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So Gross and Yet so Far Away: Psychological Distance Moderates the Effect of Disgust on Moral Judgment

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Abstract

People morally evaluate norm violations that occur at various distances from the self (e.g., a corrupt politician vs. a cheating spouse). Yet, distance is rarely studied as a moderator of moral judgment processes. We focus on the influence of disgust on moral judgments, as evidence here has remained inconclusive. Based on feelings as information theory and the notion that disgust evolved as a pathogen avoidance mechanism, we argue that disgust influences moral judgment of psychologically distant (vs. near) norm violations. Studies 1 and 3 show that trait disgust sensitivity (but not trait anger and fear) more strongly predicts moral judgment of distant than near violations. Studies 2 and 4 show that incidental disgust affects moral judgment of distant (vs. near) violations and that the moderating role of distance is mediated by involvement of others (vs. the self) in the evaluator's conceptualization of the violation.

Keywords

disgust, moral judgment, psychological distance, feelings as information theory

An intriguing finding that has emerged from moral psychology research is that moral judgment may be influenced by the experience of disgust. Studies show that people who are chronically predisposed to experience high (vs. low) disgust are more condemning of criminal activity (Jones & Fitness, 2008) and gay marriage (Inbar, Pizarro, Knobe, & Bloom, 2009). Other studies show that incidentally experienced disgust makes moral judgment of unrelated norm violations more severe (e.g., Eskine, Kacinik, & Prinz, 2011; Horberg, Oveis, Keltner, & Cohen, 2009; Schnall, Haidt, Clore, & Jordan, 2008; Wheatley & Haidt, 2005). However, various studies failed to show that disgust influences moral judgment (David & Olatunji, 2011; Johnson et al., 2016; Ugazio, Lamm, & Singer, 2012; see Landy & Goodwin, 2015, for a meta-analysis; see also Schnall, Haidt, Clore, & Jordan, 2015).

To understand why disgust sometimes influences moral judgment and sometimes not, it is useful to identify theoretically relevant moderator variables that determine when this effect will materialize. Here, we identify *psychological distance* as a moderator of the effect of disgust on moral judgment. Psychological distance refers to the extent to which objects or events are present in the direct experience of reality. Large (vs. small) psychological distance results when objects or events are distant (vs. nearby) in space or time or when objects or events are hypothetical (vs. real; Liberman, Trope, & Stephan, 2007).

It has been theorized that disgust evolved as a pathogen avoidance mechanism that, over the course of human evolution, also acquired the function to signal and avoid threats to the social order (i.e., moral violations; Chapman & Anderson, 2013; Oaten, Stevenson, & Case, 2009; Rozin, Haidt, & Fincher, 2009). We build on feelings as information theory (FIT; Schwarz, 2012) to predict that disgust influences moral judgment of psychologically distant rather than near violations. FIT proposes that people rely on affective states and specific emotions as a source of judgment because this information is readily available and quickly actionable. This is especially so when the informational value of affect is considered high and when other sources of information are lacking or difficult to process.

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Research suggests that FIT is relevant to understand the effect of disgust on moral judgment: Incidental disgust affects moral judgment in particular among individuals who fail to disengage attention from emotionally colored cognitions (Van Dillen, van der Wal, & Van den Bos, 2012), who do not differentiate incidental from integral emotional experiences (Cameron, Payne, & Doris, 2013; Sato & Sugiura, 2014), who attend strongly to their internal physical states (Schnall et al., 2008, Studies 2–3), or who are sensitive specifically to the experience of disgust (Ong, Mullette-Gillman, Kwok, & Lim, 2014).

To apply FIT to the role of psychological distance in the effect of disgust on moral judgment, it is relevant to consider the informational value of the experience of disgust. In ancestral environments, pathogen sources were more likely to be psychologically distant than close. For instance, interaction with psychologically close others (e.g., those belonging to one's family group) likely posed less risk of contagion than interaction with psychologically distant others (e.g., strangers) who may host novel pathogens to which one has no immunity (Oaten et al., 2009; Rozin, Haidt, & McCauley, 2000). In support of this, disgust inductors (e.g., feces) produce more negative responses when they originate from strangers than from close others and the least negative responses when they originate from the self (Case, Repacholi, & Stevenson, 2006; Stevenson & Repacholi, 2005). We suggest that this effect of disgust generalizes to moral violations, such that disgust is found more relevant to interpret violations committed by others at large psychological distance (vs. close others or oneself).

We tested our prediction in four experiments. We operationalized disgust as trait disgust sensitivity (Studies 1 and 3) or experimentally induced incidental disgust (Studies 2 and 4) and manipulated participants' psychological distance to the violation (large vs. small).

In Studies 1 and 3, we also tested if specifically disgust but not two other negative moral emotions, that is, fear and anger (DeSteno, Petty, Wegener, & Rucker, 2000; Keltner, Horberg, & Oveis, 2006), exercises its effect for distant (vs. near) violations. In contrast to anger and fear, the informational value of disgust is arguably relevant specifically to avoid psychologically distant threats. These tests establish whether the informational value of disgust drives our effect and not reliance on negative affect as a function of psychological distance more generally.

In Studies 2 and 4, we tested if the role of psychological distance in moderating the effect of disgust on moral judgment is mediated by inclusion of others (vs. the self) in representations of violations. Psychological distance produces various distinct effects, for instance, altering the intensity of felt emotions and abstractness of event construals (Williams, Stein, & Galguera, 2014). Focusing on the representation of others (vs. the self) in the transgression specifies the role of psychological distance toward the dimension that should drive its effects according to pathogen avoidance theory on disgust.

Scholars disagree about whether disgust primarily affects judgment of violations of purity norms or generalizes beyond that domain. Purity norms protect the sacredness of the body and soul, such as sexual behaviors and taboo foods and are therefore arguably directly relevant to the function of disgust as pathogen avoidance. The nonpurity domain includes other things considered moral, such as harming others and cheating. We do not offer predictions one way or the other; yet, these design choices facilitate connecting our findings with the major streams of work investigating the effect of disgust on moral judgment (see Landy & Goodwin, 2015; Oaten et al., 2009; Tybur, Lieberman, Kurzban, & DeScioli, 2013, for overviews). Figure 1 represents our model.

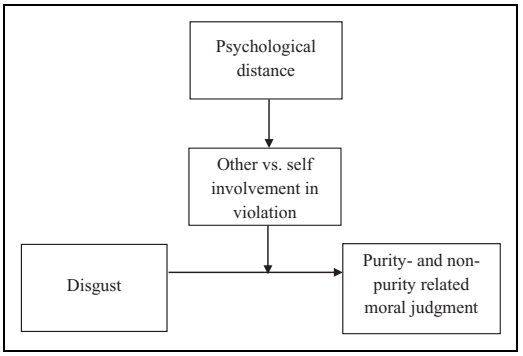

Figure 1. Conceptual model.

Study 1

Method

Design, Participants, and Procedure

We assessed trait disgust sensitivity and manipulated psychological distance (large vs. small). Detecting an effect the size of that in other research identifying moderators of the effect of disgust on moral judgment (i.e., Schnall et al., 2008, Study 3, $\eta^2 = .07$; Disgust × Private Body Consciousness), with $\alpha = .05$ and power = .95, required at least 156 participants. We therefore invited 200 adult participants from Amazon Mechanical Turk (AMT) and paid them US$0.85. Before the study commenced, we employed Oppenheimer, Meyvis, and Davidendko's (2009) instructional manipulation check. Participants who failed this check were sent to the end of the study and did not end up in our data (as were participants who did not finish the study). At the end of the study, we employed a transitivity check (Nagel & Waldmann, 2013). Specifically, we asked: "Imagine three people, Victor, Pete, and Adam. Suppose Victor is older than Pete, and Pete is older than Adam. Who is the youngest among the three?" We excluded participants who failed the transitivity check from analyses, leaving an N of 161 ($M_{age} = 33.12$, $SD = 12.22$, 61 females).

Measures

We measured trait disgust sensitivity with Olatunji, Haidt, McKay, and David's (2008) scale (e.g., "If I see someone vomit, it makes me sick to my stomach"; 1 = *strongly*

disagree (very untrue about me); 5 = *strongly agree (very true about me)*).

We measured trait anger with Spielberger's (1996; e.g., "I often find myself feeling angry") and Lerner and Keltner's (2001) scale (e.g., "I get annoyed when my contributions are not recognized"; 1 = *not at all true of me*; 7 = *very true of me*). We averaged both scales into one trait-anger measure (Lerner & Keltner, 2001).

We measured trait fear with Bernstein and Allen's (1969) Fear Survey Schedule-II ("How scared are you in the following situations . . . ?" e.g., " . . . Being criticized"; 1 = *not scared at all*; 7 = *terror*).

We measured moral judgment with Lovett, Jordan, and Wiltermuth's (2012) instrument, which contains 4 subscales (Deception, Harm, Laziness, and Violations of omission) that represent nonpurity-related moral judgment (e.g., "Feigning an injury to collect on insurance") and 2 subscales (Bodily violations and Purity) that represent purity-related moral judgment (e.g., "Drinking 10 beers at a party and vomiting several times" 1 = *not wrong at all, a perfectly OK action*; 7 = *very wrong; a very immoral action*).

Psychological Distance

We assigned participants randomly to a condition in which they imagined that the morally contentious situations happened either "very far from where you are now, like very long ago, very far in the future, or in another country" (large distance) or "very close to where you are now, like yesterday, tomorrow, or right in front of your nose" (small distance; see Henderson, Wakslak, Fujita, & Rohrbach, 2011, for an overview of similar manipulations).

Manipulation Check

After having completed the moral evaluations, participants indicated the distance between themselves and the described situations (0 = *very near to me; yesterday, tomorrow, and/or right in front of me*; 100 = *very far from where I am now; long ago, in the future, and/or in another country*).

Results

Table 1 presents descriptive statistics, Cronbach's α coefficients, and correlations.

Manipulation Check

ANOVA revealed that participants in the far condition imagined situations to be further away ($M = 68.25$, $SD = 30.41$) than participants in the close condition ($M = 31.00$, $SD = 30.00$), $F(1, 159) = 61.14$, $p < .001$, $b = 37.25$, 95% CI [27.84; 46.66], $d = 1.23$, 95% CI [0.90, 1.57].

Hypotheses Testing

We used Ordinary Least Square (OLS) regression. Table 2 presents the results.

Table 1. Descriptive Statistics and Correlations (Study 1).

Variables	*M*	*SD*	1	2	3	4	5
1 Disgust sensitivity	2.96	0.55	(.86)	.19**	.38***	.47***	.35***
2 Dispositional anger	3.21	1.10		(.92)	.41***	.13	.10
3 Dispositional fear	3.31	0.87			(.90)	.37***	.40***
4 Purity-related moral judgment	3.92	1.50				(.90)	.76***
5 Nonpurity related moral judgment	4.40	0.96					(.90)

Note. $N = 161$. The diagonal lists Cronbach's α coefficients.
*$p < .05$. **$p < .01$. ***$p < .001$.

Disgust Sensitivity × Distance significantly predicted nonpurity- and, marginally, purity-related moral judgment (Figure 2). Simple effect analyses showed a stronger disgust sensitivity effect for distant than near nonpurity-related transgressions, $b = 1.04$, $SE = 0.20$, $t(160) = 5.23$, $p < .001$, 95% CI [0.65, 1.43], $d = .82$, 95% CI [0.50, 1.15] versus $b = .32$, $t(160) = 1.88$, $p = .06$, 95% CI [−0.02, 0.66], $d = .30$, 95% CI [−0.01, 0.61] and purity-related transgressions, $b = 1.69$, $SE = 0.30$, $t(160) = 5.68$, $p < .001$, 95% CI [1.10, 2.27], $d = .90$, 95% CI [0.57, 1.22] versus $b = .98$, $SE = 0.26$, $t(160) = 3.78$, $p < .001$, 95% CI [0.47, 1.48], $d = .60$, 95% CI [0.28, 0.91].

To establish the exact shape of the Disgust × Distance effect, we also probed the effect of distance contingent upon disgust sensitivity. We used the Johnson-Neyman (1936) technique, which identifies for each value of the moderator whether the predictor significantly predicts the criterion, thus avoiding reliance on arbitrary moderator values such as 1 *SD* below and above the mean (Bauer & Curran, 2005). We found a negative effect ($p < .05$) of distance on nonpurity-related moral judgment for disgust sensitivity values <2.27 and a positive effect for values >3.42. Distance did not significantly affect purity-related moral judgment for any value of disgust sensitivity.

Discussion of Study 1 and Introduction to Study 2

In Study 1, disgust affected both distant (vs. close) nonpurity- and purity-related moral judgment, although the effect appeared to be stronger in the former case; we address this in the quantitative integration of studies section. In Study 2, we focused on the effect of incidental disgust on unrelated moral judgment.

In Study 2, we also tested if the moderating role of psychological distance is itself mediated by involvement of others (vs. the self) in the conceptualization of the violation (Figure 1). Specifically, before judging a near or distant transgression, participants described it in their own words. We coded participants' narratives with the Linguistic Inquiry and Word Count (LIWC2015) software (Pennebaker, Boyd, Jordan, & Blackburn, 2015). LIWC assigns each word and common word combination to one or more linguistic categories. We focused on the category assessing a focus on others versus the self (Kacewicz, Pennebaker, Davis, Jeon, & Graesser, 2014).

Table 2. Regression Results of Study 1.

	Purity-Related Moral Judgment			Nonpurity Related Moral Judgment		
	Step 1 $R^2 = .23$***			Step 1 $R^2 = .17$***		
Predictor	*b* (*SE*) [95% CI *b*]	*t*	*d* [95% CI *d*]	*b* (*SE*) [95% CI *b*]	*t*	*d* [95% CI *d*]
Constant	3.97 (0.11) [3.76, 4.18]	37.47***	5.91 [5.19, 6.62]	4.44 (.07) [4.30, 4.58]	62.61***	9.87 [8.75, 10.99]
Disgust	1.33 (0.20) [0.94, 1.71]	6.77***	1.07 [0.74, 1.40]	.68 (.13) [0.42, 0.94]	5.18***	0.82 [0.50, 1.14]
Distance	−.001 (0.11) [−0.21, 0.21]	−0.01	−0.002 [−0.31, 0.31]	.02 (.07) [−0.12, 0.16]	0.34	0.05 [−0.26, 0.36]
Disgust × Distance	0.36 (0.20) [−0.03, 0.74]	1.81†	0.29 [−0.03, 0.60]	.36 (.13) [0.10, 0.62]	2.72***	0.43 [0.12, 0.74]
	Step 2 $R^2_{change} = .05$*			Step 2 $R^2_{change} = .07$**		
Constant	3.97 (0.10) [3.76, 4.17]	38.14***	6.01 [5.29, 6.74]	4.44 (0.07) [4.30, 4.57]	64.68***	10.20 [9.04, 11.35]
Disgust	1.15 (0.21) [0.73, 1.57]	5.38***	0.85 [0.53, 1.17]	0.50 (0.14) [0.22, 0.78]	3.51***	0.55 [0.24, 0.87]
Distance	0.001 (0.10) [−0.20, 0.21]	0.01	0.002 [−0.31, 0.31]	0.03 (0.07) [−0.11, 0.16]	0.40	0.06 [−0.25, 0.37]
Disgust × Distance	0.33 (0.21) [−0.09, 0.75]	1.54	0.24 [−0.07, 0.55]	0.29 (0.14) [0.01, 0.57]	2.07*	0.32 [0.02, 0.64]
Anger	−0.04 (0.10) [−0.25, 0.16]	−0.40	−0.06 [−0.37, 0.25]	−0.07 (0.07) [−0.21, 0.06]	−.1.07	−0.17 [−0.48, 0.14]
Fear	0.38 (0.14) [0.10, 0.66]	2.68**	0.42 [0.11, 0.73]	0.35 (0.09) [0.17, 0.54]	3.78***	0.60 [0.28, 0.91]
Anger × Distance	0.13 (0.10) [−0.07, 0.34]	1.28	0.20 [−0.11, 0.51]	0.02 (0.07) [−0.11, 0.16]	0.32	0.05 [−0.26, 0.36]
Fear × Distance	−0.19 (0.14) [−0.47, 0.10]	−1.31	−0.21 [−0.52, 0.10]	−0.05 (0.09) [−0.23, 0.14]	−0.52	−0.08 [−0.39, 0.23]

Note. Interactions are based on mean centered versions of disgust, anger, and fear and an effect coded version of distance (−1 = *near*, 1 = *distant*). Table presents unstandardized regression coefficients, standard errors (in round brackets), 95% confidence intervals (CIs; in square brackets), *t* values, Cohen's *d*, and its 95% CI (in square brackets).
†*p* < .10. *p < .05. **p < .01. ***p < .001.

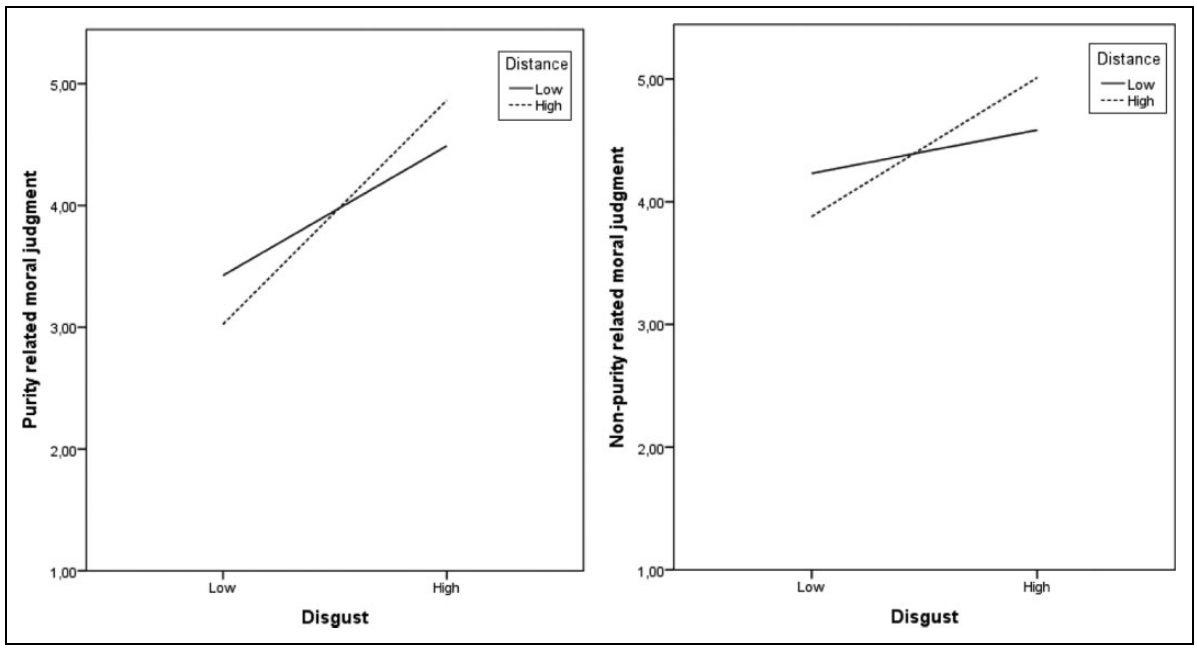

Figure 2. How disgust sensitivity predicts moral judgment as a function of psychological distance in Study 1.

Study 2

Method

Participants and Design

We expected tests involving the involvement of others (vs. the self) in the transgression conceptualization to be relatively low in statistical power. Therefore, we recruited 300 adults via AMT (rather than 200, as in Study 1) and paid them US$0.75. As in Study 1, participants who failed the instructional check were sent to the end of the study and did not end up in our data (as were participants who did not finish the study, $N = 27$). We excluded 29 participants who did not describe a physical disgust situation and 10 participants who had missing values on one of the key variables, resulting in a final N of 234 (121 men; $M_{age} = 36.64$, $SD = 12.28$). We did

Table 3. Descriptive Statistics and Correlations (Study 2).

	Variables	*M*	*SD*	1	2	3	4
1	Others versus self (purity)	57.47	28.53		.48***	−.13*	−.10
2	Others versus self (nonpurity)	43.48	20.37			−.29***	−.25***
3	Purity-related moral judgment	7.21	1.89			(.68)	.47***
4	Nonpurity related moral judgment	6.24	1.75				(.51)

Note. $N = 234$. Higher scores on others versus self indicate a stronger focus on others rather than the self in participants' transgression narratives. The diagonal lists Cronbach's α coefficients.
*$p < .05$. **$p < .01$. ***$p < .001$.

not employ a transitivity check. We assigned participants randomly to one condition in a 2 (disgust induction vs. control) × 2 (psychological distance: near vs. far) between-subjects factorial design.

Procedure

We manipulated incidental disgust using Schnall et al.'s (2008, Study 3) procedure. In the disgust condition, participants wrote about a specific event that happened to them that involved seeing or touching something physically disgusting. In the control condition, participants viewed a picture of a landscape, pretested to ensure it did not arouse positive or negative emotion. After this, participants indicated their disgust (3 items: disgusted, repulsed, grossed out; 1 = *does not describe my feelings right now*; 5 = *describes my feelings extremely well*; Schnall et al., 2008). Subsequently, we manipulated psychological distance as in Study 1. We measured moral judgment with six transgression vignettes from Schnall et al. (2008, Studies 2–4; 1 = *perfectly ok*; 9 = *extremely wrong*): "Dog," "plane crash," and "kitten" involve *purity-related moral judgment*; "wallet," "resume," and "trolley" involve *nonpurity-related moral judgment*. Participants described each transgression in their own words before judging the violation. Finally, participants responded to the distance check, provided demographics, and were debriefed (Table 3).

Results

Manipulation Checks

ANOVA revealed that disgust was significantly higher in the disgust ($M = 3.34$, $SD = 1.13$) than the control condition ($M = 1.67$, $SD = 1.20$), $F(1, 231) = 104.84$, $p < .001$, $d = 1.37$, 95% CI = [1.07, 1.66].

ANOVA revealed a significant distance effect $F(1, 224) = 27.45$, $p < .001$, $d = .70$, 95% CI = [0.43, 0.97], on the distance check, but no disgust, $F(1, 224) = 2.02$, $p = .16$, $d = .20$, 95% CI = [−0.06, 0.46], or Disgust × Distance effect, $F(1, 224) = .37$, $p = .54$, $d = .09$, 95% CI = [−0.17, 0.35]. Participants in the far condition considered the situations to be further away ($M = 6.65$, $SD = 2.17$) than those in the close condition ($M = 4.78$, $SD = 2.93$).[1]

Hypothesis Testing

We used OLS regression. Table 4 shows the results.

We first tested if psychological distance moderates the effect of disgust on moral judgment. Disgust × Distance did not significantly affect nonpurity-related moral judgment, but it affected purity-related moral judgment (Figure 3). Simple effect tests revealed that disgust did not affect purity-related judgment in the near condition, $b = -.28$, $SE = 0.33$, $t(233) = -.83$, $p = .41$, 95% CI [−0.93, 0.38], $d = -.11$, 95% CI [−0.37, 0.15], but it did in the far condition, $b = .78$, $SE = 0.40$, $t(233) = 1.96$, $p = .05$, 95% CI [−0.01, 1.56], $d = .26$, 95% CI [0.00, 0.51].

To establish the exact shape of the Disgust × Distance effect, we also probed the effect of distance contingent upon disgust. There was no distance effect in the disgust condition, $b = .46$, $SE = 0.41$, $p = .27$, $d = .14$, 95% CI [−0.11, 0.40], but a marginal effect in the control condition. Near (vs. distant) transgressions led to less severe purity-related moral judgment, $b = -.60$, $SE = 0.31$, $p = .06$, $d = -.25$, 95% CI = [−0.51, 0.01].

We then tested if other (vs. self) focus mediates the moderating role of psychological distance (Figure 1). For such a mediating role, other (vs. self) focus should be affected by distance. OLS regression revealed that high (vs. low) distance leads to stronger other (vs. self) focus for purity transgressions, $b = 9.40$, $SE = 3.74$, $t(233) = 2.52$, $p = .01$, 95% CI [2.04, 16.77], $d = .33$, 95% CI [0.07, 0.59] but not for nonpurity transgressions, $b = 4.24$, $SE = 2.69$, $t(233) = 1.57$, $p = .12$, 95% CI [−1.07, 9.54], $d = .21$, 95% CI [−0.05, 0.46].

We subsequently tested if other (vs. self) focus moderates the effect of disgust on moral judgment (Table 4, Model 2). We found a significant Disgust × Other versus self focus effect for purity-related moral judgment but not for nonpurity-related moral judgment.

Johnson–Neyman analyses (Figure 4) revealed that disgust (vs. control) led to more severe purity-related judgment ($p < .05$) only for other (vs. self) focus values >84.75 (Figure 4).

Other versus self focus predicted purity-related moral judgment in the control condition, $b = -.02$, $SE = 0.01$, $t(233) = -2.83$, $p = .01$, 95% CI [−0.03, −0.01], $d = -.37$, 95% CI [−0.63, −0.11], but not in the disgust condition, $b = .004$, $SE = 0.007$, $t(233) = .59$, $p = .56$, 95% CI [−0.01, .02], $d = .08$, 95% CI [−0.18, 0.33].

As an overall test that other (vs. self) focus mediates psychological distance's moderating role in the effect of disgust on moral judgment (Figure 1), we fitted the complete model with R (using the Lavaan package; Rosseel, 2012) to calculate a bootstrapped (5,000 resamples) confidence interval (CI) of the index of moderated mediation (index = .17, 95% CI [0.03, 0.48]; $d = 0.20$, 95% CI [−0.05, 0.46]).

Table 4. Regression Results of Study 2.

	Purity-Related Moral Judgment			Nonpurity Related Moral Judgment		
	$R^2 = .02$			$R^2 = .01$		
Model 1	*b* (SE) [95% CI *b*]	*t*	*d* [95% CI *d*]	*b* (SE) [95% CI *b*]	*t*	*d* [95% CI *d*]
Constant	7.23 (.13) [6.97, 7.48]	55.74***	7.29 [6.58, 8.00]	6.22 (.12) [5.99, 6.46]	51.74***	6.76 [6.10, 7.43]
Disgust	0.13 (.13) [−0.13, 0.38]	−0.97	−0.13 [−0.38, 0.13]	.04 (.12) [−0.19, 0.28]	−0.36	−0.05 [−0.30, 0.21]
Distance	−0.03 (.13) [−0.29, 0.22]	−0.27	−0.04 [−0.29, 0.22]	−.14 (.12) [−0.38, 0.10]	−1.16	−0.15 [−0.41, 0.11]
Disgust × Distance	0.26 (.13) [0.01, 0.52]	2.03*	0.27 [0.01, 0.52]	.10 (.12) [−0.14, 0.34]	0.83	0.11 [−0.15, 0.37]
Model 2	$R^2 = .04^{\dagger}$			$R^2 = .07$**		
Constant	7.22 (.13) [6.96, 7.47]	56.12***	7.34 [6.63, 8.05]	6.22 (.12) [5.99, 6.45]	53.06***	6.94 [6.26, 7.62]
Disgust	0.08 (.13) [−0.17, 0.33]	0.64	0.08 [−0.17, 0.34]	0.01 (.12) [−0.22, 0.24]	0.07	0.01 [−0.25, 0.27]
Distance	−0.08 (.13) [−0.33, 0.17]	−0.65	−0.09 [−0.34, 0.17]	−0.12 (.11) [−0.35, 0.10]	−1.07	−0.14 [−0.40, 0.12]
Others versus self	−0.005 (.005) [−0.014, 0.004])	−1.21	−0.16 [−0.42, 0.10]	−0.02 (.01) [−0.03, −0.01]	−3.61***	−.47 [−0.73, −0.21]
Disgust × Others versus self	0.01 (.005) [0.001, 0.019]	2.18*	0.29 [0.03, 0.54]	−0.001 (.006) [−0.01, 0.01]	−0.23	−0.03 [−0.29, 0.23]

Note. Interactions are based on mean centered versions of others versus self focus, and effect coded versions of disgust (−1 = *control*, 1 = *disgust*) and distance (−1 = *near*, 1 = *distant*). Table presents unstandardized regression coefficients, standard errors (in round brackets), 95% confidence intervals (CIs; in square brackets), *t* values, Cohen's *d*, and its 95% CI (in square brackets).
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Discussion of Study 2 and Introduction to Studies 3 and 4

In line with Study 1, Study 2 shows that incidental disgust (vs. the control condition) affects moral judgment of distant (vs. near) purity transgressions. The moderating role of psychological distance is mediated by a focus on others (vs. the self) in representations of the violation. However, unlike Study 1, Study 2 did *not* reveal a moderating role of distance for nonpurity-related judgments. We return to this in the quantitative integration of studies section.

Studies 3 and 4 were replications of Studies 1 and 2, respectively. To determine the sample size we averaged the effect sizes of Studies 1 and 2. Power analysis with an average effect size $d = .32$, power = .95, and $\alpha = .05$ yielded a minimum sample of 499. Based on Studies 1 and 2 we expected a drop-out of 20%. We also wanted to exclude participants who went through the study too quickly to have taken it seriously. We therefore invited 750 participants for each study.

Study 3

Method

Design, Participants, and Procedure

Of 750 AMT workers invited, 727 finished the study, thus providing us with their data. Of these, 49 failed the attention check and 79 took insufficient time to go through the study, leaving an *N* of 612 (there was some overlap between these two criteria; $M_{age} = 39.82$, $SD = 12.76$, 301 females).[2]

Design and Measures

Study 3 was a replication of Study 1 with one difference: We assessed the distance check on a 9-point scale (1 = *very close*; 9 = *very far*).

Results

Table 5 presents descriptive statistics, Cronbach's α coefficients, and correlations.

Manipulation Check

ANOVA revealed that participants in the far condition imagined situations to be further away ($M = 6.53$, $SD = 2.33$) than participants in the close condition, $M = 4.35$, $SD = 2.79$; $F(1, 610) = 110.31$, $p < .001$, $\eta^2 = .15$, $b = 1.09$, 95% CI [27.84, 46.66], $d = .26$, 95% CI [0.10, 0.42].

Hypotheses Testing

We used OLS regression. Table 6 presents the results.

As in Study 1, Disgust Sensitivity × Psychological Distance significantly predicted nonpurity-related moral judgment, and marginally, purity-related judgment (Figure 5). Simple slope analyses showed a stronger effect of disgust sensitivity on

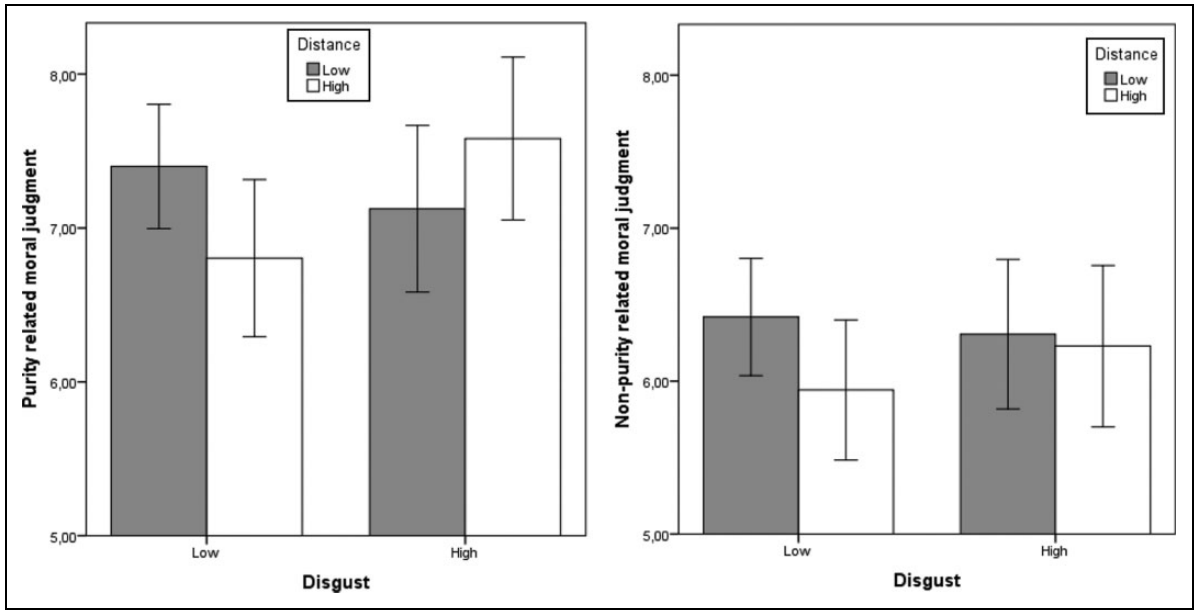

Figure 3. The effect of incidental disgust on moral judgment as moderated by psychological distance (Study 2). Error bars represent 95% confidence intervals.

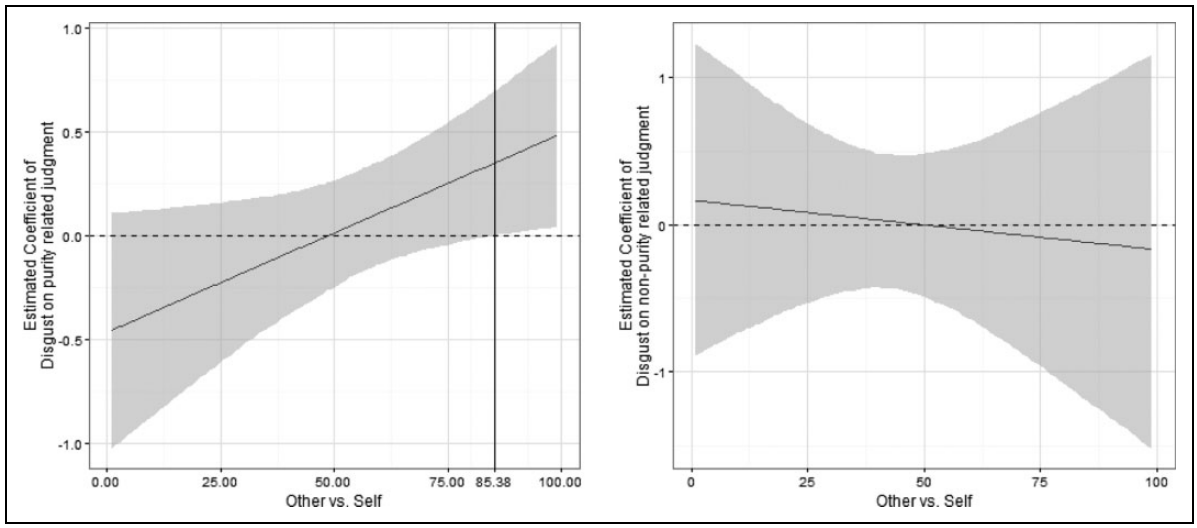

Figure 4. Regions of significance plots of the effect of disgust on moral judgment as moderated by other (vs. self) focus in Study 2. Grey zones represent 95% confidence intervals for the effect of disgust as a function of other (vs. self) focus.

nonpurity-related judgment in the near than the distant condition, $b = .64$, $SE = 0.08$, $t(611) = 8.12$, $p < .001$, 95% CI [0.48, 0.79], $d = .66$, 95% CI [0.49, 0.82] versus $b = .35$, $SE = 0.08$, $t(611) = 4.51$, $p < .001$, 95% CI [0.20, 0.50], $d = .37$, 95% CI [0.21, 0.52]. The positive relationship between disgust sensitivity and purity-related moral judgment did not differ between the distance conditions.

Johnson-Neyman (1936) analyses revealed that distance negatively affects ($p < .05$) nonpurity-related moral judgment for disgust sensitivity values <2.94 and positively affects it for values >4.72. Psychological distance positively affected purity-related judgment regardless of the level of disgust sensitivity.

Study 4

Method

Participants and Design

Of 750 invited AMT workers, 720 finished the study, thus providing us with their data. Of these, 66 wrote about an event that was not physically disgusting, 24 took less than the pre-set time limit of 320 s, and 42 failed the attention check. There was some overlap between the two exclusion criteria, leaving an N of 603 (291 females; $M_{age} = 37.84$, $SD = 11.56$).

Table 5. Descriptive Statistics and Correlations (Study 3).

	Variables	*M*	*SD*	1	2	3	4	5
1	Disgust sensitivity	3.18	0.65	(.89)	.22***	.46***	.44***	.34***
2	Dispositional anger	2.34	0.79		(.88)	.43***	.04	−.09*
3	Dispositional fear	2.88	0.74			(.90)	.24***	.18***
4	Purity-related moral judgment	3.92	1.46				(.89)	.65***
5	Nonpurity related moral judgment	4.29	0.94					(.89)

Note. $N = 612$. The diagonal lists α coefficients.
*$p < .05$. ***$p < .001$.

Procedure

Study 4 was a replication of Study 2.

Results

Table 7 presents descriptive statistics and correlations.

Manipulation Checks

ANOVA revealed that disgust was higher in the disgust ($M = 3.25$, $SD = 1.23$) than in the control condition ($M = 1.28$, $SD = .72$), $F(1, 600)^3 = 592.59$, $p < .001$, $d = 2.00$, 95% CI [1.80, 2.20].

ANOVA revealed a significant distance effect on the distance check, $F(1, 599) = 75.73$, $p < .001$, $d = .70$, 95% CI [0.54, 0.86], but no significant disgust, $F(1, 599) = .02$, $p = .88$, $d = .00$, 95% CI [−0.16, 0.16]), or Disgust × Psychological Distance effect, $F(1, 599) = .60$, $p = .44$, $d = .06$, 95% CI [−0.10, 0.22]. Participants in the far condition considered the situations to be further away ($M = 6.56$, $SD = 2.43$) than those in the close condition ($M = 4.57$, $SD = 3.02$).

Hypothesis Testing

Table 8 presents the results.

We first tested if distance moderates the effect of disgust on moral judgment. Disgust × Distance did not significantly affect nonpurity- or purity-related moral judgment (see Figure 6). We nevertheless conducted simple effects tests to assess equivalence with Study 2. High (vs. low) disgust led to more severe purity-related judgment of distant transgressions, $b = .46$, $SE = 0.46$ $t(602) = 2.52$, $p = .01$, 95% CI [0.10, 0.82], $d = .21$, 95% CI [0.05, 0.37], but not of near transgressions, $b = .18$, $SE = 0.17$, $t(602) = 1.08$, $p = .28$, 95% CI [−0.15, 0.52], $d = .09$, 95% CI [−0.07, 0.25].

From a different vantage point, there was no distance effect on purity-related moral judgment in the control condition, $b = -.21$, $SE = 0.17$, $t(602) = -1.21$, $p = .23$, 95% CI [−0.54, 0.13], $d = -.10$, 95% CI [−0.26, 0.06] or disgust condition ($b = .07$, $SE = 0.18$, $t(602) = .39$, $p = .69$, 95% CI [−0.29, 0.43], $d = .03$, 95% CI [−0.13, 0.19]).

We then tested if distance influences other (vs. self) focus (Figure 1). OLS regression revealed that high (vs. low) distance strengthened other (vs. self) focus for purity transgressions, $b = 13.23$, $SE = 2.20$, $t(602) = 6.02$, $p < .001$, 95% CI [8.91, 17.54], $d = .49$, 95% CI [0.33, 0.65], and nonpurity transgressions, $b = 10.94$, $SE = 1.50$, $t(602) = 7.13$, $p < .001$, 95% CI [7.75, 13.64], $d = .58$, 95% CI [0.42, 0.74].

We subsequently tested if other (vs. self) focus moderates the effect of disgust on moral judgment (Table 8, Model 2). Disgust × Self versus other focus marginally affected purity-related but not nonpurity-related moral judgment.

Johnson-Neyman analyses revealed that disgust (vs. control) led to more severe purity-related moral judgment ($p < .05$) only for self versus other focus values >52.36 (see Figure 7).

Self versus other focus predicted purity-related moral judgment in the control condition ($b = -.008$, $SE = 0.003$, $t(602) = -2.67$, $p = .01$, 95% CI [−0.015, −0.002], $d = -.22$, 95% CI [−0.38, −0.06]) but not in de disgust condition ($b = -.002$, $SE = 0.003$, $t(602) = -.07$, $p = .95$, 95% CI [−0.007, 0.006], $d = .01$, 95% CI [−0.15, 0.17]).

As an overall test that other versus self focus mediates psychological distance's moderating role in the effect of disgust on purity-related moral judgment (Figure 1), we fitted the full model with Lavaan (Rosseel, 2012) to calculate a bootstrapped (5,000 resamples) CI of the index of moderated mediation (index = .06, 95% CI [0.001, 0.166]; $d = 0.12$, 95% CI [−0.04, 0.28]; Hayes, 2013).

Quantitative Integration of Studies

Overall, Studies 1–4 indicate that disgust influences moral judgment of distant (vs. near) violations. However, this effect was not significant in all studies. Given that true effects are unlikely to be statistically significant in each study that tests them, this is not surprising (Lakens & Etz, 2017). Furthermore, distance appears to more strongly moderate the relationship between disgust sensitivity and nonpurity- than purity-related moral judgment (Studies 1 and 3). However, distance appears to more strongly moderate the effect of incidental disgust on purity rather than nonpurity-related moral judgment (Study 2). To assess which effects consistently emerge across our studies, we conducted within-paper meta-analyses using meta-essentials (van Rhee, Suurmond, & Hak, 2015) with random effect models and weighting the study effect sizes by the inverse variance (Lipsey & Wilson, 2001). Table 9 presents the results.

Across Studies 1–4, we found a robust Disgust × Psychological Distance interaction on purity- and nonpurity-related moral judgment. Distance does not significantly more strongly moderate the relationship between disgust sensitivity and nonpurity- than purity-related judgment (Studies 1 and 3). Distance also does not significantly more strongly moderate the effect of incidental disgust on purity- than nonpurity-related judgment (Studies 2 and 4).

Table 6. Regression Results of Study 3.

	Purity-Related Moral Judgment			Nonpurity Related Moral Judgment		
	Step 1 $R^2 = .20$***			Step 1 $R^2 = .13$***		
	b (*SE*) [95% CI *b*]	*t*	*d* [95% CI *d*]	*b* (*SE*) [95% CI *b*]	*t*	*d* [95% CI *d*]
Constant	3.92 (.05) [3.81, 4.02]	73.79***	5.97 [5.60, 6.34]	4.29 (.04) [4.22, 4.36]	120.20***	9.72 [9.15, 10.29
Disgust	1.00 (.08) [0.83, 1.16]	12.13***	0.98 [0.81, 1.15]	0.49 (.06) [0.39, 0.60]	8.95***	0.72 [0.56, 0.89]
Distance	−0.07 (.05) [−0.17, 0.04]	−1.27	−0.10 [−0.26, 0.06]	−0.04 (.04) [−0.11, 0.03]	−1.10	−0.09 [−0.25, 0.07]
Disgust × Distance	0.10 (.08) [−0.06, 0.26]	1.19	0.10 [−0.06, 0.25]	0.14 (.06) [0.04, 0.25]	2.60**	0.21 [0.05, 0.37]
	Step 2 $R^2_{change} = .01^{\dagger}$			Step 2 $R^2_{change} = .04$**		
Constant	3.92 (.05) [3.82, 4.03]	74.02***	5.98 [5.61, 6.34]	4.30 (.04) [4.23, 4.36]	122.83***	9.93 [9.35, 10.51]
Disgust	0.97 (.09) [0.78, 1.15]	10.45***	0.84 [0.68, 1.01]	0.49 (.06) [0.37, 0.61]	8.10***	0.65 [0.49, 0.82]
Distance	−0.07 (.05) [−0.17, 0.04]	−1.24	−0.10 [−0.26, 0.06]	−0.03 (.04) [−0.10, 0.04]	−.96	−0.08 [−0.24, 0.08]
Disgust × Distance	0.16 (.09) [−0.02, 0.34]	1.71†	0.14 [−0.02, 0.30]	0.21 (.06) [0.09, 0.33]	3.38***	0.27 [0.11, 0.43]
Anger	−0.16 (.08) [−0.30, −0.01]	−2.09*	−0.17 [−0.33, 0.01]	−0.25 (.05) [−0.35, −0.16]	−5.14***	−0.42 [−0.58, −0.26]
Fear	0.15 (.09) [−0.03, 0.32]	1.64	0.13 [−0.03, 0.29]	0.14 (.06) [0.02, 0.25]	2.38*	0.19 [0.03, 0.35]
Anger × Distance	−0.07 (.08) [−0.22, 0.07]	−0.99	−0.08 [−0.24, 0.08]	−0.05 (.05) [−0.15, 0.05]	−1.00	−0.08 [−0.24, 0.08]
Fear × Distance	−0.08 (.09) [−0.25, 0.10]	−0.89	−0.07 [−0.23, 0.09]	−0.09 (.06) [−0.20, 0.03]	−1.52	−0.12 [−0.28, 0.04]

Note. Interactions are based on mean centered versions of disgust, anger, and fear and an effect coded version of distance (−1 = *near*, 1 = *distant*). Table presents unstandardized regression coefficients, standard errors (in round brackets), 95% confidence intervals (CIs; in square brackets), *t* values, Cohen's *d* coefficients, and 95% CIs (in square brackets).
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

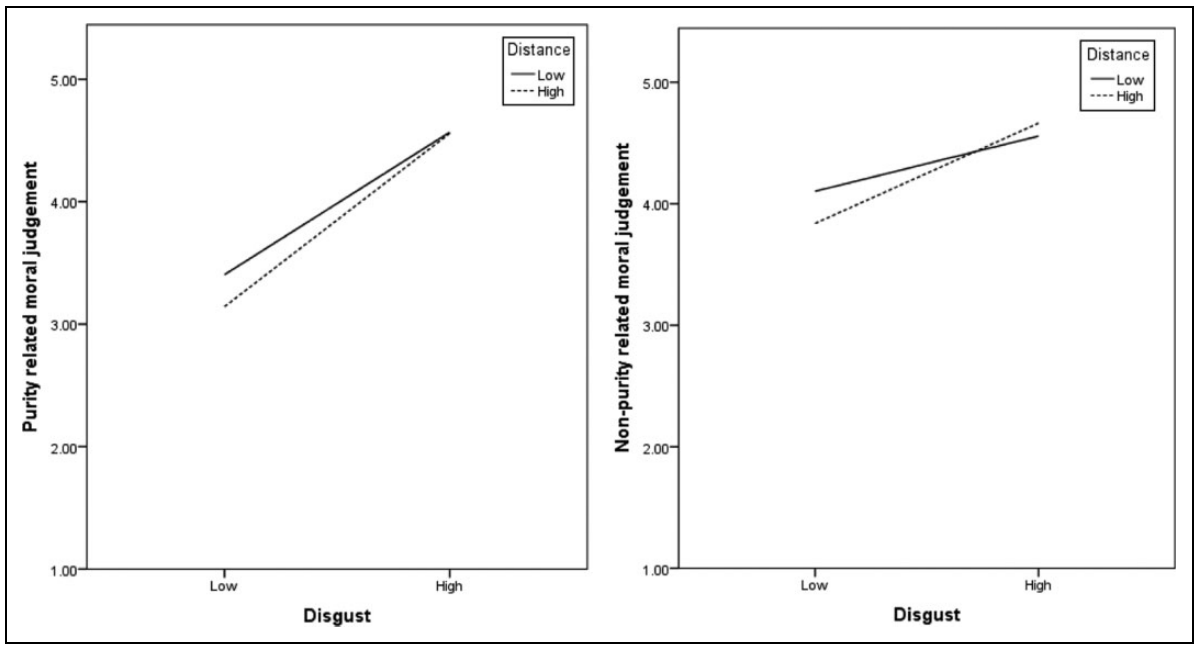

Figure 5. How disgust sensitivity predicts moral judgment in Study 3.

General Discussion

High (vs. low) disgust sensitivity predicts (Studies 1 and 3) and incidental disgust (vs. a control condition) causes (Studies 2 and 4) more severe moral judgment of violations that are psychologically distant (vs. near). Psychological distance moderates the effect of disgust sensitivity on moral judgment specifically and not effects of trait anger and fear (Studies 1 and 3). The moderating role of psychological distance results because conceptualizations of distant (vs. near) violations are

Table 7. Descriptive Statistics and Correlations (Study 4).

Variables	*M*	*SD*	1	2	3	4
1 Other versus self (purity)	59.52	27.66		.42***	−.08*	−.07†
2 Other versus self (nonpurity)	41.98	19.11			−.07†	−.08*
3 Purity-related moral judgment	7.66	1.53			(.52)	.34***
4 Nonpurity related moral judgment	6.35	1.69				(.48)

Note. $N = 634$. The diagonal lists α coefficients.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

more likely to involve others (vs. the self; Studies 2 and 4). Across the studies, the role of psychological distance does not vary significantly for disgust sensitivity versus incidental disgust or for purity- versus nonpurity-related moral judgment.

Evaluations of distal transgressions can have important consequences. For instance, people often decide whether or not to support authorities they may never meet (e.g., voting for politicians). Such decisions have moral connotations (Mayer, David, & Schoorman, 1995). This makes them prone to be affected by disgust, which can be aroused by various inconsequential factors (e.g., facial attractiveness; Krendl, Macrae, Kelley, Fugelsang, & Heatherton, 2006).

Prior work studying effects of psychological distance on moral judgment found inconsistent effects. Some studies found more severe moral judgment of near (vs. distant) transgressions, including purity-related transgressions (Study 5; Gong & Medin, 2012); others found opposite effects of distance (Study 2; Eyal, Liberman, &Trope, 2008; Žeželj & Jokić, 2014) or no effect (Studies 1 and 3; Žeželj & Jokić, 2014). Our Study 1 shows that high (vs. low) distance makes moral judgment more severe among individuals low in disgust sensitivity but less severe among individuals high in disgust sensitivity. Disgust sensitivity varies reliably between individuals and collectives, for instance, between sexes (Oaten et al., 2009) and political orientation (Inbar et al., 2009). Conflicting prior findings may thus partly reflect differences in disgust sensitivity among study samples.

Studies 2 and 4 showed that violations in which others (vs. the self) are involved resulted in less severe purity-related judgment in the control condition, but no effect of other (vs. self) involvement was observed in the disgust condition. This results from (nonsignificant or marginal) main effects of other (vs. self) involvement on purity-related judgment: Violations are judged more severely when they involve the self. This is in line with much research and theory (Lind, Kray, & Thompson, 1998), and distance having a main effect does not undermine our conclusions about distance as moderating disgust and the mediating role of other (vs. self) orientation in this process.

To conclude, although disgust is an avoidance-oriented emotion, it affects moral judgment of distant rather than near events. These findings integrate suggestions that disgust pertains specifically to unknown threats (e.g., pathogens for which one lacks immunity) with theory on how affect influences human judgment.

Table 8. Regression Results of Study 4.

	Purity-Related Moral Judgment			Nonpurity Related Moral Judgment		
	b (*SE*) [95% CI *b*]			*b* (*SE*) [95% CI *b*]		
Model 1	$R^2 = .01$†	*t*	*d* [95% CI *d*]	$R^2 = .003$	*t*	*d* [95% CI *d*]
Constant	7.67 (.06) [7.54, 7.79]	122.75***	10.00 [9.41, 10.58]	6.35 (.07) [6.21, 6.48]	91.31***	7.44 [6.99, 7.89]
Disgust	.16 (.06) [0.04, 0.28]	2.59**	0.21 [0.05, 0.37]	−0.02 (.07) [−0.15, 0.12]	−0.25	−0.02 [−0.18, 0.14]
Distance	−0.03 (.06) [−0.16, 0.09]	−0.53	−0.04 [−0.20, 0.12]	−0.004 (.07) [−0.13, 0.14]	0.05	0.004 [−0.16, 0.16]
Disgust × Distance	0.07 (.06) [−0.05, 0.19]	1.11	0.09 [−0.07, 0.25]	0.08 (.07) [−0.05, 0.22]	1.18	0.10 [−0.06, 0.26]
Model 2	$R^2 = .02$*			$R^2 = .01$		
Constant	7.67 (.06) [7.55, 7.49]	123.39***	10.05 [9.46, 10.64]	6.36 (.07) [6.22, 6.49]	91.60***	7.46 [7.01, 7.91]
Disgust	0.16 (.06) [0.03, 0.28]	2.50*	0.20 [0.04, 0.36]	−0.03 (.07) [−0.17, 0.11]	−0.43	−0.04 [−0.20, 0.13]
Distance	−0.006 (.06) [−0.13, 0.12]	−0.09	−0.01 [−0.17, 0.15]	0.04 (.07) [−0.10, 0.18]	0.56	0.05 [−0.11, 0.21]
Self versus Other	−0.004 (.002) [−0.0088, −0.0002]	−1.86†	−0.15 [−0.31, 0.01]	−0.01 (.004) [−0.0151, −0.0003]	−2.04*	−0.17 [−0.33, −0.01]
Disgust × Self versus Other	0.004 (.002) [−0.0003, 0.0085]	1.82†	0.15 [−0.01, 0.31]	0.003 (.004) [−0.004, 0.010]	0.75	0.06 [−0.10, 0.22]

Note. Interactions are based on mean centered versions of self versus other focus, and effect coded version of disgust (−1 = *control*, 1 = *disgust*) and distance (−1 = *near*, 1 = *distant*). Table presents unstandardized regression coefficients, standard errors (in round brackets), 95% confidence intervals (CIs; in square brackets), *t* values, Cohen's *d*, and its 95% CI (in square brackets).
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

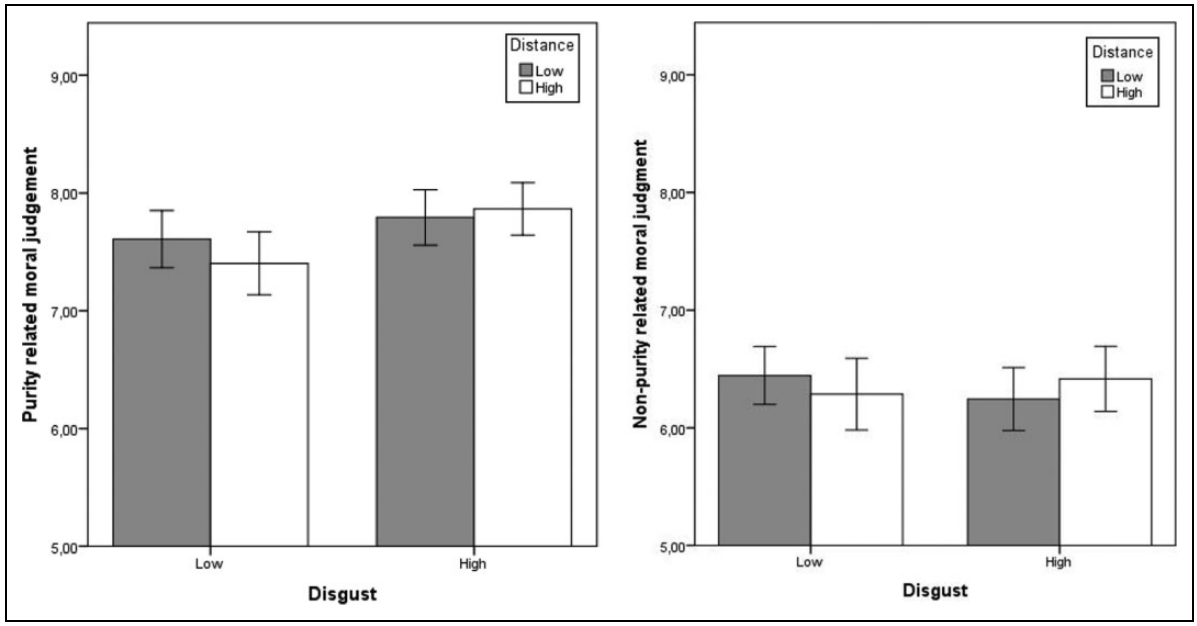

Figure 6. The effect of incidental disgust on moral judgment as moderated by psychological distance (Study 4). Error bars represent 95% confidence intervals.

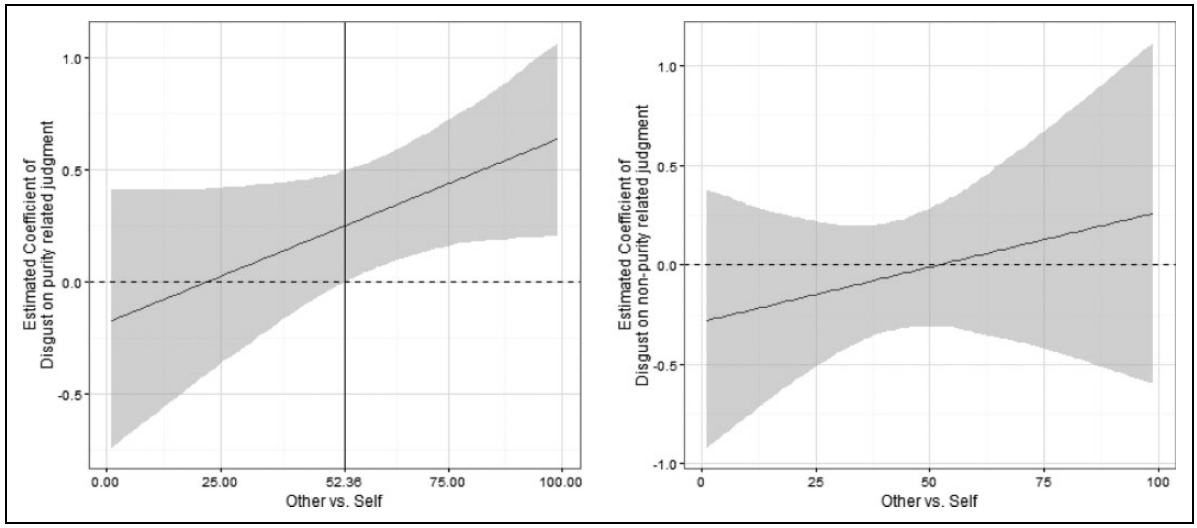

Figure 7. Regions of significance plots of the effect of disgust on moral judgment as moderated by other versus self focus in Study 4. Grey zones represent 95% confidence intervals for the effect of disgust as a function of other versus self focus.

Table 9. Meta Analytic Integration of Studies.

	All Studies	Studies 1 and 3	Studies 2 and 4
Purity-related judgment	.14 [.04, .24]	.14 [−.001, .281]	.14 [.004, .276]
Nonpurity related judgment	.18 [.08, .28]	.26 [.12, .40]	.10 [−.04, .24]
Nonpurity—purity-related judgment difference	−.0004 [−.10, .10]	.06 [−.08, .20]	−.06 [−.20, .08]

Note. Table presents Cohen's *d* and 95% confidence intervals (within square brackets).

Declaration of Conflicting Interests

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Notes

1. Two participants did not respond to the disgust manipulation check; six did not respond to the distance check.
2. We pretested Studies 3 and 4 in a sample of trusted respondents ($N = 23$) who learned: "In order for your responses to be useable, it is necessary that you work at an appropriate speed. This means that you don't rush through the survey but also don't take too much time to think through everything in great detail. Just work at a steady, realistic pace." The fastest respondent spents 320 s on the study. Therefore, we excluded participants from Studies 3–4 who spent less than 320 s on the study.
3. One person did not respond to this check.

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