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Effects of social framing for environmental persuasion in Japan and the United States: a brief report

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Highlighting social outcomes of behaviors may be useful for pro-environmental persuasion, but the focus of the social outcome may need to be different across cultures. For example, social outcomes could focus on benefits to the individual via approval of other people in one's ingroup or benefits to the collective due to improvements to the environment. For two countries (Japan and America) and two environmental topics (plastic straws use and hoarding), we examined two dimensions of social framing: emphasizing positive outcomes for either shared benefits or one's social image. The 1,398 participants, recruited from Japan and the United States, viewed a social media-style message and shared their reactions to it and interest in pro-environmental behaviors. The framing manipulation did not have direct effects on policy support or behavioral intentions for either country. However, social image framing led to more psychological reactance for Americans but not for Japanese. Higher reactance predicted lower intended outcomes for participants who were high on self-orientation, but this effect was only observed for Americans regarding plastic straw use. Practical implications of these results include taking care in message design to avoid eliciting psychological reactance, especially for topics that are complex, important for the global future, and require culturally aware communication practices. Theoretical implications include encouraging further clarification between collectivist and individualistic messages since collectivist (social) messages can appeal to personal or collective benefits and suggested boundary effects for when reactance can negatively impact outcomes.

KEYWORDS

culture, framing, social image, social benefit, psychological reactance

Introduction

To have significant impact, pro-environmental behaviors need to be enacted around the globe. Yet even global initiatives can be targeted toward different audiences since cultural differences are important for message design (Kahan, 2010; Han and Shavitt, 1994). Moreover, targeted messages advocating pro-environmental behaviors and policies often ask the audience to give up some of their own autonomy for public good (Looker and Hallett, 2006), a challenging and global wicked problem. For example, enacting policies to ban single-use plastic straws from restaurants can reduce personal freedom while improving the environment for everyone.

Messages can frame a pro-environmental behavior as beneficial to the group overall (e.g., "if you avoid using plastic straws at restaurants, you are improving the environment for everyone") or one's social image among the group (e.g., "others may think highly of you if they see you using a re-usable straw"). Depending on the receivers' culture, pro-environmental

messages may create support or psychological reactance, a counter-productive reaction to feeling like an advertisement is manipulative (Brehm, 1966).

Thus, creating successful pro-environmental messages requires careful consideration as even brief exposure to pro-environmental messages relying on basic facts can cause reactance for some viewers (Ma et al., 2019), and reactance can in turn create an effect opposite to the intention of the pro-environmental message, a boomerang effect (Ma and Hmielowski, 2021). Building on this existing research, we seek to examine the impact of pro-environmental message characteristics (e.g., framing: social benefit versus social image) and characteristics of audience members (e.g., Americans versus Japanese) to increase support for pro-environmental policies.

Conceptual base

Social framing

Social framing can highlight different outcomes to be achieved within group contexts. Social image framing can emphasize how others may perceive the self, while social benefit framing can focus on the benefits that others and the self can enjoy (Mosquera, 2018). For example, social image framing can convey the positive social standing gained through pro-environmental actions. In contrast, social benefit framing can focus on advantages for the collective. Indeed, people can be motivated to engage in pro-social behaviors when they seek to contribute to others' health and wellbeing (Batson, 2022) or when they feel that they will gain personally (Ferguson et al., 2008).

Since pro-environmental efforts require global cooperation, message characteristics can differ depending on the audience's location as countries can differ culturally. Japan has traditionally been considered a collectivist culture; America has been considered an individualistic culture (Načinović Braje et al., 2019; Markus and Kitayama, 2003). A key distinction is that people from individualistic cultures are said to value independence while people from collectivist cultures are said to value interdependence.

We were interested in first determining which of two social frames will be more persuasive for each culture. Concern about others may underlie the collectivistic rather than the individualistic orientation. Indeed, a more multifaceted perspective (Lui and Rollock, 2018) views collectivism as concern for group outcomes, group harmony, and one's status in the group. However, social image framing may be more about individual benefits, whereas social benefit framing is more about shared benefits. Han and Shavitt (1994), for example, found that personal benefits were more persuasive in an individualistic culture while ads that emphasized ingroup benefits worked better for a collectivistic culture.

Ma and Hmielowski (2021) explain that conforming to norms and group expectations is tied to identifying with the group. In terms of this identity, Americans, being more individualistic, may be more accustomed to thinking of themselves primarily as individuals rather than members of a group. Given the focus on one's responsibilities toward others in social benefit framing (rather than the more typical identity as an individual), American people may indicate greater reactance after exposure to social benefit framing than social image framing as protecting and enhancing social image is consistent with individualistic orientation. Implications that the viewer is responsible in

part for the wellbeing of others may cause them to feel some manipulative intent since they do not as readily identify as a group member rather than an individual.

On the other hand, Japanese people may indicate greater reactance after exposure to social image framing than social benefit framing due to increased identification as a group member and cultural reluctance to stand out. Japanese people may already be more accustomed to developing positive attitudes toward behaviors aligned with their group affiliations since they might be accustomed to peer pressure-expectations that they behave in ways that reflect well on their group (Rich and Dooley, 2022). In fact, people who come from more collectivist cultures tend to have a higher tolerance for autonomy-threatening messages since they are generally less concerned with individual freedoms (Bang et al., 2021).

On this basis, these hypotheses are proposed:

H1a: Social image framing will be more persuasive for Americans than social benefit framing for policy support and behavioral intentions.

H1b: Social benefit framing will be more persuasive for Japanese than social image framing for policy support and behavioral intentions.

Psychological reactance

Psychological reactance is conceptualized as a combination of negative thoughts and emotions such as anger, annoyance, and irritation (Dillard and Shen, 2005) that arise from perceived threats to one's freedom to make decisions and can result in the viewer pushing back against that threat by doubling down on their previous attitude (Brehm, 1966). Psychological reactance can decrease persuasion for environmental issues (Ma et al., 2019; Ma and Hmielowski, 2021).

However, whether psychological reactance impacts persuasion is nuanced depending on audience characteristics (e.g., Ng et al., 2021), message characteristics (e.g., Ward et al., 2021), and the interaction between message and audience characteristics (e.g., Bang et al., 2021). In their paper about the boomerang effects of messages that induce reactance, Ma and Hmielowski (2021) explain that conforming to norms and group expectations is tied to aspects of one's identity, such as environmental identity.

Conceptualizing identity in a cultural context, Americans may be more accustomed to thinking of themselves primarily as individuals rather than members of a group. Given the focus on one's responsibility toward others in social benefit framing, Americans may indicate greater reactance after exposure to social benefit framing than social image framing as protecting social image is consistent with individualistic orientation. On the other hand, Japanese may indicate greater reactance after exposure to social image framing than social benefit framing due to increased identification as a group member and cultural reluctance to stand out.

H2a: Social benefit framing will generate greater reactance, lower policy support, and lower behavioral intentions among Americans than Japanese.

H2b: Social image framing will generate greater reactance, lower policy support, and lower behavioral intentions among Japanese than Americans.

Psychological reactance and cultural orientation

Whether or not messages induce psychological reactance is important inasmuch that psychological reactance can have a negative impact on outcomes. However, few studies examined cultural sensitivity to psychological reactance (see for an exception Quick and Kim, 2009). Since self-orientation (Triandis and Gelfand, 1998) explores how a person feels about their own welfare versus the welfare of others, it may impact how likely a viewer is to care about whether a message manipulated them or not. For example, if someone finds a message manipulative, this sense of manipulation may not harm policy support or behavioral intentions if they are more other-oriented (concerned for others) than self-oriented (concerned for the self). In other words, two types of people may find a message to be manipulative, and while one group (self-oriented) may reject the message (i.e., I care about myself, and the message was manipulating me, so I reject the message), the other group may not (i.e., Sure the message was manipulative, but I do care about other people, so I accept it).

H3: Across both Japan and the U.S., the negative association between reactance and outcomes will be amplified among individuals with high rather than low self-orientation.

Methods

Design and participants

This study used random assignment and employed a 2 (country: Japan or the United States) \times 2 (message framing: social benefit or social image) \times 2 (topic: drinking straws or the supply chain) design.

A total of 1,398 participants were recruited from Japan and the United States via Dynata (an international online panel).

Those who failed the attention control check ($n = 59$) or answered that they are from a country other than Japan or America ($n = 19$) were removed from the data, resulting in a final sample of 1,320. Table 1 summarizes their demographic characteristics.

Experimental stimuli

The social framing messages resembled public service announcements such as those seen on social media. Messages were designed to be as equivalent as possible other than the differences in framing. Thus, text alone was included with the same font and font size, and wording overlapped where possible (see below for full text). The text was written originally in English, and a professional translator was paid to create the Japanese version.

One message topic encouraged readers to support limiting purchases during times of a supply chain crisis and the other encouraged readers to support limiting the use of plastic straws. One version of each focused on the outcome of the behavior for the group (the social benefit environmental outcome) while the other focused on the outcome of the behavior for the individual (improving their reputation/social image).

The supply chain message read (words in brackets varied per condition): A few days into the coronavirus pandemic, shoppers around the world emptied grocery store shelves, taking more than they needed in food, medicine, and hygiene products. This left many others unable to buy the things they needed, even though these empty shelves were fully avoidable. [You can do your part to help protect the supply chain by purchasing only what you need for a one-week time frame during times of crisis. Make sure that you contribute to a healthier supply chain. Limiting your purchases can keep necessary supplies available to everyone who needs them] or [You can show people around you that you protect the supply chain by purchasing only what you need for a one-week time frame during times of crisis. Show that you care. Limiting your purchases can demonstrate that you are a responsible and respectable citizen.]

TABLE 1 Demographic characteristics of American and Japanese participants.

Country and topic	Americans/plastic straws	Japanese/plastic straws	Americans/supply chain	Japanese/supply chain
Total	346	329	317	328
Male	155 (44.8%)	235 (71.4%)	150 (47.3%)	214 (65.2%)
Female/other	189 (54.7%)	94 (28.6%)	167 (52.7%)	112 (34.3%)
American Indian/Alaskan Native	4 (1.2%)	0	4 (1.3%)	0
Asian	22 (6.4%)	315 (95.7%)	13 (4.1%)	309 (94.2%)
Black/African American	40 (11.6%)	0	56 (17.7%)	0
Native Hawaiian or other Pacific Islander	1 (0.3%)	0	0	1 (0.3%)
White	268 (77.5%)	4 (1.2%)	226 (71.3%)	6 (1.8%)
Other race	11 (3.2%)	9 (2.7%)	17 (5.4%)	9 (2.7%)
Age range	18–84	18–81	18–89	19–79
Age mean and SD	43.70 (16.71)	52.52 (13.57)	46.22 (17.67)	51.86 (13.61)

The single-use plastics message (words in brackets varied per condition) read: Single-use plastics, including plastic straws, are harmful to the environment, especially in the oceans. Reusable straws are available, affordable, and convenient. Many people are already using them. [You can do your part to reduce marine pollution and protect animals in the ocean by purchasing a re-useable straw to carry with you on your keychain or in a bag. Make sure that you contribute to a healthier marine ecosystem. Choosing re-useable straws can help keep humans, animals, and oceans safe and clean.] or [You can show your friends and family that you are committed to helping by purchasing a re-useable straw to carry with you on your keychain or in a bag. Show that you care. Choosing reusable straws demonstrates that you are a responsible, ethical, and respectable part of the solution.]

Measures

Policy support: Three items measured support on a five-point scale from “Strongly Disagree” to “Strongly Agree” for hoarding during supply chain shortages (e.g., laws that forbid grocery stores from selling too many of the same product to one person, and laws that ensure that supplies are distributed equitably). These items loaded onto one factor in exploratory factor analysis and indexed, $\alpha = 0.807$.

Policy support for reusable straws measured support on a five-point scale from “Strongly Disagree” to “Strongly Agree” for creating laws that forbid restaurants from using plastic straws, creating laws that forbid grocery stores from selling plastic straws, and creating laws that forbid people from buying plastic straws. These loaded onto one factor, $\alpha = 0.946$.

Behavioral intentions: Behavioral intentions were measured on a five-point scale from “Strongly Disagree” to “Strongly Agree” measuring likelihood of limiting purchases during supply chain crisis $\alpha = 0.70$ or plastic straw use $\alpha = 0.837$.

Psychological reactance was measured on a five-point scale from “Strongly Disagree” to “Strongly Agree” with 8 items modified from Kim et al. (2020), $\alpha = 0.910$.

Cultural orientation (Triandis and Gelfand, 1998). For self-orientation, as expected, there were two factors with an eigenvalue greater than one. However, when both components of the larger latent variable were examined together, the reliability was acceptable, $\alpha = 0.722$. Thus, all eight items were indexed by averaging.

Demographics: Demographic variables included country of residence (Japan or The United States), gender, race, ethnicity, political ideology, and education.

Analysis

ANCOVAs were used to compare framing effects on reactance using age and race as controls (H1). Hayes’s (2018) Model 14 from his PROCESS Macro was used for moderated mediation analyses (H2). The following analyses were conducted with age, gender, education, political ideology, ethnicity, and race included as controls to help isolate the effects of country of residence.

Results

Social framing did not predict policy support ($p = 0.241$) or behavioral intentions ($p = 0.312$) for Americans who saw messages about plastic straws. Likewise, for Americans who saw ads about hoarding, social framing did not predict policy support ($p = 0.533$) or behavioral intentions ($p = 0.141$).

For Japanese who saw messages about plastic straws, framing did not predict policy support ($p = 0.067$) or behavioral intentions ($p = 0.133$). Neither, for Japanese who saw messages about hoarding, was there any significant difference in policy support ($p = 0.355$) or behavioral intentions ($p = 0.243$). Thus, H1 was not supported as there were no difference between the two countries in terms of message framing direct impacts on outcome variables.

For Americans who saw messages about plastic straws, social image framed ($M = 2.980$, $SD = 0.981$) messages resulted in significantly more reactance ($p = 0.020$) than those who saw social benefit framed ($M = 2.737$, $SD = 0.921$) messages. This contrasts with Hypothesis 1 in that there were no direct effects of framing on policy support or behavioral intentions, but there was a direct effect of framing on psychological reactance for Americans who saw messages about plastic straws.

Likewise, for Americans who saw messages about hoarding, it was the social image framed messages ($M = 3.094$, $SD = 0.868$) group who experienced more reactance ($p = 0.007$) than those who saw the social benefit framed messages ($M = 2.844$, $SD = 0.914$).

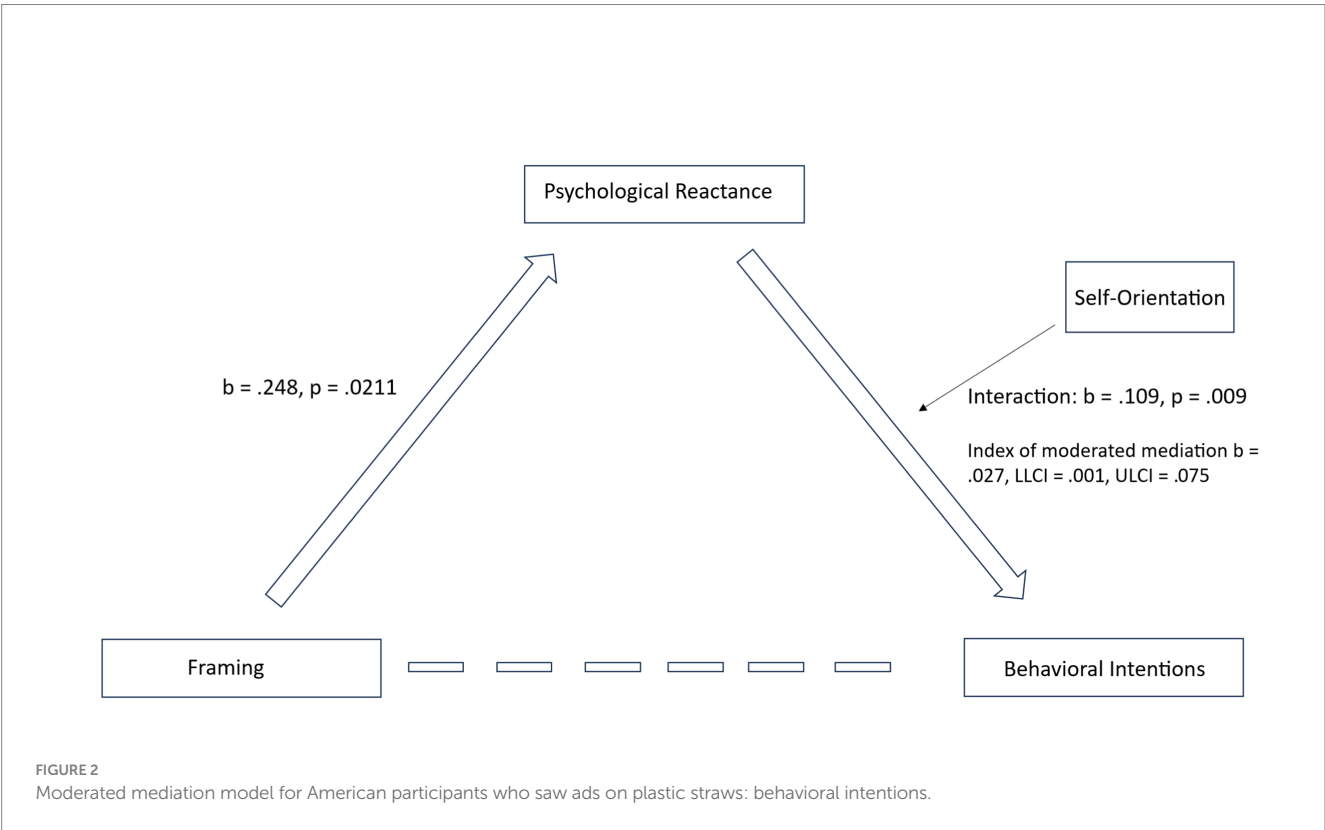
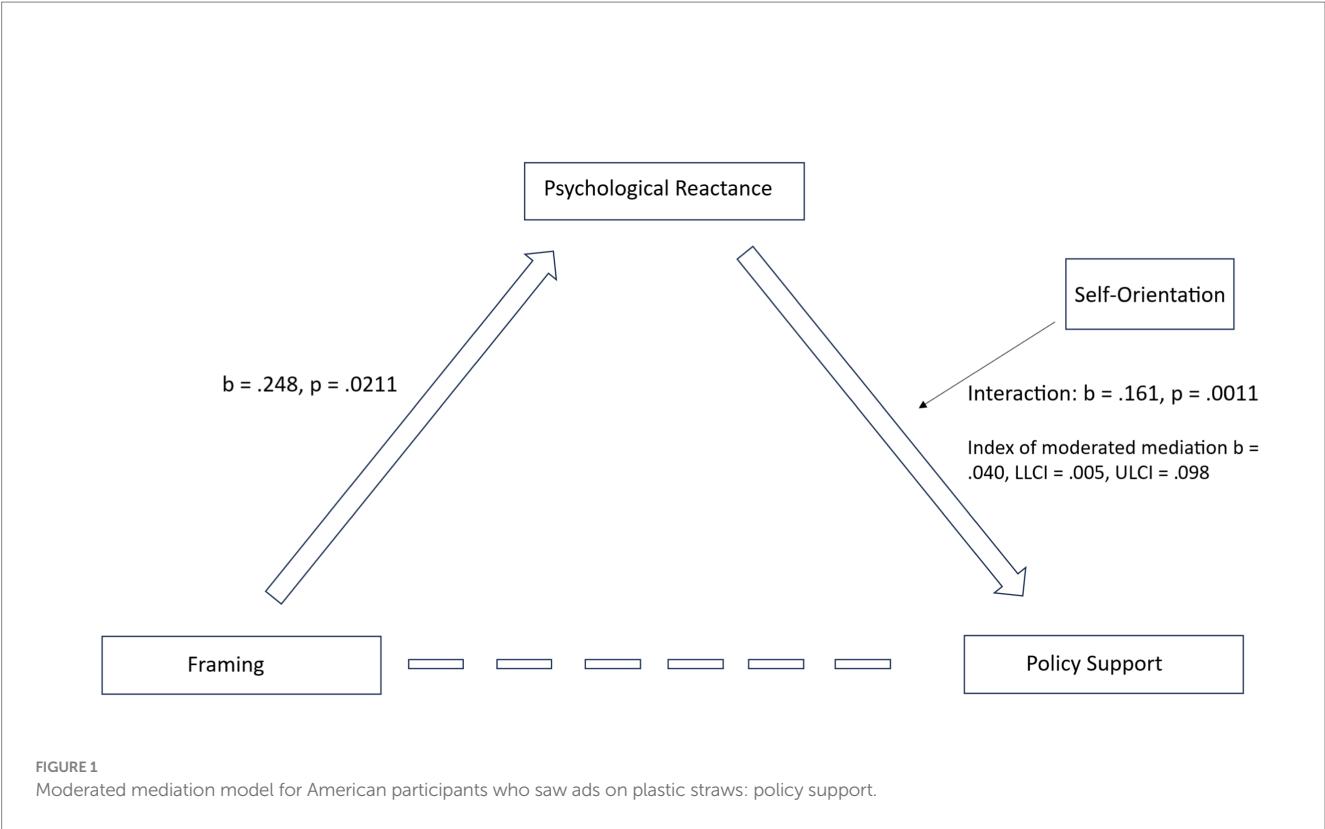
For Japanese who saw messages about plastic straws, no significant difference ($p = 0.108$) was found between those who saw messages that were social image framed and those who saw ads that were social benefit framed on reactance.

Likewise, there was not a significant difference in reactance ($p = 0.396$) between Japanese people who saw messages about hoarding that were social image framed than those who saw messages that were social benefit framed.

Indirect effects

H3 examined a moderation model testing whether reactance predicted outcome variables depending on self-orientation, again with covariates. For Americans who saw ads about plastic straws, moderated mediation was supported when examining the relationship between self-orientation and psychological reactance on outcome variables. Social framing predicted psychological reactance ($p = 0.0321$), and reactance interacted with self-orientation to predict policy support ($b = 0.1623$, $SE = 0.0488$, $p = 0.0010$, $LLCI = 0.0663$, $ULCI = 0.2582$). For the whole model, the index of moderated mediation is significant ($b = 0.0373$, $LLCI = 0.0016$, $ULCI = 0.0924$). See Figures 1, 2.

In sum, social image framing was more likely to lead to reactance across topics for American participants. Yet that reactance only correlated negatively with behavioral intentions for plastic straw use for people high on self-orientation, but not behavioral intentions regarding hoarding or policy support for either plastic straws or hoarding.



Discussion

It is important to study environmental health issues in a cultural context because vulnerable people rely on others. For issues such as support for environmental policies and practices, the audience is asked for some altruistic sacrifice to promote public good. In this case, social benefit framing was less likely than social image framing to result in reactance for Americans, but not Japanese.

This provides some insight to several different questions. The first question was regarding which type of social framing would be more successful at persuasion, social image (messages that make salient how your behavior can impact the way your group feels about you) or social benefit (messages that make salient the collective benefit of behaviors). However, there were no direct effects of message framing on policy support or behavioral intentions for Americans or Japanese.

The second question was how social framing might impact psychological reactance. In this case, social benefit framing was less likely than social image framing to result in reactance for both Japanese and Americans. Indeed, reactance overall did not differ between countries, rather it was the interaction of message framing with country of residence that drove reactance.

The third question was how psychological reactance might impact policy support and behavioral intentions. There have been cases in which expected psychological reactance has not had a backfire effect (Rode et al., 2022) and cases in which psychological reactance to even simple manipulations decreased persuasion (Ma and Hmielowski, 2021). The results of this study indicated that whether reactance influenced policy support and behavioral intentions was partially dependent on the topic (plastic straw use or the supply chain). Also, while country and message framing interacted to predict whether people felt reactance, it was an individual difference that predicted whether reactance would decrease outcome measures (but only for Americans who saw messages about plastic straws). In this case, reactance led to lower policy support and behavioral intentions only if they were high on self-orientation.

Contextualizing these results with previous research, one potential reason for the results is that people in different cultures can think of freedom restriction differently. Conceptualizations of personal freedoms may differ, with people from collectivist cultures exhibiting more reactance toward threats against collective (rather than personal) freedom (Sittenthaler et al., 2015). Freedom to make personal choices may be less important to Asians who have more collectivist orientation since they are more likely to see obligations and expectations as motivating rather than threatening (Jonas et al., 2009). Regarding policy support, though, the freedom threat is both personal (the person supporting the policy is willing to restrict their own actions) and collective (the person supporting the policy is willing to restrict the actions of others), posing an interesting question of how people will respond to messages. Jonas and colleagues explain that even people willing to sacrifice their personal freedoms for the benefit of the group may still be reluctant to give up the freedoms of other people in their ingroup. Another aspect of the cultural differences in reactance is that although individuals with more individualistic cultures tend to be more sensitive to threat to their individual freedom (Jonas et al., 2009), it is possible that the same results could stem from threats to one's social image (rather than freedom).

Given the results of this study, one might think, then, that messages could include information that appeals to both social benefit

and social image. However, in a study looking at prosocial behaviors of alumni from a large public university in the United States, messages that combined altruistic and egoistic reasons to engage in prosocial behaviors were less successful than messages that only appealed to either altruism or egoism (not both) due to psychological reactance (Feiler et al., 2012). Feiler et al. believe this might be because presenting the two types of reasoning (egoistic and altruistic) together might cause the audience to think more deliberatively about the message, resulting in more feelings that the message is manipulative.

Limitations and future research

One strength of this study is that we examined two types of social framing (making salient the benefit to the group or the individual's social image) for two different pro-environmental topics (banning plastic straws or hoarding during a supply chain crisis) on two different outcome variables (behavioral intentions and policy support) in two different countries (Japan and The United States).

However, although this study explored two ways to frame a collectivist message, individualistic message could also be framed in two different ways. Messages that focus on autonomy could either highlight an increase to one's own autonomy or an increase in autonomy of others. For example, in persuading the public to support pro-environmental policies related to air quality, ads could emphasize one's own ability to decide to exercise outdoors or other people's ability to exercise outdoors. Both would address autonomy, a key feature of individualistic cultures, but one would be egoistically motivated. Additionally, other countries and environmental issues should be included in future research as well.

Exploring additional message features across cultures would also be useful for continuing efforts to understand the individualistic-collectivist differentiation. In previous research, there have been inconsistent results in examining whether countries such as the United States, which is commonly thought of as individualistic, and countries such as Japan, which is commonly thought of as collectivist, truly do fit those definitions. For example, in their meta-analysis, Takano and Osaka found that comparing America and Japan in terms of cultural orientation, 19 studies reported no clear difference and 11 studies reported that Japanese people were more individualistic than Americans; yet only 5 studies supported the traditional view (2018).

Conclusion

The broad theoretical question we explored was: For what types of audience members under which situations might different message characteristics be more successful in persuading the public to engage in behaviors that decrease their own autonomy but benefit the environment?

In general, we found that messages that were framed with social image, rather than societal benefits, elicited more psychological reactance for American participants.

The results of this research, in addition to previous research (e.g., Bang et al., 2021) indicate that it is possible to craft messages that persuade people to react positively to assertive messages that may decrease personal freedoms; we just need the right messages in the right circumstances.

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 The Ohio State University Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because online data collection was utilized.

Author contributions

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

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The author(s) declared that Generative AI was not used in the creation of this manuscript.

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References

- Bang, H., Choi, D., Yoon, S., Baek, T. H., and Kim, Y. (2021). Message assertiveness and price discount in prosocial advertising: differences between Americans and Koreans. *Eur. J. Mark.* 55, 1780–1802. doi: 10.1108/EJM-10-2019-0791
- Batson, C. D. (2022). Prosocial motivation: a Lewinian approach. *Motiv. Sci.* 8, 1–10. doi: 10.1037/mot0000217
- Brehm, J. W. (1966). A theory of psychological reactance. New York: Academic Press.
- Dillard, J. P., and Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Commun. Monogr.* 72, 144–168. doi: 10.1080/03637750500111815
- Feiler, D., Tost, L. P., and Grant, A. M. (2012). Mixed reasons, mixedgivings: the cost of blending egoistic and altruistic reasons in donation requests. *J. Exp. Soc. Psychol.* 48, 1322–1328.
- Ferguson, E., Farrell, K., and Lawrence, C. (2008). Blood donation is an act of benevolence rather than altruism. *Health Psychol.* 27, 327–336. doi: 10.1037/0278-6133.27.3.327
- Han, S. P., and Shavitt, S. (1994). Persuasion and culture: advertising appeals in individualistic and collectivistic societies. *J. Exp. Soc. Psychol.* 30, 326–350. doi: 10.1006/jesp.1994.1016
- Hayes, A. (2018). Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. New York: The Guilford Press.
- Jonas, E., Graupmann, V., Niesta Kayser, N., Zanna, M., Traut-Mattausch, E., and Frey, D. (2009). Culture, self, and the emergence of reactance: is there a universal freedom? *J. Exp. Soc. Psychol.* 45, 1068–1080.
- Kahan, D. M. (2010). Finding the communications failure. *Nature* 463, 296–297.
- Kim, H. J., Lee, H., and Hong, H. (2020). Scale development and validation for psychological reactance to health promotion messages. *Sustainability* 12:5816.
- Looker, K. J., and Hallett, T. B. (2006). Individual freedom versus collective responsibility: too many rights make a wrong? *Emerg. Themes Epidemiol.* 3, 3–14. doi: 10.1186/1742-7622-3-14
- Lui, P. P., and Rollock, D. (2018). Greater than the sum of its parts: development of a measure of collectivism among Asians. *Cult. Divers. Ethn. Minor. Psychol.* 24, 242–259. doi: 10.1037/cdp0000163
- Ma, Y. N., Dixon, G., and Hmielowski, J. D. (2019). Psychological reactance from reading basic facts on climate change: the role of prior views and political identification. *Environ. Commun.* 13, 71–86. doi: 10.1080/17524032.2018.1548369
- Ma, Y. N., and Hmielowski, J. D. (2021). Are you threatening me? Identity threat, resistance to persuasion, and boomerang effects in environmental communication. *Environ. Commun.* 16, 225–242. doi: 10.1080/17524032.2021.1994442
- Markus, H. R., and Kitayama, S. (2003). Culture, self, and the reality of the social. *Psychol. Inq.* 14, 277–283. doi: 10.1207/S15327965PLI1403&4_17
- Mosquera, P. M. R. (2018). Cultural concerns: how valuing social-image shapes social emotion. *Eur. Rev. Soc. Psychol.* 29, 1–37. doi: 10.1080/10463283.2017.1412180
- Načinović Braje, I., Klindžić, M., and Galetić, L. (2019). The role of individual variable pay in a collectivistic culture society: an evaluation. *Econ. Res.-Ekonom. Istraz.* 32, 1352–1372. doi: 10.1080/1331677X.2018.1559073
- Ng, A., Kermani, M. S., and Lalonde, R. N. (2021). Cultural differences in psychological reactance: responding to social media censorship. *Curr. Psychol.* 40, 2804–2813. doi: 10.1007/s12144-019-00213-0
- Quick, B. L., and Kim, D. K. (2009). Examining reactance and reactance restoration with south Korean adolescents: a test of psychological reactance within a collectivist culture. *Commun. Res.* 36, 765–782. doi: 10.1177/0093650290346797
- Rich, M., and Dooley, B. (2022). Japan's secret to taming the coronavirus: Peer pressure. New York: The New York Times.
- Rode, J. B., Dent, A. L., and Ditto, P. H. (2022). Climate change consensus messages may cause reactance in conservatives, but there is no meta-analytic evidence that they backfire. *Environ. Commun.* 17, 60–66. doi: 10.1080/17524032.2022.2101501
- Sittenthaler, S., Traut-Mattausch, E., and Jonas, E. (2015). Observing the restriction of another person: vicarious reactance and the role of self-construal and culture. *Front. Psychol.* 6. doi: 10.3389/fpsyg.2015.01052
- Triandis, H. C., and Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *J. Pers. Soc. Psychol.* 74, 118–128.
- Ward, N. J., Finley, K., Townsend, A., and Scott, B. G. (2021). The effects of message threat on psychological reactance to traffic safety messaging. *Transp. Res. Part F Traffic Psychol. Behav.* 80, 250–259. doi: 10.1016/j.trf.2021.04.013