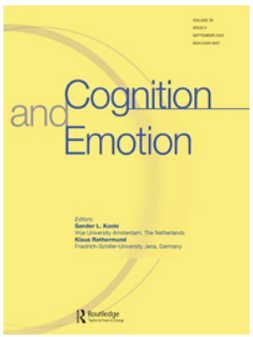

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Linking anger and disgust to motives and anticipations of aggression in the East: testing a socio-functional account of moral emotions in Japan

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ABSTRACT

Anger and disgust often underlie responses to social transgressions, yet their links to aggressive punishments have been primarily studied in Western populations. Across two studies sampling from Japan, we tested a socio-functional account of these two other-condemning moral emotions, which predicts differential associations of anger and disgust with direct versus indirect aggression. Study 1 ($N = 1,231$) revealed that anger relates to motives to aggress both directly and indirectly, whereas disgust relates only to motives to aggress indirectly. Study 2 ($N = 930$) extended these findings by showing that people infer greater direct aggression from anger expressions and greater indirect aggression from disgust expressions. These results are largely the same as those previously observed in Western samples. Overall, findings suggest that across culturally distinct populations, anger and disgust play similar functional roles in regulating aggressive punishments.

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Moral emotions; anger; disgust; aggressive punishment; cultural psychology

1. Introduction

People in all societies are faced with social transgressions. They might respond to such transgressions with emotions such as anger, disgust, or contempt and behaviours such as confrontation, gossip, or avoidance. Recent research involving participants from Western populations showed that two emotions – anger and disgust – have distinct associations with direct and indirect aggression (see Table 1 for an overview of studies). However, existing work leaves unanswered whether – or to what degree – this pattern generalises outside of Western populations. Such a gap is especially important to fill given that, while norm enforcement shares some features across cultures, punishment varies across populations (Molho et al., 2024). The present research therefore examines how two moral emotions, anger and disgust, are associated with distinct responses to social transgressions in a non-Western setting – Japan.

1.1. Moral emotions and punishment

Some researchers have treated anger and moral disgust as a single emotion or as a synonymous set of labels of outrage (e.g. Brady et al., 2020; Crockett, 2017; Nabi, 2002; Spring et al., 2018). This interpretation aligns with the observation that verbal self-reports of anger and disgust are often highly correlated (e.g. Giner-Sorolla et al., 2018). Yet, increasing evidence suggests differences between these two emotions. Some functional perspectives, such as the CAD triad hypothesis (Rozin et al., 1999) and Moral

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Table 1. Overview of studies examining relations between moral emotions of anger and disgust and punishment motives or anticipations of direct and indirect aggression.

			Key Results			
			DV: Direct Aggression		DV: Indirect Aggression	
Study	Sample Size and Nation	Emotion Measurement/Manipulation	Anger	Disgust	Anger	Disgust
Motives						
Hutcherson & Gross, 2011; Study 5	27, Panel; US	Lexical label	+			+
Molho et al., 2017; Study 3	819, MTurk; Predominantly US	Facial expression	+			+
Molho et al., 2017; Study 4	347, MTurk; Predominantly US	Facial expression	+			+
Molho et al., 2020	257, Panel; The Netherlands	Facial expression	+		+	+
Konishi et al., 2020; Study 2	21, Student; Japan	Lexical label	+		+	+
Tybur et al., 2020	233, Student; The Netherlands	Facial expression	+			+
Lopez et al., 2021; Study 2	568, MTurk; Origin N.S.	Facial expression	+			+
Lopez et al., 2021; Study 3	575, MTurk; Origin N.S.	Facial expression and lexical label	+		+	+
van der Eijk & Columbus, 2023; Study 3	500, Prolific; UK	Lexical label and emotion description	+			+
van der Eijk & Columbus, 2023; Study 4	600, Prolific; UK	Lexical label and description	±	±	±	±
Ocampo et al., 2023	863, MTurk; Origin N.S.	Facial expression and lexical label	+	+	+	+
Andersson et al., 2024	17774, Various; Mixed	Lexical label	+	+	+	+
Fan et al., 2024a; Study 1	847, MTurk; Origin N.S.	Facial expression	+		+	+
Fan et al., 2024a; Study 2	360, Student; The Netherlands	Facial and nonverbal vocal expression	+	−	+	+
Anticipations						
Fan et al., 2024b; Study 1	1440, Prolific; Origin N.S.	Facial and nonverbal vocal expression	+		+	+
Fan et al., 2024b; Study 2	1630, Prolific; UK	Facial and nonverbal vocal expression	+	+	+	+
Fan et al., 2024b; Study 3	1100, Prolific; UK	Facial and nonverbal vocal expression	+		+	+
Liu & Giner-Sorolla, 2024; Study 1	224, Prolific; Origin N.S.	Facial expression and emotion label	+	+	+	+
Liu & Giner-Sorolla, 2024; Study 2	328, Prolific; Origin N.S.	Facial expression and emotion label	+	+	+	+

Note: Origin N.S. indicates no explicit information of the sample's origin country provided in the original article. + indicates positive relation; − indicates negative relation; blank indicates nonsignificant; and ± indicates mixed results.

Foundations Theory (Graham et al., 2009), suggest a one-on-one mapping between moral emotions and moral violation content (i.e. linking autonomy violations to anger and divinity violations to disgust). Recent findings support an alternative socio-functional account that similarly draws distinctions between anger and disgust: the two emotions differentially respond to the identity of the victim of a transgression and differentially relate to distinct forms of aggressive punishment (e.g. Molho et al., 2017; Molho et al., 2020). Specifically, disgust has a stronger relation with indirectly aggressive punishment (e.g. gossiping) than directly aggressive punishment (e.g. physical or verbal assaulting). In contrast, anger is either similarly related to both kinds of punishment, or it has a stronger relation with direct than indirect punishment in previous studies (see Table 1 for an overview). Meanwhile, these studies reveal that relational factors, such as the relationship to the victim, relate to both moral emotions and associated aggressive sentiments. For example, individuals are more likely to experience anger and desire to directly aggress when they themselves are the victim of a transgression (i.e. second-party

punishment contrasting to third-party punishment, e.g. Molho et al., 2017), when the victim is a relative or friend compared to more distant relationship partners (Lopez et al., 2021), or when they otherwise value the victim more (Fan et al., 2024a).

Beyond people's own experiences, individuals also infer action tendencies from displays of moral emotions. One study revealed that people expect greater direct aggression from those expressing nonverbal anger compared to disgust, but no differences in expected indirect aggression across emotion expressions (Fan et al., 2024b). Meanwhile, the extent to which participants perceive disgust related more strongly to inferences of indirect aggression than direct aggression, whereas the extent to which participants perceive anger related more strongly to inferences of direct aggression than indirect aggression (see also Liu & Giner-Sorolla, 2024 for a conceptual replication). These findings align with a socio-functional perspective, whereby anger signals readiness for confrontation and disgust is tied to less costly actions (e.g. social exclusion).

However, most of the studies listed in Table 1 sampled from Western populations – specifically the US, the UK, and the Netherlands. We identified two studies that sampled from other societies (i.e. a Japanese sample in Konishi et al., 2020; a multi-country sample in Andersson et al., 2024). Konishi et al. (2020) report that anger relates to both direct and indirect punishment, whereas disgust relates only to indirect punishment. However, this result is based on a small sample size (e.g. $N = 21$ in Study 2 of Konishi et al., 2020), leading to low statistical power for detecting differential emotion-punishment associations. Moreover, this study confounded social transgressions with transgressions involving pathogen and sexual content, which elicit disgust for other reasons (Tybur et al., 2013). Anger and disgust were also mostly assessed via endorsement of verbal labels – an approach that often does a poor job of differentiating between emotions (Weidman et al., 2017). Finally, Konishi et al. (2020) did not test whether people inferred different action tendencies from anger versus disgust expression. Another multi-country study (Andersson et al., 2024), which did not detect differences in emotion-behaviour links across anger and disgust, shares similar limitations – its measure of emotion was limited to verbal, binary yes/no self-reports. Given these issues and the equivocal nature of findings outside of Western samples, more research with better assessment tools and methods is needed to evaluate the cross-cultural robustness of the socio-functional hypothesis.

1.2. Moral emotions across cultures

Emotions and their expression function to neutralise threats and capitalise on opportunities. Some threats, such as pathogen risks, predators, and violent conspecifics, are universal and deeply rooted in humans' evolutionary history. Consequently, emotions serve adaptive functions that are broadly shared across cultures (Cordaro et al., 2016; Ekman & Cordaro, 2011). If key adaptive problems are broadly similar, and if emotions like anger and disgust fulfil similarly relevant functions across ecologies, we might expect the socio-functional links between these emotions and aggressive behaviours to generalise beyond Western populations. In particular, previously observed associations between anger and direct aggression and between disgust and indirect aggression might manifest similarly in Japan. However, cultural norms could shape these links. In high-context, collectivistic cultures, open confrontation may be less socially favoured and, hence, the anger-aggression relationship might be attenuated or not exist (e.g. Butler et al., 2007; Vishkin et al., 2023).

Meanwhile, the expression of emotion also varies across cultures (Lindquist et al., 2022; Mesquita, 2022). This variation is especially noteworthy for moral disgust. Research reveals that the English word of disgust cannot be exactly translated into Korean or Malayalam (Han et al., 2016), and that disgust has more of a moral connotation in English than these other two languages. Another study across five cultures has similarly found that the moral connotations of disgust vary across populations (Schweiger Gallo et al., 2024). However, differences in language do not necessarily reflect substantial differences in emotion or its underlying mental mechanisms (e.g. Breugelmans & Poortinga, 2006). Indeed, even members of a population that does not linguistically differentiate between anger and disgust are able to recognise differences between facial expressions of anger and disgust (Sauter et al., 2011). Nevertheless, such differences may influence the pattern of relations between moral emotions and punishments across societies.

Cultural contexts influence how emotions translate into behaviour, with different societies emphasizing distinct responses to transgressions. For instance, Maitner et al. (2022) demonstrated that anger and shame, while universal emotions, are linked to culturally specific behavioural intentions. In dignity cultures (e.g. the Netherlands, Sweden, the UK, and the

US), anger is tied to reclaiming resources or raising awareness about violations, whereas shame plays a smaller role in motivating aggression. In contrast, in honour (e.g. Brazil, Poland, Russia, and the UAE) and face cultures (e.g. China, Japan, and Singapore), shame is more closely associated with aggressive retaliation, reflecting a context-specific emphasis on restoring social standing. If cultural differences are substantial, such as when a specific moral emotion concept (e.g. moral disgust) is absent in some cultures, then the mapping of emotions to behaviours may differ significantly. Alternatively, socio-functional accounts suggest that moral emotions, while shaped by culture, retain universal adaptive functions, which should be observable across societies. Even within this framework, cultural norms and display rules could lead to cross-cultural variation in the strength of these links.

1.3. Current studies

The current two-study project aims to contribute to understanding the generalizability of the link between different moral emotions and distinct types of aggressive punishment across populations. Japan is a compelling context for examining these accounts. It is non-Western; offers infrastructure to collect large samples of good quality; has research stimuli developed and validated specifically for this population; and has emotion displays differing from those in the Western populations that have been studied already (e.g. Kitayama et al., 2006; Matsumoto et al., 2008). Further, anger is more normatively constrained in Japan than in Western contexts (e.g. Boiger et al., 2013; Hall, 1976; Matsumoto et al., 2008). Replicating the association between anger and aggressive motives in Japan would suggest that the relation applies even in a culture that constrains anger displays; failing to replicate the association could suggest that it emerges only in populations where anger is normatively displayed.

We chose to assess emotional reactions to moral violations using agreement with nonverbal vocalizations based on the availability of the stimuli and their use in earlier studies conducted in Western populations (e.g. Fan et al., 2024b). Previous studies have created and validated a set of Japanese nonverbal vocal expressions, including those of anger and disgust (Xin et al., 2024). By using nonverbal vocalizations rather than facial expression or lexical label self-reports, we are also able to limit the potential influence from the visual attributes of the posing actors/actresses, such as age and attractiveness, and individuals' interpretations of verbal labels.

In Study 1, we test whether participants' personal feelings of anger versus disgust toward a social transgression relate to motives to aggress directly or indirectly. Further, we test whether second parties and third parties respond to social transgressions with different emotions and motivations. In Study 2, we test whether participants infer motivations to aggress directly versus indirectly after hearing expressions of anger versus disgust from others. Both studies illuminate the cognitive mechanisms underlying emotion-driven social judgments and decisions. Study 1 addresses how individuals' subjective feelings of anger and disgust inform their motivation to punish, reflecting affective evaluation and behavioural intention formation. Study 2 focuses on how people perceive and interpret nonverbal emotion expressions from others to infer their likely punitive behaviour, involving emotion recognition and social inference.

Based on a socio-functional perspective, we would expect the patterns observed in Western samples to replicate in Japan, albeit with possible variation in the strength of these relations. In general, we hypothesise that from both **the punishment actor perspective** (Study 1; those who experience emotions and endorse punitive motives) and **the punishment perceiver perspective** (Study 2; those who perceive others' emotions and infer punitive motives), anger will be positively related to both direct and indirect aggression motives and anticipations, whereas disgust will be positively related to indirect aggression motives and anticipations, but not direct ones. In contrast, perspectives that consider emotions as socially constructed categories (e.g. Lindquist et al., 2022; Mesquita, 2022) may forward a stronger version of arguments regarding cultural variation, i.e. that the pattern of links we have observed in Western populations will not replicate in Eastern populations.

1.4. Transparency and openness

We report how we determined our sample size, all data exclusions, all manipulations, and all measures, and the research conduction follows JARS (Appelbaum et al., 2018). All data, analysis code, and research materials are available at the Open Science Framework (OSF, https://osf.io/xs6cz/). Sample sizes were determined based on a priori power analyses

using SimR (Green & MacLeod, 2016), with parameters extracted from relevant prior studies (Fan et al., 2024a; Molho et al., 2017). Analyses were conducted using R 4.4.1 (R Core Team, 2021), with packages including lme4 (Bates et al., 2015), emmeans (Lenth et al., 2022), and sjPlot (Lüdecke, 2024). The design, hypotheses, and analysis plan of the two studies were preregistered prior to data collection and are accessible at AsPredicted.org (https://aspredicted.org/8t8x-t8rk.pdf). No other published or in-press manuscripts have utilised this dataset. Ethical approvals were granted by the Research Ethics Committee of Aarhus BSS, Aarhus University (BSS-2024-082-S1) and the Scientific and Ethical Review Board of the Faculty of Behaviour and Movement Sciences, Vrije University Amsterdam (VCWE-2021-032).

2. Study 1

Study 1 tests whether anger versus disgust toward moral transgressions is associated with motives to aggress directly versus indirectly. The study was also designed to address a secondary aim: to test if anger and disgust function consistently across the different transgression roles that the punishment actor might have (i.e. second-party victims [2P] versus third-party observers [3P]).

2.1. Method

2.1.1. Participant

Based on an a priori power analysis with SimR (Green & MacLeod, 2016) using parameters extracted from Molho et al. (2017) and Fan et al. (2024a), we targeted a sample of 1001 adult native Japanese participants through the panel service provider Cint. This sample size affords 85% power to detect an interaction effect of $r^2_p = .01$ (Cohen's $d = 0.20$) between aggression type and perceived anger or disgust, while controlling for the interaction between actor-role manipulation and aggression type. We recorded 1231 valid responses ($N_{Female} = 483$, $M_{Age} = 49$, $SD_{Age} = 14.55$).

2.1.2. Procedures

Participants randomly read one out of twelve scenarios describing either themselves (2P condition) or another person (3P condition) being victimised by a moral transgression. Participants then reported the degree to which voices expressing anger or disgust matched their feelings toward the transgression, evaluated the moral wrongness of the transgression, and reported their motivations to directly and indirectly aggress against the transgressor. We also collected demographic information (e.g. age, sex), and some other variables for exploratory purposes (e.g. social dominance orientation, perceived socio-economic status; see OSF survey file for the full items).

The study was completed in Japanese. The translation was assisted by translation tools (Google Translate and DeepL translator) and further edited by Japanese-English bilinguals and verified via back-translation.

2.1.3. Materials

2.1.3.1. Moral violation scenarios. The scenarios used in the current study were retrieved from Molho et al. (2017) and Studies 2 and 3 of Fan et al. (2024b). We selected 12 scenarios and adjusted them to fit common social settings in Japan, including broken promises, reckless driving, damage caused by a pet, littering, discrimination, workplace bullying, rule-breaking, violence, inconsiderateness, rudeness, and stealing. In line with our aims, scenarios were used to present clear agentive moral transgressions rather than to be representative of the frequency of moral violations witnessed in daily life. To ensure clarity and naturalness in Japanese while preserving the underlying transgression, materials underwent content and linguistic adjustments by two native speakers (adjusting narratives and adding contextual details, e.g. converting currency to JPY). As a manipulation check, participants rated the moral wrongness of each scenario on a 0–100 scale. Results indicated that the scenarios were construed as moral violations with mean moral wrongness ratings ranging from 53.06 to 86.98 ($SD = 15.09$–33.93) across scenarios. Each scenario was used to create a 2P and a 3P version (see the Supplementary Online Material, SOM).

2.1.3.2. Emotion endorsement. We asked participants to rate how well each of 12 nonverbal (nonlexical) vocal stimuli matched their feelings in response to the transgression described in the scenario on a seven-point scale (1 = strongly disagree, 7 = strongly agree). We used three vocal tokens for each sex (male and female) and each emotion (anger and disgust; in the current sample Cronbach's $\alpha_{Anger} = .87$, $\alpha_{Disgust} = .86$) from the Corpus of Japanese Nonverbal Vocalizations (JNV, Xin et al., 2024). We selected tokens that received authenticity scores greater than 50 (0-100) and accuracy scores greater

than .60 (0-1) based on the corpus's validation metrics. All tokens were presented in random order.

2.1.3.3. Aggression motives and moral wrongness.

Participants were asked to rate the degree to which they agreed with statements describing their direct and indirect aggressive motives toward the perpetrator on a seven-point scale (1 = strongly disagree, 7 = strongly agree). The items are adapted from influential research on aggression (Fan et al., 2024a; Lopez et al., 2021; Molho et al., 2017; for validations, see Fan et al., 2024a), which were themselves adapted from existing measures (Björkqvist et al., 1992; Griskevicius et al., 2009; Hutcherson & Gross, 2011). Five direct aggression items (e.g. hit the transgressor, Cronbach's $\alpha = .88$) and six indirect aggression items (e.g. spread negative information about the transgressor, Cronbach's $\alpha = .89$) were included. We also included a moral wrongness perception item ("How morally wrong do you think the behaviour of the transgressor in this scenario was?"; 0 = not morally wrong at all, 100 = extremely morally wrong).

2.1.4. Analytic approach

Using linear mixed-effects modelling, we regressed aggression motives on aggression type (direct vs. indirect), anger, disgust, and the interactions between aggression type and anger and aggression type and disgust. We also controlled for the actor-role manipulation (2P versus 3P) and its interactions. We modelled random intercepts for scenario nested within violation content and actor-role manipulation, and random intercepts for participants. Significant differences for all fixed factors were indicated by p values (.05). All significant interactions were probed with lower-order simple-effect tests. We also controlled demographic variables of age and sex, as well as perceived moral wrongness in the models. For detailed results, see SOM.

2.2. Results

2.2.1. Emotion endorsements and aggression motives

Results revealed a significant interaction between disgust and aggression type ($\beta = -.06$, 95% CI [−.09, −.03], $t(1228) = -3.94$, $p < .001$), but not anger and aggression type ($\beta = .03$, 95% CI [−.00, .06], $t(1228) = 1.83$, $p = .07$). Disgust related more strongly to indirect motives ($\beta = .17$, 95% CI [.10, .23]) than direct aggression motives ($\beta = .03$, 95% CI [−.04, .09]), while anger related equivalently to direct ($\beta = .32$, 95% CI [.26, .38]) and indirect aggression motives ($\beta = .26$, 95% CI [.20, .32]) (see Figure 1). For detailed regression results see SOM, same below.

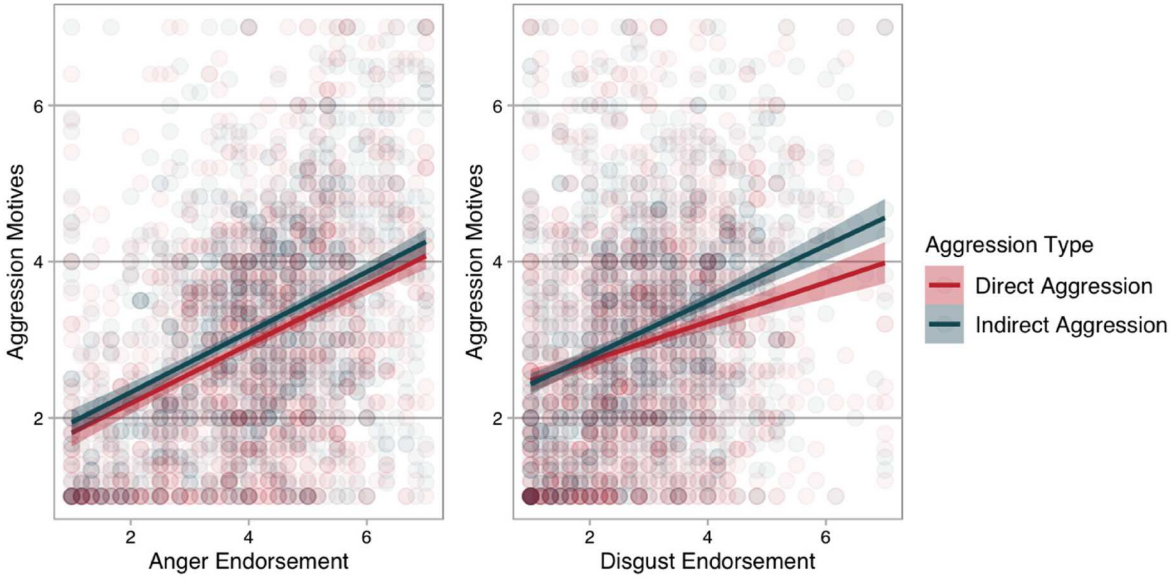

Figure 1. Marginal effects of emotion endorsement predicting aggressive punishment motives in Study 1.
Note: The shaded areas indicate the 95% CI of the slopes.

2.2.2. Effect of punishment actor role

We also tested the effect of the punishment actor-role manipulation on both emotion endorsements and aggressive punishments. Results showed a statistically significant interaction between the actor-role manipulation and emotion type ($\beta = .03$, 95% CI [.01, .06], $F(1, 1230) = 6.80$, $p = .01$). The endorsement of anger was stronger in the 2P condition than the 3P condition ($t(26.3) = 2.18$, $p = .04$, Cohen's $d = 0.07$), while no difference was found for the endorsement of disgust ($t(26.3) = 0.65$, $p = .52$, Cohen's $d = 0.01$). Participants endorsed more anger ($M_{2P} = 4.22$, 95% CI [4.03, 4.41]; $M_{3P} = 3.94$, 95% CI [3.75, 4.13]) than disgust ($M_{2P} = 3.00$, 95% CI [2.81, 3.19]; $M_{3P} = 2.92$, 95% CI [2.73, 3.11]) in both 2P ($t(1230) = 22.57$, $p < .001$, Cohen's $d = 1.29$) and 3P conditions ($t(1230) = 18.81$, $p < .001$, Cohen's $d = 1.08$). Actor-role manipulation did not relate to overall aggression motives ($\beta = .05$, 95% CI [−.05, .15], $t(22) = 0.97$, $p = .34$), nor did it interact with the type of aggression ($\beta = .01$, 95% CI [−.02, .03], $F(1, 1230) = 0.16$, $p = .69$).

2.3. Discussion

In Study 1, we assessed the association between moral emotions (anger and disgust) and different types of aggressive motives (direct and indirect). Our findings suggest that the distinctions between disgust and anger, and their links with direct and indirect motives observed in Western populations, are also present in Japan (e.g. Fan et al., 2024a, Study 2; see Table S9 in the SOM). That is, anger endorsement related to both direct and indirect aggression motives, while disgust was linked only to indirect aggression motives. These results are consistent with a socio-functional account, which posits that different moral emotions serve distinct roles in motivating specific types of aggressive behaviour. Anger, often tied to confrontational actions, appeared to motivate both direct and indirect forms of aggression motives, whereas disgust was more closely related to non-confrontational, indirect aggression motives, such as social exclusion or gossip.

3. Study 2

Whereas Study 1 examined how experiences of anger and disgust correspond with motivations to aggress, Study 2 examined whether people infer distinct motivations to aggress based on others' expressions of anger and disgust.

3.1. Method

3.1.1. Participant

Based on an a priori power analysis, we targeted 850 Japanese adults, again recruited via Cint. This sample size affords 85% power to detect an interaction effect of $r^2_p = .01$ (Cohen's $d = 0.20$) between aggression type and perceived anger or disgust, while controlling for the interaction between emotion expression and aggression type. As in Study 1, only adults who are native Japanese speakers and reside in Japan were invited to participate in the study. We recorded 930 valid responses ($N_{Female} = 340$, $M_{Age} = 47.68$, $SD_{Age} = 14.77$).

3.1.2. Procedures

Participants first read a scenario describing that an agent witnessed one of the transgressions included in Study 1 and then responded through either a nonverbal vocalization of anger, a nonverbal vocalization of disgust, or no vocal expression (hereafter referred to as the expressor). They then rated the degree to which the expressor expressed sadness, happiness, fear, anger, surprise, and disgust, the perceived valence and intensity of the expression, and the degree to which they perceived the expressor as likely to engage in directly and indirectly aggressive punishments against the transgressor. Additionally, we assessed participants' perceptions of the moral wrongness of the transgression and the expression's authenticity ("How authentic do you think the emotional response was, given the person is a Japanese?") and appropriateness ("How appropriate do you think the emotional response was, given in the Japanese society?") on 7-point Likert scales (1 = not at all, 7 = strongly). Participants also provided demographic information on their sex and age and responded to some exploratory items (see OSF survey items for the full list of items).

3.1.3. Materials

3.1.3.1. Emotion expression stimuli and moral transgression scenarios. We employed the same 12 nonverbal vocalizations used as in Study 1. Participants were presented with one vocalization of either anger or disgust from either a man or a woman. The moral transgression content of the scenarios is the same as in the third-party condition of Study 1. We used common Japanese names (expressor: Yuta

(male) /Yuko (female), 裕太/裕子; transgressor: Kenta, 健太; victim: Takuya, 拓也) representing different agents in the scenarios. Scenario–token pairing was fully randomised across participants. Again, participants rated the moral wrongness of each scenario on a 0–100 scale. The scenarios were consistently rated as morally wrong, with means ranging from 54.43 to 76.12 (SD = 28.08–36.82).

3.1.3.2. Emotion perception. We assessed perceived emotion with "How much is Yuta/Yuko feeling the following emotions in response to transgressor's behavior?" on 7-point Likert-type scales (1 = not at all to 7 = extremely), given the six basic emotions (anger怒り, disgust嫌悪, fear 恐怖, happiness幸福, sadness悲しみ, and surprise驚き; Japanese label translations retrieved from Sato et al., 2019). We also included two items assessing perceived emotion valence and intensity.

3.1.3.3. Aggression anticipation and moral wrongness. We used the rephrased items from Study 1 to capture anticipated aggression, which have been tested and used in previous studies (e.g. Fan et al., 2024b). We asked the participants how well each statement describes the expressor's likely behaviour on a 7-point Likert-type scale (1 = extremely unlikely, 7 = extremely likely, in the current sample Cronbach's α_{Direct} = .86, $\alpha_{Indirect}$ = .88). We included the same moral wrongness perception item as in Study 1.

3.1.4. Analytic approach

We again used linear mixed-effects modelling. We regressed anticipated aggression on the interaction between aggression type (direct vs. indirect aggression) and emotion expression conditions. We then regressed the same dependent measure on perceived anger and disgust and their interactions with aggression type. We also controlled for age and sex, as well as the victim's sex and perceived moral wrongness in all models. We followed the same analysis pipelines as in Study 1, including random intercepts for scenarios, the token presentation, and participants, and post-hoc analyses for significant interaction terms.

3.2. Results

3.2.1. Verbal label ratings of emotion perceptions

Across conditions, participants most strongly perceived anger and disgust, and in a way consistent with the manipulations. Anger perceptions were higher in the anger expression condition (M = 5.85, 95% CI [5.66, 6.05]) than in the disgust (M = 4.44, 95% CI [4.25, 4.63], $t(117) = 11.18$, $p < .001$, Cohen's $d = 2.06$) and in the no expression conditions (M = 4.89, 95% CI [4.70, 5.08], $t(30.9) = 7.55$, $p < .001$, Cohen's $d = 2.73$). Disgust perceptions in both anger (M = 5.70, 95% CI [5.50, 5.89]) and disgust expression (M = 5.73, 95% CI [5.54, 5.92]) conditions were higher than in the no expression conditions (M = 5.18, 95% CI [4.98, 5.39], $t_{Anger - No}(30.9) = 4.00$, $p = .001$, Cohen's $d = 1.45$; $t_{Disgust - No}(29.4) = 4.33$, $p = .001$, Cohen's $d = 1.61$), but they did not differ from each other ($t(117) = 0.27$, $p = .96$, Cohen's $d = 0.05$). We revisit this finding in the discussion.

3.2.2. Effect of emotion expression manipulation

We regressed anticipated aggression on the emotion expression manipulation and its interaction with aggression type. We observed a significant interaction between the emotion expression manipulation and anticipated aggression type ($F(2, 927.9) = 28.51$, $p < .001$, Cohen's $f = 0.17$). Anticipated direct aggression was higher both when expressors showed anger and disgust compared with a neutral expression (M = 2.87, 95% CI [2.58, 3.15]; $t_{Anger - No}(7.56) = 8.31$, $p < .001$, Cohen's $d = 6.04$; $t_{Disgust - No}(7.33) = 3.05$, $p = .04$, Cohen's $d = 2.25$). Meanwhile, participants anticipated more direct aggression from an anger expressor (M = 4.05, 95% CI [3.85, 4.25]), compared to a disgust expressor (M = 3.30, 95% CI [3.10, 3.49]; $t_{Anger - Disgust}(16.24) = 6.17$, $p < .001$, Cohen's $d = 3.06$). Participants also anticipated more indirect aggression from both anger and disgust expressors than from a neutral expressor (M = 3.27, 95% CI [2.99, 3.56]; $t_{Anger - No}(7.56) = 5.10$, $p = .002$, Cohen's $d = 3.71$; $t_{Disgust - No}(7.33) = 5.12$, $p = .03$, Cohen's $d = 3.78$, see Figure 2). However, we observed no difference in anticipated indirect aggression across anger (M = 4.00, 95% CI [3.80, 4.19]) and disgust expression conditions (M = 4.00, 95% CI [3.80, 4.19]; $t_{Anger - Disgust}(16.24) = 0.01$, $p = .99$, Cohen's $d = 0.01$).

3.2.3. Effect of emotion perception

We also regressed anticipated aggression on the degree to which participants perceived anger and disgust from the expressor. Results revealed significant interactions between each of these perceptions and aggression types ($\beta_{Anger} = .14$, 95% CI [.10, .17], $p < .001$; $\beta_{Disgust} = -.11$, 95% CI [−.15, −.08], $p < .001$). Perceptions of anger corresponded with more

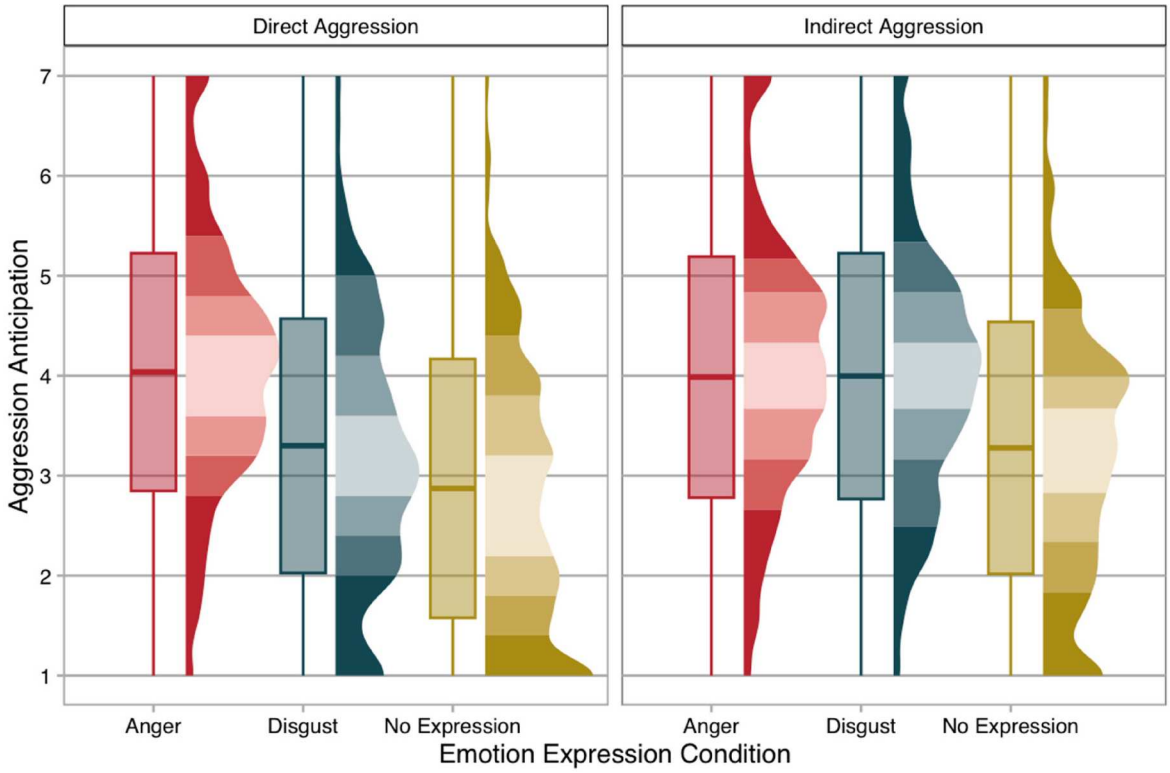

Figure 2. Distributions of aggression anticipation of the two aggression types between emotional expression conditions in Study 2.

Note: Gradient coloring of the half-violins represents central quantile intervals (CQIs) around the median (100%, 75%, 50%, 25%), with each shade indicating a different interval.

expected direct aggression ($\beta = .23$, 95% CI [.18, .29]), but not more indirect aggression ($\beta = .02$, 95% CI [−.03, .08]), $t(928) = 7.68$, $p < .001$, Cohen's $d = 0.50$. Perceptions of disgust corresponded with more expected indirect aggression ($\beta = .16$, 95% CI [.10, .22]), but not more direct aggression ($\beta = -.04$, 95% CI [−.10, .02]), $t(928) = -6.33$, $p < .001$, Cohen's $d = 0.42$ (see Figure 3). The interactions between perceived emotions and aggressive type remained when controlling for the experimental manipulation ($\beta_{Anger} = .10$, 95% CI [.06, .14], $p < .001$; $\beta_{Disgust} = -.10$, 95% CI [−.13, −.06], $p < .001$). See SOM for more details.

3.3. Discussion

Study 2 evaluated the association between perceptions of others' moral emotion expressions and expectations of aggression from those expressors. Individuals anticipate more direct aggression from an angry expressor than a disgusted expressor, while anticipating similar degrees of indirect aggression regardless of whether anger or moral disgust is expressed. The results revealed greater distinctions between perceptions of anger and disgust. When individuals perceive more anger, they tend to anticipate more direct aggression, but not indirect aggression; when they perceive stronger disgust, they anticipate more indirect aggression, but not direct aggression. These results aligned with those found in Fan et al. (2024b, Study 3; see Table S9 in the SOM) and in other studies of emotion-aggression links among victims and observers of moral transgressions (e.g. Fan et al., 2024a; Lopez et al., 2021; Molho et al., 2017). Overall, this study revealed associations between anger and disgust with expectations of specific aggressive punishments in Japan, as those found in Western samples (as presented in Table 1).

However, there was a noteworthy difference in emotion perception in the Japanese context compared to previous studies conducted with Western samples. In this Japanese sample, we did not detect a difference in perceived disgust across anger and disgust expression conditions. On the one hand, this might reflect moral emotion structures specific to

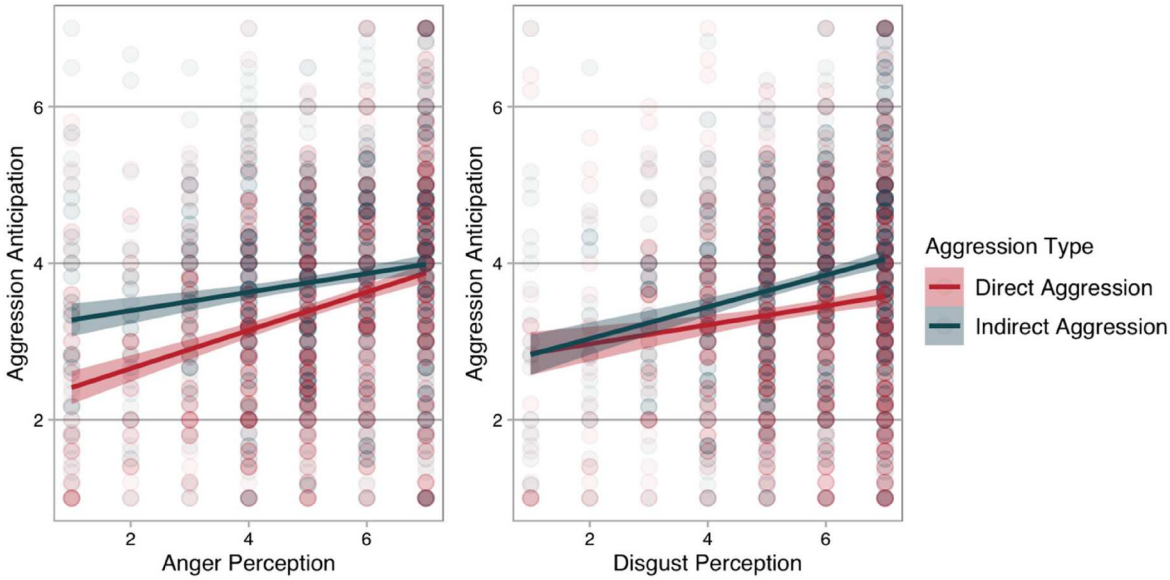

Figure 3. Marginal effects of emotion perception predicting aggressive punishment anticipation in Study 2.
Note: The shaded areas indicate the 95% CI of the slopes.

Japanese culture. Anger might be conceptualised more broadly in Japanese culture, encompassing both aspects of disengaging and condemning emotion, as observed and discussed in other relevant literatures (e.g. Matsumoto et al., 2008; Yoshie & Sauter, 2020). This interpretation aligns with the observed high levels of anger perception in the null expression condition. On the other hand, the similar levels of disgust perception across emotion conditions may reflect limitations of the verbal label rating task used to measure perceived emotion. While verbal rating tasks have been used in prior studies to verify participants' accurate identification of nonverbal expressions, these tasks may perform less reliably across different languages and cultures. This is likely because verbal labels for emotions, such as anger and disgust, differ in salience and conceptual boundaries depending on the cultural and linguistic context, potentially obscuring distinctions between these emotions in non-Western populations (see Russell et al., 1993; Weidman et al., 2017).

Despite the reduced differentiation observed in verbal labelling, analyses of individual perceptions revealed distinct patterns for anger and disgust. Notably, the overall correlation between perceptions of anger and perceptions of disgust was moderate ($r_{Anger} = .53$; $r_{Disgust} = .32$; $r_{No} = .72$), which aligns with prior findings in the moral disgust literature showing overlap between these emotions while highlighting their distinct roles. These findings suggest that while verbal labels may obscure the differentiation of these emotions in this context, anger and disgust still function differently, consistent with the patterns observed in Study 1 and prior research.

4. General discussion

The current research investigated the links between other-condemning emotions, specifically anger and disgust, and motives to aggress in a non-Western cultural context. Across two studies, we examined these associations from both a punishment actor's (Study 1) and a punishment perceiver's (Study 2) perspective in Japan. Study 1 demonstrated that anger and disgust responses to moral transgressions are differentially associated with direct and indirect aggression motives. Anger was related to both direct and indirect aggression motives, while disgust was related only to indirect aggression motives. These findings are consistent with a socio-functional hypothesis proposing that anger motivates confrontational behaviours, whereas disgust drives non-confrontational strategies, such as gossip and social exclusion. Study 2 extended these findings by examining how perceivers infer motives to aggress when they are presented with expressions of anger and disgust. Perceivers

inferred greater direct aggression from anger expressions and greater indirect aggression from disgust expressions. Verbal labelling tasks in Study 2, which asked participants to rate the degree to which the expressors expressed anger and disgust, revealed less differentiation between perceptions of these emotions. That said, both the expression manipulations and analyses based on emotion perceptions showed distinct patterns of association with expectations of aggressive punishment. Taken together, the findings provide evidence for cross-cultural generalizability in moral emotion–aggression associations.

4.1. Universality and cultural variation in moral emotions

Our results contribute to the broader literature on moral emotions by demonstrating that, in Japan, anger and disgust maintain distinct links to different forms of aggressive behaviours, similar to what has been observed in Western populations. (e.g. Fan et al., 2024a, 2024b; Molho et al., 2017). While these results lend support to the universality of anger and disgust's functional roles, there are some culturally specific nuances in how participants recognised and labelled these emotions. For instance, in Study 2, perceived disgust did not differ significantly across the anger and disgust expression conditions. This finding suggests that some aspects of emotion displays – or the inferences perceivers make based on these displays – might differ across Japan and some Western populations.

Cross-cultural variation in emotion display norms might provide some insights into the culturally-specific underpinnings of disgust in Japanese society. Low- and high-context cultural frameworks (Hall, 1976) offer a useful lens for understanding how emotion display norms differ. In low-context cultures (e.g. US, UK, the Netherlands), communication is explicit and verbal, whereas in high-context cultures (e.g. Japan) communication relies more on implicit, contextual cues such as tone of voice and gestures. These distinctions are linked to broader cultural dimensions, such as individualism versus collectivism (Matsumoto et al., 2008; Nisbett, 2010) and independence versus interdependence (Kitayama et al., 2006). From this perspective, the action of choosing to express anger/disgust might by itself already indicate unique emotional or affective content for Japanese perceivers. However, despite such cultural differences in norms and emotional expression, our results suggest that the functional roles of anger and disgust in motivating direct and indirect aggression motives and anticipations appear to be consistent across Western and Eastern populations.

4.2. Potential social norm differences in punishment across cultures

Study 1 demonstrated distinct patterns in emotional endorsements, with anger endorsed more strongly than disgust across both 2P and 3P actor role conditions. Anger endorsements were higher in the 2P condition compared to the 3P condition, while disgust endorsements showed no such variation. This pattern replicates findings from Western populations. However, these differences in emotional endorsements did not extend to aggressive responses. Unlike findings in Western societies (e.g. Molho et al., 2017), we found no interaction between actor role and aggression type (i.e. direct versus indirect).

One possible explanation for this latter pattern is the influence of cultural norms that govern acceptable ways of responding to social transgressions, particularly punishments. In collectivistic societies such as Japan, maintaining group harmony takes precedence over individual assertiveness. Unlike in individualistic Western societies, where people are encouraged to have direct and confrontational responses aimed at restoring justice, Japanese norms tend to discourage open displays of conflict, even in response to moral violations (Boiger et al., 2013; Kitayama et al., 2006; Matsumoto et al., 2008). However, the relationship between individualism-collectivism and punishment norms is not straightforward. While collectivistic societies are often thought to prioritise indirect or non-confrontational responses, findings across studies remain inconsistent, with evidence both supporting and contradicting these assumptions (for an overview, see Molho et al., 2024). This suggests that additional cultural dimensions, such as conflict resolution norms or social expectations, might contribute to explaining variation in punishment behaviours. Future research should investigate how these influences operate in different cultural contexts, particularly by examining how individuals navigate tensions between emotional responses and social expectations.

4.3. Potential of nonverbal vocalizations in emotion research

The use of nonverbal vocalizations in the current research represents a significant methodological

advancement over prior studies that rely primarily on lexical labels or facial expressions. While lexical self-reports have been widely used to assess moral emotions (e.g. Konishi et al., 2017, 2020), such measures may not always capture emotion with consistency across cultures. For instance, the null finding in Andersson et al. (2024) of emotion-aggression links may be due in part to methodological constraints such as reliance on lexical, binary self-reports. Meanwhile, Study 2 demonstrates that vocalizations have the potentials to differentiate between emotional reactions to moral violations (i.e. moderate emotion rating correlation of anger and disgust responding to the given vocalization stimuli of anger $r = .53$ and disgust $r = .32$, compared with the no expression condition $r = .72$), even without simultaneous exposure to facial expressions (cf., Fan et al., 2024a). By focusing on vocalizations, this study avoids key limitations of both lexical and facial expression methods, offering a more precise and culturally adaptable approach to studying emotional responses.

Compared to lexical tasks, which depend heavily on participants' linguistic abilities and cultural familiarity with emotion terms, nonverbal vocalizations capture affective responses directly, reducing reliance on verbal interpretation (Weidman et al., 2017). For instance, in our study, vocalizations elicited consistent and reliable associations between anger, disgust, and punitive behaviours – associations that may not emerge as clearly in lexical tasks. Given challenges in translating the English word disgust into other languages (e.g. Korean and Malayalam as in Han et al., 2016), the use of vocalizations offers benefits to future cross-cultural studies.

Similarly, vocalizations address limitations associated with facial expressions, another common method in emotion research. Facial stimuli can introduce biases based on the poser's physical appearance (e.g. age, attractiveness) and are subject to cultural variability in recognition and interpretation (Matsumoto et al., 2008). By using validated Japanese vocal stimuli, the current research avoids these confounds and better reflects real-world emotion communication, particularly in high-context cultures like Japan, where vocalizations often carry implicit emotional meaning that complements or substitutes for visual cues (Hall, 1976).

Future research should explore the broader applicability of vocalizations across diverse cultural and linguistic contexts, as well as their interaction with other nonverbal communication channels, such as body language. By validating vocalizations as independent measures, this study expands the methodological toolkit for emotion research, providing a more culturally adaptable and precise method for investigating emotional responses in cross-cultural and naturalistic settings.

4.4. Limitations, eneralizability and uture irections

While the current research contributes to understanding moral emotions across cultures, we note limitations that can be used to guide future directions. First, our claims concern generalizability rather than any specific cultural dimensions that (do not) lead to effects different from those observed in Western populations. We did not include direct measures of culture (e.g. values, display rules, self-construal), so we refrain from attributing the Japanese patterns to "culture" per se. Moreover, although our studies go beyond existing work by sampling from Japan, they do not warrant claims of universality. Japan, like Western populations sampled before, is a relatively rich, educated, and industrialised nation; other work investigating populations that differ along these dimensions would be required to infer universality. While Japan represents a collectivistic, high-context culture, extending the research to other cultural contexts, including honour-based or egalitarian societies, is essential to comprehensively evaluate hypotheses about the universality of emotions. Notably, future studies could also examine inter-cultural perceptions of emotions and punishments, for example, how individuals from one culture interpret and respond to emotional expressions or punitive behaviours exhibited by people from another culture.

Second, while the study provides valuable insights into the links between moral emotions and aggressive responses, a key limitation is that all responses were hypothetical. Participants were asked to react to scenarios rather than report on actual behaviours, which may limit the ecological validity of the findings. Hypothetical responses might not fully capture the intensity or complexity of emotional and punitive reactions observed in real-life situations. Future research could address this limitation by employing methods such as diary studies (e.g. Molho et al., 2020), where participants document real-life experiences of moral violations and their emotional and behavioural responses. In addition, although the moral violation scenarios in the present studies were

adapted from materials previously validated in Western samples, further adjusted by native speakers, and consistently rated as morally wrong by our two Japanese samples, we encourage future research to replicate these findings using scenarios that are more locally grounded and culturally specific.

Further, the two studies yielded divergent patterns: participants' own anger related to indirect aggression in Study 1, whereas perceived anger did not in Study 2. This ambiguity mirrors the broader literature, where about half of prior studies report such a link and about half do not (see Table 1). Our data cannot adjudicate the mechanisms, but one plausible asymmetry is categorical decoding versus composite experience. Punishment actors may integrate a composite of constraints (e.g. power, reputational costs, audience, display rules), allowing anger to support both direct and indirect tactics. When perceiving an emotion expression, in contrast, people only infer antagonistic intent from limited non-lexical cues and may compress the signal into the direct-aggression category. Future research could further examine the mechanisms underlying differential anger-aggression associations across different roles.

4.5. Conclusion

The current research advances the field by demonstrating that in a non-Western population, anger and disgust maintain distinct links to direct and indirect aggression on both motives and anticipation levels, consistent with socio-functional accounts. Using samples from Japan, our findings affirm the functional roles of anger and disgust in motivating aggression, with anger associated with confrontation and disgust with gossip and social exclusion. Overall, these findings illustrate the benefits of using nonverbal vocalizations to study emotions, especially when aiming to generalise across cultural contexts.

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