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Moral expansiveness and pro-environmentalism: the mediating role of moral emotions

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ABSTRACT

Moral circles represent the figurative boundaries that distinguish the human and non-human entities that are considered to have moral worth from the entities that are considered to lack moral worth. The extent to which individuals have wide-reaching boundaries is referred to as moral expansiveness. Investigations into the psychological processes that underlie moral circle decision-making and moral expansiveness are only just beginning. Through two studies, we investigated the mediating role of moral emotions as a potential mechanism linking individual differences in moral expansiveness with pro-environmental outcomes. In Study 1, anger mediated the link between moral expansiveness and pro-environmental behavioural intentions. We replicated and extended this finding in Study 2 using two culturally distinct samples (the United States and Japan). Unlike anger, the mediating effect of disgust depended on the culture and specific form of moral judgment. The mediating effect of disgust was significant only in the United States and in relation to pro-environmental and prosocial decision-making for in-groups. Together, these findings provide some of the first evidence of the psychological mechanisms linking moral expansiveness to subsequent pro-environmental decision-making and highlight anger as a crucial emotional component.

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A forest, to some, is merely an expendable resource. To others, a forest has intrinsic moral value, and thus deserves protection (Crimston et al., 2016; Rottman et al., 2021). One useful conceptual tool for delineating which entities are perceived to warrant moral concern is that of the "moral circle" (Singer, 2011). Moral circles refer to the figurative boundaries individuals draw around those entities they consider worthy of moral concern. For example, a person may firmly include their family and friends within their moral circle, granting them moral consideration, while excluding distant outgroups, such as political opponents, or certain animal species. The breadth of one's moral circle influences moral judgments and behaviour.

Recent research has considerably advanced our understanding of the moral circle as a psychological construct (Bastian et al., 2011; Bastian, Costello, et al., 2012; Bastian, Loughnan, et al., 2012; Graham et al., 2017; Laham, 2009; Opotow, 1993; Waytz et al., 2019) and how we may assess individual differences in the scope of the moral circle, hereafter referred to as moral expansiveness (see Crimston et al., 2016, 2018a, 2018b). The Moral Expansiveness Scale (MES; Crimston et al., 2016) assesses the breadth of one's moral circle using a graded, concentric-circle task. Participants place a diverse set of human and non-human entities into one of four zones: inner circle (highest moral concern; people would defend or sacrifice resources for these entities), outer circle (substantial but less absolute concern), fringes of moral concern (minimal or conditional concern), and outside the moral boundary (no perceived

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claim to moral concern). Higher placements across entities indicate greater moral expansiveness. People with greater moral expansiveness extend moral concern to a diverse range of entities, including those that are socially, physically, or biologically distant, such as outgroups, animals, and even ecosystems. They are more likely to advocate for the rights and well-being of entities that others may overlook or exclude. In contrast, people with lower moral expansiveness tend to limit their moral concern to those with whom they have direct relationships or a strong sense of social connection, such as family, close friends, and members of their ingroup. For them, moral consideration rarely extends beyond their immediate social and cultural boundaries.

Research has revealed that greater moral expansiveness is linked to enhanced empathy, compassion, identification with humanity, connectedness to nature, and the endorsement of progressive moral and universalist (versus parochial) values (Crimston et al., 2016, 2018b, 2022; Waytz et al., 2019). Moreover, individual differences in moral expansiveness are powerful predictors of prosocial attitudes and behaviours. For example, greater moral expansiveness predicts an increased willingness to donate time and financial resources to protect animals and the environment (Crimston et al., 2016, 2018a; Takamatsu & Takai, 2016).

Additionally, greater moral expansiveness has been proposed as a powerful driver of pro-environmental attitudes and intentions in the environmental psychology literature (Bain & Bongiorno, 2020; Bratanova et al., 2012; Swim & Bloodhart, 2018). However, little is known about the affective and motivational mechanisms through which moral expansiveness leads to pro-environmental outcomes. Specifically, the reality of defending morally expansive principles requires more than just favourable environmental attitudes; it often also requires concrete commitments in terms of one's time and resources (Crimston et al., 2016). This may explain why environmental knowledge alone is insufficient to encourage pro-environmental action (Carmi et al., 2015). What motivates morally expansive individuals to express pro-environmental concerns? One possibility is that emotions have great potential to drive pro-environmental attitudes, beliefs, and behaviours (Brick et al., 2023). In the current research, we investigate the role of moral emotions in linking a morally expansive mindset to subsequent environmental decision-making.

Anger as a moral emotion

Emotions are an integral part of moral cognition and behaviour (Haidt, 2003; Huebner et al., 2009; Rozin et al., 1999), and harmful actions typically trigger anger (Batson et al., 2007; Hechler & Kessler, 2018; Rozin et al., 1999). Traditionally, anger has been conceptualised as a destructive emotion that drives hostile behaviour as a means of harming another (Carver & Harmon-Jones, 2009; de Rivera & Grinkis, 1986), with elicitors including blocking significant goals and threatening a sense of justice (Berkowitz & Harmon-Jones, 2004). However, prior research has also demonstrated that anger may also motivate people to take prosocial action to restore a sense of equity (for review, see van Doorn et al., 2014). Moral anger can even drive people to follow through on long-term commitments (Cherry & Flanagan, 2018), make sacrifices for a particular cause (Rodgers, 2010), and drive action for the protection or reparation of victims (Jagannathan & Rai, 2016; Tangney et al., 2007).

It is plausible that anger may, therefore, fuel certain forms of prosociality by increasing motivation for subsequent engagement (Carver & Harmon-Jones, 2009; Cherry & Flanagan, 2018). Relevant to the current research, people feel morally responsible for protecting those within their circle of moral regard (Crimston et al., 2016). When people perceive harm committed against someone or something worthy of moral consideration, it may elicit compassion for the victim and anger toward the perpetrator (Graham et al., 2011; Hechler & Kessler, 2018; Hutcherson & Gross, 2011; Lopez et al., 2021; Rozin et al., 1999; Russell & Giner-Sorolla, 2011; Seip et al., 2014; Tetlock et al., 2000). In turn, when people experience moral anger, they may be motivated to engage in actions designed to serve as reparations for the perceived wrongdoing and foster the well-being of the victims (Haidt, 2003; Hechler & Kessler, 2018; Rozin et al., 1999; Russell & Giner-Sorolla, 2011; Tetlock et al., 2000). Therefore, a sense of anger may serve as a crucial link between our judgments regarding moral worth, and our motivations to engage in prosocial actions tied to those judgments.

Trait anger in moral psychology has been a relatively understudied topic. Generally, trait anger refers to a destructive nature and unfavourable interpersonal outcomes, such as violence (Carver & Harmon-Jones, 2009). In the moral context, the widely used measure of trait anger tends to

measure a hostile tendency to respond unethically to restore justice (Berry et al., 2005). Furthermore, the focus of anger in moral psychology has been on state anger, which is operationalised as a temporary experience of anger that instigates action, whereas the role of trait anger in shaping moral cognition has received comparatively little attention.

Anger and environmentalism

Specifically, in the current research we are interested in advancing our understanding of the mechanisms associated with greater moral expansiveness towards the environment – including non-human animals, plants, and their broader ecosystems. In previous studies, anger has been directly tied to prosocial environmental attitudes and intentions (Antadze, 2020; Lu & Schuldt, 2015; Stanley et al., 2021). Specifically, state anger often occurs in response to the damage or destruction of nature and is most pronounced when there is an agent (i.e. a morally responsible character) perceived to be responsible for that destruction (Carrus et al., 2008; Nerb & Spada, 2001). Anger also plays an important role in predicting attitudes toward and intentions to adopt pro-environmental actions. For example, anger has been shown to mediate the link between environmental justice beliefs and pro-environmental intentions (Reese & Jacob, 2015) as well as to promote active participation in climate action (Stanley et al., 2021). Environmental knowledge on its own is weakly predictive of pro-environmental attitudes and intentions unless it is tied to emotional components such as affective bonding to nature, environmental concerns, and felt commitment to nature (Carmi et al., 2015). Taken together, prior research suggests anger may provide a crucial motivational link between environmental moral expansiveness and subsequent pro-environmental intention. However, the nature of this association is poorly understood. One possibility is that anger in response to perceived harm to environmental entities we deem worth of moral consideration may motivate pro-environmental engagement.

Beyond positive and negative affect

The positive–negative spectrum is a convenient way to categorise emotions; however, focusing solely on valence may oversimplify the cognitive and motivational tendencies that each emotion elicits. An appraisal tendency framework posits that emotions of the same valence category (positive or negative) differentially influence judgment and choice (Lerner & Keltner, 2000). In particular, negative emotions of the same valence, such as anger and fear, differ on cognitive appraisal dimensions (Smith & Ellsworth, 1985) and produce divergent judgments and choices (Lerner & Keltner, 2000). Similarly, moral emotions have motivational components that differentially influence subsequent moral cognition and behaviour (Horberg et al., 2011).

To illustrate, anger and disgust drive distinct motivational tendencies – anger increases approach-oriented responses, while disgust promotes avoidance. Anger has been shown to motivate participants to endorse harm aimed at achieving a utilitarian outcome (saving a greater number of people by harming one), whereas disgust leads participants to make harsher judgments of such behaviour (Baron et al., 2018; Ugazio et al., 2012). In response to moral violations, anger can lead to direct aggression (i.e. acts of violence), whereas moral disgust is more likely to lead to indirect forms of aggression, such as spreading negative information or avoiding contact (Molho et al., 2017). Understanding the unique roles of each of these specific emotions in moral expansiveness judgments may clarify why morally expansive individuals are committed to securing the moral rights of distant and dissimilar others, including environmental entities. Accordingly, Study 1 focused on anger as a starting point, while Study 2 extended this by including both anger and disgust.

Disgust

Disgust is often elicited in different contexts from those that elicit anger (Haidt, 2003; Hutcherson & Gross, 2011; Rozin et al., 1999; Russell & Giner-Sorolla, 2011). For example, an action that blasphemes a sacred entity may violate the moral standards endorsed by individuals and/or groups (Graham et al., 2011; Haidt, 2003) and produce feelings of disgust which, in turn, may fuel the desire for moral condemnation and retribution. Because nature is considered sacred in many cultures and religions (Billet et al., 2023; Mazumdar & Mazumdar, 1993), including the Japanese appreciation of nature in Shinto (Ama, 1996), and environmental entities are commonly perceived to be worthy of moral protection (Crimston et al., 2016; Rottman et al., 2015), harm or perceived violations involving nature may evoke disgust responses across cultures.

Current research

In the current research, we aimed to ascertain the role of anger and disgust as potential mechanisms linking environmental moral expansiveness (i.e. moral concern for animals, plants, and ecosystems) to subsequent pro-environmental decision-making. Previous work has shown that moral expansiveness accounts for 6%–8% of the variance explaining the intention to donate to an environmental cause after controlling for age, gender, political ideology, and social and personality correlates, such as moral values and identity (Crimston et al., 2016; Takamatsu, 2022). This suggests that while moral expansiveness reliably predicts moral concern for nature, there is room for other factors to explain the relationship.

To date, the affective and motivational factors linking environmental moral expansiveness and pro-environmental intentions have not been empirically established. It remains unknown how individuals with different levels of moral expansiveness experience anger and disgust in situations that threaten the environment. Investigating the role of emotions to better understand the relationship between moral expansiveness and pro-environmental outcomes not only unifies previous research (Carmi et al., 2015; Crimston et al., 2016; Harth et al., 2013) but also advances our understanding of how emotion shapes moral cognition through the attribution of moral value to entities. In this research, we aimed to understand if anger and disgust might underly the relationship between moral expansiveness and pro-environmental decision-making. In Study 1, we tested the hypothesis that state anger in response to anti-environmental behaviours would mediate the link between moral expansiveness and pro-environmental concerns among US participants.

Although theoretical frameworks in moral psychology have sought to develop a universal model of morality, they largely rest on Western ethical principles, with most published studies conducted in Western societies. Study 2 was a preregistered replication and extension of Study 1 conducted in both the United States and Japan (https://doi.org/10.17605/OSF.IO/DXKGH). In addition to the cross-cultural examination, Study 2 further expanded on Study 1 by investigating the role of disgust in addition to anger, as well as both trait and state emotions in the two culturally diverse groups. In Study 2, we also included additional items for human outgroups to reveal whether the findings from Study 1 are unique to non-human targets, or whether anger and disgust instead have more general relationships to moral expansiveness. The Institutional Review Board of the Department of Policy Studies, Aichi Gakuin University, approved the protocol for this study.

Analysis plan

We used R version 4.4.3 (R Core Team, 2022). All analysis code and de-identified data are available at https://doi.org/10.17605/OSF.IO/Q3GTD. Based on prior findings on the demographic predictors of pro-environmental attitudes and behaviours (see Gifford & Nilsson, 2014, for review), age, gender (0 = female, 1 = male, 2 = other), and ethnicity were entered as covariates. In addition, because political ideology is closely tied to pro-environmental outcomes in the US (Brick & Lewis, 2016; Markowitz et al., 2012), we controlled for political ideology in our main analyses.

In line with prior research (Crimston et al., 2016), the aggregate score of the moral expansiveness scale (MES) was used for the primary analyses. Across both studies, the main hypotheses to be tested involved a mediation analysis (5,000 bootstrapped samples with bias-corrected 95% confidence intervals) using PROCESS in R (Preacher & Hayes, 2004).

In Study 1 and 2, the completely standardised beta for ab pathways (ab_{cs}) was used to indicate the effect size of the indirect effect (Preacher & Kelley, 2011). Effect sizes were interpretated as $ab_{cs} = 0.01$ (small effect), $ab_{cs} = 0.09$ (medium effect), and $ab_{cs} = 0.25$ (large effect). In Study 2, we compared the strength of the significant indirect effects of anger and disgust in parallel mediation models using a contrast parameter (= 1) that tests the difference between the regression weights. The strength of the indirect effects is significantly different when the confidence interval does not include 0. In Study 2, we compared the magnitudes of the indirect effects in the US and Japan models when the indirect effect was significant in both models, following the method proposed by Ryu and Cheong (2017). Indirect effects are significantly different if the Wald test comparing path a × b group coefficients shows a significant effect ($p < .05$).

Study 1

Study 1 provided a targeted test of the primary hypothesis by exploring whether greater moral concern for the environment was associated with increased pro-environmentalism with heightened

state anger as a mediator. Specifically, we tested the hypothesis that angry reactions to harm to nature (state anger) would mediate the relationship between moral expansiveness and pro-environmental donation intention.

Methods

Participants

To determine the appropriate sample size, we followed Fritz and MacKinnon's (2007) bias-corrected bootstrap method. Crimston et al. (2016) showed a medium correlation between moral expansiveness and pro-environmental intentions, whereas past research identified a large effect size for the association between anger and pro-environmentalism (Harth et al., 2013). Therefore, our analysis indicated that a sample of 148 was required to achieve a power of 0.80 and to identify our predicted large indirect effect.

One-hundred and fifty-one participants from the United States were recruited via Amazon's MTurk (female = 40.4%, M_{age} = 43.2, SD = 11.3). Workers had passed quality tests for the Mturk Masters qualification and were paid $$1.20 as compensation. The majority (n = 115, 76.2%) identified themselves as White/European American, 16 (10.6%) as East Asian, seven (4.6%) as Black/African American, and six (4.0%) as mixed/multiethnic. The remaining were Hispanic/Latino (2.0%); South/Southeast Asian (1.3%); Arab, North African, or Central Asian (0.7%); and Latin American (0.7%). We excluded two participants who indicated at the end of survey that their responses may have been unreliable.

Measures

After agreeing to participate, participants read brief descriptions of the four moral circles to ensure they understood each one before mapping human and non-human entities onto them. See the Supplementary Materials for the full list of scale items.

Moral expansiveness toward environmental entities. To measure moral expansiveness towards environmental entities, we used a modified version of the Moral Expansiveness Scale (MES; Crimston et al., 2016). As we were interested in moral expansiveness directed toward nonhuman entities, the original MES items for human targets were not included. Additionally, to measure moral expansiveness toward a wider array of environmental entities, we added an additional four targets (elephants, pigs, sheep, lizards) to the original list (bees, fish, chickens, chimpanzees, dolphins, cows, redwood trees, apple trees, rose bushes, coral reefs, old-growth forests, and national parks). Participants rated the degree to which they extended moral concern to the sixteen animals, plants, and ecosystems (α = .96). Responses were recorded on a four-point scale: 0 (*outside the moral boundary*), 1 (*fringes of moral concern*), 2 (*outer circle of moral concern*), and 3 (*inner circle of moral concern*). The scores were aggregated, with higher scores indicating greater environmental moral expansion. Internal consistency was excellent (Cronbach's α = .96).

Anti-environmental anger. To measure angry reactions to anti-environmental behaviours, participants read about six anti-environmental behaviours. The depictions of anti-environmental behaviours were based on the existing literature (Brick et al., 2017; Olli et al., 2001). Participants rated the degree to which they experienced anger in reaction to those anti-environmental behaviours (Supplementary Material 1; α = .90). Example items included "You see someone throw out something recyclable", "You hear about an anti-environmental organization that denies climate change", and "You hear about someone who refuses to conserve water". Responses were recorded on a five-point scale ranging from 1 (*not at all*) to 5 (*a great deal*). An anti-environmental anger score was calculated by aggregating the scores of the six items (α = .82). Vignettes are widely used in morality studies where participants imagine themselves in morally significant situations and report their emotional reactions and judgments. For this study, we used vignettes that specifically address the moral issues relevant to this study. Given the broad scope of environmental concerns, which involve a variety of nonhuman entities and human interests, vignettes offer a controlled way to direct participants' attention to specific morally relevant situations. This approach allows us to focus on particular aspects of environmental morality while maintaining control over the context in which participants engage.

Intention to donate to environmental causes. Participants completed six items adopted from Crimston et al.'s (2016) study to measure their intention to donate money to environmental charities. The instructions read as follows: "Now, imagine that you have recently inherited a large sum of money. How likely are you to donate a portion of it to the following causes?" The amount of money inherited was not specified.

Participants were asked for their likelihood of donation across each of the six charities (e.g. saving chimpanzee habitats, restoring blue-fin tuna populations, and saving endangered plant species), from 1 (*very unlikely*) to 7 (*very likely*). An overall donation intention score was calculated by aggregating the scores of the six items ($\alpha = .90$).

Demographics. Age, gender, ethnicity, and political orientation were also assessed. Political orientation was assessed by asking participants to report the extent to which they thought of themselves as liberal, moderate, or conservative in politics on a nine-point scale (1 = *very liberal*; 9 = *very conservative*).

Results and discussion

Zero-Order correlations

Table 1 presents the descriptive statistics and correlations among the variables studied.

Replicating Crimston et al. (2016), moral expansiveness was positively correlated with pro-environmental donation intentions. Extending prior literature, state anger regarding anti-environmental behaviour was also positively associated with moral expansiveness and as expected, positively correlated with pro-environmental donation intentions.

Mediation analysis predicting donation intention

We ran a mediation analysis to test the prediction that anger would mediate the relationship between moral expansiveness and pro-environmental donation intention (controlling for age, gender, ethnicity, and political orientation; see Figure 1).[1] In line with predictions, moral expansiveness predicted pro-environmental donation intention through state anger: $IE_{boot} = 0.127$, $SE = 0.051$, 95% CI [0.045, 0.242]. The direct effect of moral expansiveness on donation intention remained significant: $b = .34$, $p < .001$, 95% CI [.20, .48]. The mediation effect of anger was moderate, $ab_{cs} = 0.14$.

Table 1. Descriptive statistics and Pearson correlations of MES, anger, and donation (Study 1).

	1	2	3
1. MES	–		
2. Anger	.48***	–	
3. Donation	.53***	.50***	–
M	1.24	2.86	4.00
SD	0.67	1.25	1.61
α	.96	.82	.90

Note: $N = 151$. ***$p < .001$. MES = moral expansiveness for environmental entities. Anger = Anti-environmental anger (state anger).

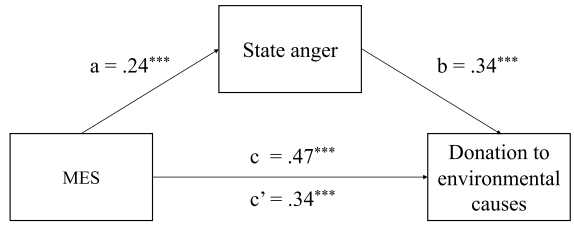

Figure 1. Mediation model of the effect of MES on donation to pro-environmental causes through anger (Study 1).

Note: ***$p < .001$. Age, gender, ethnicity, and conservatism were entered as covariates. MES = Moral Expansiveness Scale. Environmental anger = state anger.

Discussion

In Study 1, we found evidence linking state anger to increased environmental moral expansiveness and replicated past effects, whereby greater moral expansiveness predicted pro-environmental intentions. Most importantly, we found evidence supporting our primary prediction that anger tied to anti-environmental behaviour mediates the relationship between environmental moral expansiveness and pro-environmental donation intentions.

One limitation in Study 1 is that the measure of intention to donate to environmental causes (Crimston et al., 2016) is hypothetical in nature, reducing ecological validity (an issue that we discuss further in the General Discussion). Additionally, while the results of Study 1 provide valuable initial insight into our understanding of the role of moral anger as a potential mechanism linking moral expansiveness and pro-environmental intentions, at present, it is unclear to what extent anger drives the identified effect (as opposed to other forms of negative affect like disgust) and whether anger is distinct from perceptions of moral wrongness. It is also unclear whether this result extends to trait rather than state emotions. In addition, without a comparison to human targets, we cannot know whether this finding is unique to non-human targets or if the same processes hold for moral decision-making regarding human targets. Finally, it is unknown whether these findings might extend to additional cultural contexts. Therefore, we conducted Study 2 to address these limitations.

Study 2

In Study 1, we found two pieces of evidence in support of the primary hypothesis that (1) greater moral expansiveness toward the environment is

associated with more state anger in response to environmental harm, and (2) state anger mediates the link between moral expansiveness and greater pro-environmental outcomes. In Study 2, we extended the first study in several ways. While past evidence shows that people often react to moral violations with a combination of anger and disgust (Salerno & Peter-Hagene, 2013), it is unclear whether disgust serves as an additional psychological mechanism linking morally expansive decision-making to pro-environmental motivations and concerns. Therefore, state anger and disgust were examined as potential mediators in Study 2.

In addition, we explored whether individual differences in trait anger and disgust were associated with moral expansiveness and pro-environmental outcomes. While state anger has been reliably associated with adaptive responses to moral injustice (Cherry & Flanagan, 2018), less is known about the potential consequences of trait anger within the environmental domain. In addition, trait anger and disgust tend to predict different outcomes. Trait anger is associated with non-moral constructs such as hostility, aggression, and thrill-seeking (Veenstra et al., 2018), whereas trait disgust may predispose people toward making harsh moral judgments (Donner et al., 2023; Schnall et al., 2008). To explore whether individual differences in trait anger and disgust link moral expansiveness to pro-environmental outcomes, we investigated both state and trait anger and disgust in Study 2.

Another consideration, given the present focus on animals and nature, is whether the results of Study 1 are actually specific to moral expansiveness toward nonhuman entities, rather than being broadly applicable. Using the subscales of the Moral Expansiveness Scale (nonhumans, human ingroups, and human outgroups) rather than aggregated moral concern ratings provides a finer-grained picture of moral evaluations of different entities. In Study 2, we included moral expansiveness toward human in-groups and human out-groups to test the extent to which emotions link moral expansiveness to behavioural intentions in the same manner for nonhuman and human entities. By contrasting moral expansiveness for nonhumans with that for human groups, we can determine whether and how our findings are unique to the environment, as opposed to any other entity that might be included in the moral circle. This is both practically important as well as theoretically important, given previous indications that moral concern for nature and animals might operate differently than moral concern for humans (e.g. Rottman et al., 2021).

Finally, we explored whether the mediating role of emotions linking moral expansiveness and environmental decision making differed across cultures. For cross-cultural comparison, we chose Japan for two reasons. One reason is methodological, that is, a validated Japanese measure is available for the Moral Expansiveness Scale (Takamatsu & Takai, 2017), the Disgust Sensitivity Scale (Iwasa et al., 2016) and Trait Anger (Mine et al., 1996). Another reason is that cultural differences become particularly evident when examining negative emotions. To illustrate with a few examples, Japanese culture discourages people from experiencing socially disengaging emotions, including anger (Schouten et al., 2020). In addition, the motivational factors predicting pro-environmentalism often differ in the US and Japan. For example, Eom et al. (2016) examined the role of culture in motivating pro-environmental decision-making and found that Japanese participants made pro-environmental consumer choices because they believed that the choice aligned with what most others agreed with in society. In sharp contrast, for the American participants, perceived social norms did not affect purchases of environmentally conscious products. These findings suggest that the US and Japan are culturally distinct in terms of emotions and environmental decision-making, and comparing the two cultural groups would be a good starting point for investigating the role of anger in the relationship between moral expansiveness and pro-environmental outcomes.

However, evidence indicates that the types of emotions tied to moral cognition and judgment are often shared across cultures (Rozin et al., 1999; Shweder et al., 1997). Rozin et al. (1999) compared the associations between facial expressions/emotional words (anger, contempt, and disgust) and moral domains (autonomy, community, and divinity) among Japanese and American college students. They found that moral violations in one domain matched the same emotion in two diverse cultures (Rozin et al., 1999). In addition, a cross-cultural investigation of disgust sensitivity by Olatunji et al. (2009) showed that the three conceptual domains of disgust elicitors are common in Japan and the United States. Therefore, in Study 2, we wanted to further extend Study 1 by exploring the links between moral expansiveness, moral emotions (anger and disgust), judgments, and pro-environmental concerns across two distinct cultural contexts: the US and Japan.

Methods

Participants

Initially, we aimed to collect at least 150 participants from each country based on the suggestion for sample size (Fritz & MacKinnon, 2007) in Study 1. As the initial analysis plan used a new PROCESS template (Model 6) that required a larger sample size, we set out to collect a meaningfully large sample.[2] In each crowdsourcing platform, we increased the number of available slots. A total of 252 US Amazon MTurk workers and 254 Japanese CrowdWorks workers participated in Study 2. In Study 1, we relied on MTurk's quality check to collect reliable data. In Study 2, the length of the survey was doubled, so we added our own measure to ensure data quality. Two attention checks were used on separate pages. For one question, participants were presented with a list of four entities, three of which appeared in the MES task. Those who could not correctly identify the entity that was not included in the MES task were excluded from the analysis. For another attention-check question, participants were asked to enter one of the 24 entities included in the MES task at the end of the survey. Participants who could not recall an entity correctly were excluded from the analysis. In total, we excluded 51 US and 20 Japanese participants, leaving 201 US (37.8% female, $M_{age} = 33.2$, $SD = 9.5$) and 234 Japanese participants (51.7% female, $M_{age} = 41.9$, $SD = 9.4$) for the analysis. As in Study 1, the majority of US participants ($n =$ 165, 82.1%) identified themselves as White/European American, 2 participants (3.0%) as Black/African American, and 3 participants (5.5%) as Hispanic/Latino. The remaining were Native American/American Indian (2.5%), East Asian (0.5%), and South/Southeast Asian (5.5%). The ethnicity item was not included in the Japanese version, given the greater homogeneity in this country and that one of the requirements for participation was a Japanese national residing in Japan. Upon completion, the participants were compensated $$1.80 (200 yen).

Measures

As in Study 1, all of the scale items are provided in the Supplementary Material. To ensure linguistic equivalence, we used a rigorous translation process that included backward translation by bilinguals. This also included ensuring conceptual equivalence across the two cultural groups.

Moral expansiveness toward human and environmental entities. Participants rated the degree to which they extended moral concern to nonhuman (environmental) and human entities, including in-groups and out-groups, using the original Moral Expansiveness Scale (Crimston et al., 2016). All scale scores had good to excellent internal consistency in both samples (αs = .80–.96).

Intention to donate to environmental causes. In addition to the six items in Study 1, we added four items to measure intention to donate to environmental and humanitarian causes (see Supplemental Table 1). The responses ranged from 1 (*very unlikely*) to 7 (*very likely*). All scale scores had excellent internal consistency in both samples (αs = .91–.96).

Intention to donate to humanitarian causes. Participants completed 10 items measuring their intention to donate money to humanitarian charities. The recipients were either in-groups (e.g. "Support local families impacted by cancer", "End domestic violence against children", and "Help a colleague who lost their home in a fire") or out-groups ("Help refugees to meet basic survival needs", "Provide basic supplies to homeless populations", and "Help offenders transition out of prisons"). The responses ranged from 1 (*very unlikely*) to 7 (*very likely*). Intention to donate both to in-groups and to out-groups scores had excellent internal consistency in both samples (αs = .91–.94).

Moral judgments for anti-environmental behaviours. For Study 2, we adapted eight items from previous studies that depicted moral violations of autonomy that normally elicit anger (Graham et al., 2009; Rozin et al., 1999). Each item depicted an individual or a company that had acted contrary to the moral value of autonomy and caused harm toward an animal/nature or a human (e.g. capturing an endangered animal for money, stealing a purse from a blind person, shooting an endangered species, and releasing toxic elements into the air [causing pollution] or containers of yogurt [putting someone's life in serious danger]). These items were adapted to cover a wide range of moral issues (Supplemental Table 1) and were divided into two categories depending on whether the target was human or nonhuman. Thus, half of the items measured moral judgments related to environmental concerns and the other half reflected humanitarian concerns. The responses ranged from 1 (*very unlikely*) to 7 (*very likely*). The internal consistencies for both moral judgments for nonhuman and human groups were good (αs = .60–.82) except for moral judgments for human groups in the Japanese sample ($\alpha = .51$).

Emotional reactions. The participants rated how much anger (anger, fury, and rage) and disgust (disgust, queasiness, and upset stomach) they experienced after reading each item. The items were also used for assessing moral judgments for human and nonhuman targets. The instructions read as follows: "We would like you to think about your reactions to these behaviors. Please rate the extent to which you would feel the following emotions from 1 (not at all) to 7 (a great deal)". Emotional adjectives were selected based on Bamberg et al. (2015) and Horberg et al. (2009). These three emotional adjectives were combined into overall anger and disgust measures. All scale scores had acceptable internal consistency in both samples (anger: αs = .67–.73; disgust: αs = .69–.75).[3]

Trait anger. The Trait Anger scale of the Spielberger's State-Trait Anger Expression Inventory (STAXI; Spielberger et al., 1988) comprises 10 items that assess anger as a dispositional propensity with or without provocation (e.g. "I am quick tempered", "I get angry when I'm slowed down by others' mistakes"). Items are scored on a four-point Likert scale from "*almost never*" (=1) to "*almost always*" (=4). The Japanese version was validated by Mine et al. (1996) and has shown good psychometric properties. All scale scores had good internal consistency in both samples (αs = .87–.88).

Trait disgust (disgust sensitivity). The Disgust Propensity and Sensitivity Scale Revised (Olatunji et al., 2007) comprised 25 items that assess the frequency of experiencing disgust and the emotional intensity of disgust in several domains, including animal (e.g. "It would bother me to see a rat run across my path in a park") and interpersonal (e.g. "I never let any part of my body touch the toilet seat in a public washroom"). Items are scored on a five-point Likert scale ranging from "*not at all* (=1)" to "*very much* (=5)". Iwasa et al. (2018) have confirmed the reliability and validity of the Japanese version. All scale scores had acceptable and excellent internal consistency in both samples (αs = .78–.93).

Demographics. Data on age, gender, ethnicity,and political orientation were collected and used as control variables.

Results and discussion

Zero-Order correlations

Table 2 shows the descriptive statistics, correlations, and Cronbach's alphas of the studied variables for the American and Japanese respondents. Moral expansiveness toward nonhuman entities was positively associated with the intention to donate to environmental causes in both countries. Moral expansiveness was correlated with increased state anger and disgust in response to moral violations and perceived moral wrongness in the US but not in Japan. With regard to moral expansiveness, trait anger, and disgust, there were significant correlations among the US participants, whereas no significant correlation was found among the Japanese participants for either nonhuman or human entities.

Mediating role of state anger and disgust

We examined whether anger and disgust would mediate the relationship between moral expansiveness and intention to donate to both human and nonhuman targets. Anger and disgust were entered simultaneously into the model as parallel mediators. As preregistered, we tested the models separately for the US and Japanese samples. Results of mediations models predicting intentions to donate to humanitarian (in-groups and out-groups) causes are provided in the Supplementary Material.[4]

United States

For US participants, we found a significant indirect effect of moral expansiveness on donation via state anger, $IE_{boot} = 0.127$, $SE = 0.049$, 95% CI [0.046, 0.238], and disgust, $IE_{boot} = 0.117$, $SE = 0.058$, 95% CI [0.024, 0.248]. The direct effect of moral expansiveness on donation remained significant, $b = .32$, $SE = .093$, $p < .001$, 95% CI [0.138, 0.505] (see Figure 2). The mediation effects of anger and disgust were moderate: $ab_{cs} = 0.08$ (anger) and $ab_{cs} = 0.08$ (disgust). The magnitude of mediation effects did not differ significantly, $IE_{boot} = 0.009$, $SE = 0.081$, 95% CI [−0.156, 0.169].

Japan

In Japan, the indirect effect of moral expansiveness on pro-environmental donation intentions via state anger was significant, $IE_{boot} = 0.095$, $SE = 0.047$, 95% CI [0.012, 0.197], whereas the mediating effect of disgust was not significant, $IE_{boot} = 0.037$, $SE = 0.031$, 95% CI [−0.002, 0.113]. The mediation effect of anger was small, $ab_{cs} = 0.04$. The direct effect of moral expansiveness on donation intentions remained significant, $b = .36$, $SE = .136$, $p = .008$, 95% CI [0.096, 0.630] (See Figure 3).

Table 2. Descriptive statistics and Pearson correlations of variables under investigation by nationality group (Study 2).

USA ($n = 201$)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MES total													
2. MES nonhuman	.87***												
3. MES human groups	.76***	.34***											
4. Anger nonhuman	.34***	.33***	.23*										
5. Anger human groups	.26***	.22**	.21**	.65***									
6. Disgust nonhuman	.38***	.34***	.26***	.61***	.61***								
7. Disgust human groups	.31***	.26***	.23**	.62***	.72***	.70***							
8. Moral judgment nonhuman	.36***	.25***	.38***	.43***	.43***	.48***	.49***						
9. Moral judgment human	.26***	.151*	.34***	.41***	.46***	.38***	.46***	.81***					
10. Donation nonhuman	.49***	.40***	.40***	.52***	.40***	.53***	.46***	.54***	.52***				
11. Donation human	.50***	.37***	.46***	.49***	.52***	.50***	.51***	.50***	.56***	.85***			
12. Trait anger	.54***	.58***	.24**	.37***	.25***	.38***	.31***	.178*	.096	.42***	.40***		
13. Trait disgust	.49***	.52***	.24**	.47***	.51***	.47***	.49***	.39***	.35***	.56***	.61***	.68***	
M	1.85	1.71	1.98	3.72	3.74	3.72	3.76	5.27	5.35	5.44	5.47	2.76	3.14
SD	0.44	0.61	0.47	0.70	0.74	0.70	0.72	1.11	1.08	0.93	0.96	0.61	0.62
α	.87	.88	.80	.67	.73	.69	.71	.81	.82	.91	.91	.88	.93
Japan ($n = 234$)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MES total													
2. MES nonhuman	.87***												
3. MES human groups	.72***	.28***											
4. Anger nonhuman	.21**	.16*	.189**										
5. Anger human groups	.08	.01	.14*	.70***									
6. Disgust nonhuman	.19**	.15*	.15*	.64***	.40***								
7. Disgust human groups	.10	.03	.15*	.37***	.48***	.74***							
8. Moral judgment nonhuman	.12†	.05	.16*	.63***	.46***	.58***	.39***						
9. Moral judgment human	−.002	−.05	.07	.29***	.46***	.40***	.59***	.60***					
10. Donation nonhuman	.30***	.24**	.25***	.36***	.16*	.30***	.06	.29***	.04				
11. Donation human	.32***	.18**	.37***	.24***	.12†	.21**	.08	.21**	.05	.82***			
12. Trait anger	.001	−.02	.03	.06	.04	.11†	.16*	.02	.02	−.08	−.06		
13. Trait disgust	.004	.01	−.01	.23**	.22**	.23***	.24***	.26***	.23***	−.03	−.04	.13†	
M	1.28	0.80	1.76	4.04	4.32	4.12	4.43	5.89	6.23	3.62	3.96	2.23	3.52
SD	0.44	0.63	0.46	0.66	0.58	0.67	0.57	0.72	0.62	1.40	1.31	0.53	0.38
α	.92	.96	.86	.73	.70	.75	.73	.60	.51	.96	.94	.87	.78

Note: $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. MES = moral expansiveness scale. Anger = Environmental (state) anger. Disgust = Environmental (state) disgust.

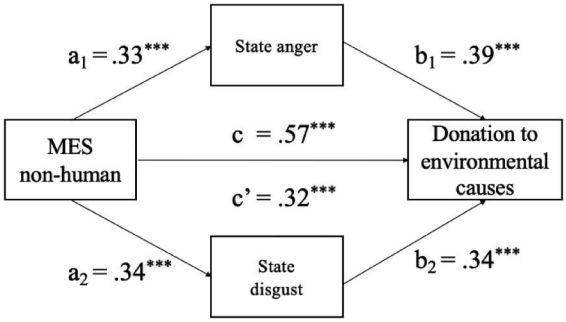

Figure 2. Parallel mediation model of the effect of MES on moral judgments of anti-environmental behaviours through anger and disgust in US (Study 2).

Note: *$p < .05$, **$p < .01$. Age, gender, ethnicity, and conservatism were entered as covariates. MES = Moral Expansiveness Scale. Environmental anger = state anger. Environmental disgust = state disgust.

Mediating role of trait anger and disgust

In the United States, the indirect effect of moral expansiveness on pro-environmental donation intention via trait anger was not significant, $IE_{boot} = -0.039$, $SE = 0.097$, 95% CI [−0.233, 0.148]. The indirect effect via trait disgust was significant, $IE_{boot} = 0.344$, $SE = 0.132$, 95% CI [0.143, 0.641]. We did not test the mediating effects of trait anger and disgust for the Japanese data because they were not significantly correlated with moral expansiveness or donation intention.

Table 3 shows the summary of results for mediation analyses. State anger mediated the relationship between moral expansiveness and pro-environmental donation intention in both the United States and Japan. We compared the magnitudes of the mediation effects and found that they were not significantly different, Wald = 0.47, $p = .636$.

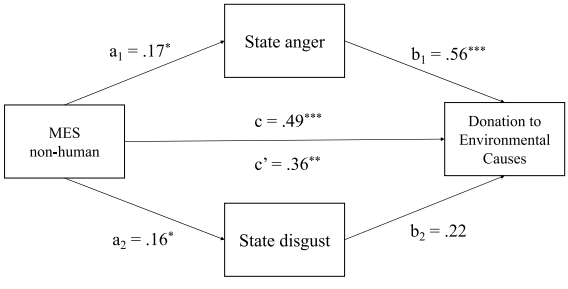

Figure 3. Parallel mediation model of the effect of MES donation to pro-environmental causes through anger and disgust in Japan (Study 2).

Note: *$p < .05$, **$p < .01$, ***$p < .001$. Age, gender, and conservatism were entered as covariates. MES = Moral Expansiveness Scale. Environmental anger = state anger. Environmental disgust = state disgust.

Table 3. Summary of results for mediation analyses.

Sample	Outcome variable	Significant mediator(s)	
Study 1			
	Donation to environmental causes	State anger	
Study 2			
	Donation to environmental causes (US)	State anger	State disgust Trait disgust
	Donation to environmental causes (Japan)	State anger	—

Note: Some mediation analyses for the Japanese sample were not run because moral expansiveness scores were not correlated with state anger, state disgust. In addition, trait anger and trait disgust were not correlated with donation intention in the Japanese sample.

In addition to the main analyses, we ran non-preregistered hierarchical regression analyses testing whether moral expansiveness scores for non-humans and humans uniquely predict intention to donate to pro-environmental and humanitarian causes. The results are provided in the Supplementary Material.

Discussion

In this preregistered study, we replicated the support for the prediction that anger mediated the link between environmental moral expansiveness and prosocial behavioural intentions, both in the US and in Japan. We also found that this was true for human targets, indicating that anger does not play a unique role in regard to nonhuman causes. However, the mediating role of disgust was more nuanced: state disgust mediated the link between moral expansiveness and pro-environmental behavioural intention in the US but not in Japan.

Notably, state disgust played a unique role in shaping the intention to protect nature, but not in the context of protecting human in-groups or out-groups. In the U.S., attitudes toward environmental issues can be polarised, but framing the protection of nature through the moral concept of purity, which relates to disgust, appeals to both conservatives and liberals (Feinberg & Willer, 2013). An important note is that the internal consistency of perceived moral wrongness (moral judgments) in Japan was inadequate, so caution should be exercised when interpreting the results involving this variable.

Moral expansiveness showed small to moderate positive correlations with trait measures (anger, disgust sensitivity) in the US, but no correlation in Japan. Trait anger did not mediate the relationship with moral expansiveness in either country. We discuss this finding further in the General Discussion.

In terms of trait disgust, why is moral expansiveness for human and nonhuman targets associated with high disgust sensitivity in the US, but not in Japan? One possible explanation is that, in Japan, disgust is more closely tied to meeting social expectations rather than protecting the moral rights of others. Prior work has shown that when asked to recall episodes of disgust, Japanese university students were more likely to mention social situations in which others failed to meet their expectations (Haidt et al., 1997). In line with this, disgust sensitivity has been strongly linked to the binding (group-based) moral foundations (respect for authority and in-group loyalty) in Japan (Aoyama, 2020). The Moral Expansiveness Scale (MES) assesses the perceived moral consideration owed to a particular entity. Prior work shows that moral expansiveness is correlated with the individualised moral foundation (care/harm), but not the binding moral foundations, (Crimston et al., 2016, Study 2). Given that disgust in Japan may be more closely tied to social norms than individualised moral concern, this cultural variation in the elicitors of disgust may explain why disgust sensitivity is not strongly tied to moral expansiveness in Japan.

General discussion

The purpose of the current research was to further our understanding of the affective and motivational mechanisms through which individual differences in moral expansiveness predicts pro-environmental decision making and intentions. In Study 1, we built on Crimston et al.'s (2016) work by showing that learning about others' anti-environmental behaviours elicit anger, which in turn mediates the relationship between moral expansiveness and pro-environmental intentions in participants from the United States. In Study 2, we investigated whether the results could be extended to other entities (humans),[5] another moral emotion (disgust), trait (in addition to state) emotions, and another culture (Japan). Our results showed that state anger reliably mediated the relationship in both the United States and Japan, while the mediating effect of disgust was specific to the cultural context. These results align with prior work demonstrating a link between anger and pro-environmentalism (Reese & Jacob, 2015; Stanley et al., 2021) and further suggest that morally expansive individuals may experience anger and be motivated to act toward pro-environmental outcomes in response to specific environmental issues and behaviours. Together, our results provide valuable insight into the role of moral emotions as potential mechanisms linking moral expansiveness to pro-environmental behavioural intentions.

Building on previous work on moral expansiveness (Bratanova et al., 2012; Crimston et al., 2016, 2022), the present study indicates that, in the context of environmental protection, broader moral expansiveness is related to pro-environmental outcomes partially via state anger toward anti-environmental activities. Consistent with the appraisal tendency framework, our results indicate that emotions with different appraisal themes play different roles in shaping moral cognition. Similarly, the domain specificity of moral emotions posits that several emotions have a moral tone, each uniquely associated with a specific moral domain and its corresponding behavioural consequences (Haidt, 2003; Horberg et al., 2011; Huebner et al., 2009). Our findings suggest that moral emotions are also tied to the context. In this study, pro-environmental outcomes involved active engagement with nature, such as donation intentions that requires some form of action. Therefore, the moral context was more relevant for anger than for disgust, as anger motivates action, whereas disgust is associated with withdrawal. Morally expansive individuals may have different emotional responses to environmental issues depending on the emotional framing of the context.

Related to this discussion, although both anger and disgust are associated with harsh moral condemnation, their conceptual divergence depends on the type of disgust (Gutierrez et al., 2012): sociomoral versus bodily. Norm violations involving harm, fairness, and autonomy are elicitors of sociomoral disgust, whereas violations concerning what should or should not be done with the body, such as sexual taboos, elicit bodily disgust. Sociomoral violations tend to trigger both anger and disgust, whereas bodily elicitors primarily evoke disgust (Russell & Giner-Sorolla, 2013). In this study (Study 2), our items measuring anger and disgust depicted moral situations in which norm violations were closely related to harm (e.g. "A man shoots and kills an animal that is a member of an endangered species"). This may be one reason why disgust did not consistently emerge as a mediator. Future studies should carefully categorise types of disgust elicitors and examine the distance between anger and disgust in the context of environmentalism.

While state anger mediated the link between moral expansiveness and pro-environmental behavioural outcomes in both cultural contexts, state disgust mediated the link in the US but not in Japan, and the mediating effect was significant only for environmental issues (vs. human-specific causes). One possible explanation is that the effects of state disgust on subsequent judgment, if they exist, are not robust. Because the present study and others have used items depicting hypothetical situations to induce imagined state disgust, the effects may be weaker than those of previous studies that have used sensory induction methods. Gustatory and olfactory inductions of disgust have been shown to produce the largest amplification effects, whereas imagined induction produced small or no effects (Landy & Goodwin, 2015). This also relates to a limitation of the present study, which is correlational in nature. To increase ecological validity, future studies should use a sensory induction method to measure emotional responses.

A second possible explanation concerns the items used to elicit emotional reactions. All of the items used to measure emotional reactions were based on published studies that recruited participants from WEIRD (Western, Educated, Industrialised, Rich, and Democratic; in this study, primarily US) populations. While the items were conceptually equivalent across the two cultures, some may have emphasised issues more relevant to the US context. Additionally, we did not include items specific to the Japanese context (e.g. the concept of harmonious relationships with nature in Shintoism). This may explain why internal consistency was low in the Japanese sample for emotional reactions to moral violations where the victim is the human out-group. Specifically, in Japan, the degradation of the moral domain of purity may be strongly associated with the deconstruction of nature (Ama, 1996). However, we did not emphasise the sanctity of nature or invoke anti-environmental behaviours that specifically focus on contamination. In the specific case of environmental degradation, disgust may emerge as a more consistent mediating factor in both countries.

The traditional valence-based approach predicts that dispositional emotions should predispose individuals to experience the corresponding emotion, which in turn amplifies the effects of state emotion on subsequent judgment. Although Study 2 measured both state and trait anger, the results are inconclusive as to whether trait anger galvanises the experience of anger in moral contexts. Individuals prone to moral anger should experience stronger anger in response to injustice (Graham et al., 2011). However, existing measures of trait anger focus on the self rather than others, and on retaliatory behaviour rather than restorative justice (Izard et al., 1993; Spielberger, 1988). This misalignment may explain why train anger, as currently measured, is not consistently tied to conceptualisation of moral anger (Cherry & Flanagan, 2018; Haidt, 2003; Hechler & Kessler, 2018). Empirical findings further highlight this issue: Steiger and Reyna (2017) found inconsistent associations between trait anger and moral values, while Wagemans et al. (2018, Studies 1–3) reported null effects for trait anger and moral judgments. Even when a significant effect is detected, it is small (Study 2; Steiger & Reyna, 2017). Given these findings, it remains unclear whether trait anger genuinely plays a weak role in moral cognition or whether current measures fail to capture moral anger adequately. To resolve this, future research should develop a measure that carefully operationalises moral anger.

It is worth noting that the direct effect of moral expansiveness was still significant after the mediator was added to our model. Emotions may play an important yet partial role in shaping moral attitudes and decision-making. Specifically, moral expansiveness may be associated with donation intentions through mechanisms other than state anger that were not captured in this study.

In Study 1, we adopted the measure of intention to donate to environmental causes from Crimston et al. (2016) for direct comparison and elaboration of emotion to the model. In the instructions, participants were asked to indicate their willingness to donate a portion of money they had recently inherited. While we believe this measure is useful in assessing people's willingness to part with a valued resource, the hypothetical nature of the task has limitations in terms of capturing willingness to engage in actual personal sacrifice. In addition, the impact of donation decisions may differ depending on an individual's financial circumstances. Future research could improve ecological validity by incorporating a more context-sensitive measure of donation behaviour, such as adjusting the donation amount relative to participants' perceived financial situation or using real rather than hypothetical donations. This approach would better capture the personal cost associated with giving and provide a clearer understanding of how financial context shapes moral decision-making.

Finally, while hypothetical moral violations are a useful tool for understanding how people might respond to certain scenarios, the imagined emotional state may differ from momentary emotional responses. Similarly, the behavioural choice in Study 1 had no real consequences, and thus, it remains unknown how committed the participants felt to their donation decisions. Real or actual targets evoke stronger emotions than hypothetical or imagined stimuli, and participants may donate less or more when their behavioural choices involve real consequences (Camerer & Mobbs, 2017). It may be that in this study, morally expansive participants could vividly imagine the situation in which an instance of anti-environmental behaviour was portrayed as outrageous and made decisions accordingly. Or they made decisions without feeling personally responsible for protecting nonhuman entities. Future studies should corroborate these findings by using experimental and ecologically valid methods to examine the effects of momentary emotions on the relationship between moral expansiveness and pro-environmental outcomes.

Conclusion

This study provides the first evidence of the mediating role of moral emotions in linking greater moral expansiveness to pro-environmental behavioural intentions. Our results suggest that pro-environmental campaigns may benefit from fostering moral anger in response to anti-environmental behaviours, even among those high with moral expansiveness. Disgust in the pursuit of advancing pro-environmental goals may work under specific conditions; however, further research is required. As we work toward a sustainable future, more research is needed to increase our understanding of the factors and processes that drive people to commit to pro-environmental causes, particularly in the face of intensifying competing interests and dwindling resources.

Notes

1. The results remained the same when the covariates were included in the analysis.
2. We preregistered a serial mediation model including moral judgment as another mediator. However, adding another mediator in the model complicated the results. Considering that our main purpose was to probe the potential role of emotion in linking moral expansiveness and pro-environmental outcomes, we report the results of parallel mediation including this variable in the Supplementary Material.
3. To test for measurement invariance, we examined the eight items measuring state anger using the target rotation method in the ccpsych package (Fischer & Karl, 2019). The US data were used as a reference category, as we rotated the Japanese sample to be similar to the US sample. The results showed a high Tucker's congruence coefficient ($\varphi = .98$), indicating that the extracted factor loadings were similar between the two cultural groups, while the correlation coefficient was relatively low ($r = .14$).
4. In the US sample, state anger mediated the relationship between moral expansiveness and donation to in-group causes. The other mediation paths were not significant. In the Japanese sample, moral emotions (state anger and state disgust) were not correlated with moral expansiveness for in-groups and out-groups, and thus, mediation analyses were not carried out.
5. In the US, the results do not appear to be specific to animals or nature, as state anger also mediated the relationship between moral expansiveness and donations to in-group causes.

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