



OPEN ACCESS

EDITED BY

Andrew Carter,
San Jose State University, United States

REVIEWED BY

Nela Filimon,
University of Girona, Spain
Manuel Escobar-Farfán,
Universidad de Santiago de Chile, Chile

*CORRESPONDENCE

Martin Tanis
✉ m.a.tanis@vu.nl

RECEIVED 07 July 2025

ACCEPTED 20 October 2025

PUBLISHED 07 November 2025

CITATION

Tanis M and Buijzen M (2025) Why we believe in superfoods: investigating attitudes, personality and message processing. *Front. Commun.* 10:1661474. doi: 10.3389/fcomm.2025.1661474

COPYRIGHT

© 2025 Tanis and Buijzen. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](#). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Why we believe in superfoods: investigating attitudes, personality and message processing

Martin Tanis^{1*} and Moniek Buijzen²

¹Vrije Universiteit, Department of Communication Science, Amsterdam, Netherlands, ²Erasmus University Rotterdam, Movez Lab, Rotterdam, Netherlands

Introduction: Belief in the benefits of so-called superfoods is widespread, yet little is known about what drives these beliefs, particularly for lesser-known products like moringa.

Methods: Two studies investigated how individual predispositions and information processing styles shape attitudes toward moringa among consumers unfamiliar with it. Study 1 ($N = 322$) used a correlational design to examine the role of superfoods attitudes, personality traits, thinking styles, and social norms. Study 2 ($N = 268$) employed an experimental design to test how message processing (central vs. peripheral) moderates these relationships.

Results: Across both studies, a general positive attitude toward superfoods predicted higher perceived message credibility and more favorable attitudes toward moringa. These effects were especially pronounced under peripheral processing (Study 2). Intuitive thinking and subjective social norms also contributed to positive responses, while analytical thinking and food-health beliefs had weaker or unexpected effects (Study 1).

Conclusion: Findings suggest that belief in superfoods is shaped more by intuition, affect, and prior attitudes than by analytical evaluation. Health communication strategies should consider these psychological mechanisms when addressing public perceptions of novel health products.

KEYWORDS

superfoods, health hacks, message credibility, cognitive-experiential self-theory (CEST), elaboration likelihood model (ELM), consumer attitudes, personality traits

1 Introduction

Superfoods is a term reserved for food products that are believed to be exceptionally rich in nutrients and are believed to help prevent disease or promote optimal health (van den Driessche et al., 2018). Examples are kale, chia seeds, and turmeric. In this sense, superfoods can be understood as a particular type of *health hack*, a broad category of simple, shareable practices or products that promise quick and often unconventional ways to improve health and wellbeing. Health hacks typically circulate through social media, influencers, and online communities, and tend to emphasize experiential cues such as naturalness, novelty, or personal testimonials rather than systematic scientific evidence. While health hacks encompass a wide range of advice and practices, from dietary tips to lifestyle routines, superfoods form a prominent example, often marketed as natural shortcuts to health.

The global superfoods market is expanding steadily, growing from USD 155.2 billion in 2022 to an expected USD 295.8 billion by 2030 (Compound Annual Growth Rate, CAGR $\approx$ 8.4%; DataM Intelligence 4Market Research LLP, 2023). In Europe, revenues are projected to rise from USD 52.1 billion in 2023 to USD 70.1 billion by 2030 (CAGR $\approx$ 4.3%; Grand View

Research, 2024b). The North American market, valued at USD 70.6 billion in 2023, is forecast to reach USD 92.2 billion by 2030 (CAGR $\approx$ 3.9%; Grand View Research, 2024c). The Asia-Pacific region shows the fastest growth, driven by rising incomes and health awareness, from USD 43.6 billion in 2023 to USD 61.4 billion in 2030 (CAGR $\approx$ 5.0%; Grand View Research, 2024a). Collectively, these figures reflect a strong and geographically broad expansion of the superfoods sector.

Despite the growing popularity of superfoods, only limited knowledge exists about the factors explaining their appeal. Studies by Franco Lucas and colleagues have shown that consumers most likely to eat superfoods are health-conscious, educated, and possess nutritional knowledge and an interest in organic, sustainable foods (Franco Lucas et al., 2021, 2023). However, little empirical research has examined *how* such promotional efforts succeed or *why* consumers are persuaded by them. This lack of research leaves important gaps in understanding the psychological mechanisms driving their appeal.

This is the first study to systematically examine how individual predispositions and information processing styles shape attitudes toward health products promoted as superfoods, conceptualized as a broader class of online health hacks. To this date, little is known about the psychological mechanisms that make such health claims persuasive. In particular, research has yet to clarify how personality traits, thinking styles, and prior attitudes interact with message processing to shape beliefs and evaluations of newly introduced superfoods. This knowledge gap limits our understanding of why consumers are influenced by often unverified health hacks. By integrating personality traits, thinking styles, and message processing within a dual-process framework, this study provides a novel and needed perspective on why consumers are persuaded by intuitive, affective, and socially reinforced health claims that circulate in digital environments.

In the present studies, we further explore what drives the appreciation of a particular superfood called *moringa*. The *moringa oleifera* is a tropical tree whose various parts have been consumed for centuries. Food products derived from the moringa tree are believed to be rich in vitamins, minerals, antioxidants, and plant proteins, and are promoted for their potential to reduce inflammation, lower blood sugar and cholesterol levels, and combat oxidative stress. Moringa also shows promise in antimicrobial and neuroprotective roles, although most supporting evidence stems from laboratory or animal research. While this is encouraging, particularly regarding its nutritional and antioxidant properties, high-quality clinical trials are needed to confirm its effectiveness and safety in humans (Bonvissuto, 2022; Stohs and Hartman, 2015). Nevertheless, the absence of conclusive scientific proof does not appear to hinder its growing popularity (Shivanna et al., 2024). Moringa was selected as the focal product because, at the time of the study, it was increasingly promoted as a superfood across media and online platforms. It embodies many characteristics typical of the superfood category (exotic origin, high nutritional density, and purported broad health benefits) making it a suitable representative of this broader class. Moreover, moringa products are generally regarded as safe for consumption, even though their empirical evidence base remains incomplete. This combination makes moringa a relevant and ethically appropriate exemplar for examining consumer beliefs and persuasive mechanisms surrounding superfoods more generally.

This leads to our overall research question: How do personality traits, thinking styles, and prior attitudes interact with message

processing to shape perceived message credibility and attitudes toward newly promoted superfoods such as moringa? To address this question, we conducted two complementary studies using a sequential mixed-method design (see Figure 1). Across both studies, we examined the determinants of favorable attitudes toward the increasingly popular superfood moringa among individuals with no prior familiarity. Study 1 explored how individual predispositions, such as general attitudes toward superfoods, health and nutrition, personality traits, thinking styles, and perceived social norms, relate to beliefs about and the perceived credibility of a novel superfood. Building on these findings, Study 2 employed an experimental design to test whether the depth of information processing (central versus peripheral) moderates these relationships, thereby linking stable cognitive styles to situational message processing within a unified explanatory framework. Together, these studies provide an integrated understanding of how enduring individual differences and situational processing dynamics jointly shape consumer responses to superfood promotions.

2 Study 1

Study 1 explored the factors influencing beliefs about the superfood moringa, focusing on how individuals would assess the credibility of information about moringa and their attitudes toward it. Grounded in health communication and consumer psychology research, the study examined general attitudes toward superfoods, associations between nutrition and health, personality traits based on the *Big Five* model, thinking styles (intuitive-experiential vs. analytical-rational), and subjective social norms (see Figure 2 for model). Importantly, this investigation included participants who were previously unfamiliar with moringa, allowing us to understand how initial exposure and individual differences shape early impressions regarding a superfood.

2.1 Attitude toward superfoods

Superfoods are purported to be nutritionally dense and beneficial to health. No official definition of the term superfood exists, nor is there a scientific, regulatory, or legal framework governing its use. The term generally refers to nutrient-rich foods that support bodily functions (van den Driessche et al., 2018; Fernández-Ríos et al., 2022; Liu et al., 2021). Studies suggest that superfoods may enhance overall health by strengthening the immune system, modulating hormone levels (e.g., serotonin), and supporting the optimal functioning of various physiological systems (Fernández-Ríos et al., 2022; Proestos, 2018).

Despite the absence of a formal definition, the term superfoods often refers to products with a long history of consumption by indigenous populations due to their purported nutritional or medicinal value (Franco Lucas et al., 2023; Tacer-Caba, 2019). In Western countries, superfoods have only recently been marketed to a broader audience, with their unique attributes often overemphasized, where they are frequently presented as essential components of a healthy diet (Šamec et al., 2019; Santini and Novellino, 2014; Urala and Lähteenmäki, 2003; Urala and Lähteenmäki, 2007). Accordingly, these foods are heavily advertised across various media platforms as crucial

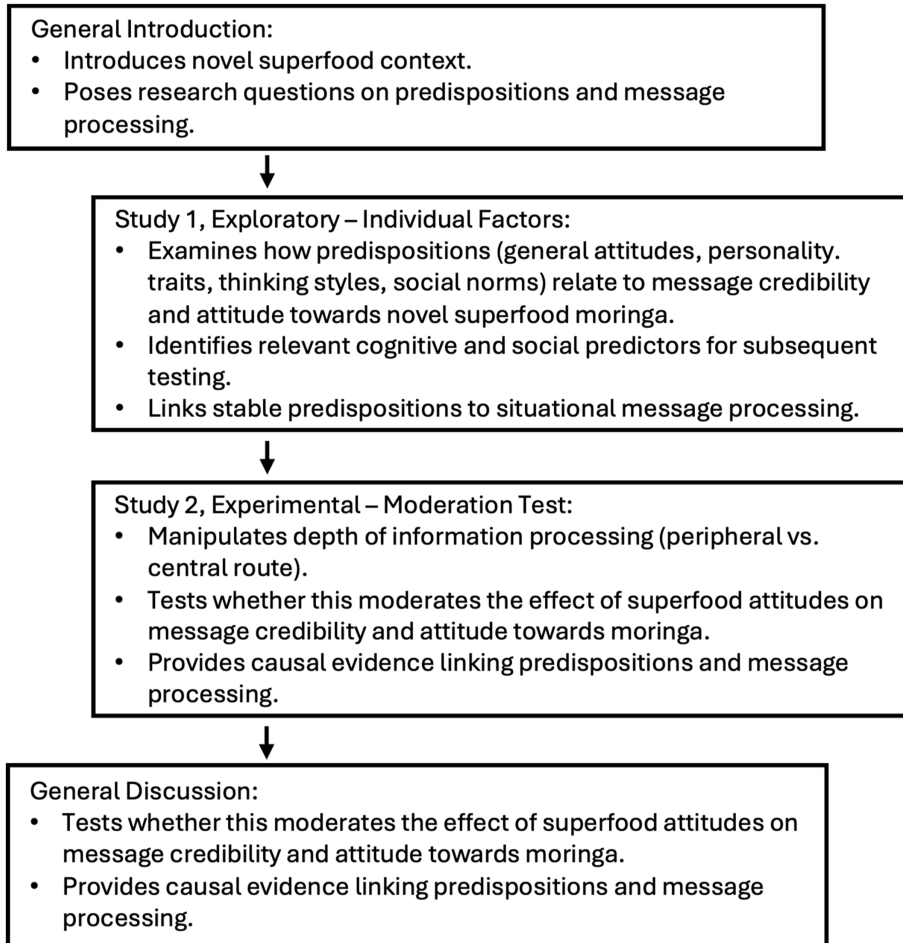


FIGURE 1
Chart representing structure of article and studies.

for health and wellness (MacGregor et al., 2021; Roth and Zawadzki, 2018). Despite the lack of substantial scientific evidence for many of these claims (Fernández-Ríos et al., 2022; van den Driessche et al., 2018), superfood marketing has proven effective (Chopra et al., 2022). Marketing strategies frequently highlight the exotic origins of superfoods, using narratives of remote, pristine environments to enhance their appeal (Cobos and Díaz, 2023). This approach has boosted consumer demand and sales significantly (Shahbandeh, 2022), as exemplified by blueberries, of which sales doubled following their promotion as a superfood (Weitkamp and Eidsvaag, 2014).

The limited research investigating the popularity of superfoods suggests that people who are most likely to have a positive attitude toward superfoods share several key characteristics across demographic, psychological, and lifestyle dimensions. Demographically, women—particularly those who are middle-aged and have higher levels of education and income—are consistently more favorable toward superfoods (Franco Lucas et al., 2021). Younger adults are also strong supporters, often influenced by wellness trends and social media (Franco Lucas et al., 2023). Psychologically, health consciousness is a major driver. Individuals who actively seek to improve their health, prevent illness, and maintain a balanced diet are more inclined to embrace superfoods. These consumers value nutritional benefits, natural ingredients, and

often see superfoods as part of a preventive health strategy (Franco Lucas et al., 2021, 2023). Lifestyle values also play an important role. People who are environmentally and ethically motivated, those who care about sustainability, organic farming, and fair-trade practices, tend to view superfoods more positively, especially when such products align with their values (Oude Groeniger et al., 2017). In addition, those with an openness to innovation and new food experiences, such as trend-followers or consumers who enjoy trying novel food products, are also more receptive to superfoods (Annunziata and Vecchio, 2013).

Given that superfood consumption reflects broader patterns of health-conscious and value-driven dietary behavior, it is reasonable to assume that a generally positive superfoods attitude also shapes how consumers perceive newly introduced ones. We suggest a carryover effect, where existing positive attitudes create a perceptual lens through which novel superfoods are evaluated. Consequently, individuals with a favorable overall view of superfoods are expected to respond positively to new superfood offerings, even without prior knowledge or experience. Based on this reasoning, we propose our first hypothesis: *A general superfoods attitude is positively correlated with (1a) the perceived credibility of messages about a newly introduced superfood and (1b) the attitude toward the specific superfood being promoted.*

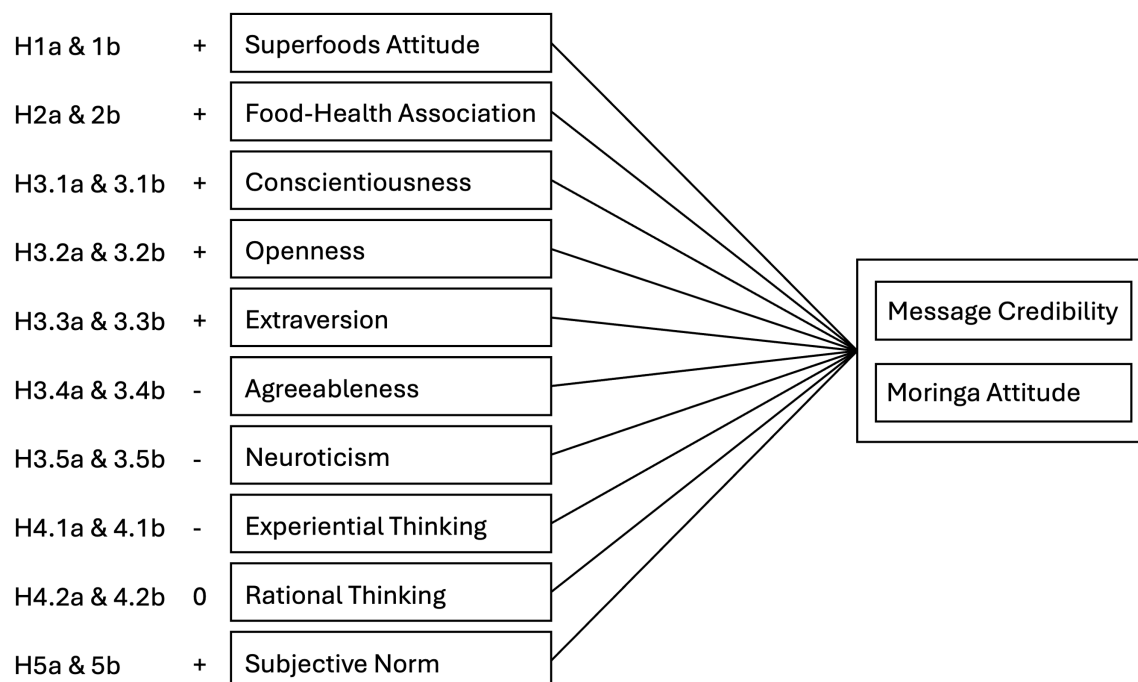


FIGURE 2

Conceptual model of Study 1 mapping variables and relation valences with hypotheses labels.

2.2 Superfoods and the food-health association

Labelling foods as *super* may elevate consumer expectations, potentially leading to strong associations between food and health. The choice to consume these foods may stem from a desire for a healthy lifestyle (Dean et al., 2012; Schifferstein and Ophuis, 1998; Franco Lucas et al., 2023; Kirsch et al., 2022; Fernández-Ríos et al., 2022), even in the absence of scientific evidence supporting their role in maintaining a healthy lifestyle or balanced diet (Benson et al., 2018; Hassoun et al., 2024; Lähteenmäki, 2013; van den Driessche et al., 2018).

Research demonstrates substantial individual variation in how people perceive the relationship between food and health, and these perceptions strongly influence dietary choices. European surveys reveal that many consumers define a healthy diet in line with official guidelines, emphasizing balance, variety, and high intake of fruits and vegetables while limiting fat, salt, and sugar (Lappalainen et al., 1998; Paquette, 2005). However, individuals often interpret dietary advice through the lens of their own health beliefs, selectively adopting practices such as consuming more fresh or natural products or following popular diet trends (Silva et al., 2023). As a result, dietary behavior is shaped not only by professional recommendations but also by personal perceptions of food–health associations, which are in turn influenced by knowledge, motivation, and socio-environmental factors (De Ridder et al., 2017). These differences matter: research shows that the extent to which people perceive nutrition as directly related to health is a key predictor of adherence to dietary advice (Kaur et al., 2017; Lindeman et al., 2000; Schifferstein and Ophuis, 1998).

Building on research showing that perceived health benefits are associated with the consumption of functional foods in general (Siegrist et al., 2015; Verbeke, 2005) and superfoods in particular (Franco Lucas et al., 2021), we formulated our second hypothesis: *The perceived link between food and health is positively associated with (2a) the credibility of messages about a newly introduced superfood and (2b) attitudes toward the promoted superfood.*

2.3 Superfoods and the *big five* personality traits

The *Big Five* personality traits, formally known as the Five Factor Model (FFM), conceptualizes personality traits as stable patterns of thoughts, feelings, and behaviors that differentiate individuals. The FFM describes personality across five domains: Conscientiousness, Openness to experience, Extraversion, Neuroticism, and Agreeableness (Costa and McCrae, 1992). Existing research suggests that FFM personality traits are linked to specific dietary habits (Esposito et al., 2021; Lunn et al., 2014; Stevenson, 2017).

The meta-analysis by Allen et al. (2024) provides a comprehensive synthesis of the associations between the *Big Five* personality traits and components of healthy dietary behavior. The findings indicate that personality traits are meaningfully and systematically related to individuals' dietary choices, with some traits demonstrating stronger predictive value than others.

Conscientiousness emerged as the most robust and consistent predictor of healthy eating. Individuals high in conscientiousness were more likely to adhere to health-promoting dietary patterns. This association is attributed to the trait's underlying characteristics such

as self-discipline, goal orientation, and rule adherence, which facilitate structured and regulated eating behaviors.

Openness to experience was positively associated with dietary variety and the intake of plant-based foods. High openness was linked to a greater willingness to experiment with novel foods and adopt diverse dietary patterns, including vegetarian and vegan diets. This trait appears to promote exploratory food behavior and responsiveness to health-related dietary innovations.

Extraversion showed a modest positive relationship with healthy food consumption. This relationship may be explained by several characteristics commonly associated with extraversion. Extraverted individuals are typically more social, energetic, and motivated by rewards, which can influence their lifestyle choices, including diet. Furthermore, their active social lives may expose them to a wider variety of foods and health-related norms, potentially encouraging experimenting with health-related dietary choices.

Agreeableness demonstrated relatively weak and inconsistent associations with healthy dietary patterns. In some cases, higher agreeableness correlated with more ethical or prosocial food choices, such as sustainable or plant-based diets, though overall effects were limited.

Neuroticism was consistently linked to poorer dietary outcomes. Individuals scoring high in neuroticism were more likely to engage in emotional or stress-related eating and reported lower intake of health-promoting foods such as fruits and vegetables. These findings suggest that difficulties in emotional regulation may contribute to maladaptive eating patterns in neurotic individuals.

Together, these results underscore the relevance of personality traits in shaping dietary behavior. In the present study, we were not examining healthy food choices in general, but rather focused specifically on individuals' attitudes and intended behavior toward consuming a new and unfamiliar superfood. However, we expected similar patterns to emerge as in studies on healthy eating, with potentially even stronger associations for the personality trait of openness. This is because openness is characterized by intellectual curiosity and a greater interest in novel experiences, including the willingness to try new things (Costa and McCrae, 1992), which may make individuals high in openness particularly receptive to trying an unknown superfood. This leads to our third set of hypotheses: *Conscientiousness* (3.1), *Openness* (3.2), and *Extraversion* (3.3) are positively, and *Agreeableness* (3.4) and *Neuroticism* (3.5) negatively, associated with (a) the perceived credibility of messages about a newly introduced superfood and (b) attitudes toward the promoted superfood.

2.4 Superfoods and thinking styles

Cognitive-Experiential Self-Theory (CEST; Epstein, 1998, 2014) is a dual-process model of thinking styles. It proposes that people process information through two parallel systems: the intuitive-experiential system, which is fast, automatic, and affect-driven, and the analytic-rational system, which is deliberate, systematic, effortful, and affect-neutral. A central feature of CEST is that, although one system may dominate depending on the context, both operate simultaneously and jointly shape behavior. The rational system supports careful analysis and long-term planning, while the experiential system provides quick, emotionally informed responses

shaped by prior experience (Epstein, 1998, 2014; Idrogo and Yelderman, 2019).

Although reliance on one system may shift with context, there are also stable individual differences in preferred processing styles. Research confirms that rational and experiential styles are independent constructs rather than opposite ends of a continuum (Epstein et al., 1996; Pacini and Epstein, 1999). Factor analyses of the Rational-Experiential Inventory (REI; Pacini and Epstein, 1999), the most widely used measure, consistently show that the two dimensions load on separate factors and are only weakly correlated. In other words, a high experiential score does not imply a low rational score, and vice versa (Epstein et al., 1996; Pacini and Epstein, 1999). In food-related contexts, these tendencies have also been captured with the Preference for Intuition and Deliberation in Eating Decision-Making scale (E-PID), which distinguishes intuitive (experiential, internal-cue driven) from deliberative (rational, cognitive-regulatory) eating decisions. Evidence suggests that both styles are distinct and can be adaptive (König et al., 2021).

Thinking styles may play a key role in dietary choices and in the adoption of novel food products. The way consumers process information influences how they evaluate foods and make subsequent decisions. Individuals high in rational processing tend to scrutinize food-related claims more carefully than those who rely on intuitive processing (Cacioppo et al., 1983). Although no studies have directly examined thinking styles and superfood appreciation, related evidence shows that processing style shapes attention to informative food labels and reliance on heuristic cues. Eye-tracking and discrete-choice experiments with yogurt packaging, for example, reveal that analytic-rational thinkers (with higher cognitive reflection) devote more attention to nutritional information, whereas intuitive-experiential thinkers are guided more by imagery and simple heuristics (Ares et al., 2014; Kim et al., 2020). Similar dual-process perspectives have been applied to complementary and alternative medicine (Aarnio and Lindeman, 2004), *magical food* and health beliefs (Lindeman et al., 2000), and organic food appeal (Lindeman and Anttila, 2018), consistently suggesting that experiential processing aligns with positive evaluations of *natural* or *holistic* claims.

The popularity of superfoods often persists despite limited scientific evidence for their health benefits (Benson et al., 2018). Their appeal is frequently tied to exotic or ancient origins and to broader aspirations for a healthier lifestyle, and can generate a *health halo*, or the impression that a product is healthy even when its nutritional advantages are uncertain (Dean et al., 2012; Schifferstein and Ophuis, 1998; Liu et al., 2021; Richetin et al., 2022). Third party organic and eco-labels can further amplify these halos, inflating perceived healthiness through associative/experiential processing (Lanero et al., 2021; Richetin et al., 2022). Although no research has directly examined experiential thinking and superfood attitudes, evidence from organic food studies suggests that individuals high in intuitive-experiential thinking are particularly likely to evaluate superfoods positively (Lindeman and Anttila, 2018). While natural products are generally viewed favorably, intuitive thinkers are especially influenced by emotional impressions and what “feels right” (Lindeman and Anttila, 2018, p. 67). From a CEST perspective, experiential cues such as exoticism, naturalness, trendiness, or influencer narratives may act as associative signals that the experiential system encodes quickly, leading to more favorable superfood attitudes among experiential processors.

The link between analytic-rational thinking and superfood attitudes might be less straightforward. Individuals high in rational processing should generally prefer diagnostic evidence (Epstein et al., 1996; Pacini and Epstein, 1999; Liu et al., 2021). This style is closely related to Need for Cognition (NFC), a trait reflecting enjoyment of effortful, analytical thinking (Epstein et al., 1996). However, findings by Lindeman and Anttila (2018) indicate weak and inconsistent associations between NFC and attitudes toward organic foods, suggesting similar patterns for superfoods. Rational thinkers may approach health claims with greater skepticism, demanding stronger evidence before forming positive evaluations. Nevertheless, the overall influence of analytic-rational style on superfood appreciation is likely to be minimal.

Because superfood appeal often relies on associative and affect-laden cues, sometimes co-occurring with cues that might trigger health halos, experiential thinking is expected to play a stronger role in shaping favorable attitudes and credibility judgments. Although no studies have directly tested this relationship, converging evidence from research on organic labeling effects, superfood segmentation, the E-PID scale, and eye-tracking/choice studies supports this expectation (Ares et al., 2014; König et al., 2021; Franco Lucas et al., 2021, 2023; Richetin et al., 2022). In contrast, the analytic-rational style, closely linked to Need for Cognition, is expected to foster greater scrutiny of health claims, with weaker and potentially inconsistent associations with superfood favorability (Lindeman and Anttila, 2018; Kim et al., 2020).

Based on these insights, we propose the fourth set of hypotheses: *An experiential thinking style is positively associated with (4.1.a) the perceived credibility of messages about a newly introduced superfood and (4.1.b) attitudes toward the promoted superfood.* Furthermore, *a rational thinking style is not expected to be associated with these perceptions (4.2a/b).*

2.5 Superfoods and subjective social norms

In line with the Theory of Planned Behavior (Ajzen, 1991), individual's behavioral intentions are not only influenced by personal attitudes and behavioral control but also by subjective norms (Manning, 2009). The subjective norm deals with an individual's expectations of what is desirable behavior according to important others within the individual's social environment. Subjective social norms play a crucial role in shaping dietary choices (Higgs, 2015), and potentially in attitudes toward the consumption of superfoods as well. The influence of social norms on food choices is well-documented, with studies indicating that individuals tend to model their eating behaviors after those of their peers (Gleaves et al., 2024). This effect might be particularly relevant in the context of superfoods, which often gain popularity through social influence, either by known peers (Stok et al., 2016) or by exposure to peer-generated online content showcasing trendy, health-oriented food choices (Qutteina et al., 2019). Our fifth hypotheses is: *The subjective norm about superfoods is positively associated with (5a) the perceived credibility of messages about a newly introduced superfood and (5b) attitudes toward the promoted superfood.*

TABLE 1 Sample description study 1.

Description of sample	#
Total number of respondents	350
Final sample ¹	322
Average age: M(SD)	34.80 (11.73)
Gender	
Male	93 (29%)
Female	225 (70%)
Other	3 (1%)
Educational level	
Higher education	189 (59%)
Mid-level education	73 (23%)
Lower education	60 (19%)

¹Respondents who reported prior familiarity with moringa ($n = 28$) were excluded from the sample.

TABLE 2 Summary table of the variables used in study 1.

Variable	# items	Cronbach's α	M(SD)
Superfoods attitude	8	0.85	2.92 (0.68)
Food-health association	7	0.86	3.37 (0.72)
Big five personality traits			
Extraversion	8	0.86	2.93 (0.74)
Agreeableness	9	0.77	3.64 (0.58)
Conscientiousness	9	0.81	3.51 (0.59)
Neuroticism	8	0.87	3.23 (0.79)
Openness	10	0.79	3.41 (0.56)
Thinking styles			
Rational component	20	0.90	3.47 (0.54)
Experiential component	20	0.89	3.40 (0.48)
Subjective norm	4	0.80	2.54 (0.73)
Message credibility	3	0.84	3.51 (0.75)
Moringa attitude	8	0.75	3.06 (0.46)

2.6 Materials and methods

2.6.1 Respondents and procedure

Data were collected via an online survey for which respondents were recruited through www.prolific.ac. The survey targeted UK residents aged 18 and older. Respondents were compensated \$2.50 upon survey completion. A total of 350 individuals participated. Since our focus was on predictors of interest in a superfood that was new to potential consumers (moringa), we excluded respondents who reported prior familiarity with it ($n = 28$), yielding a final sample of $N = 322$ (see Table 1). The sample had an average age of 34.80 years ($SD = 11.73$) and was composed of 29% male, 70% female, and 1% identifying as other or not specifying gender. 59% of respondents received higher education or equivalent qualifications, 23% had

mid-level qualifications like A Levels or vocational Level 3, and 19% had lower-level or no formal qualifications.

After a brief introduction outlining the study's purpose, respondents were informed that their data would be used exclusively for scientific research, reminded that participation was voluntary and could be discontinued at any time, and notified of the \$2.50 compensation before providing informed consent. Respondents then completed sections on their attitudes toward superfoods, perceived links between nutrition and health, the *Big Five* Inventory, thinking styles, and subjective norms regarding superfood consumption. Following this section, respondents read a brief article introducing moringa as a new superfood, what it is and how it can be used. Moringa was selected because it was relatively new, minimizing the likelihood of prior familiarity among respondents. Additionally, its health claims appeared non-harmful and non-misleading, ensuring participant safety. The original text was downloaded from www.healthline.com, with hyperlinks removed for clarity. The third section assessed message credibility, attitudes toward moringa, and intended use, followed by demographic questions. The survey concluded with a brief debriefing and researcher contact information.

2.6.2 Operationalization

Unless stated otherwise, all variables were measured on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. See [Table 2](#) for overview.

2.6.2.1 Superfoods attitude

We adapted the reward-related component of the scale measuring attitudes toward functional foods, as developed by [Urala and Lähteenmäki \(2007\)](#) by substituting *functional foods* with *superfoods*. Example items include “My performance improves when I eat superfoods” and “I am prepared to compromise on the taste of food if the product is functional” (8 items, Cronbach's $\alpha = 0.85$, $M = 2.92$, $SD = 0.68$).

2.6.2.2 Food-health association

The Food-Health Association scale, a subset of the Health Consciousness Scale ([Schifferstein and Ophuis, 1998](#)), was used to

measure the extent to which individuals associate food with health. This scale reflects an individual's awareness of healthy eating in relation to dietary choices. Example items include “My health is influenced by nutrition” and “Health aspects are very important for my food choices” (7 items, Cronbach's $\alpha = 0.86$, $M = 3.37$, $SD = 0.72$).

2.6.2.3 Big five personality traits

The *Big Five* Inventory ([John and Srivastava, 1999](#)) assessed personality traits using 44 items. This resulted in subscales for Extraversion (8 items, Cronbach's $\alpha = 0.86$, $M = 2.93$, $SD = 0.74$), Agreeableness (9 items, Cronbach's $\alpha = 0.77$, $M = 3.64$, $SD = 0.58$), Conscientiousness (9 items, Cronbach's $\alpha = 0.81$, $M = 3.51$, $SD = 0.59$), Neuroticism (8 items, Cronbach's $\alpha = 0.87$, $M = 3.23$, $SD = 0.79$), and Openness (10 items, Cronbach's $\alpha = 0.79$, $M = 3.41$, $SD = 0.56$).

2.6.2.4 Rational and experiential thinking styles

[Pacini and Epstein \(1999\)](#) rational-experiential inventory (REI) measured individual differences in rational and experiential information processing. Example items for the rational component include “I enjoy thinking in abstract terms” and “I usually have clear, explainable reasons for my decisions” (20 items, Cronbach's $\alpha = 0.90$, $M = 3.47$, $SD = 0.54$). Example items for the experiential component include “Using my ‘gut feelings’ usually works well for me in figuring out problems in my life” and “If I were to rely on my gut feelings, I would often make mistakes” (recoded) (20 items, Cronbach's $\alpha = 0.89$, $M = 3.40$, $SD = 0.48$).

2.6.2.5 Subjective norm

Subjective norm regarding superfood consumption was assessed using the scale validated by [Armitage and Conner \(1999\)](#). Statements were slightly modified by replacing “people who are important to me” with “my friends,” resulting in items such as “My friends think I should eat superfoods” and “I feel pressure from my friends to eat superfoods” (4 items, Cronbach's $\alpha = 0.80$, $M = 2.54$, $SD = 0.73$).

TABLE 3 Pearson two-tailed correlation matrix for key study 1 variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Message credibility	–											
2. Moringa attitude	0.61***	–										
3. Superfoods attitude	0.23**	0.22**	–									
4. Food-health association	–0.04	–0.08	0.36***	–								
5. Conscientiousness	0.08	0.14*	0.03	0.13*	–							
6. Openness	–0.05	–0.11*	0.09	0.10	–0.02	–						
7. Extraversion	0.05	0.10	0.13*	0.07	0.21**	0.17**	–					
8. Agreeableness	0.10	0.17**	0.01	–0.04	0.36***	0.13*	0.16**	–				
9. Neuroticism	0.00	–0.04	–0.05	–0.11	–0.39***	–0.04	–0.37***	–0.27***	–			
10. Experientiality	0.16**	0.14*	0.02	–0.06	0.16**	0.16**	0.20**	0.16**	0.01	–		
11. Rationality	0.01	–0.08	0.00	0.17**	0.28***	0.37***	0.17**	0.17**	–0.34***	–0.04	–	
12. Subjective norm	0.20**	0.12*	0.37***	0.20**	–0.01	0.11	0.07	–0.04	–0.01	0.12	0.10	–

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 4 Multiple regression analyses predicting message credibility and moringa attitude.

Predictors	Dependent variables	
	Message credibility	Moringa attitude
(Intercept)	1.69**	2.26***
	(0.61)	(0.37)
Superfoods attitude	0.26***	0.17***
	(0.07)	(0.04)
Food-health association	−0.14*	−0.10**
	(0.06)	(0.04)
Conscientiousness	0.06	0.08
	(0.08)	(0.05)
Openness	−0.16*	−0.12*
	(0.08)	(0.05)
Extraversion	−0.00	0.03
	(0.06)	(0.04)
Agreeableness	0.10	0.12*
	(0.08)	(0.05)
Neuroticism	0.05	0.01
	(0.06)	(0.04)
Experientiality	0.21*	0.08
	(0.09)	(0.05)
Rationality	0.08	−0.05
	(0.09)	(0.05)
Subjective norm	0.14*	0.05
	(0.06)	(0.04)
R ²	0.126	0.152
RMSE	0.70	0.42

Unstandardized regression coefficients are reported. Standard errors are shown in parentheses. $N = 316$. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2.6.2.6 Message credibility

Message credibility was assessed using the scale developed by Appelman and Sundar (2016). Participants rated how well three adjectives described the content about moringa they had just read on a 5-point scale from “describes very poorly” to “describes very well” (3 items: accurate, authentic, and believable; Cronbach's $\alpha = 0.84$, $M = 3.51$, $SD = 0.75$).

2.6.2.7 Moringa attitude

Moringa attitude was assessed similarly to superfoods attitude, substituting “superfoods” with “moringa” (8 items, Cronbach's $\alpha = 0.75$, $M = 3.06$, $SD = 0.46$).

2.7 Results

Based on the correlational analysis as displayed in Table 3, we found support for H1a/b in that the general superfoods attitude

was positively related to the perceived credibility of the message about moringa ($r = 0.23^{**}$) and the moringa attitude ($r = 0.22^{**}$). H2 was not supported as we found no relation between people's food-health association and message credibility (H2a) nor their moringa attitude (H2b). When looking at the relations with the *Big Five* personality characteristics, we found a small positive relation between conscientiousness ($r = 0.14^*$) and agreeableness ($r = 0.17^{**}$) with the moringa attitude, supporting H3.1b and H3.4b. All other hypotheses were not supported. For openness, we even found a small but significant negative relation with moringa attitude ($r = -0.11^*$). As predicted by H4.1.a/b, we found a positive association between experiential thinking and message credibility ($r = 0.16^{**}$) and the moringa attitude ($r = 0.14^*$). H4.2a/b related to a rational thinking style were confirmed as no significant associations were found. Finally, the subjective norm about superfood was positively associated with message credibility ($r = 0.20^{**}$) and the moringa attitude ($r = 0.12^*$), supporting H5a/b.

Two multiple regression analyses were conducted to examine which variables predicted perceived message credibility and moringa attitude (Table 4). For perceived message credibility the overall model was statistically significant, $F(10, 305) = 4.38$, $p < 0.001$, explaining approximately 12.6% of the variance in message credibility ($R^2 = 0.126$, adjusted $R^2 = 0.097$). Among the predictors, *superfoods attitude* was positively associated with message credibility, $\beta = 0.26$, $p < 0.001$, suggesting that individuals with a more favorable superfoods attitude perceived the message as more credible, providing further support for H1a. *Experientiality* was also a significant positive predictor, $\beta = 0.21$, $p < 0.05$ (supporting H4.1.a), as was *subjective norm*, $\beta = 0.14$, $p < 0.05$ (H5a), indicating that social approval plays a role in perceived credibility. Conversely, *food-health association* was negatively associated with message credibility, $\beta = -0.14$, $p < 0.05$, which was contrary to what was hypothesized in H2a. *Openness* showed a marginal negative effect, $\beta = -0.16$, $p < 0.10$, again contrary to what was hypothesized in H4.2.a. All other predictors were not statistically significant.

The model to identify predictors of participants' moringa attitude was also statistically significant, $F(10, 305) = 5.45$, $p < 0.001$, accounting for 15.2% of the variance in attitude ($R^2 = 0.152$, adjusted $R^2 = 0.124$). The results indicated that *superfoods attitude* was a strong positive predictor of moringa attitude, $\beta = 0.17$, $p < 0.001$, supporting H1b. In addition, *food-health association* was negatively associated with moringa attitude, $\beta = -0.10$, $p < 0.01$, suggesting that stronger beliefs about the link between food and health were related to a less favorable attitude, again contrary to what was hypothesized in H2b. *Openness* was negatively associated with attitude, $\beta = -0.12$, $p < 0.05$ (contrary to H3.2.b), while *agreeableness* showed a significant positive effect, $\beta = 0.12$, $p < 0.05$, in line with H3.4.b. Other predictors, including experientiality, conscientiousness, and subjective norm, did not reach statistical significance in this model.

2.8 Discussion study 1

The results of our correlation and regression analyses provided mixed support for our hypotheses. In both analyses, convincing support was found for the assumption that positive attitudes toward superfoods in general would result in positive responses to the unknown superfood, moringa: individuals with positive attitudes

toward superfoods demonstrated greater perceived credibility of the message about moringa and a more favorable attitude toward the product. This finding is consistent with previous research suggesting that superfood consumption is often shaped by pre-existing attitudes toward functional foods (Urala and Lähteenmäki, 2007; Franco Lucas et al., 2021). The positive association between general superfood attitudes and perceptions of moringa highlights the role of subjective interpretations in shaping consumer responses (Chaiken and Ledgerwood, 2012).

Surprisingly, the food-health association was not positively related to attitudes toward moringa. On the contrary, regression analyses revealed small but significant negative relationships between food-health association and message credibility as well as moringa attitude. This finding diverges from earlier work suggesting that individuals who strongly associate food with health are more likely to adopt novel dietary products (Chen, 2011; Schifferstein and Ophuis, 1998) and the influence of perceived health benefits on functional food acceptance (Siegrist et al., 2015; Verbeke, 2005; Franco Lucas et al., 2021). One possible interpretation is that individuals who more rigidly link food with health may be more critical or skeptical of newly introduced foods such as moringa, especially when health claims are not yet substantiated by robust empirical evidence. This nuance could reflect a more discerning orientation toward new food trends among those who are most attuned to nutrition-health links.

Personality traits were only very limitedly related to message credibility and moringa attitude. Conscientiousness (only in the correlation analysis, and only for perceived message credibility) and agreeableness were weakly associated with more favorable perceptions, in line with our expectations. For the other variables, no significant associations were found in the proposed direction. Interestingly, we found a consistent negative relation between openness and the moringa attitude. This result stands in contrast to prior literature, which has consistently linked openness to curiosity, a preference for novelty, and a greater willingness to explore unfamiliar and exotic foods (Brummett et al., 2008; Möttus et al., 2012; Allen et al., 2024). A possible explanation may be that individuals high in openness, while typically curious, may also be more critical of simplified narratives around health, or more demanding of evidence before forming positive attitudes. Individuals high in openness may be more skeptical of health-related claims of which knowledge of strong empirical support is missing, a tendency observed in prior literature on health skepticism (Esposito et al., 2021). At least our findings suggest that openness does not universally translate into acceptance of novelty, particularly in health-related contexts. The lack of significant relationships between extraversion and attitudes toward moringa also suggests that willingness to try new foods may not always be related to seeking new experiences.

The role of thinking style was also affirmed in this study. Individuals with an intuitive-experiential thinking style were perceived the moringa message more credible and had a more positive moringa attitude. Even though this was a small effect, and with regard to the attitude only found in the correlational analysis, this finding supports the hypothesis that intuitive processing is associated with positive evaluations of superfoods, echoing earlier findings from research on alternative medicine and magical health beliefs (Aarnio and Lindeman, 2004; Epstein, 2014). Rational thinking, by contrast, did not predict any of the outcome variables, reinforcing the idea that

affective and intuitive responses play a stronger role in shaping consumer interest in superfoods than do analytic deliberations.

Finally, subjective norms proved influential. Individuals who perceived stronger social encouragement around superfood consumption found the moringa message more credible and had a more positive attitude toward it. These findings are in line with social psychological models of food choice, and with previous research illustrating the importance of peer influence in dietary behavior (Gleaves et al., 2024; Higgs, 2015; Qutteina et al., 2019; Stok et al., 2016). Together, these results underscore the importance of both individual and social-level variables in shaping attitudes toward novel food products.

Study 1 has several limitations. First, its cross-sectional, correlational design limits the ability to draw causal inferences about the relations between psychological factors and attitudes toward moringa. While associations were observed, it is unclear whether, for example, a positive superfoods attitude leads to higher credibility perceptions, or vice versa. Also, conclusions about potential mediation between the characteristics of the individual, perceived message credibility and moringa attitude cannot be drawn. Second, although a wide range of predictors was included, some theoretically relevant variables, such as health status, diet diversity, trust in health industry, were not measured, which may have influenced results. Third, personality effects were generally weak or inconsistent, and the unexpected negative association between openness and moringa attitudes raises questions about the robustness and interpretation of these findings. Fourth, all data were based on self-report measures, which are vulnerable to social desirability and may not reflect actual consumption behavior.

Building on these findings, Study 1 showed that positive attitudes toward superfoods and intuitive-experiential thinking were key predictors of favorable responses to the message, in terms of message credibility and attitude towards moringa. However, due to its design, the study could not establish causal relationships or clarify how these two factors interact in shaping these evaluations. To address these limitations and uncover the underlying mechanisms, Study 2 employed an experimental design that manipulated the type of message processing (central versus peripheral) to test whether the relationship between general superfood attitudes and message evaluations depends on the depth of cognitive engagement. This approach enabled us to determine whether reliance on prior attitudes and intuition reflects stable cognitive styles or also situational variations in processing depth, thereby extending the correlational insights from Study 1 into a more causal and process-oriented framework.

3 Study 2

In an experimental study, that built on Study 1, we further explored how information processing influenced the evaluation of a new product—specifically, the superfood moringa. While Study 1 focused on thinking styles as a (more or less stable) personality trait, showing that experiential thinking predicted greater appreciation of moringa, the current study adopted a situational perspective. According to Cognitive-Experiential Self-Theory (CEST; Epstein, 2014), individuals process information through two parallel systems: the intuitive-experiential system, which is fast and affect-driven, and the analytic-rational system, which is slow, deliberate, and

systematic. Importantly, according to CEST, thinking styles vary from person to person, but a reliance on either system depends on contextual factors. Study 2 applied the Elaboration Likelihood Model (ELM, Petty and Cacioppo, 1986), one of the most well-known dual-process theories, widely used framework for understanding what the consequences are of differences in processing information.

CEST and ELM share the same point of departure, in that both propose that humans process information through two distinct systems: one that is more intuitive and emotionally driven, and another that is more deliberate and analytical. But whereas CEST is a broad theory of personality and information processing styles that explains how these two systems influence everyday thinking, decision-making and behavior, ELM is more directed toward persuasion, specifically explaining how people are influenced by messages either through deep, thoughtful evaluation (central route) or more superficial cues (peripheral route).

When individuals process information via the peripheral route, due to low ability, motivation, or time constraints, they are less likely to engage in careful evaluation of message content. Instead, they rely on heuristic cues or pre-existing associations to form attitudes. In such cases, existing attitudes toward a broader product category (e.g., superfoods) can serve as a mental shortcut to base decisions on. These general attitudes may spill over and shape evaluations of a specific product within that category (e.g., moringa). Because individuals do not systematically analyze the unique attributes of the product, they are more likely to transfer their general category attitude to the specific product in question (Maheswaran et al., 1992). For instance, people believing that superfoods are essential for a healthy diet, may automatically assume that a particular superfood like moringa is beneficial, without critically evaluating its specific properties. Conversely, if their general attitude toward superfoods is less favorable, this skepticism may similarly extend to moringa. This reliance on prior attitudes allows individuals to make quick judgments in the absence of detailed scrutiny, a typical characteristic of peripheral route processing (Petty and Cacioppo, 1986). Moreover, peripheral processing can also influence perceived message credibility: when consumers do not actively evaluate a promotional message, their acceptance of product claims may be guided by these existing category-level attitudes rather than the content itself.

In contrast, when consumers engage in central processing, they critically analyze the message and product attributes, reducing the direct influence of their prior category attitudes on specific product evaluations. Instead, category-level beliefs act as a background framework against which specific product attributes are evaluated (Petty et al., 1997). For example, if a consumer perceives superfoods as beneficial, but the specifics of moringa are not appealing, they may revise their product-specific attitude based on this detailed evaluation. When central processing is engaged, consumers also evaluate the credibility of messages more systematically. This scrutiny reduces the extent to which a general category attitude serves as a heuristic for evaluating the quality of arguments and the credibility of the text.

In conclusion, and consistent with findings from Study 1, we expected that a *positive attitude toward superfoods is positively associated with both the perceived credibility of a moringa-related message (H1a) and the specific attitude toward moringa (H1b)*. Building on this, we tested the assumption that the depth of information

processing moderates this relationship. Specifically, we hypothesized that *compared to when engaging in effortful and systematic processing (i.e., the central route), when individuals engage in more superficial or rapid processing (i.e., the peripheral route), their general attitudes toward superfoods more strongly predict both their perceived credibility of the moringa-related message (H2a) and their attitude toward moringa (H2b)* (see Figure 3).

3.1 Materials and methods

3.1.1 Respondents and procedure

Data were collected among a convenience sample by means of inviting respondents through social media channels, including LinkedIn, Facebook, Instagram and WhatsApp, resulting in an initial sample size of 300. Thirty-two respondents indicated to be familiar with moringa, and were removed from our sample, resulting in a final sample of $N = 268$ (average age = 36.63 years, $SD = 16.75$; 31% male, 69% female; 93% attending of completed higher education or professional/vocational equivalents, 7% completed A levels or vocational level 3 or less, see Table 5).

After a brief introduction and the measurement of superfoods attitude¹, participants were presented with the same stimulus material as in Study 1. Depending on their experimental condition, participants were provided with different introductions to the same stimulus material. In the condition designed to encourage central processing of the message, participants received the following instruction: “*You are going to read a text about the superfood moringa. We ask that you read the text carefully. While reading, pay particular attention to the properties of the product moringa, such as the mentioned health effects, taste, ingredients, and so on. After reading the text, you will be asked questions related to its content.*” In the condition aimed at eliciting peripheral processing, participants received the following instruction: “*You are going to read a text about the superfood moringa. You do not need to read the text thoroughly; it is more about getting a general impression.*” After reading the text, participants completed the second part of the questionnaire, which measured (among others) message credibility and moringa attitude followed by demographic background

1 This study was part of a larger project and more variables were measured that hold no relation to the present study.

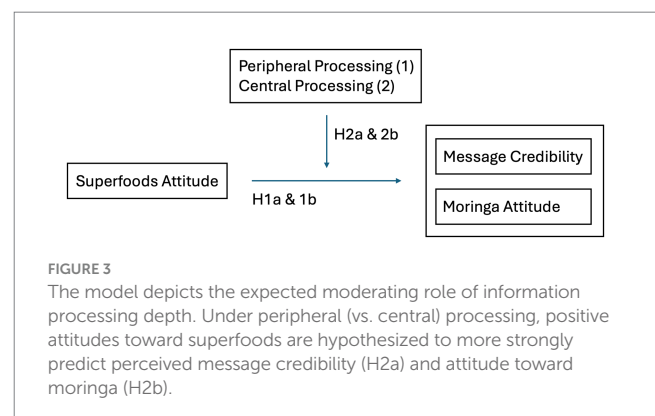


TABLE 5 Sample description study 2.

Description of sample	#
Total number of respondents	300
Final sample ¹	268
Average age: M(SD)	36.63 (16.75)
Gender	
Male	83 (31%)
Female	185 (69%)
Educational level	
Higher/professional education	189 (93%)
A-level / vocational level 3	60 (7%)

¹Respondents who reported prior familiarity with moringa ($n = 32$) were excluded from the sample.

TABLE 6 Summary table of the variables used in study 2.

Variable	# items	Cronbach's α	M(SD)
Superfoods Attitude ¹	8	0.83	2.62 (0.63)
Message Credibility ²	3	0.80	3.62 (1.10)
Moringa Attitude ²	6	0.88	4.26 (1.10)

¹5-point scale, ²7-point scale.

questions, prior familiarity with moringa, and measures to assess the successfulness of the manipulation.

3.1.2 Operationalization

See Table 6 for overview.

Superfoods attitude (Urala and Lähtenmäki, 2007, Cronbach's $\alpha = 0.83$, $M = 2.62$, $SD = 0.63$) and message credibility (Appelman and Sundar, 2016, Cronbach's $\alpha = 0.80$, $M = 3.62$, $SD = 1.10$) were measured similar to Study 1, but using a 7-point scale instead of a 5-point scale for message credibility.

3.1.2.1 Moringa attitude

Moringa attitude was measured with a bipolar scale based on the work of Miniard et al. (1990). Participants were asked to indicate how they rated the product moringa on a 7-point scale (ineffective / effective, unsafe / safe, negative / positive, uninteresting / interesting, useless / useful, unusable / usable). Scores on the six items were combined to form the variable measuring moringa attitude (Cronbach's $\alpha = 0.88$, $M = 4.26$, $SD = 1.10$).

3.2 Results

3.2.1 Manipulation check

To check whether our manipulation was successful, respondents were asked to select on a multiple-choice question what type of instruction they received. A chi-square test revealed that the processing manipulation was successful, $X^2(1, N = 268) = 103.26$, $p < 0.001$. When looking at how much time participants spent reading the text about moringa, results show that in the central processing condition, participants spent significantly more time (76 s) compared to the peripheral processing condition (52 s), $t(266) = 3.50$, $p < 0.001$. Finally, our self-report measure of the degree of central processing (6 items, 7-point scale, Cronbach's $\alpha = 0.88$, $M = 3.84$, $SD = 1.19$) also

TABLE 7 Pearson two-tailed correlation matrix for key study 2 variables.

Variable	1	2	3	4	5	6
1. Message credibility	–					
2. Moringa attitude	0.45***	–				
3. Superfoods attitude	0.25***	0.42***	–			
4. Condition	0.08	0.07	–0.00	–		
5. Self-report processing	0.15	0.20**	0.09	0.28***	–	
6. Reading time	0.04	0.10	–0.00	0.21**	0.21**	–

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

showed higher scores in the central ($M = 4.19$, $SD = 1.18$) compared to the peripheral ($M = 3.51$, $SD = 1.13$) condition, $t(266) = 4.82$, $p < 0.001$.

3.2.2 Test of hypotheses

We predicted that superfoods attitude in general would lead to increased perceived credibility of the message (H1a) and the moringa attitude (H1b). As can be seen in Table 7, superfoods attitude was significantly correlated to message credibility ($r = 0.25$, $p < 0.001$) and moringa attitude ($r = 0.42$, $p < 0.001$), supporting these hypotheses.

Hypotheses 2a and 2b predicted that this effect would be moderated by type of processing, in such a way that this relation was expected to be stronger when the message was processed peripherally compared to centrally. To test these assumptions, we conducted two linear regressions in which the condition was dummy coded as a factor, and simple slopes analyses were conducted using the interactions package in R. For message credibility, results showed a significant positive effect of the superfoods attitude on message credibility; $B = 0.53$, $SE = 0.12$, $t = 4.40$, $p < 0.001$, 95% CI [0.29, 0.76], again supporting Hypothesis 1a. Also, the effect of the manipulation of processing type had an effect with more message credibility in the central processing condition (coded as 2) compared to the peripheral condition (coded as 1), $B = 1.07$, $SE = 0.46$, $t = 2.32$, $p < 0.05$, 95% CI [0.16, 1.97]. The interaction between the attitude and processing style was also significant, $B = -0.35$, $SE = 0.17$, $t = -2.05$, $p < 0.05$, 95% CI [-0.69, -0.01]. As illustrated in Figure 4, the simple slope of superfoods attitude on message credibility was significant in the peripheral processing condition; $B = 0.53$, $SE = 0.12$, $t = 4.44$, $p < 0.001$, 95% CI [0.29, 0.76], but not in the central processing condition; $B = 0.18$, $SE = 0.12$, ns , 95% CI [-0.07, 0.42].

As for the hypothesis that superfoods attitude would be positively related to the moringa attitude, but that this effect would again be moderated by type of processing, the moderated regression analysis presented weaker support. Results showed a significant positive effect of the superfoods attitude on moringa attitude; $B = 0.91$, $SE = 0.13$, $t = 6.81$, $p < 0.001$, 95% CI [0.65, 1.17], supporting H1b, and a significant effect of the manipulation on the moringa attitude, $B = 1.12$, $SE = 0.52$, $t = 2.16$, $p < 0.05$, 95% CI [0.10, 2.15]. However, the interaction between the attitude and processing style only approached significance $B = -0.37$, $SE = 0.19$, $t = -1.92$, $p = 0.056$, 95% CI [-0.75, 0.01]. Both simple slopes were significant (see Figure 5), but the simple slope of superfoods attitude on moringa attitude was stronger in the peripheral processing condition; $B = 0.91$, $SE = 0.13$, $t = 6.81$, $p < 0.001$, 95% CI [0.65, 1.17], compared to the

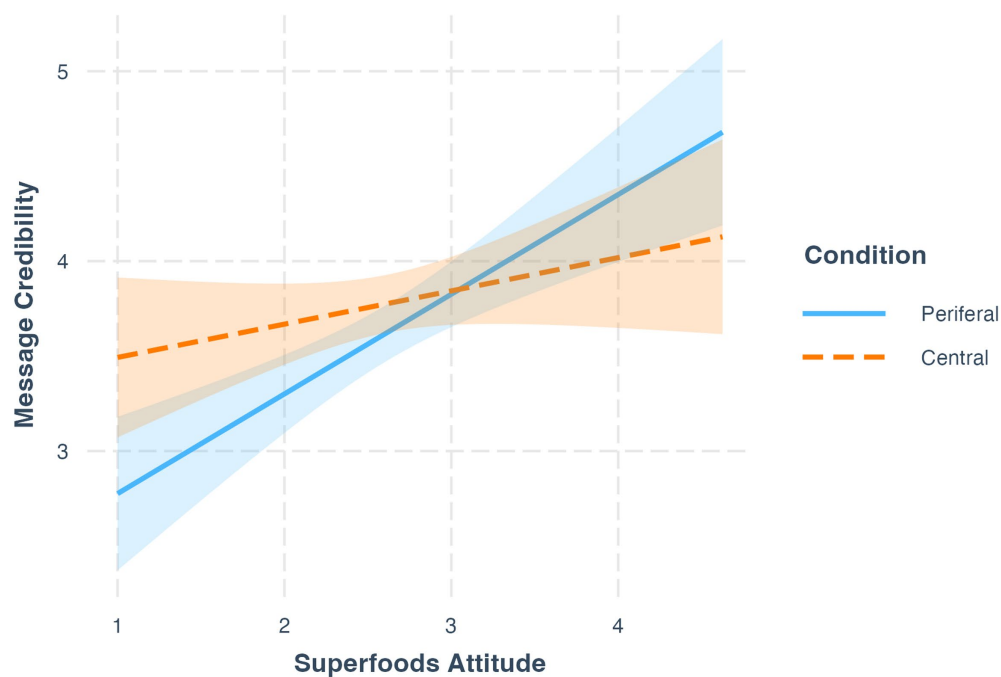


FIGURE 4

Message credibility plotted as a function of superfoods attitude, separately for participants in the peripheral and central conditions. Shaded areas represent 95% confidence intervals.

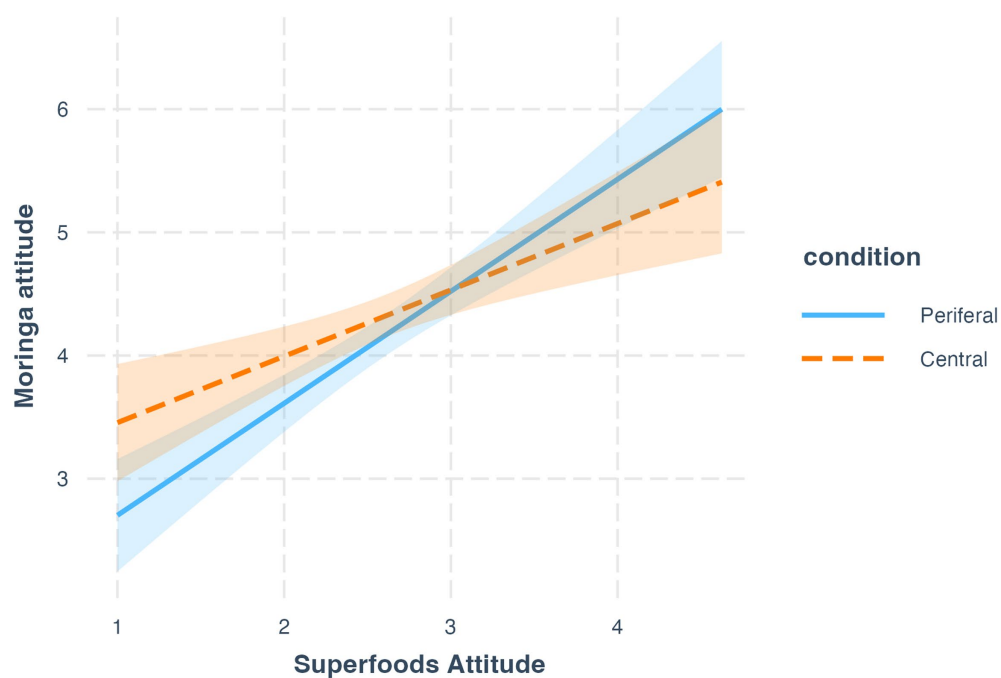


FIGURE 5

Moringa attitude plotted as a function of superfoods attitude, separately for participants in the peripheral and central conditions. Shaded areas represent 95% confidence intervals.

central processing condition; $B = 0.54$, $SE = 0.14$, $t = 3.86$, $p < 0.001$, 95% CI [0.64, 1.17], but again, with a p -level of 0.056, this difference cannot be considered significant.

See Table 8 for an overview of hypotheses and findings.

3.3 Discussion study 2

Study 2 examined how general attitudes toward superfoods influence message credibility and attitudes toward moringa, and whether these

TABLE 8 Summary hypotheses and outcomes study 2.

Hypotheses	Outcome
H1a: Attitude toward superfoods is positively associated with perceived credibility of message.	Confirmed
H1b: Attitude toward superfoods is positively associated with attitude toward moringa.	Confirmed
H2a: Processing type moderates the relation between attitude toward superfoods and perceived credibility of the message.	Confirmed: Central processing suppresses relation between superfoods attitude and message credibility.
H2b: Processing type moderates the relation between attitude toward superfoods and the attitude toward moringa.	Not confirmed

relationships are moderated by the type of message processing. Results confirmed that individuals with more positive attitudes toward superfoods in general perceived the message about moringa as more credible and held more favorable attitudes toward the product itself. These findings align with our findings of Study 1 and previous research indicating that pre-existing category attitudes can serve as heuristic cues in evaluating new products within that category (Maheswaran et al., 1992; Franco Lucas et al., 2023; Oude Groeniger et al., 2017).

Consistent with the Elaboration Likelihood Model (Petty and Cacioppo, 1986), the strength of the relationship between general attitudes and message evaluation varied by processing type. Specifically, the influence of general superfood attitudes on message credibility was significantly stronger in the peripheral processing condition, supporting the notion that heuristic-based judgments are more likely when cognitive effort is low (Petty et al., 1983). This effect was not observed in the central condition, suggesting that individuals engaging in more thoughtful evaluation of the credibility of the message rely less on prior beliefs and more on the content of the message itself.

Although the moderation effect for attitudes toward Moringa was not significant (p -value of 0.056), results do suggest a stronger association in the peripheral processing condition. This supports the theoretical expectation that product-specific evaluations are more strongly shaped by category-level attitudes when cognitive scrutiny is limited (Chaiken and Ledgerwood, 2012; Maheswaran et al., 1992), but again, with the effect only approaching significance, we should be more cautious in making this claim.

Despite its contributions, Study 2 has several limitations. First, the use of a convenience sample recruited via social media resulted in a highly educated and possibly health-conscious participant group, limiting the generalizability of the findings. Second, the experimental manipulation of type of processing, though supported by reading time and self-report, may not fully capture the complexity of central versus peripheral processing in naturalistic settings. Relatedly, participants may not have consistently adhered to the assigned processing route. Third, all measures were self-reported, introducing the potential for social desirability bias and limiting conclusions about actual behavior.

Finally, while the moderation effect of processing type on message credibility was significant, it only approached significance for the attitude toward Moringa, suggesting caution in interpreting this interaction.

4 General discussion

4.1 Conclusion

Together, the two studies presented provide better understanding of the factors that contribute to the appeal of superfoods, and more specifically in relation to feelings toward superfoods that are yet unknown to participants, in our case moringa. While we make no claims about the actual health benefits or risks of moringa, our findings shed light on how people form attitudes toward novel food products and how these attitudes are shaped by individual differences and information processing styles.

Both studies demonstrated that general attitudes toward superfoods play a significant role in shaping perceptions of a newly introduced product. Individuals who viewed superfoods positively were more likely to perceive information about moringa as credible and to express more favorable attitudes and stronger intentions to use the product. This aligns with previous work showing that superfood consumption is often guided by general beliefs rather than specific evidence (Benson et al., 2018; Lähteenmäki, 2013; Lalor et al., 2011; Urala et al., 2003; Franco Lucas et al., 2023). This notion is further corroborated by the findings in Study 1 that showed that people with more intuitive, experiential thinking styles perceived the moringa message as more credible, and held a more positive attitude toward moringa, consistent with prior findings linking experiential thinking to beliefs in alternative medicine and food-related magical thinking (Aarnio and Lindeman, 2004; Lindeman et al., 2000). Study 2 expanded on these findings by experimentally manipulating the depth of message processing using the Elaboration Likelihood Model (Petty and Cacioppo, 1986). Participants instructed to read a message about Moringa in a peripheral manner were more likely to rely on their general attitudes toward superfoods when evaluating both the credibility of the message and the product itself. This supports the idea that under low-effort conditions, individuals tend to rely on heuristic cues—such as pre-existing beliefs or associations—rather than systematically analyzing content (Chaiken and Ledgerwood, 2012, Maheswaran et al., 1992).

Additionally, the *Big-Five* personality traits had only a small selective influence: conscientiousness and agreeableness showed weak positive associations with favorable moringa attitudes, while, contrary to expectations, openness was negatively associated. Although prior research has linked openness to the willingness to try novel foods (Brummett et al., 2008; Möttus et al., 2012) and healthy dietary choices (Allen et al., 2024), our findings suggest otherwise. It is highly speculative, but it could be that individuals high in openness may also exhibit greater skepticism toward unverified health claims, possibly due to reflective and critical thinking tendencies (Ackerman and Heggestad, 1997), but again, we cannot empirically back-up this explanation.

4.2 Theoretical and practical contributions

Taken together, these studies underline the importance of understanding how individual predispositions and processing contexts influence responses to health- or diet-related information. While superfoods like moringa may offer potential benefits, public perceptions of such products are often constructed through mechanisms that are far from rational or evidence based. More broadly, our findings may reflect a concerning trend in the current media environment: the prevalence of biased or heuristic-driven processing in everyday information consumption. In the digital age, consumers are inundated with rapid, attention-grabbing health messages, often via social media, where there is limited time or motivation for in-depth processing (Metzger and Flanagin, 2015). As previous studies suggest, online health content is frequently evaluated through the lens of social influence, intuitive thinking, and emotional appeals, rather than scientific scrutiny. When individuals process such content peripherally, their evaluations may be guided more by prior beliefs or perceived social norms than by message quality or evidence (Chaiken and Ledgerwood, 2012; Petty et al., 1997).

The present research contributes to theory in three main ways. First, our findings underscore the role of general attitudes as heuristic cues in shaping perceptions of novel food products in general, and superfoods in specific. Across both studies, positive baseline attitudes toward superfoods strongly predicted the perceived credibility of messages about moringa as well as attitudes toward moringa itself. This suggests that category-level beliefs act as mental shortcuts when individuals evaluate unfamiliar products, consistent with research on heuristic processing and attitude carryover effects (Chaiken and Ledgerwood, 2012; Maheswaran et al., 1992; Metzger and Flanagin, 2015). Extending this logic to the superfoods domain demonstrates that general attitudes are not merely background variables but play an active role in guiding evaluations under conditions of limited information.

Second, the findings advance dual-process perspectives by showing how processing styles influence evaluations of superfoods. Study 1 highlighted the role of intuitive-experiential thinking in fostering positive attitudes and higher credibility perceptions, echoing prior work linking experiential processing to dietary choices (Ares et al., 2014; Kim et al., 2020; Lanero et al., 2021; Richetin et al., 2022; Lindeman and Anttila, 2018), alternative medicine and magical food beliefs (Aarnio and Lindeman, 2004; Lindeman et al., 2000). Study 2 provided experimental evidence that these effects are accentuated under peripheral message processing, consistent with the Elaboration Likelihood Model (Petty and Cacioppo, 1986). Together, these findings integrate Cognitive-Experiential Self-Theory (Epstein, 1998, 2014) with the ELM framework, illustrating how stable cognitive styles and situational processing depth interact to shape consumer responses to health-related information.

Third, our results contribute to personality research by offering a more nuanced perspective on individual difference effects in health-related decision making. Contrary to expectations, openness was negatively associated with attitudes toward moringa, suggesting that this trait may sometimes be linked to scepticism toward unverified health claims rather than uncritical acceptance of novelty (Ackerman and Heggestad, 1997; Allen et al., 2024). This challenges the assumption that openness universally predicts receptivity to new food products and instead points to the importance of distinguishing between novelty-seeking and evidence-based critical reflection. More

broadly, these findings highlight the need to reconsider how personality traits and cognitive styles jointly shape attitudes in domains where scientific evidence is ambiguous and affective or associative cues are salient.

Beyond theoretical advances, the present findings also offer practical insights for improving consumer decision-making about novel health products. Because evaluations of superfoods such as moringa are often shaped by general attitudes and heuristic cues rather than systematic evidence, interventions should aim to strengthen consumers' ability to critically assess health claims. This could involve enhancing food and health literacy, for instance by teaching individuals to distinguish between associative signals (e.g., *natural, ancient, trendy*) and diagnostic evidence of effectiveness (Metzger and Flanagin, 2015). Moreover, communication strategies should focus on presenting transparent, evidence-based information in a way that is both accessible and engaging, thereby encouraging central rather than peripheral processing of health messages (Petty and Cacioppo, 1986). Finally, recognizing that intuitive-experiential thinkers may be particularly susceptible to persuasive but unsubstantiated claims suggests a need for tailored educational approaches that address not only knowledge gaps but also the emotional and heuristic bases of food evaluations.

Importantly, we do not argue that all claims about superfoods are unfounded—many such foods can indeed be a healthy addition to one's diet—but emphasize that in all cases individuals should carefully inform themselves before drawing conclusions. The present study illustrates the risk of not doing so: participants previously unfamiliar with moringa, and thus without prior knowledge of its presumed health effects, were nonetheless quickly persuaded of its benefits.

4.3 Limitations and future Research

While the present studies offer important insights into the mechanisms shaping attitudes toward superfoods, several limitations need to be acknowledged. First, both studies relied on self-report measures of thinking style and message evaluation, which may not fully capture the underlying processes. Future research should measure both trait and state processing to disentangle stable preferences from situational shifts. This can be achieved by combining dispositional measures such as the Rational-Experiential Inventory (REI; Pacini and Epstein, 1999) with context-specific instruments such as the Preference for Intuition and Deliberation in Eating Decision-Making scale (E-PID; König et al., 2021), as well as task manipulations like justification prompts or time pressure (Ares et al., 2014; Kim et al., 2020). Such designs would allow researchers to capture how more stable traits and contextual constraints jointly influence responses to superfood claims.

Second, our designs primarily assessed outcomes (credibility judgments, attitudes) rather than tracing the underlying processes of information processing. Future research could employ eye-tracking or neuroimaging techniques to quantify attention allocation to experiential versus analytic information, such as imagery and narratives versus nutritional facts. Linking these process measures to individual differences in thinking style would provide a richer understanding of how superfood messages are attended to and evaluated (Ares et al., 2014; Kim et al., 2020).

Third, although we highlighted the role of heuristic cues such as general superfoods attitudes, we did not experimentally manipulate halo-relevant cues. Future research could systematically cross cues typical of superfoods (e.g., *organic, eco, superfood*) with factual

information cues (e.g., the list of ingredients, the recommended daily intake) to test whether different cues compete or reinforce one another, and whether rational prompts attenuate halo effects (Liu et al., 2021; Richetin et al., 2022). Such manipulations could clarify how associative cues interact with more evidence-based cues and which interventions might promote more balanced evaluations.

Taken together, future research should combine trait and situational measures, track underlying cognitive processes, and manipulate cues. These efforts would not only address the limitations of the present work but also extend our understanding of how consumers form beliefs about superfoods or other *health hacks* and how more informed choices can be fostered.

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 humans were approved by Research Ethics Review Committee (RERC) Vrije Universiteit, Amsterdam. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MT: Project administration, Formal analysis, Data curation, Writing – review & editing, Methodology, Conceptualization, Investigation, Writing – original draft. MB: Writing – review & editing, Funding acquisition, Conceptualization, Writing – original draft, Formal analysis.

References

- Aarnio, K., and Lindeman, M. (2004). Magical food and health beliefs: a portrait of believers and functions of the beliefs. *Appetite* 43, 65–74. doi: 10.1016/j.appet.2004.03.002
- Ackerman, P. L., and Heggestad, E. D. (1997). Intelligence, personality, and interests: evidence for overlapping traits. *Psychol. Bull.* 121, 219–245. doi: 10.1037/0033-2909.121.2.219
- Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T
- Allen, M. S., Mishra, M., Tashjian, S. M., and Laborde, S. (2024). Linking big five personality traits to components of diet: a meta-analytic review. *J. Pers. Soc. Psychol.* 128, 905–929. doi: 10.1037/pspp0000526
- Anunziata, A., and Vecchio, R. (2013). Consumer perception of functional foods: a conjoint analysis with probiotics. *Food Qual. Prefer.* 28, 348–355. doi: 10.1016/j.foodqual.2012.10.009
- Appelman, A., and Sundar, S. S. (2016). Measuring message credibility: construction and validation of an exclusive scale. *J. Mass. Commun. Q.* 93, 59–79. doi: 10.1177/1077699015606057
- Ares, G., Mawad, F., Giménez, A., and Maiche, A. (2014). Influence of rational and intuitive thinking styles on food choice: preliminary evidence from an eye-tracking study with yogurt labels. *Food Qual. Prefer.* 31, 28–37. doi: 10.1016/j.foodqual.2013.07.005
- Armitage, C. J., and Conner, M. (1999). Predictive validity of the theory of planned behavior: the role of questionnaire format and social desirability. *J. Community Appl. Soc. Psychol.* 9, 261–272. doi: 10.1002/(SICI)1099-1298(199907/08)9:4<261::AID-CASP503>3.0.CO;2-5
- Benson, T., Lavelle, F., Bucher, T., McCloat, A., Mooney, E., Egan, B., et al. (2018). The impact of nutrition and health claims on consumer perceptions and portion size selection: results from a nationally representative survey. *Nutrients* 10:656. doi: 10.3390/nu10050656
- Bonvissuto, D. (2022). The truth about Moringa. Available online at: <https://www.webmd.com/vitamins-and-supplements/ss/slideshow-truth-moringa> (accessed February 29, 2024).
- Brummett, B. H., Siegler, I. C., Day, R. S., and Costa, P. T. (2008). Personality as a predictor of dietary quality in spouses during midlife. *Behav. Med.* 34, 5–10. doi: 10.3200/BMED.34.1.5-10
- Cacioppo, J. T., Petty, R. E., and Morris, K. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. *J. Pers. Soc. Psychol.* 45, 805–818. doi: 10.1037/0022-3514.45.4.805
- Chaiken, S., and Ledgerwood, A. (2012). A theory of heuristic and systematic information processing. In P. A. M. van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 246–266). Thousand Oaks; SAGE Publications Ltd. doi: 10.4135/9781446249215.n13
- Chen, M.-F. (2011). The joint moderating effect of health consciousness and healthy lifestyle on consumers' willingness to use functional foods in Taiwan. *Appetite* 57, 253–262. doi: 10.1016/j.appet.2011.05.305

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This publication was partly funded by the project 'SocialMovez: Effective and responsible health campaigns for adolescents using online social networks' (with project number VI. C.181.045) of the Vici Talent Programme, which is financed by the Dutch Research Council (NWO).

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.

Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

- Chopra, A. S., Lordan, R., Horbańczuk, O. K., Atanasov, A. G., Chopra, I., Horbańczuk, J. O., et al. (2022). The current use and evolving landscape of nutraceuticals. *Pharmacol. Res.* 175:106001. doi: 10.1016/j.phrs.2021.106001
- Cobos, Á., and Díaz, O. (2023). 'Superfoods': reliability of the information for consumers available on the web. *Foods* 12:546. doi: 10.3390/foods12030546
- Costa, P. T. J., and McCrae, R. R. (1992). Revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI) professional manual. Odessa, FL: NEO.
- DataM Intelligence 4Market Research LLP. (2023). Global superfoods market – 2023-2030 [Report]. MarketResearch.com. Available online at: <https://www.marketresearch.com/DataM-Intelligence-4Market-Research-LLP-v4207/Global-Superfoods-34671824/>
- De Ridder, D., Kroese, F., Evers, C., Adriaanse, M., and Gillebaart, M. (2017). Healthy diet: health impact, prevalence, correlates, and interventions. *Psychol. Health* 32, 907–941. doi: 10.1080/08870446.2017.1316849
- Dean, M., Lampila, P., Shepherd, R., Arvola, A., Saba, A., Vassallo, M., et al. (2012). Perceived relevance and foods with health-related claims. *Food Qual. Prefer.* 24, 129–135. doi: 10.1016/j.foodqual.2011.10.006
- Epstein, S. (1998). Cognitive-Experiential Self-Theory. In D. F. Barone, M. Hersen, and V. B. Van Hasselt (Eds.), *Advanced Personality* (pp. 211–238). New Jersey: Springer US. doi: 10.1007/978-1-4419-8580-4_9
- Epstein, S. (2014). Cognitive-Experiential Theory: An Integrative Theory of Personality. Oxford: Oxford University Press. doi: 10.1093/acprof:osobl/9780199927555.001.0001
- Epstein, S., Pacini, R., Denes-Raj, V., and Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *J. Pers. Soc. Psychol.* 71, 390–405. doi: 10.1037//0022-3514.71.2.390
- Espósito, C. M., Ceresa, A., and Buoli, M. (2021). The association between personality traits and dietary choices: a systematic review. *Adv. Nutr.* 12, 1149–1159. doi: 10.1093/advances/nmaa166
- Fernández-Ríos, A., Laso, J., Hoehn, D., Amo-Setién, F. J., Abajas-Bustillo, R., Ortego, C., et al. (2022). A critical review of superfoods from a holistic nutritional and environmental approach. *J. Clean. Prod.* 379:134491. doi: 10.1016/j.jclepro.2022.134491
- Franco Lucas, B., Costa, J. A. V., and Brunner, T. A. (2021). Superfoods: drivers for consumption. *J. Food Prod. Mark.* 27, 1–9. doi: 10.1080/10454446.2020.1869133
- Franco Lucas, B., Götz, F., Vieira Costa, J. A., and Brunner, T. A. (2023). Consumer perception toward "superfoods": a segmentation study. *J. Int. Food Agribus. Market.* 35, 603–621. doi: 10.1080/08974438.2022.2044955
- Gleaves, J. M., Kemp, E., Prichard, I., and Tiggemann, M. (2024). I'll have what she's having (but not what they're having): the moderating role of group membership in the effect of social norms on food choice in an online environment. *Appetite* 198:107374. doi: 10.1016/j.appet.2024.107374
- Grand View Research (2024a). Asia Pacific superfoods market size & outlook, 2023-2030. Available online at: <https://www.grandviewresearch.com/horizon/outlook/superfoods-market/asia-pacific>
- Grand View Research (2024b). Europe superfoods market size & outlook, 2023-2030. Available online at: <https://www.grandviewresearch.com/horizon/outlook/superfoods-market/europe>
- Grand View Research (2024c). North America superfoods market size & outlook, 2023-2030. Available online at: <https://www.grandviewresearch.com/horizon/outlook/superfoods-market/north-america>
- Hassoun, A., Harastani, R., Jagtap, S., Trollman, H., Garcia-Garcia, G., Awad, N. M., et al. (2024). Truths and myths about superfoods in the era of the COVID-19 pandemic. *Crit. Rev. Food Sci. Nutr.* 64, 585–602. doi: 10.1080/10408398.2022.2106939
- Higgs, S. (2015). Social norms and their influence on eating behaviors. *Appetite* 86, 38–44. doi: 10.1016/j.appet.2014.10.021
- Idrogo, J. V., and Yelderman, L. A. (2019). "Cognitive-experiential self-theory" in *Encyclopedia of personality and individual differences*. eds. V. Zeigler-Hill and T. Shackelford (Cham: Springer).
- John, O. P., and Srivastava, S. (1999). "The big-five trait taxonomy: history, measurement, and theoretical perspectives" in *Handbook of personality: Theory and Research*. eds. L. A. Pervin and O. P. John (London: Guilford Press).
- Kaur, A., Scarborough, P., and Rayner, M. (2017). A systematic review, and meta-analyses, of the impact of health-related claims on dietary choices. *Int. J. Behav. Nutr. Phys. Act.* 14, 1–17. doi: 10.1186/s12966-017-0548-1
- Kim, M.-A., Yoo, H.-J., Ares, G., and Lee, H.-S. (2020). Effect of thinking style and consumption purpose on food choice: a case study with yogurt using a discrete choice experiment and eye-tracking. *Food Qual. Prefer.* 86:104025. doi: 10.1016/j.foodqual.2020.104025
- Kirsch, F., Lohmann, M., and Böhl, G.-F. (2022). The public's understanding of superfoods. *Sustainability* 14:3916. doi: 10.3390/su14073916
- König, L. M., Sproesser, G., Schupp, H. T., and Renner, B. (2021). Preference for intuition and deliberation in eating decision-making: scale validation and associations with eating behavior and health. *Br. J. Health Psychol.* 26, 109–131. doi: 10.1111/bjhp.12460
- Lähteenmäki, L. (2013). Claiming health in food products. *Food Qual. Prefer.* 27, 196–201. doi: 10.1016/j.foodqual.2012.03.006
- Lalor, F., Madden, C., McKenzie, K., and Wall, P. G. (2011). Health claims on foodstuffs: a focus group study of consumer attitudes. *J. Funct. Foods* 3, 56–59. doi: 10.1016/j.jff.2011.02.001
- Lanero, A., Vázquez, J.-L., and Sahelices-Pinto, C. (2021). Halo effect and source credibility in the evaluation of food products identified by third-party certified eco-labels: can information prevent biased inferences? *Foods* 10:2512. doi: 10.3390/foods10112512
- Lappalainen, R., Kearney, J., and Gibney, M. (1998). A pan EU survey of consumer attitudes to food, nutrition and health: an overview. *Food Quality and Preference* 9, 468–478. doi: 10.1016/S0950-3293(98)00018-4
- Lindeman, M., and Anttila, J. (2018). Organic food appeals to intuition and triggers stereotypes. *Int. J. Psychol. Stud.* 10, 66–79. doi: 10.5539/ijps.v10n3p66
- Lindeman, M., Keski-Vaara, P., and Roschier, M. (2000). Assessment of magical beliefs about food and health. *J. Health Psychol.* 5, 195–209. doi: 10.1177/135910530000500210
- Liu, H., Meng-Lewis, Y., Ibrahim, F., and Zhu, X. (2021). Superfoods, super healthy: myth or reality? Examining consumers' repurchase and WOM intention regarding superfoods: a theory of consumption values perspective. *J. Bus. Res.* 137, 69–88. doi: 10.1016/j.jbusres.2021.08.018
- Lunn, T. E., Nowson, C. A., Worsley, A., and Torres, S. J. (2014). Does personality affect dietary intake? *Nutrition* 30, 403–409. doi: 10.1016/j.nut.2013.08.012
- MacGregor, C., Petersen, A., and Parker, C. (2021). Promoting a healthier, younger you: the media marketing of anti-ageing superfoods. *J. Consum. Cult.* 21, 164–179. doi: 10.1177/1469540518773825
- Maheswaran, D., Mackie, D. M., and Chaiken, S. (1992). Brand name as a heuristic cue: the effects of task importance and expectancy confirmation on consumer judgments. *J. Consum. Psychol.* 1, 317–336. doi: 10.1016/S1057-7408(08)80058-7
- Manning, M. (2009). The effects of subjective norms on behavior in the theory of planned behavior: a meta-analysis. *Br. J. Soc. Psychol.* 48, 649–705. doi: 10.1348/014466608X393136
- Metzger, M. J., and Flanagin, A. J. (2015). "Psychological approaches to credibility assessment online" in *The handbook of the psychology of communication technology*. ed. S. S. Sundar (New York, NY: John Wiley & Sons, Inc.).
- Miniard, P. W., Bhatla, S., and Rose, R. L. (1990). On the formation and relationship of ad and brand attitudes: an experimental and causal analysis. *J. Mark. Res.* 27, 290–303. doi: 10.2307/3172587
- Möttus, R., Realo, A., Allik, J., Deary, I. J., Esko, T., and Metspalu, A. (2012). Personality traits and eating habits in a large sample of Estonians. *Health Psychol.* 31, 806–814. doi: 10.1037/a0027041
- Oude Groeniger, J., van Lenthe, F. J., Beenackers, M. A., and Kamphuis, C. B. (2017). Does social distinction contribute to socioeconomic inequalities in diet: the case of 'superfoods' consumption. *Int. J. Behav. Nutr. Phys. Act.* 14, 1–7. doi: 10.1186/s12966-017-0495-x
- Pacini, R., and Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *J. Pers. Soc. Psychol.* 76, 972–987. doi: 10.1037/0022-3514.76.6.972
- Paquette, M. C. (2005). Perceptions of healthy eating: state of knowledge and research gaps. *Can J Public Health* 96, S16–S21. doi: 10.1007/BF03405196
- Petty, R. E., and Cacioppo, J. T. (1986). *The elaboration likelihood model of persuasion*. Communication and persuasion: Springer series in social psychology. New York, NY: Springer.
- Petty, R. E., Cacioppo, J. T., and Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: the moderating role of involvement. *J. Consum. Res.* 10, 135–146. doi: 10.1086/208954
- Petty, R. E., Wegener, D. T., and Fabrigar, L. R. (1997). Attitudes and attitude change. *Annu. Rev. Psychol.* 48, 609–647. doi: 10.1146/annurev.psych.48.1.609
- Proestos, C. (2018). Superfoods: recent data on their role in the prevention of diseases. *Curr. Res. Nutri. Food Sci.* 6, 576–593. doi: 10.12944/CRNFSJ.6.3.02
- Qutteina, Y., Hallez, L., Mennes, N., De Backer, C., and Smits, T. (2019). What do adolescents see on social media? A diary study of food marketing images on social media. *Front. Psychol.* 10:2637. doi: 10.3389/fpsyg.2019.02637
- Richetin, J., Caputo, V., Demartini, E., Conner, M., and Perugini, M. (2022). Organic food labels bias food healthiness perceptions: estimating healthiness equivalence using a discrete choice experiment. *Appetite* 172:105970. doi: 10.1016/j.appet.2022.105970
- Roth, A., and Zawadzki, T. (2018). Instagram as a tool for promoting superfood products. *Ann. Marketing Manage. Econ.* 4, 101–113. doi: 10.22630/AMME.2018.4.1.8
- Šamec, D., Urlič, B., and Salopek-Sondi, B. (2019). Kale (*Brassica oleracea* var. *acephala*) as a superfood: review of the scientific evidence behind the statement. *Crit. Rev. Food Sci. Nutr.* 59, 2411–2422. doi: 10.1080/10408398.2018.1454400
- Santini, A., and Novellino, E. (2014). Nutraceuticals: beyond the diet before the drugs. *Curr. Bioact. Compd.* 10, 1–12. doi: 10.2174/157340721001140724145924
- Schifferstein, H. N., and Ophuis, P. A. O. (1998). Health-related determinants of organic food consumption in the Netherlands. *Food Qual. Prefer.* 9, 119–133. doi: 10.1016/S0950-3293(97)00044-X

- Shahbandeh, M. (2022). Global market value of superfoods: 2021-2027. Available online at: <https://www.statista.com/statistics/1078437/superfoods-market-value-worldwide/> (accessed September 19, 2025)d.
- Shivanna, S. K., Naik, N. L., Nataraj, B. H., and Rao, P. S. (2024). Moringa marvel: navigating therapeutic insights and safety features for future functional foods. *J. Food Meas. Charact.* 18, 4940–4971. doi: 10.1007/s11694-024-02548-0
- Siegrist, M., Shi, J., Giusto, A., and Hartmann, C. (2015). Worlds apart. Consumer acceptance of functional foods and beverages in Germany and China. *Appetite* 92, 87–93. doi: 10.1016/j.appet.2015.05.017
- Silva, P., Araújo, R., Lopes, F., and Ray, S. (2023). Nutrition and food literacy: framing the challenges to health communication. *Nutrients* 15:4708. doi: 10.3390/nu15224708
- Stevenson, R. J. (2017). Psychological correlates of habitual diet in healthy adults. *Psychol. Bull.* 143, 53–90. doi: 10.1037/bul0000065
- Stohs, S. J., and Hartman, M. J. (2015). Review of the safety and efficacy of *Moringa oleifera*. *Phytother. Res.* 29, 796–804. doi: 10.1002/ptr.5325
- Stok, F. M., De Vet, E., de Ridder, D. T., and de Wit, J. B. (2016). The potential of peer social norms to shape food intake in adolescents and young adults: a systematic review of effects and moderators. *Health Psychol. Rev.* 10, 326–340. doi: 10.1080/17437199.2016.1155161
- Tacer-Caba, Z. (2019). The concept of superfoods in diet. The role of alternative and innovative food ingredients and products in consumer wellness. Amsterdam: Elsevier.
- Urala, N., Arvola, A., and Lähteenmäki, L. (2003). Strength of health-related claims and their perceived advantage. *Int. J. Food Sci. Technol.* 38, 815–826. doi: 10.1046/j.1365-2621.2003.00737.x
- Urala, N., and Lähteenmäki, L. (2003). Reasons behind consumers' functional food choices. *Nutr. Food Sci.* 33, 148–158. doi: 10.1108/00346650310488499
- Urala, N., and Lähteenmäki, L. (2007). Consumers' changing attitudes towards functional foods. *Food Qual. Prefer.* 18, 1–12. doi: 10.1016/j.foodqual.2005.06.007
- van den Driessche, J. J., Plat, J., and Mensink, R. P. (2018). Effects of superfoods on risk factors of metabolic syndrome: a systematic review of human intervention trials. *Food Funct.* 9, 1944–1966. doi: 10.1039/C7FO01792H
- Verbeke, W. (2005). Consumer acceptance of functional foods: socio-demographic, cognitive and attitudinal determinants. *Food Qual. Prefer.* 16, 45–57. doi: 10.1016/j.foodqual.2004.01.001
- Weitkamp, E., and Eidsvaag, T. (2014). Agenda building in media coverage of food research: superfoods coverage in UK national newspapers. *Journal. Pract.* 8, 871–886. doi: 10.1080/17512786.2013.865966