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Folk Beliefs about the Relationships Anger and Disgust Have with Moral Disapproval

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Current Draft: 26 February, 2019

Word count: 7,998

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Abstract

Theories that view emotions as being related in some way to moral judgments suggest that condemning moral emotions should, at minimum, be understood by laypeople to coincide with judgments of moral disapproval. Seven studies ($N = 826$) tested the extent to which anger and disgust align with this criterion. We observed that while anger is understood to be strongly related to moral disapproval of people's actions and character, disgust is not (Studies 1a, 1b, 2a, 2b, and 3), and that, in contexts where disgust expressions are thought to coincide somewhat with moral disapproval, part of the reason is that the expression is perceived as anger (Study 4). Expressions of sadness are also construed as communicating anger in such contexts (Study 5). We discuss our findings in terms of rethinking how we should consider disgust as a moral emotion.

Keywords: anger, disgust, moral judgment, emotions, expressions

Folk Beliefs about the Relationships Anger and Disgust Have with Moral Disapproval

Disgust is an aversive emotion characterised by nausea, oral inhibition, and a tendency to expel polluting, pathogenic substances (Curtis, Aunger, & Rabie, 2004; Oaten, Stevenson, & Case, 2009). The connection between disgust and moral disapproval is debated among researchers (for recent reviews, see Giner-Sorolla, Kupfer, & Sabo, 2018; Piazza, Landy, Chakroff, Young, & Wasserman, 2018). While many argue that disgust is importantly related to moral disapproval (e.g., Chapman & Anderson, 2013; P.S. Russell & Giner-Sorolla, 2013; Tybur, Lieberman, Kurzban, & DeScioli, 2013), others consider disgust's role in the moral domain to be largely incidental or illusory (e.g., Kayyal, Pochedly, McCarthy, & Russell, 2015; Landy & Goodwin, 2015; Piazza, P.S. Russell, & Sousa, 2013). For example, although disgust has been connected to judgments of bad character (Giner-Sorolla & Chapman, 2017), and disgust expressions (e.g., exclaiming one is "disgusted" or wrinkling one's nose) can communicate moral disapproval (Chapman, Kim, Susskind, & Anderson, 2009; Kupfer & Giner-Sorolla, 2016), it remains possible that linguistic and bodily expressions of disgust are largely being repurposed to communicate anger (see, e.g., Kayyal et al., 2015; Pochedly, Widen, & J.A. Russell, 2012; Yoder, Widen, & J.A. Russell, 2016). Alternatively, or additionally, disgust expressions may serve some unique means for communicating one's disapproval, semantically distinct from anger.

Recent research has examined laypeople's beliefs about what disgust communicates, and has found that disgust terms and prototypical disgust expressions (e.g., wrinkling one's nose and/or sticking out one's tongue; Ekman & Friesen, 1971) convey slightly different meanings within a moral context, compared to anger terms and expressions (e.g., tight lips and furrowed brow; Kupfer & Giner-Sorolla, 2016; Molho, Tybur, Güler, Balliet, & Hofmann, 2017). Kupfer

and Giner-Sorolla (2016) found that disgust terminology (e.g., “disgusted”) communicates a greater sense of principled moral offense on behalf of others, compared to anger terminology (e.g., “angry”), which was perceived to more strongly communicate that one had been *personally* offended by someone’s actions. Similarly, Molho et al. (2017) found that participants were more likely to select a prototypical disgust expression (the nose-wrinkle disgust face), over an expression of anger, when a moral offense was directed at a third party, as opposed to one’s self. However, it is important to draw a distinction between disgust as an experienced emotion, which involves nausea, oral inhibition, and appraisals of contamination (Darwin, 1872), and symbols that can be used to communicate disgust (Piazza et al., 2018; Royzman & Kurzban, 2011). In the studies described above, the authors investigated what laypeople think disgust-relevant words and facial expressions communicate about a person’s psychological state within contexts involving transgressions that lacked canonical disgust elicitors (e.g., gore, germs, bodily fluids). It remains possible that disgust symbols are being repurposed in such pathogen-free contexts to communicate (in a nuanced way) notions closer to the meaning of anger than of canonical disgust.

The Present Research

The present research aimed to test the degree to which laypeople associate expressions of anger and disgust with moral disapproval. There exist several competing theories about the relationships that emotions have with moral judgment (see e.g., Greene & Haidt, 2002; Huebner, Dwyer, & Hauser, 2006; Prinz, 2007; Tiberius, 2015). Emotions might *constitute* moral judgments; emotions might *cause* moral judgments; emotions might *be caused by* moral judgments; emotions might *co-occur with* moral judgments, but each might be separately caused by a third variable. Regardless of which view is correct, they all share the belief that emotions

and moral judgments should be experienced at roughly the same time, for one reason or another. We posit that this might be a good starting point or minimal criteria for understanding which emotions ought to be understood as “moral emotions.” If an emotion is a “condemning moral emotion,” then people should believe that it co-occurs temporally with moral disapproval, such that when the emotion is exhibited, observers are likely to expect that the actor also formed a moral judgment, and vice versa. On this view, the strength of lay beliefs of an association between an emotion category and moral judgment can serve as a guiding principle for assessing the moral relevance of an emotion. Such an approach aligns nicely with constructivist approaches to emotion, for example, the conceptual act model of emotion (Feldman-Barrett, 2006), which posits that emotional experiences are constructed *in situ* using the conceptual knowledge people have of emotion categories and the sensations arising within their body (see also Cameron, Lindquist, & Gray, 2015; Schachter & Singer 1962). Likewise, this methodological approach – eliciting lay intuitions and treating them as one constraining input into theory development – is widespread among experimental philosophers (see, e.g., Knobe & Nichols, 2008), and it strikes us as particularly appropriate for studying people’s emotion concepts.

In seven studies, we sought to examine the extent to which laypeople believe that expressions of anger and disgust relate to moral disapproval, particularly in contexts in which canonical disgust elicitors are present. “Purity violations” or “bodily-norm violations” which involve disgusting misuses of the body, aberrant sexual acts, or contact with contaminating substances, have often been theorized as the domain of morality where disgust plays the largest role, with anger being less involved (e.g., Chakroff & Young, 2015; Giner-Sorolla, Bosson, Caswell, & Hettinger, 2012; Horberg, Oveis, Keltner, & Cohen, 2009; Inbar, Pizarro, Knobe, &

Bloom, 2009; Rozin, Lowery, Imada, & Haidt, 1999; P.S. Russell & Giner-Sorolla, 2013; P.S. Russell, Piazza, & Giner-Sorolla, 2013). Yet, we argue, it is precisely within these kinds of transgressive contexts that disgust symbols are at their most ambiguous: expressions of disgust may be construed either metaphorically as expressions of anger at an offense, or as expressions of nausea and physical revulsion at abnormal sexual practices, bloody viscera, and the like. Thus, the central question we seek to answer in this research is: do laypeople perceive disgust as indicative of moral disapproval in the context of canonically disgusting moral offenses to an extent that is comparable to anger? If disgust falls short on this criterion, and it is reasonable to say that moral emotions and judgments should be seen as co-occurring to an appreciable degree, we might still have other reasons for believing disgust to be a moral emotion; for example, we might also expect moral emotions to motivate morally relevant actions, such as punishing offenders, helping others, or repairing relationships. But this would certainly diminish disgust's perceived moral emotion status vis-à-vis other moral emotions, such as anger, compassion, or guilt.

We tested two hypotheses regarding the perceived relevance of anger and disgust as condemning moral emotions.

Hypothesis 1: Laypeople see anger as typically co-occurring with moral disapproval, while they see disgust as more separable from moral disapproval (i.e., less likely to be indicative of moral disapproval), even in the context of “purity” violations.

It is important to point out that we are not positing that disgust will *never* be seen as relating to moral disapproval, only that its contribution will be substantially diminished relative to anger's in this respect. Nor do we expect anger to be seen as communicating moral disapproval in every instance. Rather, we expect expressions of anger to communicate moral

disapproval quite reliably, whereas we do not expect expressions of disgust to communicate this as clearly.

We also sought to test whether disgust expressions might be perceived as having a relationship with moral disapproval due, in part, to being construed as expressions of anger within transgressive contexts:

Hypothesis 2: Part of why expressions of disgust are, at times, conceptually linked to moral disapproval is because such expressions are contextually interpreted as signs of anger.

Studies 1-3 tested Hypothesis 1 using distinct yet convergent methodologies. In Study 1, we directly compared participants' beliefs about whether anger or disgust can occur in the absence of moral disapproval of a person's actions (Study 1a) or character (Study 1b). In Study 2a, we examined participants' unconstrained beliefs about what elicits anger and disgust. Study 2b replicated Study 2a using alternative operationalizations of disgust and anger. In Study 3, we examined what displays of anger and disgust communicate in ambiguously moral contexts. Studies 4-5 tested Hypothesis 2. Study 4 applied a mediational method to test whether disgust expressions sometimes communicate moral disapproval partly because they are interpreted as expressions of anger. Study 5 extended this mediational method to expressions of sadness, a negatively-valenced emotion that has no obvious relationship to moral judgment.

Full materials, data, and analysis scripts for all studies in this paper can be found at <https://osf.io/7m8q9/>. This research was approved by the Lancaster University Research Ethics Committee.

Study 1

In Study 1, we directly examined whether laypeople believe that anger and disgust can plausibly occur in the absence of moral disapproval when judging a purity violation. We examined disapproval of both a person's actions and moral character, as some researchers have argued that disgust should have a particularly close connection to the latter (see Giner-Sorolla & Chapman, 2017). We selected two men in a romantic relationship as our stimulus, because homosexuality is a harmless act that is condemned by some people as a violation of sexual purity (see, e.g., Inbar et al., 2009). Thus, if disgust is most strongly related to moral judgment in the context of such violations, then disgust in the absence of moral disapproval should be considered quite implausible. We predicted, contrary to this view, that anger would be seen as implausible in the absence of disapproval, while disgust would be ambiguous, and considered more plausible in the absence of disapproval, because it is attributable to physical revulsion at homosexual acts.

In our studies (with the exception of Study 2b), we used the term “grossed out,” rather than “disgust” or “disgusted,” to describe the experience of disgust, because in English the term “disgust” is often used to communicate anger, while this is less true of “grossed out” (see Herz & Hinds, 2013; Nabi, 2002; P.S. Russell et al., 2013). For example, Nabi (2002) found that, when asked to think of acts that “disgust” them, laypeople often reported similar events as when asked to report acts that “anger” them, while this was not true when asked to report acts that made them feel “grossed out.” Thus, to best disambiguate the concept of disgust (as an experienced emotion) from anger, we avoided the term “disgust”/“disgusted”.

Method

Participants. In all of our studies, participants were recruited through Amazon Mechanical Turk. Following the recommendations of Simmons, Nelson, and Simonsohn (2013), we attempted to recruit about 50 participants per experimental condition in all of our studies. We

did not analyse responses that failed “Captcha” verifications or incomplete responses. In the reported analyses, we exclude participants who failed attention checks, which sometimes resulted in per-cell sample sizes below 50, but the results remain largely unchanged if these participants are included. After exclusions, we retained final samples of $N = 84$ in Study 1a (54 male, $M_{\text{Age}} = 34.80$, $SD = 10.88$) and $N = 94$ (59 male, $M_{\text{Age}} = 35.73$, $SD = 11.66$) in Study 1b.

Procedure. Participants were randomly assigned to one of two conditions. They read a scenario about a man (“Joe”) who is sitting in a park when he sees two men walk by holding hands and kissing. In the anger (grossed out) condition, seeing this makes Joe feel angry (grossed out). The scenario then stipulated that “Joe thinks that it is morally acceptable for two men to be romantically involved, but he cannot seem to shake” his initial emotional response. In Study 1a, we then asked how likely it was that “Joe really thinks it is morally acceptable for two men to be romantically involved” (1-7 scale, “Very unlikely” to “Very likely”) and how plausible it was that “Joe is fine with these men being romantically involved” (1-7 scale, “Totally implausible” to “Totally plausible”). In Study 1b, we asked similar questions about Joe’s beliefs about moral character: how likely it was that “Joe really thinks gay men can be good people” and how plausible it was that “Joe does NOT think these men have bad character”.

Results

The likelihood and plausibility questions were averaged together to form a composite measure of belief that the emotion can occur in the absence of moral disapproval (Study 1a: $\alpha = .90$; Study 1b: $\alpha = .88$). Participants in Study 1a considered anger in the absence of disapproval of the men’s actions to be quite implausible ($M = 2.86$, $SD = 1.54$); participants perceived gross feelings in the absence of disapproval to be much more plausible ($M = 4.87$, $SD = 1.84$), $t(82) = 5.38$, $p < .001$, $CI_{95\%}: [1.26, 2.75]$, $d = 1.18$. The mean for grossed out was significantly above

the scale midpoint of 4.00 (“Neither likely nor unlikely”), $t(44) = 3.17$, $p = .003$, $CI_{95\%}: [0.32, 1.42]$, $d = 0.47$, revealing that it is quite plausible to consider feeling gross as separable from disapproval. By contrast, the mean for anger was significantly below the midpoint, $t(38) = -4.62$, $p < .001$, $CI_{95\%}: [-1.64, -0.64]$, $d = 0.74$, suggesting it is quite implausible to consider anger separate from disapproval.

Similarly, participants in Study 1b considered it more plausible that Joe did not impugn the character of the two men when he experienced gross feelings than when he experienced anger ($M_{Disgust} = 5.07$, $SD = 1.48$; $M_{Anger} = 4.26$, $SD = 1.83$), $t(92) = 2.34$, $p = .021$, $CI_{95\%}: [0.12, 1.49]$, $d = 0.49$. The mean for grossed out was significantly above the midpoint, $t(46) = 4.88$, $p < .001$, $CI_{95\%}: [0.62, 1.50]$, $d = 0.72$, revealing that it is considered plausible to experience gross feelings while not attributing bad character. By contrast, the mean for anger was not different from the midpoint, $t(48) = 0.99$, $p = .329$, $CI_{95\%}: [-0.27, 0.79]$, $d = 0.14$, suggesting that it is neither plausible nor implausible to experience anger while not attributing bad character.

Discussion

In Study 1, participants considered the occurrence of anger without the occurrence of disapproval to be substantially less plausible than the occurrence of gross feelings without disapproval. Study 1b found that this is true even when the disapproval is focused on attributions of character, inconsistent with some recent work positing a privileged connection between character judgments and disgust (Giner-Sorolla & Chapman, 2017).

Study 2a

Study 2a improved upon Study 1 by adding a control condition, in which the protagonist experiences no emotion, and a condition in which the protagonist experiences *both* anger and

gross feelings. These changes allow us to examine whether disgust can communicate moral disapproval at all (i.e., relative to no emotion) and whether it communicates any such disapproval *over and above* anger. We also used a different dependent measure: we asked participants to infer what elicited the emotional response, and to rate how likely it was that the eliciting event was a moral violation. This allowed us to examine participants' unconstrained beliefs about what kinds of events evoke anger and disgust. Consistent with Hypothesis 1, we expected the presence of anger to enhance the judgment that a moral violation occurred, whereas we did not expect the presence of gross feelings to promote such an inference.

Method

Participants. After exclusions, we retained a final sample of $N = 232$ (132 male, $M_{\text{Age}} = 37.35$, $SD = 11.77$).

Procedure. Participants were randomly assigned to one cell of a 2 (anger: absent vs. present) x 2 (grossed out: absent vs. present) design. Participants read a very brief scenario: "Joe sees Bill do something. What Bill does makes Joe feel...". The scenario ended with "no emotion at all", "angry", "grossed out", or "angry and grossed out", depending on condition. They then responded to an open-ended question, "What do you think Bill did?". On the following page, the scenario was repeated, and participants indicated how likely it was that "Bill did something morally wrong" (1-7 scale, "Very unlikely" to "Very likely").

Results

Open-ended responses. Two research assistants, blind to the purpose of the study and to condition, coded participants' guesses about what Bill did. Table 1 presents the results from Coder 1; the results from Coder 2 are essentially identical (89% agreement, Cohen's $\kappa = .86$).

[Insert Table 1 about here]

In the absence of anger or gross feelings, the majority of participants guessed that Bill had done something that was not morally wrong, and involved no pathogenic, canonically disgust-eliciting content (e.g., drinking coffee). In the presence of anger, but not gross feelings, the majority guessed that he had done something immoral, which did not involve pathogenic content (e.g., stealing). In the presence of gross feelings, but not anger, the majority guessed that he had done something that involved pathogenic content, which was not immoral (e.g., picking his nose). Results were more variable when both anger and disgust were present, with a roughly even split among moral violations that involve pathogenic content (i.e., purity violations, e.g., spitting in someone's face), moral violations that do not involve pathogenic content, and actions that involve pathogenic content, but are not immoral.

Likelihood judgments. We next analysed participants' judgments of how likely it was that what Bill did was morally wrong. Figure 1 presents descriptive statistics (means and standard errors) for the four cells of the design. A 2x2 between-subjects analysis of variance (ANOVA) revealed a large effect of anger, $F(1, 228) = 296.71, p < .001, \eta^2_p = 0.57$, and a much smaller effect of gross feelings, $F(1, 228) = 26.10, p < .001, \eta^2_p = 0.10$, which were qualified by a significant interaction, $F(1, 228) = 46.91, p < .001, \eta^2_p = 0.17$. Simple effects tests revealed that in the presence of anger, feeling gross communicated nothing additional about whether or not Bill had done something wrong, $F(1, 228) = 1.50, p = .222, \eta^2_p = 0.01$. However, in the absence of anger, gross feelings did make it seem more likely that Bill had done something wrong, relative to the no-emotion condition, $F(1, 228) = 72.12, p < .001, \eta^2_p = 0.24$, though the means did not rise above the midpoint of the scale, i.e., participants overall believed it was somewhat *unlikely* that Bill had done something wrong, $t(57) = -2.59, p = .012, CI_{95\%}: [-.947, -$

.122], $d = 0.34$. The presence of anger communicated disapproval significantly above the midpoint both without gross feelings present, $t(57) = 10.16$, $p < .001$, $CI_{95\%}: [1.19, 1.77]$, $d = 1.33$, and with them present, $t(56) = 6.52$, $p < .001$, $CI_{95\%}: [.826, 1.55]$, $d = 0.86$.

[Insert Figure 1 about here]

Discussion

Based on participants' open-ended responses and likelihood ratings, anger seems to convey that someone did something morally wrong, regardless of the presence or absence of gross feelings. By contrast, in the absence of anger, feeling gross did not foster open-ended predictions that Bill acted immorally. Nonetheless, analysis of likelihood ratings revealed that gross feelings on their own did somewhat increase likelihood ratings relative to no emotion, though these ratings were still on the "unlikely" side of the scale.

Study 2b

Thus far, we have utilised the terms "angry" and "grossed out," respectively, to describe anger and disgust. Arguably, our findings may be limited to the peculiarities of these terms.¹ To test whether they generalise when using other terms for anger and disgust, we conducted a conceptual replication of Study 2a with two conditions.

Method

Sixty-five participants² (39 male, 25 female, 1 missing; $M_{\text{age}} = 36.14$ years, $SD = 10.73$) were presented the same scenario from Study 2a: Joe had witnessed Bill do something, and what

¹ We thank Roger Giner-Sorolla for pointing this out.

² We aimed for 100 participants; however, 35 participants were excluded either because they failed the attention check questions, or they provided responses that were either nonsensical (e.g., "very good," "no," "over rate,"

Bill did made Joe feel “irritated, frustrated” (anger terms) or “nauseated, queasy” (disgust terms). Participants were asked to describe what they thought Bill did, and, on a separate page, indicated how likely it was that “Bill did something morally wrong” (1-7 scale, “Very unlikely” to “Very likely”).

We chose the terms “irritated, frustrated” for anger, as these terms tend to be used to describe a self-oriented form of anger (i.e., anger at someone blocking one’s own goals; Kupfer & Giner-Sorolla, 2016). We chose the terms “nauseated, queasy” for disgust as these terms have commonly been used by researchers (e.g., Giner-Sorolla et al., 2012; Horberg et al., 2009; Piazza et al., 2013; P.S. Russell & Piazza, 2015) to reliably discriminate disgust from anger. If anger is conceived of as more indicative of moral wrongdoing than disgust, then Study 2b should represent a conservative test of this hypothesis, insofar as our choice of anger terms should orient participants’ thoughts towards a personal offense (i.e., something Bill did to Joe), as opposed to a third-party offense (i.e., something Bill did to someone else), the latter of which, according to some (e.g., Kupfer & Giner-Sorolla, 2016), is the privileged domain of disgust expressions.

Results

When Joe felt “irritated, frustrated”, participants predicted that Bill had performed a morally wrong act significantly above the 4.00 midpoint of the scale ($M = 5.03$, $SD = 1.36$), $t(36) = 4.58$, $p < .001$, $CI_{95\%}$: [0.57, 1.48], $d = 0.76$. When Joe felt “nauseated, queasy”, participants predicted that it was “neither likely nor unlikely” that Bill performed a morally wrong act—the mean likelihood score in the disgust condition ($M = 4.18$, $SD = 1.66$) did not differ from the

“something”) or were redescrptions of the emotions described (e.g., “Bill makes Joe feel nauseated”; “Bill does makes Joe feel irritated, frustrated”), and were therefore excluded from analysis. Two raters independently coded the responses for their suitability as sensible responses to the question (i.e., a discrete action of Bill). Agreement levels were high, Spearman’s $\rho = .94$, $p < .001$.

midpoint of the scale, $t(27) = 0.57$, $p = .573$, $CI_{95\%}: [-0.46, 0.82]$, $d = 0.11$. The mean difference between the two emotion conditions was significant, $t(63) = 2.26$, $p = .027$, $CI_{95\%}: [0.10, 1.60]$, $d = 0.56$.

As in Study 2a, responses for the anger condition tended to involve non-disgusting immoral acts (e.g., stealing), while responses in the disgust condition tended to involve canonical disgust elicitors, usually non-transgressive (e.g., put ketchup on ice cream), though sometimes transgressions (e.g., hurting an animal). Thus, we replicated previous findings using different terms to designate anger and disgust: an expression of irritation/frustration led to predictions about moral wrongdoing at appreciable levels, whereas this was not the case for an expression of nausea/queasiness.

Study 3

In Study 3, we tested Hypothesis 1 using yet another approach. We examined inferences derived from displays of disgust and anger in a context that contains pathogenic content (bloody viscera), which may or may not be considered a moral violation. Note that our argument is not specific to purity violations – the point we are making is that canonical disgust elicitors (which purity violations happen to contain) make expressions of disgust ambiguous. Thus, in Study 3 we employed a harm violation that incidentally includes canonical disgust elicitors. We expanded our operationalization of anger and disgust to include descriptions of prototypical bodily expressions of these emotions. We predicted that a display of disgust could signal disapproval or simply a preference not to view gory content, whereas a display of anger would less ambiguously signal moral disapproval.

Method

Participants. After exclusions, we retained a final sample of $N = 97$ (39 male, $M_{\text{Age}} = 37.39$, $SD = 11.85$).

Procedure. Participants were randomly assigned to one of two conditions and read a brief scenario about a person (“John”) who watched a video of cows being killed at a slaughterhouse and bleeding out. John either expressed anger (“furrowed his brow, clenched his fist, and exclaimed, ‘This makes me really angry!’”) or disgust (“wrinkled his nose, stuck out his tongue, and exclaimed, ‘Yuck! This is really gross!’”). Participants then indicated how likely and plausible it was that “John thinks it is OK to slaughter animals for food, he simply prefers not to witness it”, rated on 1-7 scales (“Very unlikely/Totally implausible” to “Very likely/Totally plausible”).

Results and Discussion

The likelihood and plausibility questions were averaged together to form a composite measure of belief that John did not morally disapprove of what he saw ($\alpha = .85$). Participants considered it more likely that John considered slaughtering animals morally acceptable when he expressed disgust ($M = 5.21$, $SD = 1.50$) than when he expressed anger ($M = 4.11$, $SD = 1.74$), $t(95) = 3.35$, $p = .001$, $CI_{95\%}: [0.44, 1.76]$, $d = 0.68$. Plausibility estimates were significantly above the midpoint of the scale when John expressed disgust, $t(49) = 5.70$, $p < .001$, $CI_{95\%}: [0.78, 1.64]$, $d = 0.81$, but did not differ from the midpoint when John expressed anger, $t(46) = 0.42$, $p = .678$, $CI_{95\%}: [-0.41, 0.62]$, $d = 0.06$.

Consistent with Studies 1-2, an expression of anger more clearly conveyed moral disapproval than did an expression of disgust. However, even participants in the disgust condition expressed some belief that John was opposed to slaughtering animals (the estimates of

moral approval were not at ceiling). In Studies 4-5, we explore this result further, and find that, in line with Hypothesis 2, when disgust expressions *do* signal moral disapproval, it is partly because they are interpreted as communicating anger.

Study 4

In Study 4, we examined directly what information is communicated by an expression of disgust in response to a potential moral violation that contains pathogenic content (the “slaughterhouse” scenario from Study 3). We expected, based on Study 3, that participants would infer some amount of moral disapproval from an expression of disgust, relative to no emotional expression. Consistent with Hypothesis 2, we expected that this inference would be partly explained by inferences that the target person is experiencing anger.

Method

Participants. After exclusions, we retained a final sample of $N = 99$ (55 male, 1 missing; $M_{\text{Age}} = 37.04$, $SD = 12.19$).

Procedure. Participants were randomly assigned to one of two conditions. In the disgust condition, participants read a scenario identical to the disgust condition of Study 3. In the no-emotion condition, participants read a similar scenario, except that John expressed no emotion in response to the video (“John had little expression at all and said, ‘Well, this has to happen so we can eat.’”). After reading the scenario, participants indicated how likely it was that John was feeling angry and grossed out about what he watched, and how likely it was that John disapproves of the slaughter of animals for meat (1-7 scales: “Very unlikely”/“Very likely”).

Results

Compared to the no-emotion condition, participants in the disgust condition perceived John to be more grossed out ($M = 6.54, SD = 1.01$ vs. $M = 2.75, SD = 1.57$), $t(97) = 14.24, p < .001, CI_{95\%}: [3.25, 4.31], d = 2.87$, and more angry ($M = 4.32, SD = 1.58$ vs. $M = 2.12, SD = 1.41$), $t(97) = 7.29, p < .001, CI_{95\%}: [1.60, 2.79], d = 1.47$. Thus, the disgust expression primarily communicated that John was grossed out, though it also communicated some anger. On average, participants in the disgust condition considered it somewhat likely that John disapproved of the slaughter of animals for meat ($M = 4.86, SD = 1.61$), midpoint comparison $t(49) = 3.76, p < .001, CI_{95\%}: [0.40, 1.31], d = 0.53$, whereas participants in the control condition found it moderately unlikely ($M = 2.16, SD = 1.62$), midpoint comparison $t(48) = -7.91, p < .001, CI_{95\%}: [-2.30, -1.37], d = 1.14$. The between-condition comparison was significant, $t(97) = 8.28, p < .001, CI_{95\%}: [2.05, 3.34], d = 1.66$.

To test whether this inferred disapproval was attributable to inferences of anger or gross feelings, we conducted a competitive mediation analysis using the PROCESS macro for SPSS, Model 4 (Hayes, 2013) with 10,000 bootstrap resamples (summarized in Figure 2). Disgust expression had a significant indirect effect on inferences of disapproval through inferred anger, $ab = 1.50, CI_{95\%}: [1.01, 2.06]$, accounting for 56% of the total effect. The indirect effect through disgust did not reach significance, $ab = 0.69, CI_{95\%}: [-0.08, 1.51]$, yet accounted for 26% of the total effect.

[Insert Figure 2 about here]

Discussion

A disgust expression was again interpreted as signalling moral disapproval to some extent. A disgust expression communicated both gross feelings *and* anger, and part of disgust's

perceived relationship with moral disapproval was explained by it being contextually interpreted as a sign of anger; indeed, the indirect effect via perceived anger was larger than the indirect effect via gross feelings.

Disgust expressions may be interpreted as signalling moral disapproval to some extent because they are negatively valenced. In Study 5, we sought to test this idea by examining whether another negatively-valenced emotion, sadness, might also serve as a basis for drawing inferences about moral disapprobation, much like disgust, and whether part of this relationship may be explained by people contextually construing expressions of sadness as anger.

Study 5

Method

After exclusions, we retained a sample of $N = 155$ (90 male, $M_{\text{Age}} = 37.09$ years, $SD = 11.31$). The methods were identical to Study 4, however, we added a third condition in which John expressed sadness (“tears began to well up in John’s eyes and he said, ‘This is so depressing.’”), and we included a measure of sadness (“Based on his reaction, how likely is it that John is feeling saddened about what he watched in the video?”), alongside the measures of anger, grossed out, and moral disapproval.

Results and Discussion

For Study 5, we preregistered our hypotheses, and our planned analyses (see <https://aspredicted.org/4we59r.pdf>), which entailed contrasting disgust vs. no-emotion, and, separately, sadness vs. no-emotion. Compared to the no-emotion condition, participants in the disgust condition inferred that John was more grossed out, more sad, more angry, and that he was more disapproving of the slaughter of cattle (see Table 2). Similarly, compared to the no-

emotion condition, participants in the sadness condition attributed to John more sadness, more gross feelings, and more anger, and inferred he was more disapproving.

[Insert Table 2 about here]

We conducted two separate competitive mediation analyses (5,000 resamples; Hayes' [2013] PROCESS Model 4), following our pre-registered plan. First, we contrasted disgust with no-emotion using gross feelings and anger as simultaneous mediators, and, secondly, we contrasted sadness with no-emotion using sadness and anger as simultaneous mediators. We used disapproval judgments as the outcome variable in both instances.³ The disgust expression indirectly affected judgments of John's moral disapproval via perceptions that John was angry, $ab = 1.12$, $SE = .27$, $CI_{95\%}: [0.67, 1.77]$, and grossed out, $ab = 1.42$, $SE = .36$, $CI_{95\%}: [0.81, 2.27]$ (the direct effect of disgust was no longer significant when accounting for the indirect effects; $c' = 0.08$, $SE = 0.34$, $t(102) = 0.23$, $p = .813$, $CI_{95\%}: [-0.59, 0.76]$). The sadness expression indirectly affected judgments of John's disapproval via judgments that John was angry, $ab = 0.99$, $SE = .18$, $CI_{95\%}: [0.67, 1.41]$, and sad, $ab = 0.52$, $SE = .21$, $CI_{95\%}: [0.19, 1.00]$ (the direct effect of sadness was no longer significant when accounting for the indirect effects; $c' = 0.28$, $SE = 0.21$, $t(103) = 1.33$, $p = .184$, $CI_{95\%}: [-0.13, 0.69]$).

Thus, an expression of sadness about an ambiguously immoral event was interpreted as communicating some moral disapproval, at levels comparable to, if not greater than, a disgust expression, and, like disgust, an expression of sadness was perceived as relating to disapproval in part via perceptions that the actor was angry.

³ If sadness is included as a mediator in the first analysis, it does not mediate the effect of disgust on inferred disapproval, $ab = .16$, $SE = .22$, $CI_{95\%}: [-0.23, 0.60]$, and grossed out and anger remain significant mediators. If grossed-out is included as a mediator in the second analysis, it does not mediate the effect of sadness on inferred disapproval, $ab = -.04$, $SE = .23$, $CI_{95\%}: [-0.56, 0.35]$, and sadness and anger remain significant mediators.

General Discussion

The present studies showed that laypeople believe anger to more consistently relate to moral disapproval than disgust. Our participants found it less plausible for someone to approve of an action (Study 1a) or have a positive opinion of someone's character (Study 1b), when experiencing anger than when feeling grossed out, in the context of a purity violation. Participants were more likely to predict that someone had done something wrong when someone reacted with anger than gross feelings (Study 2a) or nausea (Study 2b). Moreover, participants were more likely to infer that a person was merely expressing a preference, rather than making a moral judgment, when disgust was expressed in the face and verbally, versus an anger expression, when presented with a harm violation that incidentally contains pathogen content (Study 3). These multiple findings converge on the conclusion that, even in the context of "purity" violations, when some theories would predict that disgust should be *most* associated with moral disapproval, the presence of canonical disgust elicitors makes disgust ambiguous, while anger is much less so. Nonetheless, it should be acknowledged that even anger expressions were at times met with uncertainty: in Studies 1b and 3, judgments that anger expressions predicted moral disapproval did not differ significantly from the midpoint of the scale, which represented ambivalence or uncertainty about whether or not the emotion expression was indicative of moral disapproval.

In Studies 4-5, we explored whether part of why people sometimes associate disgust with moral disapprobation is because expressions of disgust are interpreted as expressions of anger within morally-relevant contexts. We found that disgust expressions communicated both disgust *and* anger in such contexts, and the relationship disgust had with inferences of moral disapproval was partly explained by disgust conveying anger. Moreover, we found that sadness, an ostensibly

amoral, negatively-valenced emotion, can be construed as anger within an ambiguously moral context, much like disgust. These studies demonstrate that laypeople closely associate anger and moral disapprobation, as expressions of disgust and sadness generated inferences of moral disapproval via inferred anger. Yet, we should not conclude that disgust and sadness relate to moral disapproval *exclusively* because of what they communicate about anger. In both studies, the indirect effect via anger only partly explained the effect of disgust and sadness on moral disapproval judgments. Additional research is needed to better understand how disgust and sadness may play a more direct role in people's inferences of moral disapproval, for example, via the negative valence inherent within both of these emotions.

Limitations and Future Directions

Our studies only examined contexts in which canonically gross, pathogen-linked disgust elicitors were present, and therefore do not speak to folk beliefs about how anger and disgust relate to moral disapproval in other contexts. Previous research suggests that, in contexts without disgust elicitors, expressions of disgust more strongly convey principled moral outrage on behalf of others, whereas expressions of anger convey that one has been *personally* victimized (Kupfer & Giner-Sorolla, 2016). Moreover, in the context of a non-pathogenic, self-directed violation (suicide), moral judgments were more correlated with disgust than with anger (Rottman, Kelemen, & Young, 2014). Thus, what different emotions communicate may depend importantly on the context in which they are expressed. That said, much prior theorizing stipulates that canonically gross, "purity" violations are precisely the context in which disgust should be *most* associated with moral disapproval. Our findings suggest instead that the presence of pathogenic content makes disgust expressions particularly ambiguous in this context.

The present findings also do not speak to *why* laypeople believe that anger (and, to a lesser extent, disgust) co-occurs with moral disapproval. It could be that laypeople embrace a strong sentimentalist view that the experience of an emotion *constitutes* a moral judgment (see, e.g., Prinz, 2007). Alternatively, they might endorse the view that the experience of an emotion *causes* a moral judgment, or moral judgments cause emotions, or that both emotions and moral judgments independently result from certain features of an act (e.g., intentionality), but are not causally related to one another. Investigating how laypeople conceptualize the causal relationship (or lack thereof) between emotions and moral judgments is an interesting and fruitful direction for future research.

Relation to Past Work

Our findings join with other recent work, which has contrasted the relative status of anger and disgust as condemning moral emotions. One line of research has examined the extent to which emotions, like disgust, *modulate* moral disapproval. Several studies seem to show that experimentally-induced feelings of disgust tend to increase moral condemnation (e.g., Schnall, Haidt, Clore, & Jordan, 2008; Wheatley & Haidt, 2005), but meta-analytic evidence (Landy & Goodwin, 2015) and high-powered failures to replicate (Johnson, Cheung, & Donnellan, 2014; Johnson et al., 2016) suggest that this effect is unreliable. At best, disgust is no more likely than other emotional states, like sadness or excitement, to exogenously amplify moral disapproval (e.g., Cheng, Ottati, & Price, 2013; Landy & Piazza, in press). Another reasonable, putative feature of condemning moral emotions is that they *are modulated by* factors that alter moral judgments. However, studies have found that the amount of disgust experienced in transgressive contexts does not reliably respond to modulators of moral judgment, such as a person's intentions (P.S. Russell & Giner-Sorolla, 2011a; Young & Saxe, 2011) or whether the person had

good reasons for their actions (Piazza et al., 2013; P.S. Russell & Giner-Sorolla, 2011b), whereas anger is highly affected by these factors.

While some have claimed that the disconnect between disgust and intentionality is one of its peculiarities as a moral emotion (e.g., P.S. Russell & Giner-Sorolla, 2013), we argue that this dissociation is problematic for any definition of moral emotions that recognises that moral emotions and moral judgments should relate in some manner. If disgust does not relate to important modulators of moral disapproval, then this casts further doubt on its relationship with moral judgment. As we discussed earlier, disgust might still strongly relate to morality on other grounds; for example, disgust might *motivate* morally relevant actions, such as efforts to punish or ostracise someone. Yet our findings do seem to further narrow down the ways in which disgust reliably relates to moral condemnation, relative to the larger role played by anger.

Our mediational findings from Study 4-5 provide further evidence that disgust symbols, even those centred on “core,” “visceral” or “physical” disgust, are often construed as symbols of anger in morally relevant contexts. In Study 4, for instance, many participants inferred that a man exhibiting a disgust face and exclaiming “Yuck” was angry out about cattle slaughter. These findings are consistent with the notion that emotion symbols are polycemous and can be construed differently in different contexts (e.g., see Aviezer, Hassin, Ryan, et al., 2008; Carroll & J.A. Russell, 1996; Pochedley et al., 2012). For example, Aviezer et al. (2008) showed that when the prototypical disgust face was presented in a context where a person had their arm raised and fist clenched, 87% of participants categorised the disgust face as an expression of anger. Studies 4-5 converge with past findings to showcase the polycemous nature of disgust symbols, particularly in contexts where a person could be plausibly construed as forming a moral judgment.

Conclusion

The present studies highlight the greater association anger has with moral disapproval for laypeople, relative to disgust, and call into question any approach that would place disgust on the same level as anger as a condemning moral emotion. Laypeople simply do not conceptually connect disgust to moral disapproval to the degree that they do for anger, at least within the American samples that we studied. More broadly, we think that this research illustrates the utility of studying laypeople's beliefs about how emotions and mental states operate. While laypeople may lack perfect introspective access to their cognitive processes, and their understandings of emotion concepts are subject to self-report biases, they can still provide convergent evidence with other methodological approaches, as they have here.

Acknowledgments

We thank Timothy Hayward, Nicholas Herzog, and Yena Kim for their assistance with this research.

Declaration of Interests Statement

No potential conflict of interest was reported by the authors.

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Table 1.

Frequencies of open-ended responses, Study 2a.

Category	Condition			
	Anger absent, Gross feelings absent	Anger present, Gross feelings absent	Anger absent, Gross feelings present	Anger present, Gross feelings present
Moral violation with pathogenic content	0	0	2	16
Moral violation without pathogenic content	2	50	2	17
Pathogenic content with no moral violation	4	0	51	18
No moral violation, and no pathogenic content	49	4	0	1
Other/unscorable	4	4	3	5

Note. Modal responses are bolded.

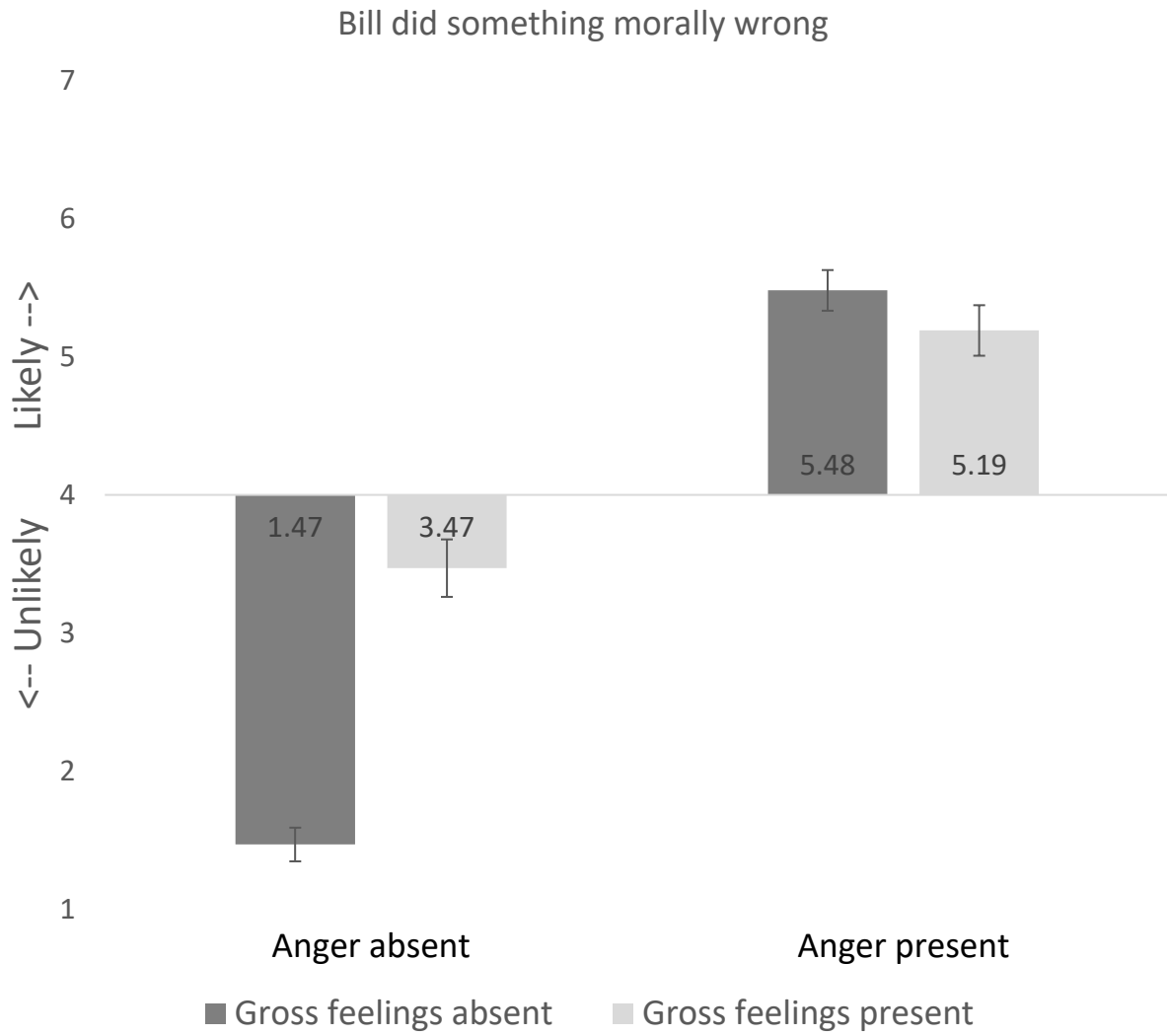
Table 2.

Condition means and standard deviations and inferential statistics, Study 5.

Disgust Condition versus Control Condition					
	Disgust Condition	Control Condition	<i>t</i>(102)	95% CI	<i>d</i>
Gross feelings	6.46 (1.21)	2.74 (1.79)	12.28	3.12, 4.32	2.43
Sadness	4.62 (1.71)	2.74 (1.60)	5.78	1.23, 2.52	1.14
Anger	4.60 (1.78)	2.14 (1.43)	7.75	1.82, 3.07	1.52
Disapproval	4.88 (1.43)	2.26 (1.73)	8.37	2.00, 3.24	1.65

Sadness Condition versus Control Condition					
	Sadness Condition	Control Condition	<i>t</i>(103)	95% CI	<i>d</i>
Gross feelings	5.98 (1.15)	2.74 (1.79)	10.93	2.65, 3.83	2.15
Sadness	6.53 (1.02)	2.74 (1.60)	14.32	3.26, 4.31	2.82
Anger	5.37 (1.42)	2.14 (1.43)	11.54	2.67, 3.78	2.26
Disapproval	5.84 (1.37)	2.26 (1.73)	11.71	2.98, 4.19	2.30

Note. All *ps* < .001.



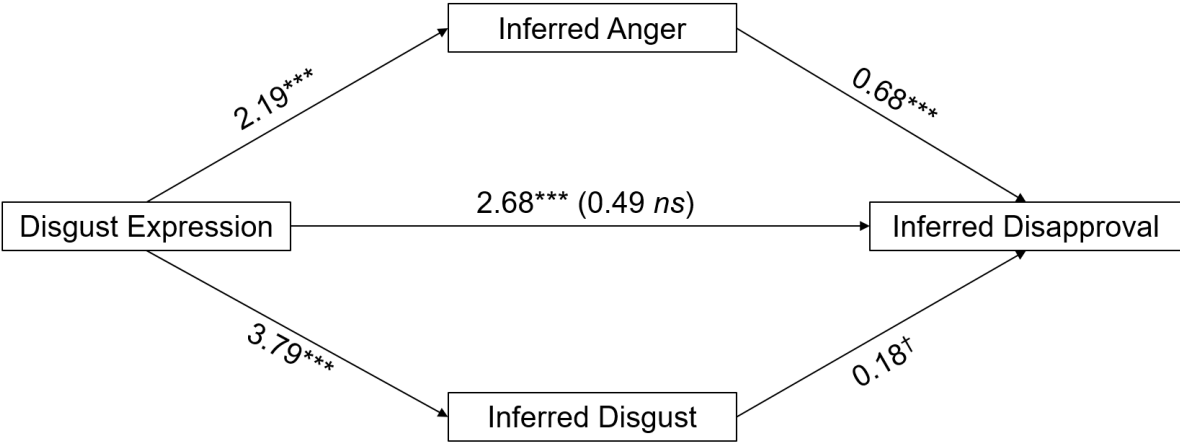


Figure Captions

Figure 1. Means (± 1 SEs) of the likelihood that Bill did something morally wrong, by emotion condition, Study 2a. Means < 4.00 fall within “unlikely” range; means > 4.00 fall within “likely” range.

Figure 2. Competitive mediation model, Study 4. *Note.* $^{\dagger} p < .10$, $*** p < .001$.