological factors and coronary heart disease. Swedish prospective findings and US prevalence findings using a new occupational inference method. *Adv. Cardiol.* 29, 62−67. doi: 10.1159/000406198

Kasser, T., and Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Pers. Soc. Psychol. Bull.* 22, 280–287. doi: 10.1177/0146167296223006

Kaufman, S. B. (2018). Self-actualizing people in the 21st century: integration with contemporary theory and research on personality and well-being. *J. Human. Psychol.* 1–33. doi: 10.1177/0022167818809187

Keltner, D., Marsh, J., and Adam Smith, J. (2010). *Compassionate Instinct. The science of Human Goodness*. New York, NY: Ww Norton Co.

Kirby, J. N., Tellegen, C. L., and Steindl, S. R. (2017). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav. Ther.* 48, 778–792. doi: 10.1016/j.beth.2017.06.003

Kirby, N. J., Day, J., and Sager, V. (2019). The 'Flow' of compassion: a meta-analysis of the fears of compassion scales and psychological functioning. *Clini. Psychol. Rev.* 70:39. doi: 10.1016/j.cpr.2019.03.001

Kobau, R., Sniezek, J., Zack, M. M., Lucas, R. E., and Burns, A. (2010). Well−being assessment: an evaluation of well−being scales for public health and population

estimates of well−being among US adults. *Appl. Psychol. Health Well being* 2, 272–297. doi: 10.1111/j.1758-0854.2010.01035.x

Lazarus, R. S., and Folkman, S. (1987). Transactional theory and research on emotions and coping. *Eur. J. Pers.* 1, 141–169. doi 10.1002/per.24100 10304

Lupien, S. J., McEwen, B. S., Gunnar, M. R., and Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nat. Rev. Neurosci.* 10, 434–445. doi: 10.1038/nrn2639

MacBeth, A., and Gumley, A. (2012). Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology. *Clin. Psychol. Rev.* 32, 545–552. doi: 10.1016/j.cpr.2012.06.003

Magnusson Hanson, L. L., Theorell, T., Oxenstierna, G., Hyde, M., and Westerlund, H. (2008). Demand, control and social climate as predictors of emotional exhaustion symptoms in working Swedish men and women. *Scand. J. Soc. Med.* 36, 737–743. doi: 10.1177/14034948080 90164

Magnusson Hanson, L. L., Westerlund, H., Leineweber, C., Rugulies, R., Osika, W., Theorell, T., et al. (2014). The Symptom Checklist-core depression (SCL-CD6) scale: psychometric properties of a brief six item scale for the assessment of depression. *Scand. J. Public Health* 42, 82–88. doi: 10.1177/1403494813500591

Martela, F., and Ryan, R. M. (2015). The benefits of benevolence: basic psychological needs, beneficence, and the enhancement of well−being. *J. Pers.* 84, 750–764. doi: 10.1111/jopy.12215

Martela, F., and Ryan, R. M. (2020). Distinguishing between basic psychological needs and basic wellness enhancers: the case of beneficence as a candidate psychological need. *Motiv. Emot.* 44, 116–133. doi: 10.1007/s11031-019-09800-x

Maslach, C., and Jackson, S. E. (1981). The measurement of experienced burnout. *J. Occup. Behav.* 2, 99–113. doi: 10.1002/job.4030020205

Maslach, C., and Leiter, M. P. (2017). New insights into burnout and health care: strategies for improving civility and alleviating burnout. *Med. Teach.* 39, 160–163. doi: 10.1080/0142159X.2016.12 48918

Maslach, C., Schaufeli, W. B., and Leiter, M. P. (2001). Job burnout. *Annu. Rev. Psychol.* 52, 397–422. doi: 10.1146/annurev.psych.52.1.397

McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *N. Engl. J. Med.* 338, 171–179. doi: 10.1056/NEJM199801153380307

McEwen, B. S. (2007). Physiology and neurobiology of stress and adaptation: central role of the brain. *Physiol. Rev.* 87, 873–904. doi: 10.1152/physrev.00041. 2006

Muris, P., Meesters, C., Pierik, A., and de Kock, B. (2016). Good for the self: Self-compassion and other self-related constructs in relation to symptoms of anxiety and depression in non-clinical youths. *J. Child Fam. Stud.* 25, 607–617. doi: 10.1007/s10826-015-0235-2

Neff, K. (2003b). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self Identity* 2, 85–102. doi: 10.1080/152988603 09032

Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity* 2, 223–250. doi: 10.1080/152988603 09027

Neff, K. D., and Vonk, R. (2009). Self-compassion versus global self-esteem: two different ways of relating to oneself. *J. Pers.* 77, 23–50. doi: 10.1111/j.1467-6494. 2008.00537.x

OECD (2010). *Sickness, Disability and Work: Breaking the Barriers. A Synthesis of Findings Across OECD Countries*. Paris: OECD Publishing.

OECD (2013). *Mental Health and Work*. Sweden: OECD.

Piliavin, J. A., and Siegl, E. (2007). Health benefits of volunteering in the wisconsin longitudinal study. *J. Health Soc. Behav.* 48, 450–464. doi: 10.1177/ 002214650704800408

Raposa, B. E., Laws, B. H., and Ansell, B. E. (2016). Prosocial behavior mitigates the negative effects of stress in everyday life. *Clin. Psychol. Sci.* 4, 691–698. doi: 10.1177/2167702615611073

Ryan, R. M., and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and wellbeing. *Am. Psychol.* 55, 68–78. doi: 10.1037/0003-066X.55.1.68

Savic, I., Perski, A., and Osika, W. (2017). MRI shows that exhaustion syndrome due to chronic occupational stress is associated with partially reversible cerebral changes. *Cereb. Cortex* 28, 1–13. doi: 10.1093/cercor/bhw413

Schaufeli, W. B., Leiter, M. P., Maslach, C., and Jackson, S. E. (1996). "MBI–general survey," in *Maslach Burnout Inventory Manual*, 3rd Edn, eds C. Maslach, S. E. Jackson, and M. P. Leiter (Palo Alto, CA: Consulting Pyschologists Press).

Schutte, N., Toppinen, S., Kalimo, R., and Schaufeli, W. (2000). The factorial validity of the Maslach Burnout Inventory−General Survey (MBI−GS) across occupational groups and nations. *J. Occup. Organ. Psychol.* 73, 53–66. doi: 10.1348/096317900166877

Seidler, A., Thinschmidt, M., Deckert, S., Then, F., Hegewald, J., Nieuwenhuijsen, K., et al. (2014). The role of psychosocial working conditions on burnout and its core component emotional exhaustion – a systematic review. *J. Occupat. Med. Toxicol.* 9, 10. doi: 10.1186/1745-6673-9-10

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *J. Occup. Health Psychol.* 1, 27−41. doi: 10.1037//1076-8998.1.1.27

Singer, T., and Klimecki, O. (2014). Empathy and compassion. *Curr. Biol.* 24, R875–R878. doi: 10.1016/j.cub.2014.06.054

Stenfors, C. U., Hanson, L. M., Oxenstierna, G., Theorell, T., and Nilsson, L. G. (2013). Psychosocial working conditions and cognitive complaints among Swedish employees. *PLoS one* 8:e60637. doi: 10.1371/journal.pone.0060637

Steptoe, A., and Kivimäki, M. (2012). Stress and cardiovascular disease. *Nat. Rev. Cardiol.* 9, 360–370. doi: 10.1038/nrcardio.2012.45

Streiner, D. L., and Norman, G. R. (2008). *Health Measurement Scales: A Practical Guide to Their Development and Use*, 4th Edn. New York, NY: Oxford University Press. doi: 10.1093/acprof:oso/9780199231881.001.0001

The Swedish Social Insurance Agency (2017). Psykiatriska diagnoser. Lång väg tillbaka till arbete vid sjukskrivning (psychiatric diagnoses. A long way back to work from sick-leave). *Korta Anal.* 2017:1.

The Swedish Social Insurance Agency (2020). "Follow-up of the development of sick leave (Uppföljning av sjukfrånvarons utveckling)", Report 001382-2020.

Turner, N., Stride, C. B., Carter, A. J., McCaughey, D., and Carroll, A. E. (2012). Job demands-control-support model and employee safety performance. *Accid Anal. Prev.* 45, 811−817. doi: 10.1016/j.aap.2011.07.005

Ursin, H., and Eriksen, H. R. (2010). Cognitive activation theory of stress (CATS). *Neurosci. Biobehav. Rev.* 34, 877–881. doi: 10.1016/j.neubiorev.2009.03.001

Vigo, D., Thornicroft, G., and Atun, R. (2016). Estimating the true global burden of mental illness. *Lancet Psychiatry* 3, 171−178. doi: 10.1016/S2215-0366(15) 00505-2

Zigmond, A. S., and Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatr. Scand.* 67, 361–370. doi: 10.1111/j.1600-0447.1983.tb09716.x

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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When Depression Breeds Rejection Rather Than Compassion: Disagreeableness, Stigma, and Lack of Empathic Concern Among Support Providers

Myriam Mongrain[*†] *and Ariel Shoikhedbrod*[†]

Department of Psychology, York University, Toronto, ON, Canada

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***Correspondence:**
Myriam Mongrain
mongrain@yorku.ca

[†]ORCID:
Myriam Mongrain
orcid.org/0000-0003-0281-7623
Ariel Shoikhedbrod
orcid.org/0000-0002-5295-7838

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Past research has shown that the close relationships of depressed individuals are often characterised by rejection rather than compassion. The goal of this research was to broaden interpersonal models of depression by investigating the reports of support providers themselves. Individual differences, including disagreeableness, stigmatic beliefs about depression, and empathic concern were measured. These were examined in relation to reported interpersonal behaviours toward a significant other who was currently depressed. A cross-sectional design was used in an undergraduate (N = 312) and community sample (N = 296). Disagreeable individuals reported less compassionate and more rejecting behaviours toward depressed significant others based on an interpersonal circumplex model of social support. Serial mediation models further indicated that the associations between disagreeableness and rejecting behaviours reported by providers were mediated by stigma and lower empathic concern. The current studies shed light on how the personality, attitudes and emotions of support providers influence the level of compassion expressed toward depressed individuals.

Keywords: depression, agreeableness, stigma, empathy, compassion, rejection, interpersonal circumplex, social support

INTRODUCTION

Compassion involves a deep awareness of the suffering of another coupled with the wish to relieve it. The empirical literature supports the personal benefits accrued from compassionate responding. For example, providers of social support have been shown to live longer (1) and respond better to stress (2, 3). Compassion comes with other adaptive advantages (4) such as increases in subjective well-being (5), and greater meaning in life (6). Meta-analytic reviews of experimental interventions designed to increase compassionate responding have confirmed the causal relationship between kindness and subjective well-being (7, 8). Despite these redemptive qualities, compassion can be conspicuously absent in some interpersonal situations involving a significant other who is experiencing emotional suffering. For example, depressed individuals are more likely to report rejection rather than compassion from others in their immediate social environment (9, 10). The current research examined the characteristics of social environments marked by an absence of compassion toward a significant other who is depressed. We examined the personality, attitudes, and emotions reported by support providers as they relate to compassionate vs. rejecting behaviours toward depressed individuals.

Interpersonal models of depression have documented the ways in which depressed individuals can contribute to the negative interactional cycles in their close relationships (11, 12). For example, Coyne's interactional theory of depression (13, 14) proposed that depressed individuals' deep insecurities around their worth and lovability lead to repetitive and persistent attempts to get reassurance from loved ones. These attempts rarely bring lasting comfort, and significant others ultimately become frustrated and irritated with the depressed person (13, 14). Over time, this ultimately leads to rejection which in turn has been related to the hastened onset of a depressive episode as well as the exacerbation and perpetuation of symptoms (11, 15–17). This model has enjoyed considerable support in terms of the noxious effect of excessive reassurance seeking as a contributor to rejection in depressed populations (12, 15, 18). Decades of research were synthesised in a meta-analysis of 38 studies demonstrating a moderate association between depression, excessive reassurance seeking, and interpersonal rejection (19).

Other interpersonal models have emphasised social skills deficits and non-verbal behaviours associated with depressive states that are aversive to others and contribute to negative interpersonal outcomes [see (11)]. For example, depressed individuals speak in a slow, monotone voice, engage in less eye contact, and are less animated in their communication (20). They self-disclose negative information about themselves at inopportune times and may even solicit criticism from others [12, (15)]. The negative feedback seeking contributes to the maintenance of low self-esteem through self-verification mechanisms [see (21)]. These dynamics have received some support in the literature and describe how depressed individuals' behavioural patterns can contribute to their rejection in close relationships.

A caveat in this literature is the relative neglect of social support providers themselves and the ways in which their personality and beliefs may independently contribute to rejecting outcomes. Preliminary evidence suggests that characteristics of providers, such as intolerance and lack of empathy, play a significant role in the depression-rejection link. For example, Joiner et al. (18) reported that depressed males who were high on reassurance seeking and low in self-esteem were rejected by roommates who were intolerant and unempathetic, but not by roommates who were supportive. This suggests that characteristics of support providers may independently contribute to the erosion of compassion in the relationships of depressed individuals. The current study examines individual differences among support providers that could be associated with compassionate and rejecting behaviours toward a depressed significant other.

Trait agreeableness may be the single most important personality dimension influencing prosocial tendencies and the expression of compassionate behaviours (22–24). Agreeable individuals are described as tender, loving, and compassionate (25). They report greater empathic concern and are consequently more likely to help others in need (26, 27). This personality variable has been associated with a range of prosocial outcomes, including management of interpersonal conflict, communal concerns, as well as tolerance and cooperation in peer relationships [see (28, 29)]. Other research has shown that agreeableness is related to less prejudicial actions against out-group members [for a comprehensive review, see (30)].

Conversely, those reporting low levels of agreeableness (referred to as disagreeableness from here onward), have been described as antagonistic, indifferent to others, and hostile in daily life [see (28, 31, 32)]. Disagreeable individuals are prone to conflict and place personal interests ahead of others (23, 24). They have been shown to have a higher and stable frequency of quarrelsome behaviours across contexts and over time (33). Also problematic in marital relationships, disagreeableness entails poor conflict resolution abilities and dissatisfaction in those relationships (34, 35). Finally, disagreeableness has been related to stigmatisation and higher prejudicial biases against traditional target groups, as well as out-groups more generally [see (36, 37)].

Stigma entails blaming the victim for their emotional difficulties and not fully accepting them with those difficulties (38). Various forms of mental illness, including depression, can be seen as abhorrent and deviant conditions leading to prejudicial and discriminatory behaviours toward stigmatised victims (38). Stigmatised individuals can feel devalued and rejected as members of society (39). Personal stigma has been related to a lower likelihood of seeking help, indirect attempts at seeking support, and rejection in familial relationships (40). No study has yet examined the role of stigma as it relates to disagreeableness in the context of close relationships. The current study examines the relationship between disagreeableness, self-reported stigmatic attitudes, and supportive behaviours toward a significant other who was depressed.

A lack of empathy often accompanies the stigma directed toward individuals with mental illness (41). According to Batson's empathy-altruism hypothesis (2011), empathic concern is the immediate precursor to compassionate action. Empathic concern involves "other-oriented emotions congruent with the perceived welfare of someone in need" (p. 80). For empathic concern to produce altruistic motivation, one must value the other's welfare and see them as deserving (42, 43). As such, stigmatic attitudes impede on empathic processes by devaluing the deservingness of depressed individuals, amounting in rejection rather than compassion.

Compassionate and rejecting responses toward depressed targets can be captured with a circumplex model of supportive behaviours (44). The interpersonal circumplex (44–46) is a well-established nomological system which effectively captures the full range of interpersonal behaviours including compassion and rejection (47, 48). It is represented as a circular array of variables organised around two orthogonal axes labelled as dominance and love (44, 49). By creating a circular space that blends dominant (e.g., directive vs. avoidant) and loving (e.g., nurturant vs. critical) manifestations of support, the circumplex is ideal for the documentation of interpersonal behaviours expressed toward depressed targets. The blends of dominance and love provide a nuanced description of the types of responses that are compassionate and helpful (i.e. nurturant/loving and directive/dominant). Rejecting and hurtful

responses are reflected by the opposite poles of the same axes (e.g., critical/hostile and avoidant/submissive).

Formal definitions of compassion can help locate its position along the axes of the interpersonal circumplex. As traditionally defined, compassion is comprised of three components: (1) Perceiving the other in need, (2) Feelings of empathic concern, or sympathy toward the other, and (3) Wanting to ease their suffering through concrete action (4, 50, 51). These components of compassion imply nurturing and directive actions aimed at reducing the others' suffering. In circumplex language, this involves a blend of more loving and dominant behaviours. Rejection, on the other hand, is located on the opposing quadrant of the circumplex reflecting critical and avoidant behaviour (i.e., low love and low dominance).

In a recent application of the circumplex model in close relationships, Lizdek et al. (52) showed that depressive symptoms in husbands and wives were associated with unique interpersonal dynamics during a conflict resolution task. More specifically, depression in wives was associated with dominant behaviours during the interaction, while husbands engaged in more submissive behaviours. Conversely, depression in husbands was associated with less loving behaviours over the course of the conflict resolution task for both partners. This study demonstrates how the love and dominance axes of the circumplex can provide nuanced insights into the interpersonal dynamics between depressed individuals and their significant others.

Other interpersonal constructs have been situated within the nomological net of the circumplex. Agreeableness is strongly related to interpersonal behaviours and maps onto the loving axis of the circumplex (53, 54). Depending on its measurement, agreeableness can vary in levels of dominance, with facets such as modesty falling in the submissive quadrant (53). Conversely, disagreeableness may be found in the hostile/dominant quadrant of the circumplex. Similarly, empathic concern has been associated with loving and some degree of dominance in the supportive actions captured on the interpersonal circumplex (44). Love and dominance have not been explored within the context of supportive behaviours provided to depressed individuals specifically. The interpersonal circumplex was adopted in the current studies as a framework for capturing the roles of disagreeableness, stigma and empathic concern in relation to compassionate and rejecting behaviours reported toward depressed individuals.

Current Research

Decades of research on the interactional theory of depression suggest that depressed individuals burden their significant others with excessive reassurance seeking and or negative feedback seeking. There is evidence that these behaviours effectively erode support from the immediate social environment and ultimately lead to rejection (12). Provider characteristics contributing to the negative interpersonal outcomes in the relationships of depressives have been neglected in the empirical literature. The current work examines disagreeableness in providers and their reported levels of stigma and empathic concern toward a depressed significant other. These variables were expected to predict compassionate and rejecting forms of support as reported by providers.

Compassionate and rejecting forms of support were examined along the loving and dominant axes of the circumplex. Compassion was operationalized as high scores on love (e.g., nurturant) and dominance (e.g., directive). Rejection was operationalized as lower scores on the love (e.g., critical) and dominance (e.g., avoidant) axes. The main predictions were that stigmatising attitudes about depression and low empathic concern would mediate the relationship between disagreeableness and supportive behaviours reported toward a depressed target. The specific hypotheses are as follows:

H1: Disagreeableness in providers will be associated with greater stigma, lower empathic concern, as well as less compassionate and more rejecting forms of support on the circumplex.
H2: Stigma will mediate the relationship between disagreeableness and rejecting behaviours.
H3: Empathic concern will mediate the relationship between disagreeableness and rejecting behaviours.
H4: Stigma and empathic concern will serially mediate the relationship between disagreeableness and rejecting behaviours.

Two studies were conducted to test these predictions using an undergraduate (Study 1) and community sample (Study 2).

MATERIALS AND METHODS

Study 1

Method

Participants

Undergraduate students ($N = 349$) were recruited from a Canadian university through an undergraduate participant pool. We advertised for individuals with a significant other (i.e., friend, family member, romantic partner) who was currently depressed. Based on Schönbrodt and Perugini (55) recommendation of sample sizes approximating $N = 250$ for stable correlation estimates, we oversampled to account for anticipated data exclusions. We omitted participants whose significant other was not depressed ($n = 5$), those who failed attention checks on the Conscientious Responders Scale (CRS; 50; $n = 11$), or had open-ended responses suggesting ineligible or disingenuous responding ($n = 2$). Incomplete responders on any of the measures were also omitted ($n = 13$) along with those who asked to not have their data included in the study ($n = 6$).

The final sample for Study 1 included 312 participants. They were mostly women (71.5% female) with an average age of 20.13 years ($SD = 4.29$). Participants identified themselves as White (27.24%), South Asian (23.72%), Middle Eastern (16.35%), Black (12.50%), South East Asian (5.77%), Mixed (4.49%), Latin American (3.53%), and South American (0.96%). They also reported being mildly depressed at the time of the study with an average score of 11.72 ($SD = 6.07$) on the short-form Centre for Epidemiological Studies Depression Scale [CESD-10; (56)].

Participants also completed demographic questions regarding their significant other who was currently depressed. These

significant others were on average 24.85 years old ($SD = 10.96$) and 61.28% were female. They consisted of friends (60.90%), family (31.41%), romantic partners (5.13%), and others (2.56%). Participants had known the depressed target for over 9 years ($M = 9.42$, SD = 7.13), and interacted with them daily (40.71%), a few times a week (33.65%), once a week (8.33%), every other week (6.41%), once a month (6.09%), less than once a month (3.85%), and not at all (0.96%)[1].

The depressed status of the significant other was further confirmed with two measures. One question, "How depressed is this person?," received an average rating of 4.57 ($SD = 1.13$) out of a 7- point scale (1 = *not at all,* 7 = *very much so*). Additionally, a scale was created from the criteria listed in the Diagnostic and Statistical Manual of Mental Disorders [DSM-5; (57)] under Major Depressive Disorder[2]. Significant others were described as having an average of 5.11 ($SD = 1.95$) out of 8 symptoms for major depression, suggesting they were perceived by participants as clinically depressed.

Procedure

Participants were then provided a link to Qualtrics, an online survey platform, to complete the questionnaires in the study. Informed consent was obtained followed by demographic questionnaires about themselves, the depressed target, and general characteristics of their relationship with the target (i.e., type, length, and frequency). Participants then responded to questionnaires about their empathic concern and interpersonal behaviours toward the depressed target followed by personality measures of disagreeableness and depression stigma. Participants were debriefed at the end of the study and credited for their participation.

Measures

Ten Item Personality Inventory [TIPI; (58)]. The TIPI is a brief and widely used measure of the five-factor model of personality (i.e., Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). The agreeableness subscale consists of 2 items (e.g., I see myself as critical, quarrelsome; I see myself sympathetic, warm) rated on a 7-point scale from 1 (*disagree strongly*) to 7 (*agree strongly*). The items were reverse scored to reflect disagreeableness among support providers. Although the TIPI has weaker psychometric properties relative to lengthier five factor personality measures, it demonstrates favourable factor structure and convergent validity (59). The two items were moderately correlated ($r = 0.31$) in the current sample.

Centre for Epidemiological Studies Depression Scale, Short Form [CES-D 10; (56)]. The CES-D 10 was derived from the original CESD (60) and asked participants to rate the frequency of their depressive symptoms during the past week from 1 = *rarely or none of the time* to 4 = *most or all of the time*. The cut-off for clinically significant levels of depression is 10 (56). Its psychometric properties are robust relative to the widely used 20-item CES-D scale (61, 62). The CESD demonstrated acceptable internal consistency in the current sample ($\alpha = 83$).

Depression Stigma Scale [DSS; (39)]. The DSS was designed to assess stigmatising attitudes toward depression. A subscale of the DSS was used to measure participants' self-endorsed level of stigma. The scale is comprised of 9 items (e.g., "People with depression could snap out of it if they wanted") assessed on a 7-point scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The DSS has shown moderate to high internal consistency (39, 63), and moderate test–retest reliability (39). The DSS demonstrated acceptable internal consistency in the current sample ($\alpha = 83$).

Empathic Concern Scale [ECS; (64)]. The ECS captures the affective qualities of empathy that precede compassionate action. Participants reported the extent to which they felt empathic toward their depressed significant other. Six adjectives (e.g., sympathetic, soft-hearted, warm, compassionate, tender, and moved) were rated from 1 (*Not at all*) to 7 (*Extremely*). The ECS had acceptable internal consistency in the current sample ($\alpha = 89$), which is consistent with past research (65).

Support Actions Scale Circumplex [SAS-C; (44)]. The SAS-C is comprised of 64 items measuring supportive behaviours along the love and dominance axes of the circumplex. Participants reported the extent to which they engaged in loving and dominant behaviours toward the depressed target. The items can be further divided into 8 octants representing combinations of love and dominance as described by interpersonal circumplex models (e.g., 42). Going counter-clockwise on the circumplex starting at the top of the dominance axis, the octants included: PA/Directive ($\alpha = 0.76$, e.g., "I would tell them to let me help with their problem"), BC/Arrogant ($\alpha = 0.77$, e.g., "I would advise them to pay attention to what I have to say"), DE/Critical ($\alpha = 0.78$, e.g., "Remind them that people sometimes get what they deserve"), FG/Distancing ($\alpha = 0.79$, e.g., "Tell them I don't want to get involved"), HI/Avoidant ($\alpha = 0.70$, e.g., "I would shy away from making suggestions"), JK/Deferential ($\alpha = 0.62$, e.g., "I would not give my opinions unless asked"), LM/Nurturant ($\alpha = 0.76$, e.g., "I would give them a hug"), and NO/Engaging ($\alpha = 0.83$, e.g., "I would try to involve them in social activities"). Items are rated on a 7-point scale ranging from 1 (*I definitely wouldn't do this*) to 7 (*I definitely would do this*). The psychometric properties of the scale have been well-established (44).

Results Study 1

In the preliminary analyses, we examined the descriptive properties of the interpersonal circumplex as well as the correlations between disagreeableness, depression stigma,

[1]One participant reported "not at all" for how frequently they interacted with their depressed significant other. Their open-ended responses revealed that the depressed target was an ex-partner. When omitting the participant from the analyses, the statistical results did not change. Given that interaction frequency was not an explicit exclusion criterion for the study, we decide to keep the participant.

[2]Participants were asked if their significant other endorsed DSM-5 criteria for Major Depression (e.g., "Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day") by responding yes, no, or I don't know. The positive responses were specifically summed and averaged to describe depressive severity. The suicidality criterion for Major Depressive Disorder in the DSM-5 was omitted to comply with York University's Research Ethics Board (certificate #e2019-075).

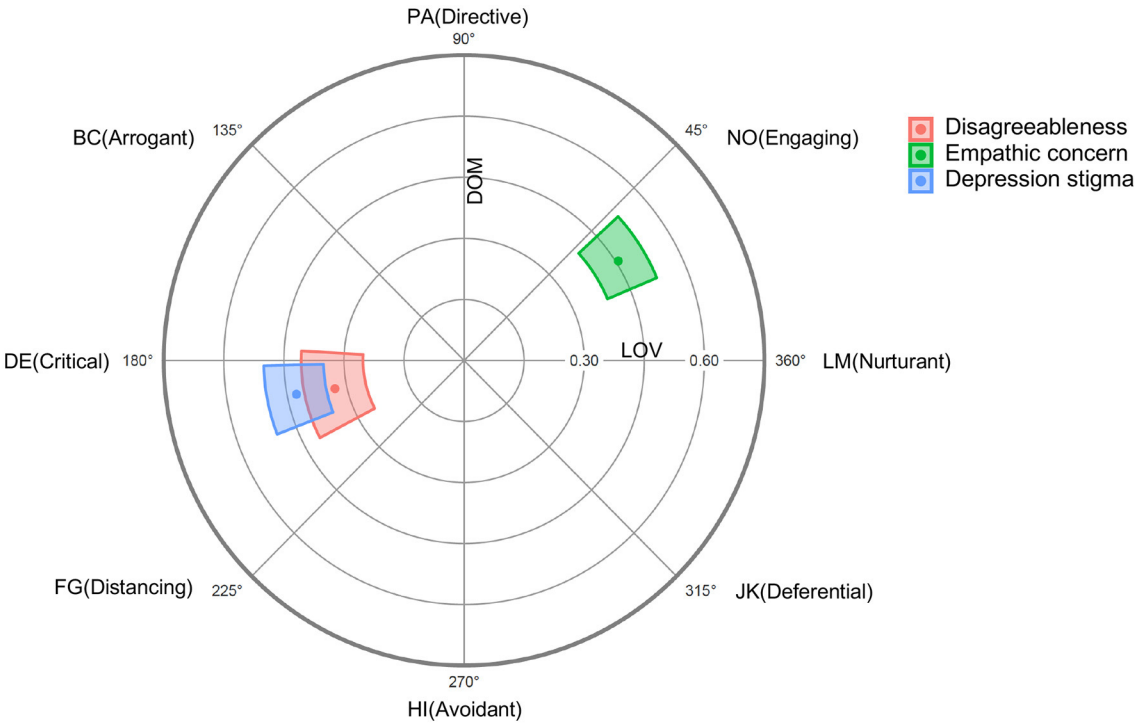


FIGURE 1 | Radar chart of Disagreeableness, Empathic concern and Depression stigma projected on to the SAS-C in Study 1. Dots represent mean values and coloured regions represent bootstrapped 95% confidence intervals [computed and plotted using the circumplex package for R; (67)].

TABLE 1 | Structural summary parameters with 95% confidence intervals in Study 1.

Profile	Love	Dominance	Elevation	Amplitude	Displacement	Fit
Disagreeableness	−0.32 [−0.40, −0.23]	−0.08 [−0.16, 0.02]	−0.03 [−0.08, 0.02]	0.32 [0.24, 0.41]	193.4 [177.0, 208.5]	0.98
Depression stigma	−0.43 [−0.50, −0.35]	−0.08 [−0.16, −0.00]	0.05 [0.00, 0.10]	0.43 [0.36, 0.51]	190.5 [180.2, 200.3]	0.98
Empathic concern	0.38 [0.31, 0.45]	0.26 [0.17, 0.34]	0.11 [0.06, 0.15]	0.46 [0.39, 0.53]	33.8 [23.7, 43.4]	0.99

empathic concern, and supportive behaviours on the SAS-C (see H1). After ruling out potential covariates, we ran the mediation analyses to test our main hypotheses (H2-H4).

Preliminary Analyses

The Structural Summary Method [SSM, (47, 66)] was employed to examine how well-disagreeableness, depression stigma, and empathic concern adhered to a circumplex configuration. **Figure 1** provides a visual representation of the SSM parameters, and **Table 1** includes the SSM statistics. The results indicate an excellent fit to a circumplex configuration for all the criterion variables. This suggests that the profiles for disagreeableness, stigma and empathic concern were prototypical in nature, allowing for the interpretation of the other SSM parameters. Amplitude values (see **Table 1**) showed that disagreeableness, stigma, and empathic concern were uniquely related to specific social support behaviours. The angular displacement value for disagreeableness ranged from 177 to 209 degrees (see **Table 1**) associating high scores on disagreeableness with critical (DE) and distancing (FG) behaviours toward depressed targets. Stigma was similarly located in the hostile and submissive quadrant of circumplex with angular displacement values ranging from 180 to 200 degrees. The angular displacement values for empathic concern, on the other hand, ranged from 24 to 43, positioning this variable between the nurturant (LM) and engaging (NO) octants of the SAS-C (see **Figure 1**). Elevation parameters were low, indicating that the criterion variables were not associated with social support actions generally [see (68) for parameter interpretation]. Overall, these results provide confidence that the profiles for disagreeableness, depression stigma, and empathic concern are appropriate for a circumplex interpretation.

The descriptive statistics and zero-order correlations between the study variables are presented in **Table 2**. Disagreeableness was negatively related to loving support on the SAS-C ($r = -0.41$, $p < 0.001$) but not with dominant support in Study 1 ($r = 0.10$, $p = 0.084$). Similarly, depression stigma was associated with less loving support ($r = -0.56$, $p < 0.001$). Empathic concern, however, was positively associated with both love ($r = 0.50$, $p < 0.001$) and dominance ($r = 0.35$, $p < 0.001$) indicating

TABLE 2 | Descriptive statistics and correlations in Study 1.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	—															
2. Gender	0.05	—														
3. CESD−10[a]	−0.10	0.21**	—													
4. Disagreeableness[b]	−0.05	−0.21**	0.03	—												
5. Depression stigma[c]	0.02	−0.26**	−0.08	0.37**	—											
6. Empathic concern[d]	0.07	0.19**	0.00	−0.29**	−0.34**	—										
7. Love[e]	0.01	0.30**	0.09	−0.41**	−0.56**	0.50**	—									
8. Dominance[e]	0.00	−0.00	−0.12*	−0.10	−0.10	0.35**	0.15*	—								
9. Directive (PA)[f]	0.03	−0.00	−0.07	−0.04	−0.02	0.33**	0.10	0.77**	—							
10. Arrogant (BC)[f]	0.09	−0.12*	−0.04	0.17**	0.29**	0.07	−0.42**	0.51**	0.65**	—						
11. Critical (DE)[f]	0.03	−0.30**	−0.12*	0.32**	0.53**	−0.32**	−0.78**	−0.10	0.11	0.45**	—					
12. Distancing (FG)[f]	0.08	−0.18**	0.10	0.22**	0.39**	−0.35**	−0.59**	−0.53**	−0.17**	0.22**	0.57**	—				
13. Avoidant (HI)[f]	0.05	0.03	0.08	0.06	0.10	−0.09	−0.06	−0.71**	−0.20**	−0.02	0.18**	0.44**	—			
14. Deferential (JK)[f]	0.11*	0.15**	0.11	−0.15*	−0.12*	0.19**	0.45**	−0.42**	0.01	−0.09	−0.09	0.17**	0.53**	—		
15. Nurturant (LM)[f]	0.06	0.21**	0.10	−0.35**	−0.35**	0.50**	0.80**	0.21**	0.29**	−0.06	−0.41**	−0.26**	0.03	0.46**	—	
16. Engaging (NO)[f]	0.10	0.17**	−0.01	−0.32**	−0.34**	0.57**	0.66**	0.58**	0.62**	0.21**	−0.28**	−0.36**	−0.17**	0.29**	0.73**	—
M	20.13	—	11.73	4.97	2.33	5.25	−0.00	0.01	4.51	3.17	2.09	2.87	3.27	4.51	5.69	5.46
SD	4.29	—	6.07	1.07	0.82	1.17	0.93	0.87	1.06	1.07	1.00	1.01	0.90	0.90	0.90	1.01

*Sample size for each correlation ranged between 297 and 312 participants due to missing data. [a]Centre for Epidemiological Studies Depression Scale, Short Form (56). Reverse scored agreeableness factor score from the Ten Item Personality Inventory (58). [c]Empathic Concern Scale (64). [d]Depression Stigma Scale (39). [e]Standardised scores for the Love and Dominance axes of the Support Actions Scale Circumplex (44). [f]Octant scores from the Support Actions Scale Circumplex (44). *p < 0.05, **p < 0.01.*

active engagement for participants reporting greater empathy. Disagreeableness was correlated with both depression stigma ($r = 0.37$, $p < 0.001$) and lower empathic concern ($r = -0.29$, $p < 0.001$). Finally, stigma correlated negatively with empathic concern ($r = -0.34$, $p < 0.001$).

Female providers reported lower disagreeableness ($r = -0.21$, $p < 0.001$), lower levels of depression stigma ($r = -0.26$, $p < 0.001$), and greater empathic concern ($r = 0.19$, $p = 0.001$). Women also reported providing more loving support ($r = 0.30$, $p < 0.001$). Additionally, depression in providers was negatively associated with dominant support ($r = -0.12$, $p = 0.040$). Controlling for gender and depression in participants did not significantly alter the results (see **Supplementary Materials**).

Serial Mediation Analyses

It was hypothesised that the effect of disagreeableness on the type of support provided would be explained by depression stigma and a lack of empathic concern toward depressed targets. Given the non-significant relationship between disagreeableness and dominance in Study 1, the first condition for mediation was not met and was not explored further (69). There was, however, a strong and negative relationship between disagreeableness and loving support reported toward targets. Consequently, the serial mediation analyses were justified for social support outcomes on the love axis.

The analyses were conducted using Hayes' (70) SPSS macro PROCESS (Model 6) with 95 % bias corrected confidence interval (CI) based on 5,000 bootstrap samples. **Figure 2** depicts the unstandardized and standardised path coefficients in a serial mediation model where disagreeableness (X) is modelled as effecting love (Y) through depression stigma (M_1) and empathic concern (M_2). The total effect of disagreeableness on love, without the mediators in the model, was significant ($b = -0.36$, $SE = 0.05$, $t = -7.74$, $p < 0.001$, 95% CI [−0.45, −0.27]). When depression stigma and empathic concern were entered as mediators, the direct effect of disagreeableness on love was attenuated but remained significant ($b = -0.15$, $SE = 0.04$, $t = -3.55$, $p < 0.001$, 95% CI [−0.23, −0.07]). The total indirect effect of the model was also significant suggesting partial mediation (see **Table 3**).

The specific indirect effects of stigma and empathic concern, individually and jointly, were examined next. As shown in **Figure 2**, Stigma and empathic concern, on their own, significantly mediated the association between disagreeableness and lower levels of loving support. Further, the serial effect suggest that stigma followed by reduced empathic concern both explain the relationship between disagreeableness less loving support (see **Figure 2**).

Study 1 provided preliminary evidence for the hypothesised effects (H1-H4) of provider characteristics on supportive behaviours. Disagreeable providers reported being more critical and distant toward depressed targets. The effect of disagreeableness was particularly salient along the love axis of the circumplex. Disagreeableness was correlated with stigmatic attitudes and less empathic concern toward depressed targets. Depression stigma and empathic concern individually and serially mediated the relation between disagreeableness and less

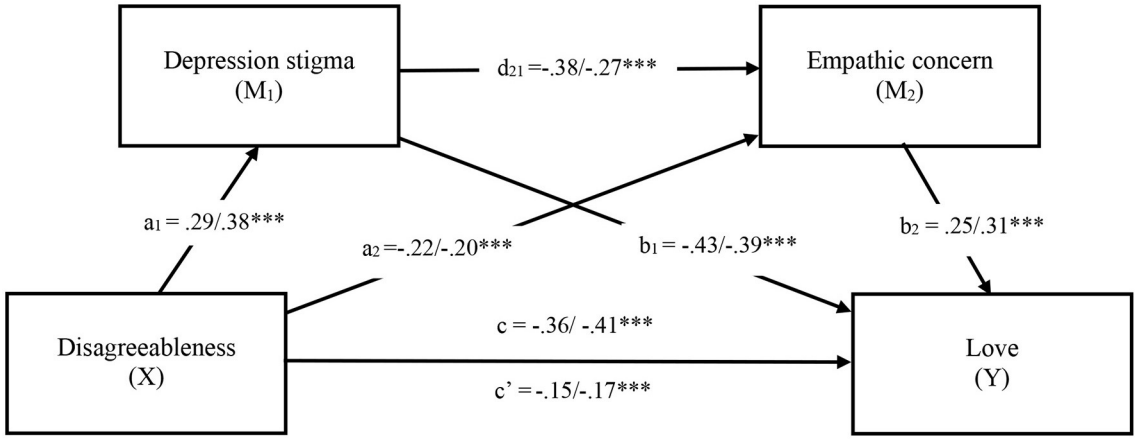


FIGURE 2 | Serial mediation model in Study 1. Note. Values shown reflect unstandardized/standardised coefficients. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. c = Total effect, c′ = Direct effect.

TABLE 3 | Total, direct, and indirect effects of disagreeableness (X) on love (Y) through depression stigma (M1) and empathic concern (M2) in Study 1.

	Effect	*SE*	*t*	*p*	LL	UL
Total effect	−0.36	0.05	−7.74	<0.001	−0.45	−0.27
Direct effect	−0.15	0.04	−3.55	<0.001	−0.23	−0.07
Total indirect effect	−0.21	0.03			−0.27	−0.15
Indirect effect (X→M_1→Y)[a]	−0.13	0.03			−0.18	−0.08
Indirect effect (X→M_2→Y)[a]	−0.05	0.02			−0.09	−0.02
Indirect effect (X→M_1→M_2→Y)[a]	−0.03	0.01			−0.05	−0.01

[a]*based on 5,000 bootstrap samples. LLCI, Lower Limit 95% Confidence Interval; ULCI, Upper Limit 95% Confidence Interval.*

loving support. In Study 2, we sought to systematically replicate these findings in a community sample.

Study 2

Method

Participants

We recruited community members from "Prolific Academic," which is a UK based crowdsourcing platform. There were 350 participants initially screened confirming their relationship with a significant other who was currently depressed. Of those, 303 enrolled in the study. Seven participants were excluded for the following reasons: responding that their significant other was not depressed ($n = 1$), selecting to not include their data in the study ($n = 1$), and open-ended responses suggesting ineligible or disingenuous responding ($n = 5$). The remainder of the participants passed the Conscientious Responders Scale [CRS; (71)].

The final sample consisted of 296 adults (62% female) with an average age of 31.81 years ($SD = 11.39$). Participants were predominantly from English-speaking countries: United Kingdom (59.12%), United States (18.24%), Canada (14.53%), and others (8.11%). Participants' ethnic backgrounds were primarily White (78.04%), followed by Black (5.41%), Mixed (4.39%), South Asian (4.39%), East Asian (3.72%), South East Asian (2.36%), Latin American (1.01%), and Middle Eastern (0.68%). Participants' employment status ranged from being employed full-time (46.60%), employed part-time (19.93%), students (11.82%), unemployed (10.47%), students with part time job (6.08%), retired (2.36%), and at home caregivers (2.36%). Education level ranged from an in-progress college education (19.93%), high school (18.58%), master's degree (13.51%), college diploma or associate degree (11.15%), doctoral degree (2.70%), and less than high school (0.34 %). Participants were single (34.46%), married (30.74%), in a committed relationship (3.72%), common law (3.72%), divorced (2.70%), in a casual relationship (2.70%), separated (1.01%), or widowed (0.34%). The mean score on the CESD-10 (56) was 11.03 ($SD = 6.78$), indicating that participants reported mild levels of depressive symptoms at the time of the study.

Participants completed a demographics questionnaire describing their depressed significant other. These depressed targets were on average 34.67 years old ($SD = 14.97$) and slightly more than half (57.78%) were female. They consisted of friends (46.96%), family members (30.41%), romantic partners (18.31%), among others (4.05%). Participants had known the

depressed person for almost 11 years (M = 10.85 years; SD = 14.97) and interacted with them daily (43.9%), a few times a week (33.45%), once a week (8.45%), every other week (6.76%), once a month (3.72%), less than once a month (3.38%), or not at all (0.34%)[3].

The depressed status of the significant other was confirmed with two measures. One item, "How depressed is this person?," received an average rating of 4.79 out of 7 (SD = 0.92) (1 = *not at all,* 7 = *very much so*), indicating that significant others were perceived as being moderately depressed. Significant others were also described as having 5.20 (SD = 1.76) out of the 8 symptoms based on the scale of DSM-5 criteria for major depressive disorder.

Procedure

Participants were initially screened on Prolific for the presence of a significant other who was currently depressed using the same descriptive summary as in Study 1. Those who confirmed their eligibility were then provided a link to a Qualtrics survey, where they engaged in the same procedure as in Study 1. Participants were debriefed at the end of the study and compensated £2.27 for their participation.

Measures

Big Five Inventory [BFI; (72)]. The BFI is a 44-item questionnaire measuring the five-factor model of personality (i.e., openness, conscientiousness, extraversion, agreeableness, and neuroticism). The BFI provides a psychometrically stronger alternative to the TIPI (58). The agreeableness subscale of the BFI consists of 9 items (e.g., "Tends to find faults with others") rated on a 5-point scale (1 = *Disagree Strongly*, 5 = Agree Strongly). The items were reverse scored to reflect disagreeableness among support providers. The disagreeableness subscale of the BFI had acceptable internal consistency in the current sample ($\alpha = 0.78$).

Centre for Epidemiological Studies Depression Scale, Short Form [CES-D 10; (56)]. Similar to Study 1, CES-D 10 was used to measure depression among support providers. The CESD demonstrated acceptable internal consistency in the current sample ($\alpha = 0.94$).

Depression Stigma Scale [DSS; (39)]. Similar to Study 1, the DSS was used to measure the extent to which support providers endorsed stigmatic beliefs about depression. The DSS demonstrated acceptable internal consistency in the current sample ($\alpha = 0.80$).

Empathic Concern Scale [ECS; (64)]. Similar to Study 1, the ECS was used to measure the extent to which support providers felt empathic toward their depressed significant other. The ECS had acceptable internal consistency in the current sample ($\alpha = 93$).

Support Actions Scale Circumplex [SAS-C; (44)]. Similar to Study 1, the SAS-C was used to measure the loving and dominant forms of support toward depressed significant others as reported by support providers. The octants of the SAS-C (PA $\alpha = 0.79$, BC $\alpha = 0.79$, DE $\alpha = 0.80$, FG $\alpha = 0.80$, HI $\alpha = 0.82$, JK $\alpha = 0.70$, LM $\alpha = 0.77$, NO $\alpha = 0.83$) all demonstrated acceptable internal consistency in the current sample.

Results Study 2

In the preliminary analyses, we examined the descriptive properties of the interpersonal circumplex as well as the correlations between disagreeableness, depression stigma, empathic concern, and supportive behaviours on the SAS-C (see H1). After ruling out potential covariates, we ran mediation analyses to test our main hypotheses (H2-H4).

Preliminary Analyses

The Structural Summary Method [SSM; (47, 66, 68)] was employed to examine the fit of our criterion variables to a circumplex configuration. SSM parameters were obtained to determine whether disagreeableness, stigma and empathic concern are well-represented within the two-dimensional space marked by love and dominance. The SSM statistics for Study 2 are presented in **Table 4**. The results indicate an excellent fit to a circumplex configuration for all the criterion variables. The profiles for disagreeableness, stigma and empathic concern were prototypical in nature, allowing for the interpretation of the other SSM statistics. Amplitude values (see **Table 4**) suggested that disagreeableness, stigma, and empathic concern were uniquely related to specific social support behaviours. As illustrated in **Figure 3**, the angular displacement value for disagreeableness ranged from 188 to 217 degrees, indicating that this personality variable was accompanied by a preponderance of critical (DE) and distancing (FG) behaviours toward depressed targets. Stigma was similarly located in the hostile and submissive quadrant of the circumplex, with values ranging from 191 to 226 degrees. The angular displacement values for empathic concern ranged from 24 to 43 degrees, positioning this variable between the nurturant (LM) and engaging (NO) octants of the SAS-C (see **Figure 3**). The elevation parameters further suggest that empathic concern was generally associated with more supportive behaviours (see **Table 4**). Overall, these SSM statistics provide confidence that the profiles for disagreeableness, depression stigma, and empathic concern are appropriate for a circumplex interpretation.

The descriptive statistics and zero-order correlations between the study variables are presented in **Table 5**. As predicted (H1), disagreeableness was negatively correlated with the love axis of the SAS-C ($r = -0.42$, $p < 0.001$). The association between disagreeableness and the dominance axis was small but significant ($r = 0.17$, $p = 0.005$). As predicted, depression stigma also predicted less loving ($r = -0.40$, $p < 0.001$), and less dominant ($r = -0.23$, $p < 0.001$) support. Empathic concern, on the other hand, was positively correlated with love ($r = 0.54$, $p < 0.001$) and dominance ($r = 0.39$, $p < 0.001$). Disagreeableness was associated with more stigma (r =0.22, $p < 0.001$) and less

[3]As in Study 1, one participant reported not interacting with their depressed significant other. Closer inspection revealed that they were referring to an ex-partner with whom they currently had limited contact with. Statistical results did not change when the participant was omitted from the analyses. Like Study 1, we decide to keep the participant because interaction frequency was not an explicit exclusion criterion.

TABLE 4 | Structural summary parameters with 95% confidence intervals in Study 2.

Profile	Love	Dominance	Elevation	Amplitude	Displacement	Fit
Disagreeableness	−0.32 [−0.40, −0.23]	−0.13 [−0.22, −0.04]	−0.05 [−0.10, 0.00]	0.34 [0.26, 0.43]	202.3 [188.1, 217.0]	0.97
Depression stigma	−0.30 [−0.38, −0.21]	−0.18 [−0.29, −0.06]	0.04 [−0.02, 0.09]	0.35 [0.25, 0.45]	210.8 [190.9, 225.7]	0.96
Empathic concern	0.41 [0.35, 0.47]	0.31 [0.20, 0.41]	0.18 [0.14, 0.23]	0.51 [0.44, 0.59]	36.5 [24.3, 46.5]	0.97

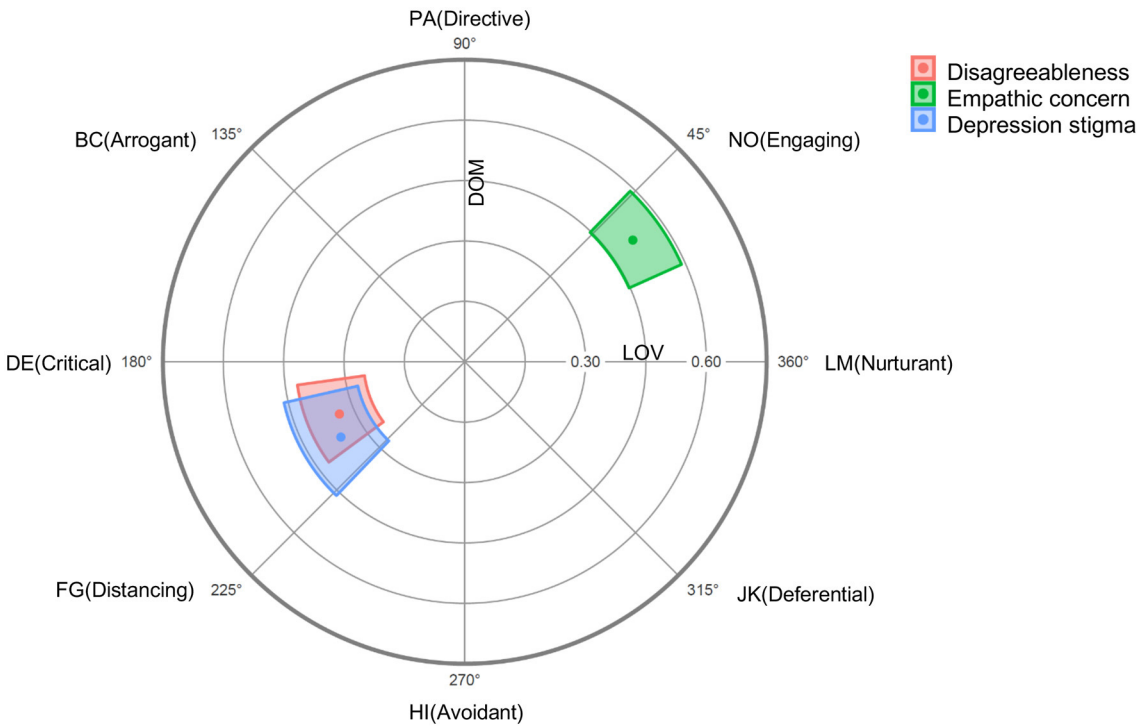


FIGURE 3 | Radar chart of Disagreeableness, Empathic concern and Depression stigma projected on to the SAS-C in Study 2. Dots represent mean values and coloured regions represent bootstrapped 95% confidence intervals (computed and plotted using the circumplex package for R; (67).

empathic concern ($r = -0.30$, $p < 0.001$). As expected, stigma was associated with less empathic concern ($r = 0.34$, $p < 0.001$).

Female providers endorsed lower stigma ($r = -0.24$, $p < 0.001$) and were more likely to provide loving support ($r = 0.19$, $p = 0.001$). Additionally, older people reported being less disagreeableness ($r = -0.23$, $p < 0.001$) and more loving in their support ($r = 0.12$, $p = 0.049$). Controlling for age and gender in the mediational analyses did not significantly alter the results (see **Supplementary Materials**).

Serial Mediation Analyses

It was hypothesised that depression stigma and a lack of empathic concern would mediate the effect of disagreeableness on the love and dominance axes of the SAS-C. **Figure 4** depicts a series of serial mediation models in which disagreeableness is modelled as effecting love and dominance through stigma and empathic concern. In the first model, the total effect of disagreeableness on love without the mediators in the model was significant ($b = -0.58$, SE $= 0.07$, $t = -7.84$, $p < 0.001$ 95% CI [−0.73, −0.44]). When depression stigma and empathic concern were entered as mediators, the direct effect of disagreeableness on love was attenuated but remained significant ($b = -0.35$, SE $= 0.07$, $t = -5.27$, $p < 0.001$, 95% CI [−0.49, −0.22]). The total indirect effect of the model was also significant suggesting partial mediation (see **Table 6**). Both stigma and empathic concern individually mediated the association between disagreeableness and love in support of our hypotheses (H2-H3). The mediators also jointly accounted for the relationship between predictor and outcome (H4). That is, greater stigma and then lower empathic concern serially mediated the relationship between disagreeableness and less loving support (see **Figure 4**).

The total effect of disagreeableness on dominance was also significant ($b = -0.24$, SE $= 0.05$, $t = -2.82$, $p = 0.005$, 95% CI [−0.40, −0.07]) but became non-significant when depression stigma and empathic concern were entered into the model ($b = -0.06$, SE $= 0.05$, $t = -0.68$, $p = 0.497$, 95% CI [−0.22, 0.11]), suggesting full mediation. Stigma and empathic concern individually (H2-H3) and serially (H4) mediated the association between disagreeableness and dominance (see **Figure 4**).

TABLE 5 | Descriptive statistics and correlations in Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	—															
2. Gender	0.02	—														
3. CESD−10[a]	−0.25**	0.05	—													
4. Disagreeableness[b]	−0.23**	−0.08	0.37**	—												
5. Depression stigma[c]	0.10	−0.24**	−0.08	0.22**	—											
6. Empathic concern[d]	0.07	0.03	−0.04	−0.30**	−0.34**	—										
7. Love[e]	0.12*	0.19**	−0.02	−0.42**	−0.40**	0.54**	—									
8. Dominance[e]	−0.06	−0.02	−0.07	−0.17**	−0.23**	0.39**	0.16**	—								
9. Directive (PA)[f]	0.01	−0.00	−0.11	−0.19**	−0.13*	0.45**	0.17**	0.77**	—							
10. Arrogant (BC)[f]	−0.02	−0.14*	−0.02	−0.00	0.03	0.21**	−0.27**	0.63**	0.68**	—						
11. Critical (DE)[f]	−0.08	−0.26**	0.09	0.34**	0.36**	−0.24**	−0.77**	−0.10	−0.00	0.32**	—					
12. Distancing (FG)[f]	−0.04	−0.14*	0.06	0.31**	0.45**	−0.44**	−0.63**	−0.63**	−0.36**	−0.06	0.52**	—				
13. Avoidant (HI)[f]	0.13*	0.01	0.02	0.03	0.19**	−0.08	−0.00	−0.72**	−0.24**	−0.16**	0.14*	0.45**	—			
14. Deferential (JK)[f]	0.20**	0.06	0.04	−0.20**	−0.07	0.30**	0.54**	−0.42**	−0.02	−0.16**	−0.22**	0.07	0.56**	—		
15. Nurturant (LM)[f]	0.07	0.10	−0.00	−0.35**	−0.28**	0.61**	0.82**	0.20**	0.32**	0.00	−0.41**	−0.40**	0.07	0.52**	—	
16. Engaging (NO)[f]	0.03	0.02	0.00	−0.31**	−0.26**	0.61**	0.63**	0.67**	0.63**	0.33**	−0.28**	−0.56**	−0.26**	0.19**	0.65**	—
M	31.81	—	11.03	3.79	2.10	5.38	0.01	−0.00	4.49	3.11	1.78	2.65	3.31	4.73	5.81	5.53
SD	11.39	—	6.78	0.65	0.81	1.22	0.91	0.95	1.10	1.07	0.83	0.98	1.04	0.93	0.84	0.97

*Sample size for each correlation ranged between 288 and 295 participants due to missing data. [a]Centre for Epidemiological Studies Depression Scale, Short Form (56). [b]Reverse scored agreeableness factor score from the Big Five Inventory (72). [c]Empathic Concern Scale (64). [d]Depression Stigma Scale (39). [e]Standardised scores for the Love and Dominance axes of the Support Actions Scale Circumplex (44). [f]Octant scores from the Support Actions Scale Circumplex (44). *$p < 0.05$, **$p < 0.01$.*

The goal of Study 2 was to replicate the findings from Study 1 in a community sample. Similar to Study 1, disagreeableness was associated with less compassionate and more rejecting behaviours. Disagreeable individuals reported more critical and distant behaviours toward depressed targets. While disagreeableness was negatively correlated with love across both studies, there was also a negative association between disagreeableness and dominance in Study 2. Depression stigma and empathic concern individually and serially mediated the effects of disagreeableness on loving and dominant support. The results showed that disagreeable individuals were more likely to endorse stigmatic attitudes toward depression, and that stigma in turn, was associated with less empathic concern. These mediators accounted for less loving and less dominant behaviours reported toward depressed targets, in support of our hypotheses.

DISCUSSION

Interpersonal theories of depression emphasise the ways in which depressed individuals contribute to the rejection they experience in close relationships (11, 12). These models describe deficits in social skills, and problems with communication that act as putative causal factors for the onset, maintenance, and recurrence of depression (12). The negative interactional cycles studied in dyads with a depressed partner acknowledge reciprocal influences between partners [e.g., (18, 52, 73)]. However, individual differences among support providers have not been studied independently in the literature on depression. Disagreeableness, depression stigma, and empathic concern among significant others were examined here as potential contributors to compassionate and rejecting behaviours toward depressed individuals. Compassionate vs. rejecting forms of support were captured with the loving and dominant dimensions of the interpersonal circumplex.

There were distinct interpersonal patterns reported by disagreeable providers in their relationship with depressed targets. The hypothesis that disagreeableness would entail less loving support was supported across both studies. Disagreeableness was negatively correlated with dominance in Study 2. Disagreeableness was primarily related to more critical and distancing forms of support toward depressed individuals as reported by providers. These findings generally suggest that disagreeable providers were more rejecting toward depressed individuals, consistent with interpersonal models of depression (12). The current work accentuates how maladaptive interpersonal dynamics among depressed individuals are more likely to occur with significant others who are disagreeable. This research also expands on the existing literature on trait agreeableness in a specific context of support provisions toward depressed individuals.

The mediational tests examined depression stigma and empathic concern as proximal predictors of compassion and rejection toward depressed individuals. Depression stigma was associated with less dominance in Study 2 and less love across both studies. Providers who endorsed stigmatic attitudes about depression reported more critical and distancing behaviours toward their depressed significant other. Empathic concern, on the other hand, was consistently associated with more

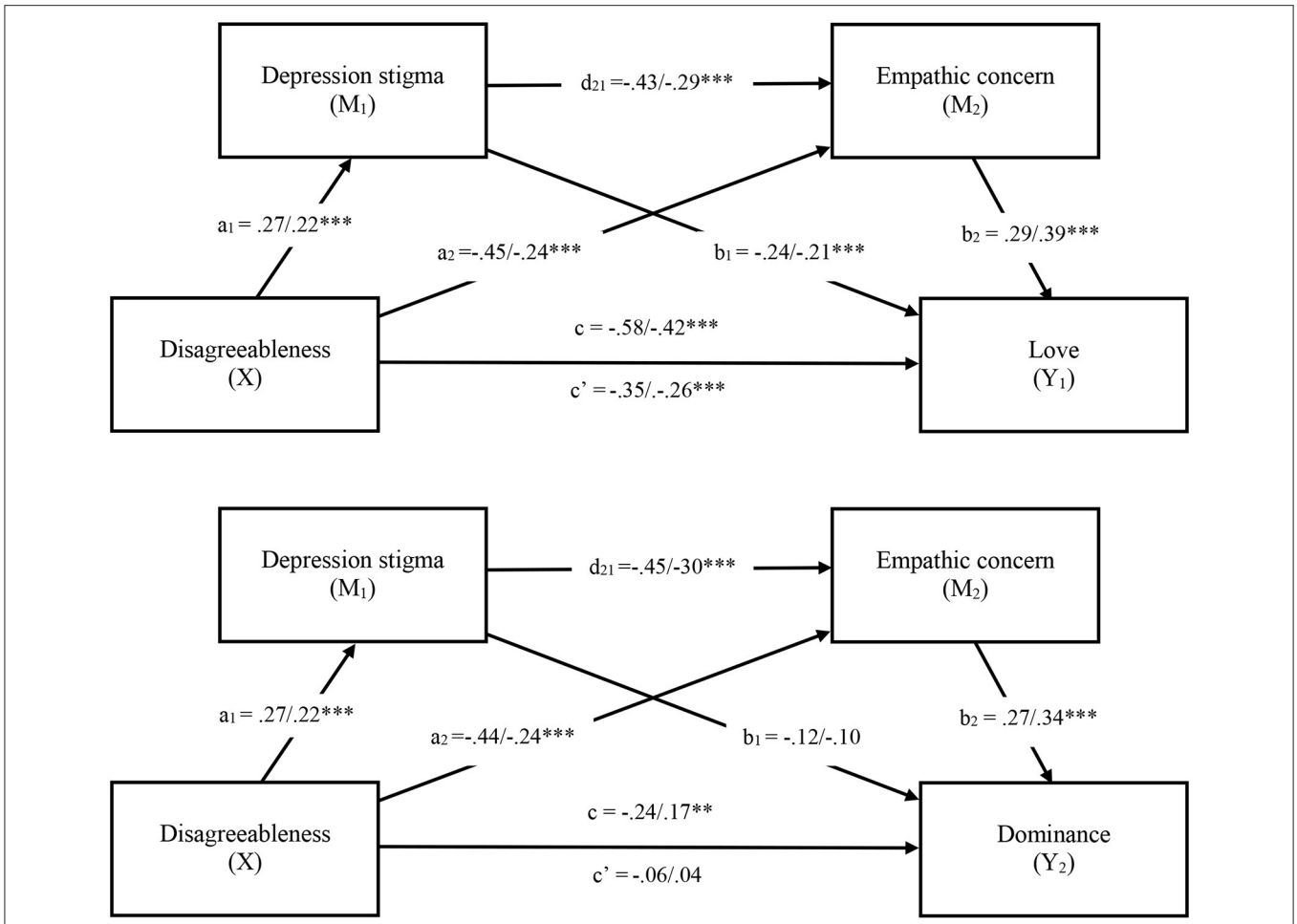


FIGURE 4 | Serial mediation models in Study 2. Note. Values shown reflect unstandardized/standardised coefficients. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. c = Total effect, c′ = Direct effect.

TABLE 6 | Total, direct and indirect effects of disagreeableness (X) on love (Y_1) and dominance (Y_2) through depression stigma (M_1) and empathic concern (M_2) in Study 2.

	Love						Dominance					
	Effect	***SE***	***t***	***p***	**LLCI**	**ULCI**	**Effect**	***SE***	***t***	***p***	**LLCI**	**ULCI**
Total effect	−0.58	0.07	−7.83	<0.001	−0.73	−0.44	−0.24	0.05	−2.82	0.005	−0.40	−0.07
Direct effect	−0.35	0.07	−5.27	<0.001	−0.49	−0.22	−0.06	0.05	−0.68	0.497	−0.22	0.11
Total indirect effect	−0.23	0.04			−0.32	−0.15	−0.18	0.04			−0.27	−0.10
Indirect (X→M_1→Y)[a]	−0.06	0.03			−0.12	−0.02	−0.03	0.02			−0.08	0.01
Indirect (X→M_2→Y)[a]	−0.13	0.03			−0.20	−0.07	−0.12	0.03			−0.19	−0.06
Indirect (X→M_1→M_2→Y)[a]	−0.03	0.01			−0.06	−0.01	−0.03	0.01			−0.06	−0.01

[a]*based on 5,000 bootstrap samples. LLCI, Lower Limit 95% Confidence Interval; ULCI, Upper Limit 95% Confidence Interval.*

nurturing and engaging support reported toward depressed targets. Providers who felt more empathy for depressed targets reported engaging in more compassionate rather than rejecting behaviours. Overall, the findings highlight the effects of support providers' attitudes (e.g., depression stigma), and emotions (e.g., empathic concern) in the type of support provided to a significant other who is depressed.

Serial mediation models were proposed to determine whether stigma and empathic concern mediated the associations between disagreeableness and social support. The models were tested on love and dominance separately. The results for the love axis were consistent across both samples; stigma and empathic concern partially mediated the relation between disagreeableness and less loving responses toward the depressed

target. The indirect effects indicated that the association between disagreeableness and love was serially mediated through greater depression stigma followed by less empathic concern. Although our study does not allow for causal statements, the results are consistent with the proposition that disagreeable providers report more rejecting behaviours toward depressed significant others because of endorsed stigmatic beliefs and reduced empathy.

The tests revealed partial mediation for the love axis, which means that less loving outcomes were not fully accounted for by the mediators. Rejection from disagreeable providers could not be solely attributed to stigmatic attitudes and low empathic concern. This suggests that deficits in compassion associated with this personality dimension may be influenced by other factors. Disagreeableness has a long history in the empirical literature demonstrating traits of interpersonal irritability that may be generalizable across situations (22, 74).

The serial mediational analyses for the dominance axis revealed mixed results. Disagreeableness was not significantly related to dominance in Study 1 but there was a significant negative association in Study 2. The mediation models revealed that disagreeableness predicted less dominant support toward depressed targets through stigmatic beliefs and lower empathic concern in Study 2. Full mediation suggests that disagreeable individuals were more likely to report withdrawing from depressed others because of their stigmatic attitudes and lack of empathy.

It has been previously suggested that trait variables map onto the love axis more strongly than the dominance axis due to situational variability in the provision of social support (44, 75). That is, significant others may be disproportionally more likely to provide nurturing or critical forms of support (i.e., love) toward depressed individuals based on their personality, whereas directive or avoidant behaviours (i.e., dominance) may be more influenced by the context (i.e., attitudes and emotions). It is also worth highlighting that the inconsistent finding regarding disagreeableness and low dominance between our samples may reflect a general measurement issue. The brief measure of disagreeableness used in Study 1 may not have reliably captured the construct of disagreeableness as much as the measure used in Study 2.

In addition to the serially mediated effects, stigma and empathic concern individually mediated the association between disagreeableness and support. Empathic concern proved to be the most salient mechanism predicting compassionate and rejecting outcomes. Consistent with previous research linking agreeableness to empathic concern and prosocial outcomes (22), our results show that the reverse is also true. That is, the absence of empathic concern partly explained the relationship between disagreeableness and more rejecting outcomes toward depressed individuals. Compassionate action involves noticing the suffering of the other in need, empathising with their distress, and attempting to ease their suffering through supportive actions. Without empathic concern, helpful supportive actions are compromised.

Critical forms of support, as measured in the current work, overlaps with the literature on expressed emotion in families of those suffering from depression (76, 77). Studies have revealed higher levels of critical expressed emotion in family members of depressed individuals [e.g., (78)]. Critical forms of expressed emotion within these families has been shown to predict relapse in individuals with a history of the disorder (79) and can have important ramifications for the course of their symptoms. Low levels of social support are generally associated with poorer mental health and increased risk for mortality (80, 81). In the case of depression, criticism from support providers may be particularly pernicious. The current studies have identified how disagreeable traits, stigmatic attitudes, and unemphatic responding among providers may incite more critical forms of expressed emotion toward depressed individuals.

Clinical Implications and Interventions

Widespread online programs designed to promote literacy about mental health, including depression have shown some promise. For example, a meta-analysis of anti-stigma approaches, including over 38,000 participants from 14 countries, found that public education programs were effective in reducing stigma (38). The programs were found to be more effective than social activism and had significant effects on attitudes, affects, and behavioural intentions toward the mentally ill (38). Community-based interventions with a strong participatory component could also be delivered to promote contact, dispel myths, and provide education about depression. A key aspect of stigma stems from beliefs around the controllability of symptoms (82). Stigmatic attitudes include the belief that depressed individuals are unpredictable, weak, and to blame for their symptoms (38). The alleviation of stigma could lead to a substantial improvement in exercising empathy toward those suffering from depression.

Among depressed participants themselves, a randomised controlled trial examined the effects of a web-based depression literacy intervention compared to a cognitive-behavioural intervention in reducing stigmatic attitudes toward depression (39). Both interventions significantly reduced personal stigma (39). The literacy website condition provided information on the nature of depression and its debilitating consequences, along with descriptions of the most promising forms of treatment. The authors concluded that psychoeducational programmes may be helpful in alleviating stigmatic attitudes although it is not yet clear if such programmes could help reduce stigma held in the general population. Such campaign could be disseminated widely and may be particularly relevant for significant others of those with depression.

It can be argued that stigmatisation is a social problem that does not lie within individuals *per se* (83). Society places a stigma label on an individual suffering from a mental illness while oblivious to other aspects of the individual. These social norms lie within a culture that can be shaped. For example, communal values that are cherished by all can be emphasised and promoted at all levels of a society, including compassion, civility, altruism, forgiveness, and harmony [see (84)]. Public campaigns could be successful in promoting these values to effectively increase tolerance, acceptance and understanding toward those suffering from depression. The

following paragraphs outline specific intervention targets that could also improve compassionate responding.

Empathy training could have tremendous social outcomes (85). Studies have shown that inducing empathy can produce increased rates of helping (86). Empathic concern can also be promoted through perspective taking exercises. Habashi et al. (22) found that a perspective taking intervention was particularly effective for disagreeable individuals who do not habitually use these social skills. Overall, promoting a empathic understanding around the nature of depressed individuals' suffering could enhance compassionate responding.

In addition to reducing stigma and promoting empathy, interventions can be geared at increasing compassionate action among support providers directly. Considerable amounts of research have shown that performing acts of kindness improves the well-being of the actor (7). There is sizable evidence showing that compassionate behaviours come with physical and psychological benefits for the provider (8). A recent study has shown that disagreeable individuals may have even more to gain from practising compassion (87). Disagreeable individuals doing acts of kindness reported greater reductions in depression, and greater increases in life satisfaction 2 months post-test compared to those in a loving-kindness and placebo control conditions (87). It was suggested that this type of exercise may act as skills training for disagreeable individuals, which could benefit their mood by increasing harmony and compassion in their relationships.

The study of support providers is important because compassionate and rejecting forms of support provided toward depressed individuals have consequences for their long-term outcomes (9). Social support is a vital and necessary part of depression recovery. Higher perceived support prospectively predicts remission from depression (16). Conversely, deficits in perceived social support predict worse outcomes, such as increases in symptoms and new onsets (17, 88, 89).

Limitations and Future Directions

Data were obtained from support providers but not from the depressed targets themselves. This provides only half the picture among dyads, and precludes a full understanding of the dynamic interplay between support providers and depressed recipients. For example, the targets may have pulled for more rejecting and less compassionate responses if they held stigmatised attitudes toward themselves and viewed their depression as a sign of weakness (90). They may have refrained from asking for support directly, as do individuals who feel stigmatised, using maladaptive and indirect strategies to seek support (90). These strategies may backfire and result in unsupportive responses, feeding into a cycle of rejection for those with personal stigma (40). This is consistent with self-verification theory (21) where those with low self-esteem will seek corroboration of their negative self-views from their interpersonal environment.

Both samples had a preponderance of female participants (72% in Study 1 and 62% in Study 2). Gender differences on the love and dominant axes of the circumplex have been reported in couple interactions involving a depressed spouse [see (52)]. More specifically, depression in husbands was related to reductions in affiliation (i.e., love). Depression in wives tended to alter levels of dominance in the interaction dynamics (52). The existing literature has also demonstrated a potential effect for gender in the reassurance-seeking rejection link with depressed individuals (19). The current studies found that women reported being more loving toward depressed targets. Nevertheless, the findings from the serial mediation models were robust when controlling for gender suggesting that the results hold for men and women. Future research should examine the effects of disagreeableness, stigma, and empathic concern on supportive behaviours toward depressed individuals using gender-balanced samples. It would also be instructive to examine targets themselves to determine if depressed men elicit different types of social support compared to depressed women.

In addition to collecting information from both partners, a limitation of the current work was its cross-sectional design. This precludes conclusions around cause and effect, and the sequence of events in real-time between providers and depressed targets cannot be ascertained. Longitudinal and experimental designs could be used to explore the causal relations between disagreeableness, stigma, empathic concern, and supportive behaviours. Expanding from the retrospective self-report measures used here, experiencing sampling and observational methods would better capture the interpersonal dynamics between depressed individuals and their support providers and those situations characterised by an absence of compassion.

Finally, it is worth highlighting the heterogeneity in the types of relationships reported by participants. In both samples, depressed targets were friends, partners, or family members whom they had known for a relatively long time. It is difficult to estimate the impact of the providers on the depressed targets' mood and symptoms given the varying degrees of closeness shared among them. For example, the effect of rejection among depressed individuals is more pronounced within romantic relationships compared to non-romantic relationships (19). Furthermore, the amount of contact reported with the target varied greatly. While most participants reported interacting daily or a few times a week, some participants had much less frequent contact. It is thus difficult to estimate the actual impact of reported behaviours on the targets. It will be important to examine the effects of disagreeableness, stigma, and empathic concern across various relational contexts including reports from each member of the dyad.

CONCLUSION

Depression is one of the most widespread and onerous mental health conditions affecting millions of individuals and their families. The current research was undertaken to provide a broader and more nuanced depiction of the interpersonal milieu of depressed individuals from the perspectives of support providers. Compassionate and rejecting behaviours reported by support providers were influenced by individual differences in disagreeableness, depression stigma, and empathic concern toward depressed individuals. Greater stigma and lower empathic concern further accounted for the rejecting behaviours reported

by disagreeable support providers. It may be possible to reduce stigma and increase empathic concern through skills training. It is also possible to teach compassion as an important human strength with immediate and long-term psychological benefits, particularly for those who are disagreeable. The current research offers targets of interventions for support providers to help promote compassion and mitigate rejection toward depressed individuals, which could have consequential effects for both recipients and providers.

DATA AVAILABILITY STATEMENT

The datasets and **Supplementary Materials** for this article can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: https://osf.io/4h9qr/?view_only=1a37d07eb83548f1a19b2810c522cdee.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Human Participant Research Ethics Committee, York University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR'S NOTE

Depression is one of the most widespread and onerous mental health conditions affecting millions of individuals and their families. Interpersonal models of depression have documented the ways in which depressed individuals contribute to the negative interaction cycles in their close relationships. A caveat in this literature is the relative neglect of support provider characteristics and the ways in which these may independently contribute to negative outcomes in those relationships. We investigated the support providers of individuals who were depressed and measured personality, depression stigma, and empathic concern. Providers who were disagreeable expressed less compassion and more criticism toward their depressed significant other. Disagreeable providers were also more likely to see depression as a weakness and hold stigmatic attitudes toward the illness. They were less empathic and more critical of a significant other who was depressed. These variables accounted for a significant amount of variance in the type of support provided. We make the case that these provider characteristics should be addressed to promote greater empathic concern and compassionate responding toward individuals who are depressed.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2021.594229/full#supplementary-material

REFERENCES

1. Brown SL, Nesse RM, Vinokur AD, Smith DM. Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *PsycholSci.* (2003) 14:320–7. doi: 10.1111/1467-9280.14461
2. Cosley BJ, McCoy SK, Saslow LR, Epel ES. Is compassion for others stress buffering? Consequences of compassion and social support for physiological reactivity to stress. *J Exp Soc Psychol.* (2010) 46:816–23. doi: 10.1016/j.jesp.2010.04.008
3. Raposa EB, Laws HB, Ansell EB. Prosocial behaviour mitigates the negative effects of stress in everyday life. *Clin Psychol Sci.* (2016) 4:691–8. doi: 10.1177/2167702615611073
4. Goetz JL, Keltner D, Simon-Thomas E. Compassion: an evolutionary analysis and empirical review. *Psychol Bull.* (2010) 136:351–74. doi: 10.1037/a0018807
5. O'Brien E, Kassirer S. People are slow to adapt to the warm glow of giving. *Psychol Sci.* (2019) 30:193–204. doi: 10.1177/0956797618814145
6. Klein N. Prosocial behaviour increases perceptions of meaning in life. *J Positive Psychol.* (2017) 12:354–61. doi: 10.1080/17439760.2016.1209541
7. Curry OS, Rowland LA, Van Lissa CJ, Zlotowitz S, McAlaney J, Whitehouse H. Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *J Exp Soc Psychol.* (2018) 76:320–9. doi: 10.1016/j.jesp.2018.02.014
8. Kirby JN, Tellegen CL, Steindl SR. A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav Ther.* (2017) 48:778–92. doi: 10.1016/j.beth.2017.06.003
9. Marroquín B. Interpersonal emotion regulation as a mechanism of social support in depression. *Clin Psychol Rev.* (2011) 31:1276–90. doi: 10.1016/j.cpr.2011.09.005
10. Mongrain M, Lubbers R, Struthers W. The power of love: mediation of rejection in roommate relationships of dependents and self-critics. *Pers Soc Psychol Bull.* (2004) 30:94–105. doi: 10.1177/0146167203258861
11. Hames JL, Hagan CR, Joiner TE. (2013). Interpersonal processes in depression. *Annual Review of Clinical Psychology,* 9, 355–377. doi: 10.1146/annurev-clinpsy-050212-185553
12. Joiner TE. Depression's vicious scree: self-propagating and erosive processes in depression chronicity. *Clin Psychol Sci Pract.* (2000) 7:203–18. doi: 10.1093/clipsy.7.2.203
13. Coyne JC. Depression and the response of others. *J Abnorm Psychol.* (1976) 85:186–93. doi: 10.1037/0021-843X.85.2.186

14. Coyne JC. Toward an interactional description of depression. *Psychiatry.* (1976) 39:28–40. doi: 10.1080/00332747.1976.11023874
15. Joiner TE, Metalsky GI. A prospective test of an integrative interpersonal theory of depression: a naturalistic study of college roommates. *J Pers Soc Psychol.* (1995) 69:778–88. doi: 10.1037/0022-3514.69.4.778
16. Lakey B, Cronin A. Low social support and major depression: research, theory and methodological issues. In: Dobson KS, Dozois, editors. Risk Factors in Depression; Risk Factors in Depression. San Diego, CA: Elsevier Academic Press (2008). p. 385–408, Chapter xxv, 483 p. doi: 10.1016/B978-0-08-045078-0.00017-4
17. Slavich GM, Thornton T, Torres LD, Monroe SM, Gotlib IH. Targeted rejection predicts hastened onset of major depression. *J Soc Clin Psychol.* (2009) 28:223–43. doi: 10.1521/jscp.2009.28.2.223
18. Joiner TE, Alfano MS, Metalsky GI. When depression breeds contempt: reassurance-seeking, self-esteem, and rejection of depressed college students by their roommates. *J Abnorm Psychol.* (1992) 101:165–73. doi: 10.1037/0021-843X.101.1.165
19. Starr LR, Davila J. Excessive reassurance seeking, depression, and interpersonal rejection: a meta-analytic review. *J Abnorm Psychol.* (2008) 117:762–75. doi: 10.1037/a0013866
20. Segrin C. Social skills deficit associated with depression. *Clin Psychol Rev.* (2000) 20:379–403. doi: 10.1016/S0272-7358(98)00104-4
21. Swann WB. To be known or to be adored. the interplay of self-enhancement and self-verification. In: Higgins ET, Sorrentino M, editors. *Handbook of Motivation and Cognition* (2nd Edition). New York, NY: Guilford Press (1990). p. 408–48.
22. Habashi MM, Graziano WG, Hoover AE. Searching for the prosocial personality: a Big Five approaching to linking personality and prosocial behavior. *Pers Soc Psychol Bull.* (2016) 42:1177–92. doi: 10.1177/0146167216652859
23. Penner LA, Dovidio JF, Piliavin JA, Schroeder DA. Prosocial behavior: multilevel perspectives. *Ann Rev Psychol.* (2005) 56:365–92. doi: 10.1146/annurev.psych.56.091103.070141
24. Sommerfeld E. The subjective experience of generosity. In: Mikulincer M, Shaver PR, editors. *Prosocial Motives, Emotions, and Behavior: The Better Angels of Our Nature*. Washington, DC: American Psychological Association (2010). p. 303–23. doi: 10.1037/12061-016
25. McCrae RR, Costa PT. The structure of interpersonal traits: Wiggins's circumplex and the five-factor model. *J Personal Soc Psychol.* (1989) 56:586–95. doi: 10.1037/0022-3514.56.4.586
26. Graziano WG, Bruce JW, Sheese BE, Tobin RM. Attraction, personality, and prejudice: liking none of the people most of the time. *J Pers Soc Psychol.* (2007) 93:565–82. doi: 10.1037/0022-3514.93.4.565
27. Graziano WG, Habashi MM, Sheese BE, Tobin RM. Agreeableness, empathy, and helping: a person x situation perspective. *J Pers Soc Psychol.* (2007) 93:583–99. doi: 10.1037/0022-3514.93.4.583
28. Crowe ML, Lynam DR, Miller JD. Uncovering the structure of agreeableness from self-report measures. *J Pers.* (2017) 86:771–87. doi: 10.1111/jopy.12358
29. Jensen-Campbell L, Graziano WG. Agreeableness as a moderator of interpersonal conflict. *J Pers.* (2001) 69:323–62. doi: 10.1111/1467-6494.00148
30. Graziano WG, Tobin RM. The cognitive and motivational foundations underlying agreeableness. In: Robinson MD, Watkins E, Harmon-Jones E, editors. *Handbook of Cognition and Emotion*. New York, NY:Guilforld Press (2013). p. 347–66.
31. Latzman RD, Vaidya JG, Clark LA, Watson D. Components of disinhibition (vs. *constraint)* differentially predict aggression and alcohol use. *Europ J Pers.* (2011) 25:477–86. doi: 10.1002/per.821
32. Wilkowski BM, Robinson MD, Meier BP. Agreeableness and the prolonged spatial processing of antisocial and prosocial information. *J Res Pers.* (2006) 40:1152–68. doi: 10.1016/j.jrp.2005.12.004
33. Côté S, Moskowitz DS. On the dynamic covariation between interpersonal behavior and affect: prediction from neuroticism, extraversion, and agreeableness. *J Pers Soc Psychol.* (1998) 75:1032–46. doi: 10.1037/0022-3514.75.4.1032
34. Buss DM. Conflict in married couples: personality predictors of anger and upset. *J Pers.* (1991) 59:663–88. doi: 10.1111/j.1467-6494.1991.tb00926.x
35. Buss DM. Manipulation in close relationships: five personality factors in interactional context. *J Pers.* (1992) 60:477–99. doi: 10.1111/j.1467-6494.1992.tb00981.x
36. Graziano WG, Tobin RM. Agreeableness. In: Leary MR, Hoyle RH, editors. *Handbook of Individual Differences in Social Behavior*. New York, NY: Guilford Press (2009). p. 46–61.
37. Graziano WG, Tobin RM. Agreeableness and the five-factor model. In: Widiger TA, editor. *The Oxford Handbook of the Five-Factor Model*. New York, NY: Oxford University Press (2017). p. 106–31. doi: 10.1093/oxfordhb/9780199352487.013.17
38. Corrigan PW, Morris SB, Michaels. PJ, Rafacz JD, Rusch N. Challenging the public stigma of mental illness: a meta-analysis of outcome studies. *Psychiatric Serv.* (2012) 63:963–73. doi: 10.1176/appi.ps.201100529
39. Griffiths KM, Christensen H, Jorm AF, Evans K, Groves C. Effect of web-based depression literacy and cognitive–behavioural therapy interventions on stigmatising attitudes to depression. *Br J Psychiatry.* (2004) 185:342–9. doi: 10.1192/bjp.185.4.342
40. Williams SL, Mickelson KD. A paradox of support seeking and rejection among the stigmatized. *Pers Relatsh.* (2008) 15:493–509. doi: 10.1111/j.1475-6811.2008.00212.x
41. Webb M, Peterson J, Willis SC, Rodney H, Siebert E, Carlile JA, et al. The role of empathy and adult attachment in predicting stigma toward severe and persistent mental illness and other psychosocial or health conditions. *J Mental Health Counsel.* (2016) 38:62–78. doi: 10.17744/mehc.38.1.05
42. Batson CD, Turk CL, Shaw LL, Klein TR. Information function of empathic emotion: learning that we value the other's welfare. *J Pers Soc Psychol.* (1995) 68:300–13. doi: 10.1037/0022-3514.68.2.300
43. Batson CD, Eklund JH, Chermok VL, Hoyt JL, Ortiz BG. An additional antecedent of empathic concern: valuing the welfare of the person in need. *J Pers Soc Psychol.* (2007) 93:65–74. doi: 10.1037/0022-3514.93.1.65
44. Trobst KK. An interpersonal conceptualization and quantification of social support transactions. *Pers Soc Psychol Bull.* (2000) 26:971–86. doi: 10.1177/01461672002610007
45. Kiesler DJ. The 1982 Interpersonal Circle: a taxonomy for complementarity in human transactions. *Psychol Rev.* (1983) 90:185–214. doi: 10.1037/0033-295x.90.3.185
46. Leary T. *Interpersonal Diagnosis of Personality: A Functional Theory and Methodology for Personality Evaluation*. Oxford: Ronald Press (1957).
47. Gurtman MB. Construct validity of interpersonal personality measures: the interpersonal circumplex as a nomological net. *J Personal Soc Psychol.* (1992) 63:105–18. doi: 10.1037/0022-3514.63.1.105
48. Wiggins JS, Trapnell PD. A dyadic-interactional perspective on the five-factor model. In: Wiggins JS, editor. *The Five-Factor Model of Personality: Theoretical Perspectives*. New York, NY: Guilford Press (1996). p. 88–162, Chapter xiii, 216. p.
49. Wiggins JS. *Interpersonal Adjective Scales: Professional Manual*. Odessa, FL: Psychological Assessment Resources (1995).
50. Jazaieri H, Jinpa GT, McGonigal K, Rosenberg EL, Finkelstein J, Simon-Thomas E, et al. Enhancing compassion: a randomized controlled trial of a compassion cultivation training program. *J Happiness Stud.* (2013) 14:1113–26. doi: 10.1007/s10902-012-9373-z
51. Jinpa T. *A Fearless Heart: How the Courage to Be Compassionate Can Transform Our Lives*. New York, NY: Avery Publishing (2016).
52. Lizdek I, Woody E, Sadler P, Rehman US. How do depressive symptoms in husbands and wives relate to the interpersonal dynamics of marital interactions? *J Couns Psychol.* (2016) 63:721–35. doi: 10.1037/cou0000167
53. DeYoung CG, Weisberg YJ, Quilty LC, Peterson JB. Unifying aspects of the big five, the interpersonal circumplex, trait affilication. *J Pers.* (2012) 81:465–75. doi: 10.1111/jopy.12020
54. Pincus AL. Constellations of dependency within the five-factor model of personality. In: Costa PT Jr, Widiger TA, editor. Personality Disorders and the five-Factor Model Of Personality. 2nd edn. Washington, DC: American Psychological Association (2002). p. 203–14. doi: 10.1037/10423-012

55. Schönbrodt FD, Perugini M. At what sample size do correlations stabilize? *J Res Pers.* (2013) 47:609–12. doi: 10.1016/j.jrp.2013.05.009
56. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D. *Am J Prevent Med.* (1994) 10:77–84. doi: 10.1016/S0749-3797(18)30622-6
57. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA (2013). doi: 10.1176/appi.books.9780890425596
58. Gosling SD, Rentfrow PJ, Swann WB. A very brief measure of the Big-Five personality domains. *J Res Pers.* (2003) 37:504–28. doi: 10.1016/S0092-6566(03)00046-1
59. Ehrhart MG, Ehrhart KH, Roesch SC, Chung-Herrera BG, Nadler K, Bradshaw K. Testing the latent factor structure and construct validity of the ten-item personality inventory. *Pers Individ Dif.* (2009) 47:900–5. doi: 10.1016/j.paid.2009.07.012
60. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Measure.* (1977) 1:385–401. doi: 10.1177/014662167700100306
61. Andresen EM, Byers K, Friary J, Kosloski K, Montgomery R. Performance of the 10-item center for epidemiologic studies depression scale for caregiving research. *SAGE Open Med.* (2013) 1:2050312113514576. doi: 10.1177/2050312113514576
62. Björgvinsson T, Kertz SJ, Bigda-Peyton J, McCoy KL, Aderka IM. Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment.* (2013) 20:429–36. doi: 10.1177/1073191113481998
63. Griffiths KM, Christensen H, Jorm AF. Predictors of depression stigma. *BMC Psychiatry.* (2008) 8:25. doi: 10.1186/1471-244X-8-25
64. Batson CD. Self-report ratings of empathic emotion. In: Eisenberg N, StrayerJ, editors. *Empathy and Its Development*. Cambridge: Cambridge University Press (1987). p. 356–60.
65. Batson CD, Batson JG, Slingsby JK, Harrell KL, Peekna HM, Todd RM. Empathic joy and the empathy-altruism hypothesis. *J Pers Soc Psychol.* (1991) 61:413–26. doi: 10.1037/0022-3514.61.3.413
66. Gurtman MB, Pincus AL. The circumplex model: methods and research applications. In: Schinka J, Velicer W, editors. *Comprehensive Handbook of Psychology, Vol. 2: Research Methods in Psychology*. New York, NY: Wiley (2003). p. 407–28.
67. Girard JM, Zimmermann J, Wright AGC. *New Tools for Circumplex Data Analysis and Visualization in R. Meeting of the Society for Interpersonal Theory and Research*. Montreal, QC (2018).
68. Zimmerman J, Wright AGC. Beyond description in interpersonal construct validation: methodological advances in the Circumplex Structural Summary approach. *Assessment.* (2017) 24:3–23. doi: 10.1177/1073191115621795
69. Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, statistical considerations. *J Pers Soc Psychol.* (1986) 51:1173–82. doi: 10.1037/0022-3514.51.6.1173
70. Hayes AF. *Process: A Versatile Computational Tool for Observed Variable Mediation, Moderation, and Conditional Process Modeling* (2012).
71. Marjanovic Z, Struthers CW, Cribbie R, Greenglass ER. The conscientious responders scale: a new tool for discriminating between conscientious and random responders. *Sage Open.* (2014) 3:4. doi: 10.1177/2158244014545964
72. John OP, Srivastava S. The big five trait taxonomy: history, measurement, theoretical perspectives. In Pervin LA, John OP, editors. *Handbook of Personality: Theory and Research*. 2nd ed. New York, NY: Guilford Press (1999). p. 102–38.
73. Mongrain M, Vettese LC, Shuster B, Kendal N. Perceptual biases, affect, and behavior in the relationships of dependents and self-critics. *J Pers Soc Psychol.* (1998) 75:230–41. doi: 10.1037/0022-3514.75.1.230
74. Moskowitz DS. Quarrelsomeness in daily life. *J Pers.* (2010) 78:39–66. doi: 10.1111/j.1467-6494.2009.00608.x
75. Wiggins JS, Trobst KK. When is a circumplex an "interpersonal circumplex?" The case of supportive actions. In: Plutchik R, Conte HR, editor. *Circumplex Models of Personality and Emotions*. Washington, DC: American Psychological Association (1997). p. 57–80. doi: 10.1037/10261-003
76. Hooley JM. Expressed emotion and depression: interactions between patients and high versus low-expressed-emotion spouses. *J Abnorm Psychol.* (1986) 95:237–46. doi: 10.1037/0021-843X.95.3.237
77. Hooley J, Orley J, Teasdale J. Levels of expressed emotion and relapse in depressed patients. *Br J Psychiatry.* (1986) 148:642–7. doi: 10.1192/bjp.148.6.642
78. Asarnow JR, Tompson M, Woo S, Cantwell DP. Is expressed emotion a specific risk factor for depression or a nonspecific correlate of psychopathology? *J Abnorm Child Psychol.* (2001) 29:573–83. doi: 10.1023/A:1012237411007
79. Okasha A, El Akabawi AS, Snyder KS, Wilson AK, Youssef I, El Dawla AS. Expressed emotion, perceived criticism, and relapse in depression: a replication in an Egyptian community. *Am J Psychiatry.* (1994) 151:1001–5. doi: 10.1176/ajp.151.7.1001
80. Braithwaite S, Holt-Lunstad J. Romantic relationships and mental health. *Curr Opin Psychol.* (2017) 13:120–5. doi: 10.1016/j.copsyc.2016.04.001
81. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci.* (2015) 10:227–37. doi: 10.1177/1745691614568352
82. Hayhurst H, Cooper Z, Paykel ES, Ramana R, Vearnals S. Expressed emotion and depression. *Br J Psychiatry.* (1997) 171:439–43. doi: 10.1192/bjp.171.5.439
83. Goffman E. *Stigma: Notes on the Management of Spoiled Identity*. Englewood Cliffs, NJ: Prentice Hall (1963).
84. Trapnell PD, Paulhus DL. Agentic and communal values: their scope and measurement. *J. Pers Assess.* (2012) 94:39–52. doi: 10.1080/00223891.2011.627968
85. Batson CD. *Altruism in Humans*. New York, NY: Oxford University Press (2011). doi: 10.1093/acprof:oso/9780195341065.001.0001
86. Batson CD, Lishner DA, Stocks EL. The empathy-altruism hypothesis. In: Schroeder DA, Graziano WG, editors. *The Oxford Handbook of Prosocial Behavior*. New York, NY: Oxford University Press (2015). p. 259–81.
87. Mongrain M, Barnes C, Barnhart R, Zalan LB. Acts of kindness reduce depression in individuals low on agreeableness. *Trans Issues Psychol Sci.* (2018) 4:323–34. doi: 10.1037/tps0000168
88. Paykel ES. Life events, social support and depression. *Acta Psychiatr Scand.* (1994) 89:50–8. doi: 10.1111/j.1600-0447.1994.tb05803.x
89. Stice E, Ragan J, Randall P. Prospective relations between social support and depression: differential direction of effects for parent and peer support? *J Abnorm Psychol.* (2004) 113:155–9. doi: 10.1037/0021-843X.113.1.155
90. Mickelson KD. Perceived stigma, social support, and depression. *Pers Soc Psychol Bull.* (2001) 27:1046–56. doi: 10.1177/0146167201278011

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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