

THE INFLUENCE OF DISGUST ON JUDGMENTS
ABOUT MORAL VIOLATIONS

By

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CHAPTER I

INTRODUCTION

Imagine the following moral offenses: Fred urinated on a car door handle, Kim stole from the collection plate at church, Peter left his grandmother waiting at the hospital for three hours, and Jennifer spray-painted on someone's favorite jacket. When reading these moral transgressions, various thoughts and feelings are inevitably elicited, which may help determine how wrong these violations are and how much punishment is deserved. Traditionally, moral decisions were believed to result from careful conscious considerations of the expected harm or utility of a transgression (i.e., consequentialist model; e.g., Bentham, 1781/1988) or the intentions of the transgressor (i.e., deontological model; e.g., Kant, 1986/1785). Such considerations, according to deontological or consequential models, ought to cause emotions, secondary to conscious reasoning. Until recently, moral judgment about another person's actions was thought to result from conscious, deliberate considerations regarding relevant moral principles such as fairness, care, and respect, as well as intentionality of the actors and severity of the actions (e.g., Kant, 1986; Kohlberg, 1984). However, people often reach moral judgments outside of conscious awareness, challenging the central role of reasoning in moral decision-making.

Evidence that reasoning may not be central in moral decision-making comes from research showing that moral judgments occur automatically (Lou et al., 2006) and when cognitive resources are unavailable (Greene, Morelli, Lowenberg, Nystrom, Cohen, 2008). People often reach strong moral judgments without being able to explain why

they made such judgments (i.e., “moral dumbfounding”; Cushman, Young, & Hauser, 2006; Haidt, Bjorklund, & Murphy, 2000), and even preverbal (pre-reasoning) children, as young as 6 months old, have been found to make moral judgments (Hamlin, Wynn, & Bloom, 2007). These findings suggest that conscious reasoning is not required for attaining moral judgments and that other factors may be more influential in this process. Consistent with this thinking, the Social Intuitionist Model (Haidt, 2007) posits that exposure to moral transgressions elicits an automatic “flash” of moral intuitions, or basic good-bad evaluations of the transgression or transgressors. These flashes are thought to result in immediate moral judgments, without going through careful deliberations of right and wrong (although reasoning can at times alter moral intuitions secondarily). However, the extent to which careful reasoning or automated affect is employed may be context dependent. For example, the Dual-Process Theory (Greene, 2007) proposes that the degree to which emotions versus reasoning cause moral decisions depends on the transgression itself. If the transgression is up-close and personal, people are more likely to base their moral judgment on emotions than if the transgression is impersonal.

Emotions (Haidt, 2001; Haidt & Kesebir, 2010) have been proposed as primary determinants of moral judgment, and the notion of “affective primacy”, where an immediate good-bad evaluation of a person or action is thought to determine moral judgment (Haidt, 2007), has received support from various sources. While the influence of emotions can at times be altered via conscious reasoning (Haidt, 2001), emotions are thought to be elicited prior to reasoning and therefore hypothesized to have a greater influence on moral judgments than reasoning (Schnall, Haidt, Clore, & Jordan, 2008). This association between morality and emotions has been demonstrated in neuroscience

research, where moral behavior (e.g., acting fairly) was found in association with emotion-related brain activity in the orbito-frontal cortex (OFC) and the anterior insula (Rilling et al., 2007; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). Also, individuals with impairments in brain structures thought to be necessary to integrate emotions into decision-making (e.g., patients with ventro-medial prefrontal cortex (VMPFC) damage; psychopaths) have shown difficulties reaching typical moral judgments (Blair, 2007; Koenigs et al., 2007). Indeed, while most individuals consider utilitarian judgments appropriate when the situation is impersonal (e.g., pulling a lever to direct a train away from a track with four workers to a track with one worker) but not when it is personal and close (e.g., pushing someone onto a train track to stop a train and keep it from killing four workers), judgments of patients with damage to the VMPFC and psychopaths are unaffected by emotion and are utilitarian in both cases. These findings suggest that emotions play a crucial role in informing, and potentially causing, moral decisions. Although the majority of the evidence for this notion has focused on the primacy of elementary good-bad evaluations, researchers have begun to examine the role of specific emotions in moral decision-making.

The Morality of Disgust

Disgust is considered particularly informative in guiding moral decision-making (e.g., Rozin, Haidt, & McCauley, 2000) and has recently received much attention in the research literature (e.g., Horberg, Oveis, Keltner, & Cohen, 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008; Wheatley & Haidt, 2005). Although disgust is traditionally viewed as a disease avoidance mechanism aimed at preventing

oral incorporation of contaminated substances (Oaten, Stevenson, & Case, 2009), it is also thought to regulate moral behavior (e.g., Looy, 2004; Miller, 1997; Schnall, Haidt, et al., 2008) and functions as an immorality-avoidance mechanism by signaling that objects, behaviors, or persons are to be avoided in order to maintain “purity.” Labeling a behavior as “disgusting” typically leads to a reduction in its occurrence (e.g., smoking; Rozin & Singh, 1999) as people work hard to prevent being considered disgusting, and risk being rejected from their ingroup (Kahan, 1998).

People who are prone to experiencing disgust (i.e., people high in disgust sensitivity, DS; Haidt, McCauley, & Rozin, 1994), tend to make more severe moral judgments and this effect has been observed in response to homosexuality (Inbar, Pizarro, Knobe, & Bloom, 2009; Olatunji, 2008), the use of animals in research (Herzog & Golden, 2009), criminal offenses (Jones & Fitness, 2008) and violations of purity (Horberg et al., 2009). The mechanism(s) by which a proneness to experience disgust may affect moral judgments however, remain unclear. Those prone to experience disgust (i.e., high in DS) experience this emotion more frequently and intensely, which may render disgust the primary emotion available when these individuals are asked to judge a moral offense. According to the affect-as-information model (Schwarz & Clore, 1983) people often determine what they think about a given situation by asking themselves how they feel about it. With disgust being available more readily, high DS individuals may consider this emotion as relevant to moral violations (“I feel disgusted, so this situation must be bad!”), resulting in more severe moral judgments. It is noteworthy that this feeling of disgust can influence judgments whether it is caused by the situation to be judged (Haidt, et al., 2000) (e.g., “Hearing about a brother and sister having sex makes

me feel disgusted”) or by other disgust cues that may be irrelevant to the violation (Schnall, Haidt, et al., 2008) (e.g., unpleasant smell in the room, facial malformation of transgressor).

High DS individuals are also more “morally hypervigilant” than those low in DS (Jones & Fitness, 2008), and are thus more actively looking for signs of moral deviance. It is well documented that disgust functions to protect from contamination (e.g., Rozin, et al., 2000). Accordingly, feelings of disgust may motivate detection and avoidance of various sources of contamination, including those moral in nature. Indeed, evolutionary theory suggests that moral disgust motivates avoidance of relationships with moral norm violators due to their costly nature (e.g., being betrayed, harmed, stolen from) (Tyber, Lieberman, & Griskevicius, 2009). A recent study found that trait disgust predicted recommended punishment of purity violations (e.g., keeping a dirty living space) as well as reward of virtues (e.g., meditating), implicating the unique role of disgust in moral judgments regarding purity (Horberg et al., 2009). Under conditions of ambiguity (e.g., uncertain culpability) those high in DS tend to assume guilt of suspects and recommend harsh punishments (Jones & Fitness, 2008) to maximize distance between themselves and potential moral offenders, thereby minimizing the risk of contact. DS may thus be associated with harsher moral judgments because these individuals’ threshold for detecting immorality is lower.

The available correlational evidence demonstrates a significant association between disgust and morality (e.g., Rozin, Markwith, & Stoess, 1997; Rozin & Singh, 1999; Stein & Nemeroff, 1995). However, causal claims about the role of disgust in moral judgment require experimental manipulation of disgust induction and its influence

on moral decision-making. To date, a few such studies have been conducted. For example, Wheatley and Haidt (2005) induced disgust in participants by first teaching them to feel disgusted upon exposure to a given (neutral) word, via hypnosis, and later embedding this word in descriptions of moral transgressions. Participants found transgressions containing this word more disgusting and more morally wrong than transgressions that did not contain this word. In a subsequent study, Schnall, Haidt and colleagues (2008) induced disgust via an unpleasant odor, a movie clip, a dirty work environment, or a writing task, and found that, for those sensitive to internal sensations (i.e., those with high private body consciousness; Miller, Murphy, & Buss, 1981), induced disgust, compared to neutral affect, led to more severe judgments of morally-relevant behaviors (Schnall, Haidt, et al., 2008). Lastly Eskine and colleagues (2011) recently found that a bitter and disgusting taste in participants' mouth resulted in more severe moral judgments than a sweet or neutral taste (Eskine, Kacinik, and Prinz, 2011).

The few available experimental findings provide initial support for the view that experiencing disgust results in more severe moral judgment. However, a major conceptual limitation of these studies, comparing disgust induction to neutral affect induction, is that they leave open the possibility that the documented influence of disgust on moral judgments is mainly one of negative affect, not the emotion of disgust specifically. In response to such concerns, three recent studies have compared disgust with sadness, and some support for the specificity of disgust in moral judgments has been observed. For example, Schnall, Haidt and colleagues (2008) found that disgust priming via a movie clip, led to more severe moral judgments than did sadness priming for participants sensitive to internal bodily sensations. Similarly, Horberg and colleagues

(2009) found that participants who had been primed with disgust via a movie clip, compared to those primed with a sadness clip, reported more perceived moral wrongness and rightness of purity violations (e.g., being sexually promiscuous) and virtues (e.g., maintaining a healthy body), respectively. In a recent study by Moretti and di Pellegrino (2010) participants were primed with disgust, sadness, or neutral affect (via exposure to images) prior to participation in an Ultimatum Game. People responded more strongly to unfairness in the Ultimatum Game after disgust priming than after sadness or neutral affect priming. From these findings, the authors concluded that disgust is indeed uniquely associated with morality and distinct from other emotions in its influence on morally relevant decision-making.

CHAPTER II

LIMITATIONS OF THE EXISTING RESEARCH

Although important advances have been made in the literature delineating the unique role of disgust in moral judgments (e.g., Horberg et al., 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008), several limitations of this line of research need to be addressed and alternative interpretations of the existing data considered. First, the observed greater moral severity following disgust induction (compared to neutral affect induction), but not following sadness induction (Horberg et al., 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008) may be caused by characteristics of disgust and sadness that are irrelevant to making moral judgments. Disgust has been identified as a “sticky” emotion (Olatunji, Forsyth, & Cherian, 2007), more resistant to extinction than other emotions. This feature of disgust may render it particularly influential in paradigms where emotions are induced first (phase one), and their influence on moral judgments is measured later (phase two). Sadness, as a comparison emotion, may have failed to affect moral judgments in prior research (Horberg et al., 2009; Moretti & di Pellegrino, 2010) because it dissipated before participants actually made moral judgments. The *dissipation disparity* between more sticky disgust and the potentially more quickly extinguished sadness may explain the uniquely influence of disgust on judgments about moral violations.

Alternatively, sadness and disgust may dissipate at an equal rate, but sadness may influence moral judgments less so than disgust due to their differential certainty

appraisals (i.e., sense of certainty about what is happening and what will happen next; Smith & Ellsworth, 1985). This difference may explain why disgust is more likely to affect any judgments, but not moral judgment specifically. While disgust is characterized by a sense of certainty about the situation and what will happen next (Tiedens & Linton, 2001), sadness is more closely associated with uncertainty (Smith & Ellsworth, 1985). Feeling certain is thought to indicate accuracy of one's beliefs and judgments, and may limit the need for further, more careful deliberation of a situation (Mackie & Worth, 1989). Certainty appraisals have been found to increase reliance on heuristics (i.e., quick rules of thumb, stereotypes, emotions) (e.g., Lerner, Goldberg, & Tetlock, 1998; Tiedens & Linton, 2001), especially when the situation bears little personal relevance, or the person judging it has little motivation to engage in careful processing or to reach a specific conclusion (Forgas, 1995; Tetlock, 1985).

The moral judgments made in most published studies typically have low personal relevance, and no experimental manipulations to encourage careful processing (e.g., accountability manipulations, Lerner et al., 1998) are employed, allowing a greater influence of disgust and its associated sense of certainty. Careful, deliberate and systematic processing of situations to be judged has been found to reduce the influence of extraneous emotions, stereotypes, or other heuristics in decision-making (Bodenhausen, Gabriel, & Lineberger, 2000). Emotions that trigger this type of processing (e.g., sadness, hope; Smith & Ellsworth, 1985) may be especially unlikely to influence judgments, in particular when these emotions are unrelated to the situation to be judged. Disgust may thus influence moral judgments more strongly than sadness due to the difference in certainty appraisals associated with each emotion. Accordingly, it may be

premature to conclude that disgust is uniquely predictive of moral judgments as other negative emotions that are characterized by certainty appraisals and associated systematic processing tendencies may play a similar role (Tiedens & Linton, 2001).

By comparing disgust with other negative emotions, more specific claims about its unique role in moral judgments can be made. Affect elicited during hand submersion in ice water may be an opportune comparison to disgust in the context of making moral judgments. Hand submersion in ice water, also known as the “cold pressor task”, has been widely used as a method to examine how pain and discomfort influence cognitive processes such as judgment, punishment (Berkowitz, 1993), and attention (Eccleston & Crombez, 1999). Prior research suggests that pain demands attention and thereby interrupts deliberate cognitive processes (Eccleston & Crombez, 1999). Such interruption of normal cognitive processing is typically associated with increased reliance on heuristics and affect-driven, automatic processing (Greene et al., 2008). Inducing discomfort may therefore be a well-suited comparison affect to examine the unique role of disgust on moral judgments. Although discomfort is not a basic emotion (e.g., disgust or sadness), it consists of sensory and affective components (Price, 2000). Furthermore, discomfort is negative in its experienced valence, making it appropriate to compare to disgust in relation to influencing moral judgments.

The first study of this investigation aimed to explore whether disgust is uniquely informative of moral judgments by comparing the influence of disgust on moral judgments to that of discomfort. To eliminate possible dissipation disparity as an explanation for differences between disgust and discomfort, moral judgments were made *during* the affect induction (i.e., in a one-phase paradigm). Consistent with prior

research indicating a unique role for disgust in moral decision-making, it was predicted that ratings of immorality regarding moral transgressions would be higher during disgust induction than during discomfort induction and a neutral affect control condition. However, if the increased severity of moral judgments associated with disgust is an artifact of the negative valence associated with disgust, then ratings of immorality in the discomfort and disgust condition are expected to be significantly higher than those in the neutral condition, but not differ significantly from one another.

CHAPTER III

STUDY ONE. THE ROLE OF DISGUST AND DISCOMFORT IN MORAL JUDGMENT: COMPARING TWO NEGATIVE EMOTIONS ASSOCIATED WITH CERTAINTY, IN A ONE-PHASE PARADIGM

Method

Participants

Seventy-seven undergraduate students (N = 77, 82% female, 69% Caucasian) participated in exchange for course credit.

Materials

Moral Transgressions. Twelve one-sentence descriptions of three levels of moral transgression (non-offenses, moderate offenses, severe offenses) were presented to participants in random order (See Appendix A). Non-offenses (N = 4) described behavior that is not morally wrong (e.g., F.W. went for a walk in the park). Moderate offenses (N = 4) described behavior that is morally questionable, but not extremely immoral (e.g., K. D. lied to a good friend). Severe offenses (N = 4) described extreme wrongdoings (e.g., G.S. murdered two people in their own home). These 12 offenses were selected from a larger pool of offenses on the basis of pilot data.

Affect Induction. Affect was induced via submersion of the participants' left hand, in a thin plastic glove, into one of three liquids (imitation vomit, ice water, or lukewarm water, depending on the condition they were randomly assigned to) while

rating each of the 12 moral transgressions. The imitation vomit in the disgust condition consisted of cream of mushroom soup, cream of chicken soup, black beans, and chopped-up pieces of fried gluten. This recipe was partially based on a recipe for imitation vomit developed by Tsao and McKay (2004). The ice water in the discomfort condition measured 50 degrees, and this temperature was kept constant by adding ice cubes to the water throughout the experiment. Finally, participants in the neutral condition were asked to place their hand in lukewarm water (80 degrees). All liquids were kept in white, four-gallon containers.

Ratings. Participants were asked to rate how morally wrong they found each transgression on a scale from 0 (not morally wrong at all) to 7 (extremely morally wrong). They were also asked to indicate how disgusting they found each of the transgressions, on a scale from 0 (not at all disgusting) to 7 (extremely disgusting). Finally, participants were asked to rate how much punishment they thought each transgression deserved on a scale from 0 (not at all deserving of punishment) to 7 (extremely deserving of punishment).

Questionnaires. The *Disgust Sensitivity Scale-Revised (DS-R)*; Haidt et al., 1994, modified by Olatunji, Williams, et al., 2007) is a 25-item scale that measures disgust sensitivity across domains of core, animal reminder, and contamination disgust. Participants are asked to indicate to what extent they agree with statements like “It bothers me to hear someone clear a throat full of mucous” on a 5-point scale, ranging from 0 (strongly disagree) to 4 (strongly agree), and they are also asked to indicate how disgusting they find things such as “You see a man with his intestines exposed after an

accident” on a 5-point scale ranging from 0 (not disgusting at all) to 4 (extremely disgusting). The *DS-R* had an alpha coefficient of .84 in the present study.

For the Negative Affect component (alpha = .80) of the *Positive and Negative Affectivity Scale* (PANAS, Watson, Clark, & Tellegen, 1988) participants are asked to indicate how they typically feel, in terms of 10 negative (e.g., “hostile”) emotions, and they rate these items on a 5-point Likert scale, ranging from 1 (very slightly or not at all) to 5 (extremely).

Procedure

After completing the *DS-R* and the NA of the PANAS, participants were randomized to one of three affect inductions. In the disgust condition, participants placed their hand in a glove and then in a container filled with imitation vomit. Participants were asked to hold their hand in the vomit while making their ratings of disgust, immorality and punishment for each moral transgression. After rating a given transgression, participants removed the glove from their hand, discarded it, and put on a new glove, to prevent habituation. In the discomfort condition, participants placed their hand in a glove and then in a container filled with ice water, while making their ratings. Immediately following completion of the ratings for a given transgression, participants placed their hand in a container with lukewarm water (80 degrees) for two minutes, to raise their hand temperature, before submerging it in ice water again to rate the next transgression. In the neutral condition, participants placed their hand in a glove, and then in lukewarm water, while rating the moral transgressions. After rating a given

transgression, participants removed the glove from their hand, discarded it, and put on a new glove.

For all participants, the time between finishing ratings for one transgression and starting ratings for the next transgression was two minutes. This time allowed for raising hand temperature (in the discomfort condition) and helped prevent carry-over effects from one transgression to the next. After all 12 transgressions were rated, participants indicated how negative and disgusted their task (submerging the hand in liquid) made them feel, as well as how much discomfort they experienced during this task on a scale from 0 (not at all) to 7 (extremely).

Results

Affect Induction Manipulation Check

A 3 (condition: disgust, discomfort, neutral) X 3 (emotion rating: disgust, negativity, discomfort) mixed-factor ANOVA yielded significant main effects of condition [$F(2, 74) = 14.34, p < .001$] and emotion rating [$F(2, 148) = 13.31, p < .001$]. These main effects were qualified by a significant condition by emotion rating [$F(2, 148) = 12.90, p < .001$] interaction. Disgust, discomfort and negativity ratings were then entered in a multivariate ANOVA with condition as the independent variable, revealing a main effect of condition for disgust [$F(2, 74) = 17.58, p < .001$], discomfort [$F(2, 74) = 16.69, p < .001$] and negativity [$F(2, 74) = 8.47, p < .001$]. Pairwise follow-up comparisons of the conditions (disgust, discomfort, neutral) for disgust, negativity and discomfort revealed that, as predicted, participants reported significantly more disgust in

the disgust condition ($M = 2.96$ $SD = 1.87$) than in the discomfort condition ($M = 1.28$, $SD = 1.60$, $p < .001$) or in the neutral condition ($M = 0.54$, $SD = .91$, $p < .001$), and the latter two did not significantly differ (see *Figure 1*). Furthermore, participants reported significantly more discomfort in the discomfort condition ($M = 3.56$, $SD = 1.78$) than in the disgust condition ($M = 2.54$, $SD = 1.77$, $p < .001$) and in the neutral condition ($M = 1.08$, $SD = .94$, $p < .001$). They also reported more discomfort in the disgust than in the neutral condition ($p = .021$). Negativity did not differ in the disgust and discomfort conditions (see *Figure 1*) while participants reported more negativity in the disgust ($M = 2.35$ $SD = 1.70$) and discomfort ($M = 2.44$, $SD = 1.92$) conditions than in the neutral condition ($M = 0.77$, $SD = 1.24$, $p_{\text{disgust-neutral}} < .001$, $p_{\text{negative-neutral}} < .001$).

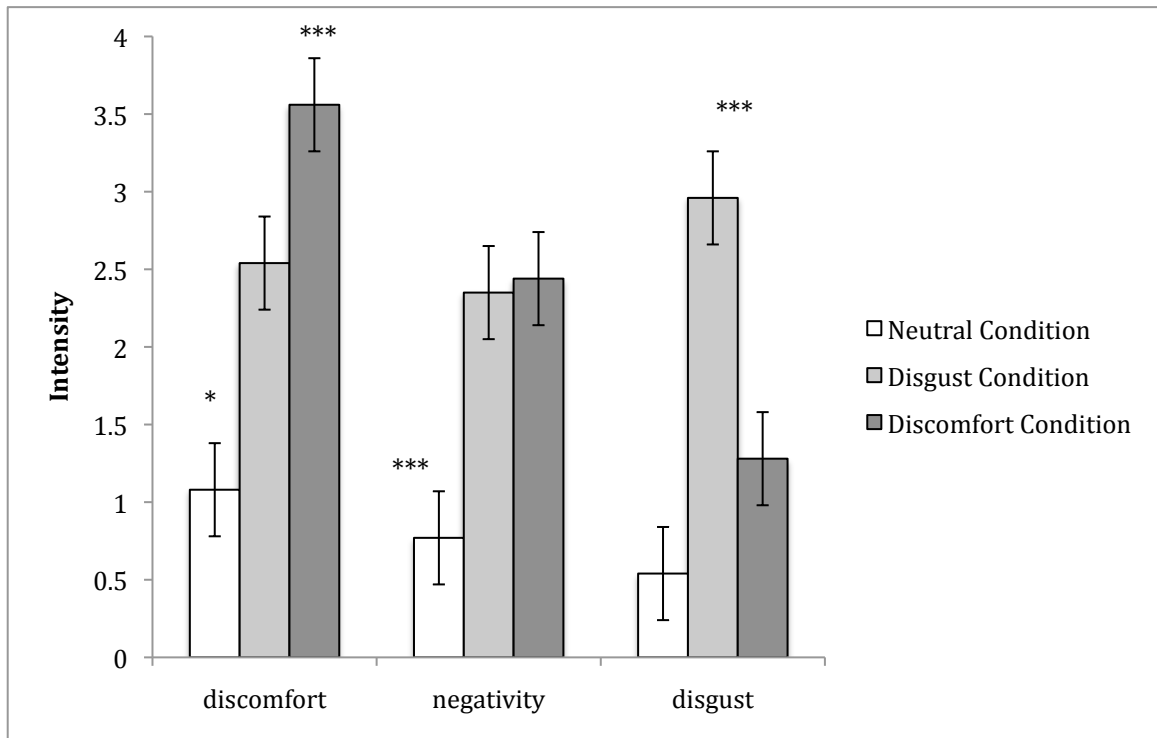


Figure 1. Disgust, Negativity and Discomfort ratings in the Disgust, Negative and Neutral condition (Note: *** $p < .001$, * $p < .05$)

DS across conditions

A univariate ANOVA was conducted with condition (disgust, discomfort, neutral) as independent variable and DS as dependent variable. The lack of a main effect of condition, $F(2, 74) = .848$, *n.s.*, indicated that DS was equally distributed across conditions. DS for participants in the disgust condition ($M = 56.61$, $SD = 15.42$) did not differ from that of participants in the discomfort ($M = 61.64$, $SD = 14.39$) or the neutral condition ($M = 58.92$, $SD = 11.18$).

Affect Induction and Judging Moral Violations

Disgust, morality and punishment ratings were then entered in a 3 (condition: disgust, discomfort, neutral) X 3 (offense level: non-offense, moderate offense, severe offense) mixed-factor ANOVA.

Morality

The analysis revealed a main effect of condition for morality, $F(2, 74) = 4.67$, $p = .012$. Pairwise comparisons showed that participants made significantly more severe moral judgments in the discomfort condition ($M = 3.60$, $SD = .43$) than in the neutral condition ($M = 3.29$, $SD = .52$; $p = .003$), and marginally more severe moral judgments in the discomfort condition than in the disgust condition ($M = 3.42$, $SD = .33$; $p = .07$). There were no differences between moral judgments in the disgust condition and the neutral condition (see *Figure 2*).

A significant main effect of offense level was also found for moral judgments, $F(2, 148) = 3431.41$, $p < .001$, confirming that the non-offenses used in this study ($M = 0.04$, $SD = .22$) were less morally wrong than the moderate offenses ($M = 3.70$, $SD = .90$,

$p < .001$) and the moderate offenses were found to be less immoral than the severe offenses ($M = 6.74$, $SD = .24$, $p < .001$). These main effects of offense level and condition were qualified by a significant condition by offense level interaction, $F(4, 148) = 3.63$, $p = .008$. Morality ratings for each offense level were then entered in a multivariate ANOVA, with condition (neutral, disgust, discomfort) as the independent variable, and there was a main effect of condition for moderate offenses only, $F(2, 74) = 4.27$, $p = .018$. Follow-up pairwise comparisons for moderate offenses showed that participants rated transgressions as significantly more morally wrong in the discomfort condition ($M = 3.98$, $SD = .93$) than in the neutral condition ($M = 3.22$, $SD = 1.12$, $p = .005$), and marginally more morally wrong in the discomfort condition than in the disgust condition ($M = 3.50$, $SD = .73$, $p = .07$). No significant differences were found in morality ratings of moderate offenses between participants in the disgust and neutral condition.

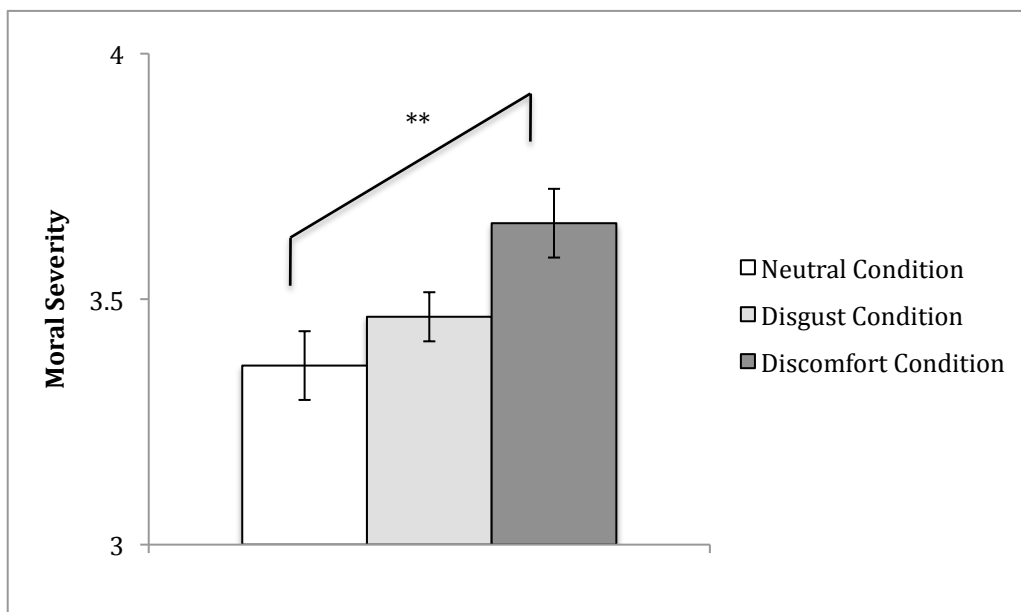


Figure 2. Morality Ratings across Levels of Moral Offense (Note: ** $p < .01$)

Disgust

The 3 (condition: disgust, discomfort, neutral) X 3 (offense level: non-offense, moderate offense, severe offense) mixed-factor ANOVA for disgust ratings showed no main effect of condition $F(2, 74) = 1.42, n.s.$, or interaction between condition and offense level $F(4, 148) = 2.06, n.s.$ There was a main effect of offense level, $F(2, 148) = 1967.39, p < .001$, with severe offenses rated as more disgusting ($M = 6.48, SD = 1.12$) than mild offenses ($M = 2.48, SD = 1.12, p < .001$) and non-offenses ($M = .02, SD = 1.12, p < .001$), and mild offenses rated as more disgusting than non-offenses ($p < .001$).

Punishment

The 3 (condition: disgust, discomfort, neutral) X 3 (offense level: non-offense, moderate offense, severe offense) mixed-factor ANOVA for punishment ratings showed no main effect of condition $F(2, 74) = 1.62, n.s.$, or interaction between condition and offense level $F(4, 148) = 1.27, n.s.$ Consistent with expectations, there was a main effect of offense level, $F(2, 148) = 1932.06, p < .001$, with severe offenses rated as deserving more punishment ($M = 3.55, SD = .61$) than mild offenses ($M = .36, SD = .28, p < .001$) and non-offenses ($M = .03, SD = .18, p < .001$), and mild offenses rated as deserving more punishment than non-offenses ($p < .001$).

DS and Judgment of Moral Violations

The role of DS in judgment of moral violations was examined via a linear regression with disgust, morality and punishment ratings for non-offenses, moderate offenses and severe offenses as outcome variables, and DS as independent variable. Results indicated that DS failed to predict how disgusting participants found non-

violations ($B = -.01, n.s.$), moderate violations ($B = -.07, n.s.$), and severe violations ($B = .09, n.s.$). Similarly, DS failed to predict how morally wrong participants found non-violations ($B = .02, n.s.$), moderate violations ($B = .05, n.s.$), and severe violations ($B = .04, n.s.$). Finally, DS did not predict how deserving of punishment participants found non-violations ($B = -.03, n.s.$), moderate violations ($B = .11, n.s.$), and severe violations ($B = -.02, n.s.$). Controlling for Negative Affect (PANAS) did not change this pattern of relationships.

Discussion

Previous research suggests that disgust is particularly informative when making moral judgments (e.g., Eskine et al., 2011; Wheatley & Haidt, 2005; Schnall, Haidt, et al., 2008), and would predict more perceived immorality of moral transgressions when disgust, relative to other affective states, is induced. However, in the present study, the most severe judgments of immorality were made in the discomfort condition, differing significantly from the neutral condition. This finding was especially relevant for moderate offenses, where morality ratings in the discomfort condition differed significantly from those in the neutral condition and marginally from those in the disgust condition. The more pronounced effect of condition on moral judgments of moderate offenses may be attributed to floor and ceiling effects for the non-offenses and severe offenses, respectively. When behavior is clearly harmless or clearly wrong, affective information may not be needed to reach moral judgments. Moderate offenses on the other hand, can be considered ambiguous with regard to their moral severity. This ambiguity is thought to render decisions about their severity more difficult. Accordingly,

participants may be more susceptible to influences of extraneous emotions in judging such offenses (Affect-as-information, Schwarz & Clore, 1983).

The finding that discomfort resulted in more severe judgments than disgust is inconsistent with the notion that disgust uniquely influences moral judgment. One explanation for this finding is that the previously documented unique effect of disgust on moral judgments was an artifact of the two-phase research paradigms used in prior studies (e.g., Horberg et al., 2009; Moretti & di Pellegrino, 2010). The current one-phase paradigm, where the influence of disgust on moral judgments was compared to that of discomfort during affect induction, eliminated the role of the proposed dissipation disparity. Disgust may thus be an informative emotion in moral judgments when there is a delay between emotion onset and moral judgment. Future research comparing effects of disgust versus other negative affect on immediate and delayed judgments about moral violations could easily test this hypothesis. Alternatively, discomfort may have influenced moral judgments more so than disgust due to the greater intensity with which this affective state was induced. The discomfort induced by hand submersion in ice water was more intense than the disgust induced via gloved hand submersion in imitation vomit. Therefore, disgust may not have played a primary role in the current moral judgments because it was induced less intensely than discomfort. This *intensity disparity* limits the ability to differentiate between how disgust versus general negative affect influence moral judgments.

CHAPTER IV

STUDY TWO. DISGUST, DISCOMFORT AND JUDGMENTS ABOUT MORAL VIOLATIONS: EXAMINING THE INTENSITY HYPOTHESIS FOR PURITY AND NON-PURITY VIOLATIONS

The findings of study one challenge the unique role of disgust in moral judgments, but it would be premature to completely rule out a specific role for disgust based on these findings. Disgust may have a very specific influence once its intensity is matched with a comparison emotion. It may also be the case that disgust affects some types of moral violations and not others. Haidt and Joseph (2004) categorized five moral foundations thought to affect judgment of misbehavior. When deciding whether a behavior is right or wrong, people may be influenced by whether someone was harmed (Harm/care foundation) or treated unfairly (Fairness/reciprocity foundation), if someone was disrespectful of authority (Authority/respect foundation), disloyal (Ingroup/loyalty foundation), or physically, mentally or spiritually impure (Purity/sanctity foundation). Prior research has shown that disgust is specifically associated with violations of Purity/sanctity (Rozin, Lowery, Imada, & Haidt, 1999), and disgust priming has been found to have an influence on moral judgments about purity violations, but not on fairness violations (Horberg et al., 2009).

A specific effect of disgust on moral judgments about purity violations has not been a consistent finding however, as several studies have demonstrated an effect of disgust inductions on judgments about moral transgressions unrelated to impurity. For example, levator labii muscle activation (i.e., a core component of the facial expression

of disgust) increased when participants experienced violations of fairness (Chapman, Kim, Susskind, & Anderson, 2009), and disgust induction increased participants' self-reported negative affect in response to unfairness (Moretti & di Pellegrino, 2010). Other studies have demonstrated an effect of disgust on violations that are related to impurity as well as those unrelated to impurity. For example, Wheatley and Haidt (2005) found an effect of disgust on moral judgments about harm, unfairness, and impurity. Also, Schnall, Haidt and their colleagues (2008) compared how disgust priming influenced judgment of purity violations and violations regarding unfairness or harm, and found no significant differences. Finally, in a recent study by Hutcherson and Gross (2011) participants reported feeling morally disgusted by violations of fairness, community, authority, care, as well as purity. Based on the current findings it is unclear whether disgust uniquely affects purity violations or if it informs judgments about all types of moral violations.

In study two, this question was directly addressed as participants were asked to rate both moral violations of purity and those unrelated to purity during a disgust or discomfort inductions, matched for intensity, or during a neutral affect induction that served as a control condition. With this design that controls for affect intensity, any differences in moral judgments between the disgust and discomfort condition can more clearly be attributed to characteristics of disgust and discomfort respectively, as opposed to an intensity disparity. If intensity and negativity are primary factors in determining the influence of emotions on judgments about moral violations, no differences were anticipated in severity of moral judgments between the disgust and in the discomfort condition, while those in both conditions were expected to be more severe than

judgments in the neutral condition. Furthermore, if disgust is particularly informative for violations of purity, an interaction was expected between condition and violation type, with disgust induction leading to more severe judgments of impure, but not pure violations.

Method

Participants

Sixty-one undergraduate students (N = 61, 75% female, 72% Caucasian) participated in this study in exchange for course credit.

Materials

Moral Transgressions. Due to the demonstrated more pronounced effect of affective inductions for judgments about moderate moral violations, only moderate violations (N = 20) were used in study two. Ten of these violations contained an element of impurity (e.g., John urinated on someone's car door handle), while the other ten did not represent impurity (e.g., John lied about how many hours he worked). These transgressions (see Appendix B) were selected on the basis of a pilot studyⁱ.

Affect Induction. Affect was induced via submersion of participants' left hand, without the use of a glove, in one of three liquids: imitation vomit at room temperature (disgust condition), 50-degree ice water (discomfort condition), or 80-degree lukewarm water (neutral condition). These emotion induction procedures were selected on the basis of a pilot studyⁱⁱ.

Ratings. Participants were asked to indicate, on a scale from 0 (not at all) to 7 (extremely) how morally wrong they found each of the 20 transgressions. Participants were also asked to indicate how disgusting they found each transgression on a scale from 0 (not at all disgusting) to 7 (extremely disgusting), and how deserving of punishment they found each transgression on a scale from 0 (not at all deserving of punishment) to 7 (extremely deserving of punishment).

Questionnaires. The *Disgust Scale – Revised* (DS-R; Haidt, McCauley & Rozin, 1994, modified by Olatunji et al., 2007) and the Negative Affect (NA) component of the *Positive and Negative Affectivity Scale* (PANAS; Watson, Clark, & Tellegen, 1988), used in study one, were also completed as part of study two. The internal consistency alphas of the DS-R and NA in the current study were .85 and .80, respectively.

Procedure

Once consent was obtained, participants, randomly assigned to one of the three conditions (disgust, discomfort, neutral), completed the DS and the NA of the PANAS. Next, participants placed their hand in a container with a specific texture (imitation vomit, ice water, or lukewarm water). Participants observed a prompt on the computer screen indicating that it was time to place their hand in the container. Once the hand was well submerged, the experimenter pressed a key to proceed to a screen displaying a moral violation. After three seconds, participants were asked to indicate level of disgust, moral wrongness and deservingness of punishment in response to the moral violation. These three questions were presented in random order, and there was no time limit to respond. Once the third question was completed, a message on the computer screen instructed

participants to remove their hand from the container. At this point, the experimenter offered a paper towel to dry their hand (neutral condition); asked participants to place their hand in a container with warmer water (discomfort condition); or asked participants to wash off their hand in a container with lukewarm water, and then dry it with a paper towel (disgust condition). This procedure was employed to offer an activity between different ratings (neutral condition), to prevent habituation (disgust and discomfort condition), to prevent pain (discomfort condition), and to equate the time between rating moral transgressions (set at 1 minute). Consistent with study one, moral judgments in study two were made simultaneously with the affective induction to rule out dissipation disparity as a cause for differential findings between disgust and discomfort. After rating all 20 moral violations, participants were asked to indicate to what extent, on a scale from 0 (not at all) to 7 (extremely so), the hand submersion task made them experience disgust and discomfort. Finally, participants were debriefed and dismissed.

Results

Vignette Manipulation Check

To confirm that the purity violations used in the current study were seen as more disgusting and equally morally wrong and deserving of punishment than non-purity violations, disgust, immorality, and punishment ratings for non-purity and purity violations were entered in separate repeated measures analyses. The analysis for disgust ratings showed a significant main effect of purity, $F(1, 60) = 276.17, p < .001$, with purity violations perceived as significantly more disgusting ($M = 5.70, SD = .79$) than

non-purity violations ($M = 2.44$, $SD = 1.57$). The analysis for morality ratings also showed a significant main effect of purity, $F(1, 60) = 14.39$, $p < .001$, with non-purity violations rated as significantly more immoral ($M = 5.00$, $SD = .74$) than purity violations ($M = 4.70$, $SD = .89$). Lastly, punishment ratings did not show a significant main effect of purity $F(1, 60) = .53$, *n.s.*, as non-purity ($M = 4.25$, $SD = .80$) and purity violations ($M = 4.31$, $SD = .95$) were rated as equally deserving of punishment.

Affect Induction Manipulation Check

To confirm that exposure to imitation vomit without a glove induced disgust to the same degree as ice water did discomfort, final disgust and discomfort ratings were entered in a 2 (rating: disgust, discomfort) X 3 (condition: disgust, discomfort, neutral) mixed-model ANOVA. This revealed a significant rating by condition interaction $F(4, 116) = 5.66$, $p < .001$. A one-way ANOVA indicated a significant main effect of condition for disgust ratings, $F(2, 58) = 10.85$, $p < .001$. Follow-up pairwise comparisons showed that participants felt significantly more disgusted when exposed to imitation vomit ($M = 3.29$, $SD = 2.15$) than when exposed to ice water ($M = 1.20$, $SD = 1.58$; $p < .001$) or lukewarm water ($M = 1.05$, $SD = 1.32$; $p < .001$), with no significant differences between the latter two. A one-way ANOVA indicated a significant main effect of condition for discomfort ratings, $F(2, 58) = 10.28$, $p < .001$. Follow-up pairwise comparisons showed that exposure to ice water ($M = 2.90$, $SD = 1.74$; $p = .001$), and imitation vomit ($M = 3.14$, $SD = 1.62$; $p < .001$) induced significantly more discomfort than exposure to lukewarm water ($M = 1.10$, $SD = 1.30$) (see *Figure 3*).

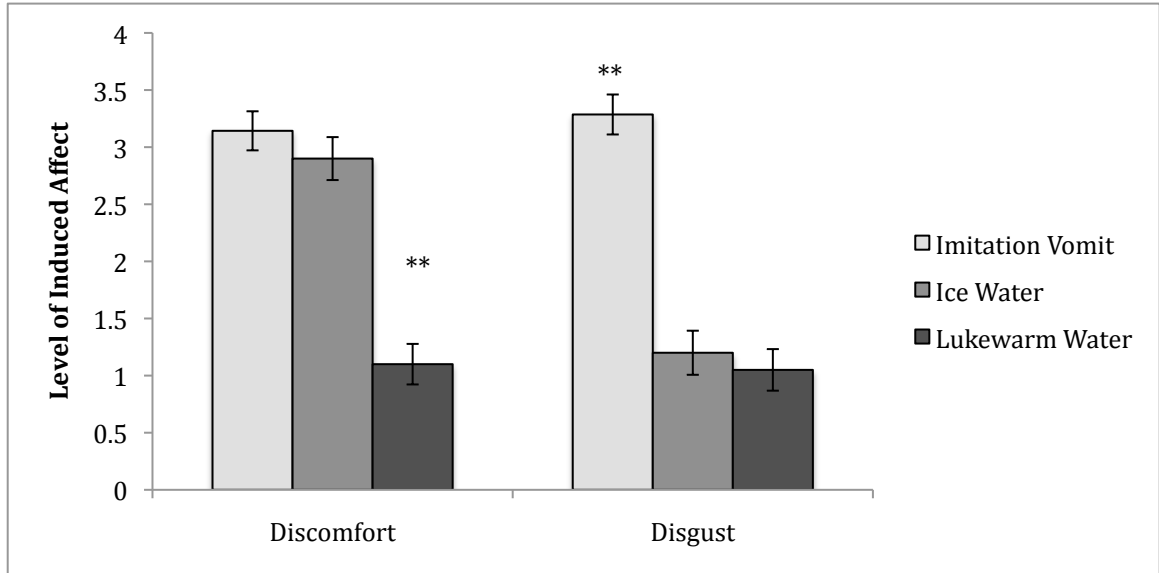


Figure 3. Ratings of Discomfort and Disgust per Condition (Note: ** $p < .01$)

DS across conditions

A univariate ANOVA was conducted with condition (disgust, discomfort, neutral) as independent variable and DS as dependent variable. The lack of a main effect of condition, $F(2, 58) = 2.883$, *n.s.*, indicated that DS was equally distributed across conditions. DS in participants in the disgust condition ($M = 52.62$, $SD = 13.81$) did not differ from DS in participants in the discomfort ($M = 61.80$, $SD = 15.28$) or the neutral condition ($M = 60.65$, $SD = 10.61$).

Affect Induction and Judging Moral Violations

Punishment

A 3 (condition: disgust, discomfort, neutral) X 2 (violation type: purity, non-purity) mixed-model ANOVA showed a significant violation type by condition interaction for punishment, $F(2, 58) = 4.50$, $p = .015$. Separate follow-up pairwise

comparisons of non-purity and purity violations for each condition showed that in the disgust condition, there was a main effect of violation type, $F(1, 20) = 5.00, p = .037$, with more severe punishment recommended for purity ($M = 4.50, SD = .98$) than non-purity violations ($M = 4.17, SD = .77$). In the discomfort condition, there was a marginal main effect of violation type, $F(1, 19) = 4.23, p = .054$, with more severe punishment recommended for non-purity ($M = 4.18, SD = .84$) than purity violations ($M = 3.97, SD = 1.00$). Finally, in the neutral condition, there was no main effect of violation type, $F(1, 19) = .072, n.s.$, with equal punishment recommended for non-purity ($M = 4.41, SD = .77$) and purity violations ($M = 4.45, SD = .81$) (see *Figure 4*).

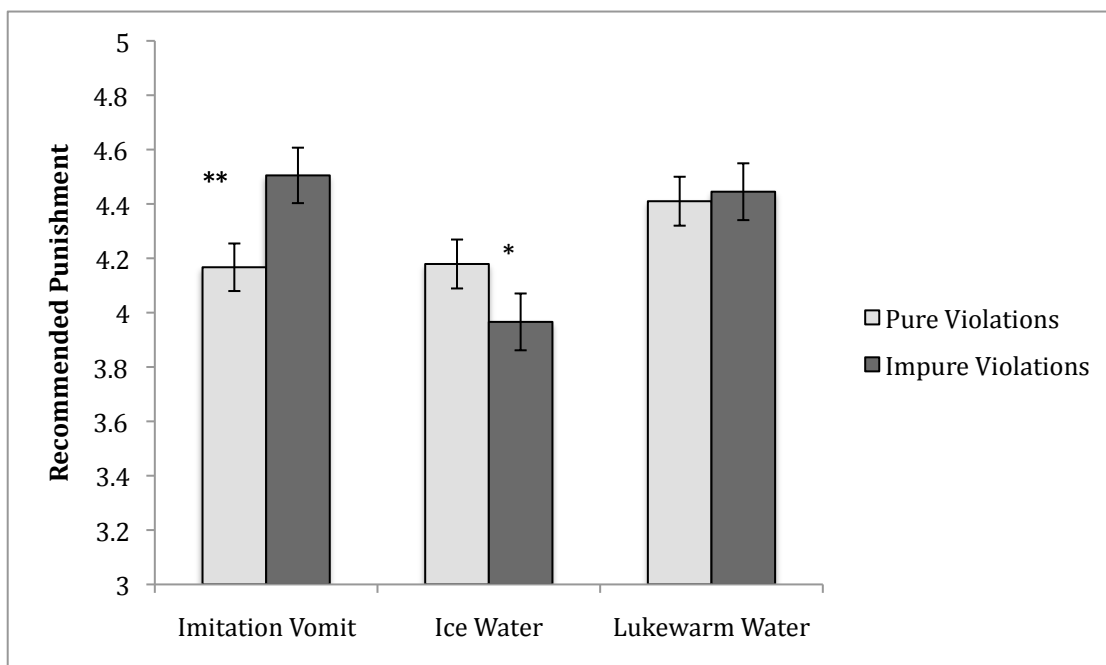


Figure 4. Recommended Punishment per Violation Type per Condition (Note: ** $p < .05$, * $p = .05$)

Morality

For morality ratings, there was no main effect of condition, $F(2, 58) = .26, n.s.$, or an interaction of condition by violation type, $F(2, 58) = 2.20, n.s.$ So, participants rated vignettes overall as equally immoral when exposed to the imitation vomit ($M = 4.80, SD = .84$) as when exposed to the ice water ($M = 4.79, SD = .83, n.s.$) or the lukewarm water ($M = 4.84, SD = .75, n.s.$). There was also no difference in perceived immorality between participants exposed to the latter two.

Disgust

Similarly, there was no main effect, $F(2, 58) = .48, n.s.$ or interaction effect, $F(2, 58) = .33, n.s.$ for disgust ratings. So, participants rated vignettes overall as equally disgusting when exposed to the imitation vomit ($M = 3.97, SD = 1.17$) as when exposed to the ice water ($M = 3.99, SD = 1.02, n.s.$) or the lukewarm water ($M = 4.24, SD = .67, n.s.$). In addition, there was no difference in perceived disgust between participants exposed to the latter two.

DS and Judgment of Moral Violations

The role of DS in judgment of moral violations was examined via linear regression with disgust, morality and punishment ratings for pure and impure violations as outcome variables, and DS as independent variable. Results indicated that DS significantly predicted how disgusting participants found purity ($B = .50, p < .001$), but not non-purity violations ($B = .12, n.s.$), how morally wrong participants found purity ($B = .33, p = .010$) and non-purity ($B = .29, p = .022$) violations, and how much punishment they recommended for purity ($B = .29, p = .037$) but not non-purity ($B = .16, n.s.$)

violations. DS remained a significant predictor of all of these factors after controlling for negative affect (PANAS).

Discussion

In the current study, where disgust and discomfort were induced with the same intensity, there were no significant differences between judgments made during disgust and discomfort induction. This finding supports the notion that discomfort may have exerted a stronger influence than disgust on moral judgments in study one due to the greater intensity with which it was elicited. The comparison of purity and non-purity violations did reveal a specific, albeit more limited role of disgust in judgments about moral violations. Participants who had their hand submerged in imitation vomit recommended harsher punishment for moral violations of purity (e.g., urinating on someone's car door handle) than for violations unrelated to purity (e.g., keying someone's car). This finding suggests that disgust may be uniquely informative when judging violations that are characterized by a sense of impurity. This finding is consistent with research by Rozin and colleagues (1999) showing that violations of Divinity/Purity are most closely associated with disgust, and research by Horberg and colleagues (2009) showing that disgust priming influenced moral evaluations regarding virtues and violations of purity, but not of fairness.

The findings of study two also showed that DS predicted how disgusting, morally wrong and deserving of punishment participants found purity violations, with more severe judgments associated with greater levels of DS. Individual differences in DS have previously been shown to predict more severe judgments of homosexuals (Inbar et al.,

2009; Terrizzi, Shook, & Ventis, 2010), criminals (Jones & Fitness, 2008), immigrants (Hodson & Costello, 2007; Tapias, Glaser, Keltner, Vasquez, & Wickens, 2007), drug addicts, and homeless people (Harris & Fiske, 2006). These previous findings are quite consistent with those of the current study showing that DS may be particularly predictive of violations related to impurity. Arguably, the groups of people judged more harshly by those high in DS in prior research (e.g., Inbar et al., 2009) largely represent those that are perceived as being impure. For example, drug addicts and homeless people are typically associated with disease, misfortune or moral taint, all of which elicit disgust due to their perceived contaminating properties (Rozin, Markwith, & McCauley, 1994). These findings also highlight that moral judgments of individuals high in DS may significantly differ from those low in DS when an element of impurity is a characteristic of the violation.

These results contribute significantly to the current literature by providing some insight into the specificity of disgust's role in judgments about moral violations as well as how DS may inform such judgments. Given that an element of impurity in the violation may be required for state or trait disgust to influence judgments about such violations, it remains unclear if reducing the experience of disgust or experiencing a state that is the opposite of disgust also influences moral judgments. Recent research suggests that a cleanliness induction immediately following a disgust induction lessens the severity of participants' judgments about others' misbehavior that is typically observed after disgust induction (Schnall, Benton, & Harvey, 2008). However, other research indicates that cleanliness inductions may also lead to increased severity of moral judgments (Zhong, Strejcek, & Sivanathan, 2010). Moreover, no studies to date have examined if a

cleanliness induction has a specific influence on purity violations or if it affects judgments regarding all violations equally. Finally, it is unclear if the demonstrated effect of reduced (Schnall, Benton et al., 2008) or increased (Zhong et al., 2010) severity in moral judgments is specifically associated with feeling clean, or if it is an artifact of feeling positive, due to the association between cleanliness and positivity. Finally, it is unclear from current findings how a disgust induction and a cleanliness induction (without prior disgust induction) may differentially affect judgments about moral violations. In study three, these questions were addressed by asking participants to submerge their hand in imitation vomit (disgust condition), soapy water (cleanliness induction) or warm soft fabric (positive condition) while they indicated how immoral, deserving of punishment and disgusting they found purity and non-purity violations.

CHAPTER V

STUDY THREE. FUNCTIONAL OPPOSITES, BUT CONCEPTUAL EQUALS? HOW FEELING CLEAN AND DISGUSTING AFFECTS JUDGMENTS ABOUT MORAL VIOLATIONS

Recent research suggests that feeling clean may lessen severity of morality judgments. For example, Schnall, Benton and colleagues (2008) primed participants with the concept of cleanliness immediately following a disgust induction. This priming occurred via either cognitive (i.e., a scrambled sentence task containing words that referred to cleanliness and washing) or physical means (i.e., washing one's hands), and following this phase, participants were asked to rate how morally wrong they found a range of moral dilemmas. The cleanliness manipulation significantly reduced the severity of participants' moral judgments, supporting the notion that while disgust renders moral judgments more severe, cleanliness makes them milder. Other research however, showed increased severity of moral judgments regarding others' wrongdoings after cleanliness priming (Helzer & Pizarro, 2011; Zhong et al., 2010). In studies by Zhong and colleagues (2010), participants were asked to clean their hands with antiseptic wipes, or not, prior to indicating how morally wrong they found various moral issues (study one). In a second and third study, participants visualized themselves as clean or dirty (via a script provided by the experimenter) prior to making moral judgments. Overall, moral judgments were more severe for participants in the clean condition than for those in the neutral (study one) or the disgust (study two and three) condition. Finally, in a recent study by Helzer and Pizarro (2011), participants who received an

indirect (a visual reminder of cleanliness in the lab) and a direct (i.e., use of antiseptic wipes) cleanliness prime made harsher moral judgments than participants in a control condition, in particular for violations involving sexual impurity (e.g., having sex in one's grandmother's bed, biological siblings having sex).

The research examining how cleanliness affects moral decision-making to date offers an inconsistent picture at best. This may be partially attributed to differences in methodologies used. For example, some studies examined the influence of cleanliness induction on moral judgments after prior disgust priming (Schnall, Benton, et al., 2008) while others examined cleanliness without prior disgust induction (Helzer & Pizarro, 2011; Zhong et al., 2010). Some studies also compared cleanliness induction with disgust induction (Schnall, Benton, et al., 2008; Zhong et al., 2010 studies 2 and 3) while other studies examine the influence of cleanliness compared to neutral affect (Zhong et al., 2010 study 1; Helzer & Pizarro, 2011). To clarify how moral judgments are affected differentially by disgust versus cleanliness induction, a disgust condition as well as a cleanliness condition (without prior disgust induction) is required because this would allow for direct comparison of how these two affective states influence judgments about moral violations while holding other factors constant (e.g., type of violations, one-phase paradigm, timing between rating different violations). Since only two studies have been conducted that directly compare disgust and cleanliness inductions (see study 2 and 3 by Zhong et al., 2010), replication of these findings is necessary prior to drawing definitive conclusions on the basis of this limited evidence.

The above mentioned studies examining how cleanliness affects moral judgments (Helzer & Pizarro, 2011; Schnall, Benton, et al., 2008; Zhong et al., 2010) also do not

provide any information regarding the influence of cleanliness independent of the positivity commonly associated with feeling clean. Therefore, it is unclear whether the demonstrated role of cleanliness is unique to cleanliness or rather caused by broad positive affect. Indeed, if the positivity associated with cleanliness causes the demonstrated effects, a happiness induction is expected to lead to similar results. Cleanliness, when used to alleviate disgust (e.g., Schnall, Benton, et al., 2008), is likely associated with an increase in positive affect, or at least a decrease in negative affect. Cleanliness without prior disgust induction however, may not be as closely linked to positive affect. A cleanliness induction may result in activation of appraisals that are specific to the construct of being and feeling clean, such as a sense of moral superiority (e.g., Zhong et al., 2010).

To illuminate the unique role of cleanliness, independent of positive affect, participants in study three were asked to rate various moral violations during a direct cleanliness induction (hand submersion in warm soapy water) as well as a positive affect induction (hand submersion in warm soft fabric). To compare the influence of cleanliness and disgust inductions on moral judgments, study three also consisted of a disgust induction (hand submersion in imitation vomit, identical to study two). Morality ratings were anticipated to be more severe in the clean than in the positive condition, due to the anticipated softening influence of positive affect on judgments overall. Judgments about moral violations were also expected to be more severe in the clean and the disgust condition than in the positive condition, given prior demonstrations that both disgust and cleanliness are associated with increased moral severity. Greater differences were expected between purity and non-purity violations in the disgust and cleanliness

condition than in the positive condition, given that disgust and cleanliness bear strong relationships with purity or lack thereof, while specific appraisals regarding purity are not typically found in association with general positive affect.

Method

Participants

Sixty-two undergraduate students (N = 62, 73% female, 68% Caucasian) participated in this study in exchange for course credit.

Materials

Moral Transgressions. Participants were presented with the same 20 moral transgressions (10 representing impurity, 10 not representing impurity) that were used in study two. The only difference was that the name “John” as actor for all violations was replaced by 20 different male names (one for each transgression), to clarify that each transgression had been committed by a different person.

Affect Induction. Affect was induced via submersion of participants’ left hand in one of three textures based on pilot dataⁱⁱⁱ (depending on the condition they were assigned to): 90-degree soapy water in the clean condition, soft warm fabric in the positive condition, or imitation vomit without a glove at room temperature in the disgust condition. The soapy water consisted of bubble bath soap, stirred up to create visible soap foam on the water. The chenille fabric used in the positive condition was made into a stuffed tube in which participants were asked to place their hand. A separate pocket was created at the

bottom of the tube, to insert a heated pad, warming the entire tube without directly touching the participant's hand. The cleanliness and positive condition elicited equal intensity of positive affect, while participants in the pilot study felt significantly cleaner in the cleanliness condition than in the positive condition. The disgust condition in this study was identical to that in study two.

Ratings. Participants were asked to indicate, on a scale from 0 (not at all) to 7 (extremely) how morally wrong they found each of the 20 transgressions. Participants were also asked to indicate how disgusting they found each transgression on a scale from 0 (not at all disgusting) to 7 (extremely disgusting), and how deserving of punishment they found each transgression on a scale from 0 (not at all deserving of punishment) to 7 (extremely deserving of punishment).

Questionnaires. The *Disgust Scale – Revised* (DS-R; Haidt, McCauley & Rozin, 1994, modified by Olatunji et al., 2007) (Alpha = .87), used in studies one and two, was also completed as part of the study. The Negative Affect scale (Alpha = .83) of the *Positive and Negative Affectivity Scale* (PANAS, Watson, Clark, & Tellegen, 1988), used in studies one and two was also completed as part of the current study.

Procedure

Participants, randomly assigned to one of three conditions (cleanliness, positivity, or disgust) received the same instructions as did participants in study one and two, with the exception that after completing the questionnaires and rating the moral violations, participants were asked to indicate to what extent, on a scale from 0 (not at all) to 7

(extremely), the hand submersion task made them feel clean, positive, disgusted and negative.

Results

Vignette Manipulation Check

To ensure that the impure violations used in the current study were seen as more disgusting, equally morally wrong and equally deserving of punishment as pure violations, disgust, immorality and punishment ratings for purity and non-purity violations were entered in separate repeated measures analyses. The analysis for disgust ratings showed a significant main effect of purity, $F(1, 60) = 255.46, p < .001$, with purity violations perceived as significantly more disgusting ($M = 5.59, SD = .84$) than non-purity violations ($M = 2.44, SD = 1.66$). The analysis for morality ratings also showed a significant main effect of purity, $F(1, 60) = 13.37, p = .001$, with non-purity violations rated as significantly more immoral ($M = 5.00, SD = .76$) than purity violations ($M = 4.59, SD = 1.15$). Lastly, punishment ratings did not show a significant main effect of purity $F(1, 60) = .166, n.s.$, as non-purity violations ($M = 4.33, SD = .85$) were rated equally deserving of punishment as purity violations ($M = 4.30, SD = 1.03$).

Affect Induction Manipulation Check

To confirm that exposure to soapy water induced more cleanliness and equal positivity than exposure to soft warm fabric, and to test if imitation vomit induced more disgust and negativity than soapy water and soft warm fabric, cleanliness, positivity,

disgust and negativity ratings were entered in a 4 (rating: clean, positive, disgusting, negative) X 3 (condition: soapy water, warm soft fabric, imitation vomit) mixed model ANOVA. This revealed a significant rating by condition interaction, $F(6, 180) = 12.40, p < .001$. One-way ANOVAs were then conducted to test main effects of condition for each of the ratings. Results indicated a significant main effect of condition for cleanliness ratings, $F(2, 60) = 9.64, p < .001$. Follow-up pairwise comparisons showed that participants felt significantly more clean when exposed to soapy water ($M = 3.95, SD = 1.66, p = .001$) and soft warm fabric ($M = 4.38, SD = 1.94, p < .001$) than when exposed to imitation vomit ($M = 2.14, SD = 1.65$), with no significant differences between soapy water and soft warm fabric. A significant main effect of condition for positivity end ratings was also observed, $F(2, 60) = 6.58, p = .003$. Follow-up pairwise comparisons showed that exposure to soft warm fabric ($M = 4.19, SD = 1.44$) induced more positivity than exposure to soapy water ($M = 2.95, SD = 1.77; p = .012$) and imitation vomit ($M = 2.52, SD = 1.40; p = .001$), with no significant differences between the latter two. There was a significant main effect of condition for disgust ratings, $F(2, 60) = 11.53, p < .001$, with imitation vomit inducing significantly more disgust ($M = 3.67, SD = 1.98$) than soapy water ($M = 1.29, SD = 1.93; p < .001$) and soft warm fabric ($M = 1.24, SD = 1.70, p < .001$), and no significant differences between the latter two. Similarly, results showed a significant main effect of condition for negativity ratings, $F(2, 60) = 11.50, p < .001$, with imitation vomit ($M = 3.67, SD = 1.83$) inducing more negativity than soft warm fabric ($M = .90, SD = 1.48; p < .001$) or soapy water ($M = 2.43, SD = 2.23, p = .036$). Furthermore, soapy water induced more negativity than soft warm fabric ($p = .011$) (see *Figure 5*).

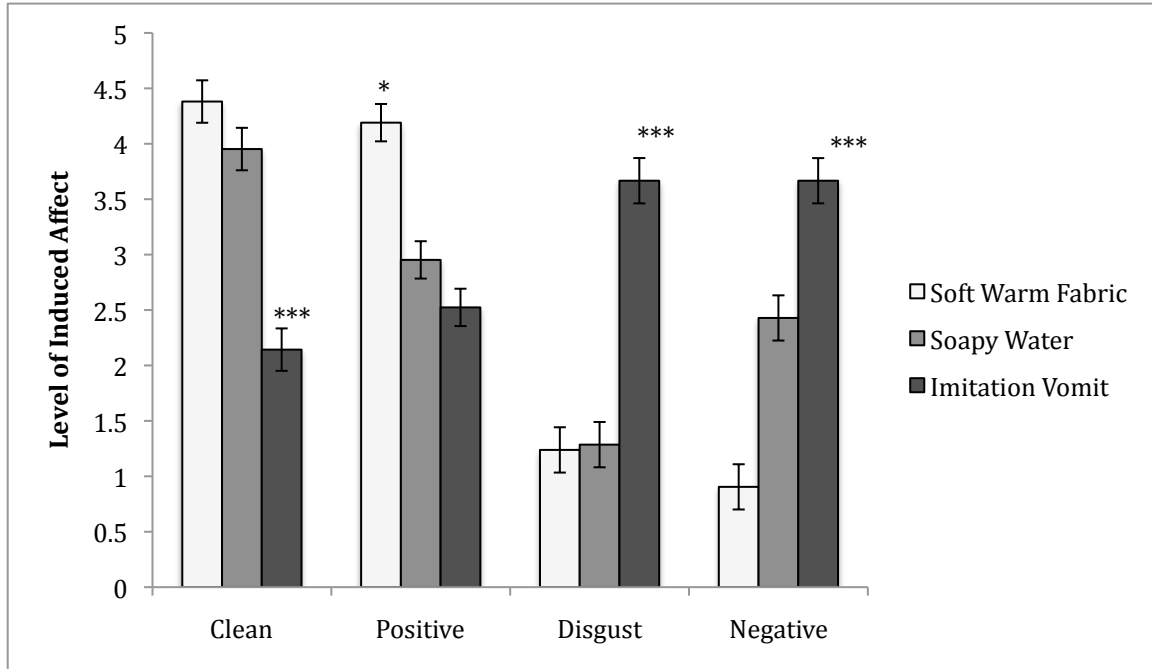


Figure 5. Cleanliness, Positivity, Disgust and Negativity ratings per condition (Note: *** $p < .001$, ** $p < .01$, * $p < .05$)

DS across conditions

A univariate ANOVA was conducted with condition (disgust, clean, positive) as independent variable and DS as dependent variable. The lack of a main effect of condition, $F(2, 59) = .124$, *n.s.*, indicated that DS was equally distributed across conditions. DS in participants in the disgust condition ($M = 55.25$, $SD = 15.90$) did not differ from DS of participants in the clean ($M = 56.57$, $SD = 15.21$) or the positive condition ($M = 54.05$, $SD = 18.05$).

Affect Induction and Judging Moral Violations

Analysis of Variance

Morality, disgust and punishment ratings were entered in separate 2 (violation type: purity, non-purity) X 3 (condition: soapy water, warm soft fabric, imitation vomit) mixed model ANOVAs.

Punishment

Results showed a significant main effect of condition for punishment ratings, $F(2, 60) = 3.44, p = .038$. Pairwise comparisons showed that participants recommended more punishment when they held their hand in imitation vomit ($M = 4.68, SD = .89$) than when they placed their hand in warm soft fabric ($M = 4.01, SD = 1.03, p = .012$). However, there was no significant difference in recommended punishment between these conditions and the soapy water condition ($M = 4.25, SD = .82, n.s.$) (see *Figure 6*).

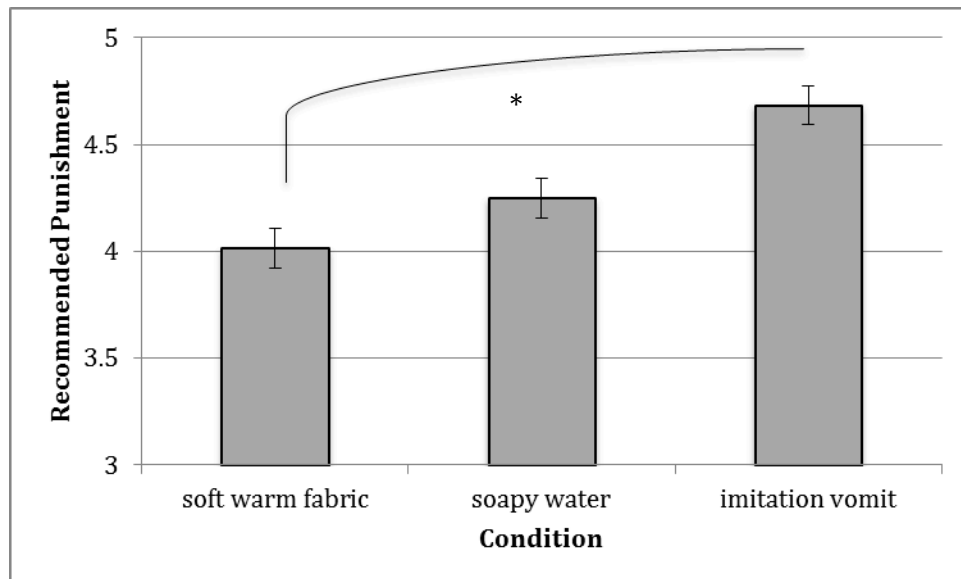


Figure 6. Recommended Punishment per Condition (Note: * $p < .05$)

Morality

There was no main effect of condition for morality ratings, $F(2, 60) = .10, n.s.$, or interaction between condition and purity, $F(2, 60) = .51, n.s.$. So, participants rated vignettes overall as equally morally wrong when exposed to the imitation vomit ($M = 4.78, SD = 1.07$) as when exposed to the soapy water ($M = 4.87, SD = .91, n.s.$) and there was no difference in perceived immorality for participants exposed to the soapy water and those exposed to the warm soft fabric ($M = 4.75, SD = .93, n.s.$).

Disgust

There was no main effect of condition for disgust ratings, $F(2, 60) = .38, n.s.$, or interaction between condition and purity, $F(2, 60) = .47, n.s.$. So, participants rated vignettes overall as equally disgusting when exposed to the imitation vomit ($M = 3.99, SD = 1.02$) as when exposed to the soapy water ($M = 4.17, SD = 1.12, n.s.$) and there was no difference in perceived disgust for participants exposed to the soapy water and those exposed to the warm soft fabric ($M = 3.89, SD = 1.08, n.s.$).

Regression Analysis

Given that the affect induction procedures did not result in distinct groups (i.e., soapy water did not induce significantly more cleanliness than warm soft fabric, and warm soft fabric induced significantly more positivity than soapy water), the extent to which participant ratings of cleanliness, disgust, positivity and negativity predicted judgments about non-purity and purity violations across the three conditions was examined in a regression analysis. Specifically, cleanliness and disgust in response to the affective inductions were examined as predictors of disgust, immorality and punishment

ratings of non-purity and purity violations. The extent to which cleanliness and disgust remained significant predictors after controlling for positivity or negativity respectively was also examined.

Across conditions, the degree to which participants felt clean as a result of their affect induction procedure predicted how much punishment they recommended for non-purity violations ($B = -.30, p = .018$), with more felt cleanliness resulting in reduced punishment. After controlling for positivity, cleanliness remained a significant predictor of punishment ($B = -.31, p = .035$). Cleanliness was not predictive of judgments of disgust or immorality.

The degree to which the inductions made participants feel disgusted across conditions predicted how disgusting they found non-purity ($B = .25, p = .046$), and purity violations ($B = .27, p = .030$), as well as how immoral they found purity ($B = .26, p = .041$) but not non-purity violations ($B = .10, n.s.$). Lastly, the extent to which participants felt disgusted as a result of the affect induction procedure predicted how much punishment they recommended for non-purity ($B = .30, p = .016$), and purity violations ($B = .29, p = .021$). After controlling for negativity during the inductions however, disgust no longer predicted any of these outcomes.

These regressions were repeated for each condition separately, and revealed largely similar effects, with one important exception. For participants exposed to soft warm fabric (i.e., the participants who reported feeling most positive ($M = 4.19, SD = 1.44$) and most clean ($M = 4.38, SD = 1.94$)), cleanliness was not a significant predictor of any judgments. However, after controlling for its shared variance with positivity, cleanliness became a significant positive predictor of immorality of purity violations ($B =$

.63, $p = .010$), with greater cleanliness resulting in more perceived immorality. Positivity was a marginal predictor of cleanliness in the opposite direction, with more positivity associated with less perceived immorality ($B = -.44, p = .059$).

DS and Judgment of Moral Violations

The role of DS in judgment of moral violations was examined via linear regression with disgust, morality and punishment ratings for pure and impure violations as outcome variables, and DS as independent variable. Results indicated that DS significantly predicted how disgusting participants found purity ($B = .58, p < .001$), but not non-purity violations ($B = .17, n.s.$), how morally wrong participants found purity ($B = .30, p = .017$) and non-purity ($B = .40, p = .001$) violations, and how much punishment they recommended for purity ($B = .31, p = .014$) and non-purity ($B = .36, p = .004$) violations. DS remained a significant predictor of all of these factors after controlling for negative affect (PANAS).

DS and Affect Induction Ratings

Pearson correlation coefficients were conducted to test the association between trait levels of disgust (DS), and state levels of disgust, cleanliness, positivity and negativity. DS was negatively correlated with cleanliness ratings ($r = -.27, p < .05$), with those higher in DS feeling less clean across conditions. DS was positively correlated with felt disgust ($r = .31, p < .05$), as well as negativity ($r = .26, p < .05$), with those higher in DS feeling more disgusted and negative across conditions. There was no correlation between DS and how positive participants felt overall ($r = -.18, n. s.$).

Discussion

Participants in the present study were asked to place their hand in lukewarm soapy water to elicit cleanliness and positivity, in a roll of soft warm fabric to elicit equal levels of positivity in the absence of cleanliness, and in imitation vomit to elicit disgust and negativity. Consistent with expectations, imitation vomit elicited significantly more disgust and negativity than soapy water and soft warm fabric. Contrary to expectations however, soft warm fabric elicited more positivity than soapy water and equal levels of cleanliness. For these reasons, a regression approach was used to examine how experienced cleanliness, disgust, positivity and negativity – as opposed to specific conditions – affected judgments about moral violations.

The regression analyses showed that the cleaner participants felt as a consequence of the affect inductions, the less punishment they recommended for non-purity, but not purity violations. Cleanliness remained a significant predictor of punishment after controlling for positivity, suggesting that its influence on recommended punishment was not caused by the positivity associated with cleanliness. The finding of reduced severity of judgments when participants feel cleaner is consistent with research by Schnall, Benton and Harvey (2008), who demonstrated lessened severity of judgments in participants who had been allowed to cleanse themselves after a disgust induction, as opposed to those who had not been given this opportunity. Because there was no prior disgust induction, these findings were surprising. When examining specifically how feeling clean affected judgments in the condition where participants felt the most clean and positive (soft warm fabric), more felt cleanliness predicted more severe perceived immorality of purity violations after controlling for the positivity of exposure to the

fabric. Indeed, exposure to the soft warm fabric elicited both cleanliness and positive affect. Examination of the regression coefficients in the positive condition showed that while the positivity of soft warm fabric had a negative slope (i.e., more positive feelings led to less perceived immorality), cleanliness had a positive slope (i.e., more cleanliness led to more perceived immorality). Once the severity-reducing influence of positivity was controlled, more cleanliness predicted more perceived immorality. This finding is consistent with prior findings about cleanliness priming without disgust induction (Zhong et al., 2010).

Regression analyses predicting disgust and negativity ratings showed that the more disgusted participants felt as a consequence of the affect induction, the more disgusting, immoral and deserving of punishment they found non-purity and purity violations. However, after controlling for negativity of the affect induction, disgust did not remain a significant predictor of disgust, morality or punishment ratings. This finding raises the possibility that the documented role of disgust in moral judgment (e.g., Wheatley & Haidt, 2005; Schnall, Haidt, et al., 2008) may be accounted for by intense negativity associated with disgust. Similar to study two, study three showed that DS was a significant predictor of how morally wrong, disgusting and deserving of punishment participants found moral transgressions, with those higher in DS showing more severe judgments overall.

CHAPTER VI

GENERAL DISCUSSION

Prior research demonstrates that disgust can play an important role in moral decision-making, as shown in significant correlations between how disgusted participants feel (as a state or a trait) and how severely they judge others' moral violations. Participants made to feel disgusted via exposure to disgust-associated words (Wheatley & Haidt, 2005), smells (Schnall, Haidt, et al. 2008; Pizarro, Inbar, & Bloom, 2012), tastes (Eskine et al., 2011) or images (Schnall, Haidt, et al., 2008) make more morally severe judgments than participants who have not been induced with disgust or than participants who have been induced with sadness. These findings suggest that disgust plays a significant role in moral decision-making. However, these findings do not rule out the possibility that the observed effect of disgust on moral decision-making is an artifact of negative affect more broadly.

The current studies examined the unique role of disgust in judgments about moral violations. Specifically, study one examined how disgust, compared to discomfort, influences moral judgments. Disgust and discomfort are negative mood states that are both characterized by a sense of certainty about what is happening (Tiedens & Linton, 2001) and an associated tendency to rely on heuristics such as how one feels during the time of judgment (e.g., Lerner, et al., 1998). An experimental paradigm was employed where disgust and discomfort inductions occurred during, rather than before, judgments about moral violations. In this one-phase paradigm, differential effects due to a

dissipation disparity between disgust and discomfort were reduced. Under these experimental conditions, study one failed to show a unique role of disgust in judgments about moral transgressions. In fact, the finding revealed more severe moral judgments by participants who had experienced discomfort than by those who had been in the neutral condition or in the disgust condition, with no significant differences between the disgust and neutral condition.

The significant difference between judgments in the discomfort and neutral condition in study one suggests that disgust may not be unique in its effect on moral judgments. However, closer examination of the affect inductions in study one revealed an intensity disparity between discomfort and disgust such that disgust was induced with significantly less intensity than discomfort. This intensity disparity leaves open the possibility that participants' moral judgments may have been more strongly influenced by discomfort because this was the most intensely induced mood state. Table 1 shows that in prior studies demonstrating a unique influence of disgust, compared to sadness, on moral judgments (Horberg et al., 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008) disgust affect in the disgust condition was consistently induced more intensely than sadness affect in the sadness condition.

The present findings, considered in the context of the available literature shown in Table 1 suggest that the previously documented unique role of disgust in moral judgment may be an artifact of an intensity disparity. The medium to large effect sizes of these emotion inductions in prior research (see Table 1) support this interpretation of the data.

Table 1 *Means and Standard Deviations of Reported Disgust, Sadness, and Discomfort in Respective Conditions, and Emotion of Most Influence on Moral Judgments*

Study	Disgust in DISG	Sadness In SAD	Discomfort in DISC	Cohen's d	Most Influential in moral judgments
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Schnall et al., 2008	11.35 (5.63)	4.72 (3.05)	<i>N/A</i>	<i>1.48</i>	Disgust
Horberg et al., 2009	5.55 (1.35)	4.57 (1.27)	<i>N/A</i>	<i>0.62</i>	Disgust
Moretti et al., 2010	5.51 (0.61)	4.87 (1.31)	<i>N/A</i>	<i>0.65</i>	Disgust
Study one	2.96 (1.87)	<i>N/A</i>	3.56 (1.78)	<i>0.34</i>	Discomfort

Note: bold font indicates the more intensely induced emotion

Given this intensity disparity, it is currently unclear if the unique effect of disgust on moral judgments in prior research, (Horberg et al., 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008) and discomfort in study one, can be attributed to the greater intensity with which this affect was induced, or to unique characteristics of disgust (vs. sadness) and discomfort (vs. disgust), respectively. In an attempt to rule out this intensity disparity account, the intensity of disgust and discomfort was matched in study two. Under these experimental conditions, no significant differences were observed between those in the disgust and discomfort condition in moral judgments. This finding suggests that the intensity of affect alone may have significant influences on moral judgment. Prior research has demonstrated that emotional intensity influences other cognitive processes as well. For example, emotional intensity can affect attention via a narrowing of focus toward emotional stimuli at the expense of other information (Pavelchak, Antil & Munch, 1988). Recognition memory has also been found to function

better for items of low and moderate affect intensity than for those of extreme intensity (Schaefer, Fletcher, Pottage, Alexander, & Brown, 2009). The findings in study one and two complement such research in demonstrating that intensity of affect in general, rather than specific emotional states, influences judgments about moral violations.

Although study one suggested that disgust does not uniquely inform judgments about moral violations, study two did find support for a unique, yet more modest, contribution of disgust in decisions about moral violations of purity. A more parsimonious view may then be that disgust informs judgments about certain types of violations. Participants in study two who felt disgusted recommended more severe punishment for moral violations of physical, emotional or spiritual purity than for violations unrelated to purity. This finding is consistent with prior research showing that disgust is specifically associated with violations of purity (Rozin, et al., 1999) and that disgust priming is particularly influential in moral judgments about purity transgressions, but not fairness transgressions (Horberg et al., 2009). Given that homosexuality is often associated with impurity as well (Haidt, Rozin, McCauley, & Imada, 1997), this finding also coincides with recent research showing that a noxious odor (i.e., disgust induction) increased negative judgments of gay, but not straight men (Inbar, Pizarro, & Bloom, 2012).

Detection of impurity when one feels disgusted may lead to strong punitive responses to maximize distance between the self and the object of disgust. These observations can be accounted for by a Moral Character Model (MCM) that holds that disgust serves to motivate people to maintain good moral character. Being perceived as having good moral character is advantageous from a social perspective because it allows

for formation of close interpersonal connections between people and helps prevent rejection from one's in-group (Kahan, 1998). Social connectivity is a central aspect to human life that increases likelihood of survival (Lieberman & Eisenberger, 2009). Social rejection is considered one of the three main threats to wellbeing (Rachman, 2004) and humans may be neurologically wired to avoid social rejection and seek out social connections. Indeed, recent research showed that experiencing social rejection activates the neural circuitries that are typically associated with the experience of physical pain and the motivational tendencies to ameliorate this pain (Lieberman & Eisenberger, 2009). Being perceived as having good moral character may lower the risk of social rejection. When no information is available about others' moral character, people tend to quickly assess this based on the behaviors of others. For example, in a Prisoner's Dilemma, where two players obtain equal gain if they cooperate (both \$5), but if one player cooperates while the other player defects, the latter gets a greater gain (\$10) and the former obtains nothing (\$0), participants may initially play under the assumption that the other player's moral character is potentially questionable. However, over time, participants tend to cooperate in such a game when they perceive the other person as morally trustworthy (i.e., the other person cooperates) (Rilling et al., 2007). From an evolutionary perspective, good moral character thus promotes survival via connections with others, and experiencing disgust may serve as a danger signal that one's character may be in jeopardy (e.g., Baumeister & Leary, 1995).

Disgust has been labeled an emotion that provides clear boundaries and moral norms regarding acceptable behaviors (Miller, 1997). Disgust also offers strong guidelines for managing norm violations, and urges the ingroup to follow through with

these guidelines to avoid rejection (Looy, 2004). When participants are asked to consider their own immoral deeds (Zhong & Liljenquist, 2006) or think of themselves as dirty (Zhong et al., 2010), their concerns about appearing disgusting increase. These concerns in turn elicit fears of social rejection or exclusion (Rachman, 2004). According to the MCM, depicted in *Figure 7*, being associated with disgust can pose a threat to one's moral character, and thereby increases the need to assert one's moral virtue. This can be done by maximizing the distance from immoral or impure deeds via severe judgment of such deeds. Such condemnation communicates knowledge of and adherence to moral norms within the community. Alternatively, one can avert the threat of being considered impure via cleansing or by engaging in a pro-social activity. Consistent with this notion, experimentally induced threats to moral character were found to result in increased contamination-related concerns and associated action tendencies (e.g., washing; Doron, Sar-El, & Mikulincer, 2012).

While a threat to moral character may motivate pro-social actions, the motivation to boost moral character should decrease once the threat has been averted. Indeed, participants in a recent study first asked to think about their own immoral deeds and then asked to volunteer in another study, were significantly less likely to volunteer if they had first been given an opportunity to wash their hands than if they had not been given a chance to “wash away their sins” (Zhong & Liljenquist, 2006). Decreasing threat to moral character by washing may alleviate participants' need to assert their moral virtue via a pro-social deed. In fact, cleansing has been documented to alleviate participants' need to explain or justify their actions (Lee & Schwarz, 2010b). According to the MCM, any of the proposed mechanisms to communicate moral virtue (i.e., cleansing, pro-social

deeds, condemnation) should restore moral character, but the most effective mechanism may depend on the source of the threat to one's moral character. This is in line with recent research showing that participants who committed a verbal transgression (e.g., telling a lie) expressed an interest in cleansing via mouthwash, while those who told a lie via email were more motivated to cleanse via hand sanitizer (Lee & Schwarz, 2010a).

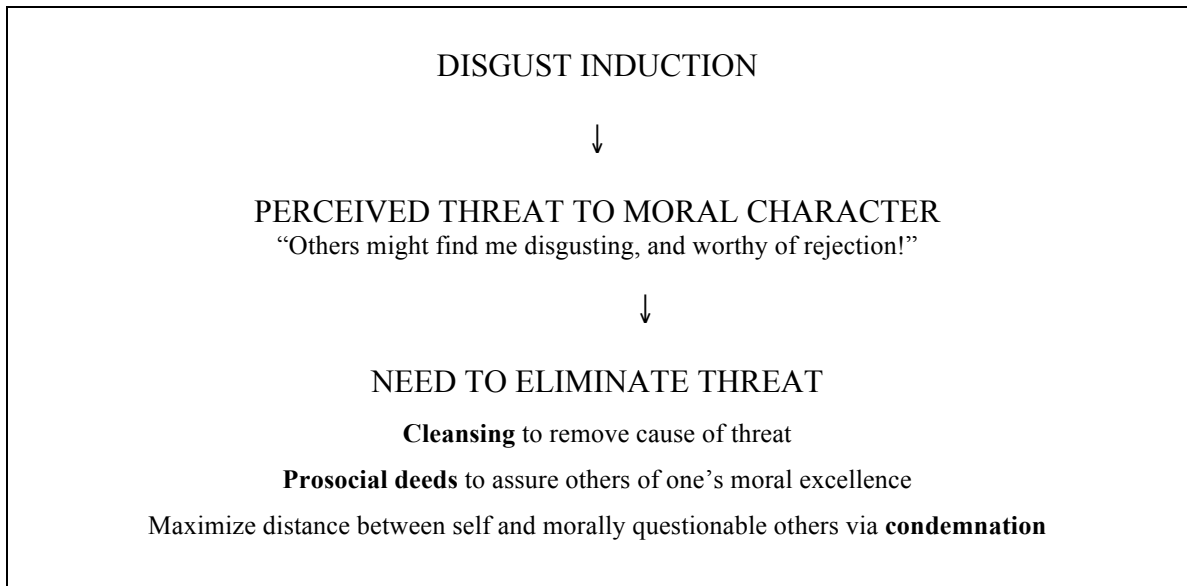


Figure 7. Threatened Moral Character after Disgust Induction

Recently, Lee and Schwarz (2011) proposed that pro-social deeds are motivated by guilt. Guilt undoubtedly plays an important role in increasing motivation to compensate for prior misdeeds (Haidt, 2003). Guilt is thought to result from the belief of having caused harm to others (Baumeister, Stillwell, & Heatherton, 1994), and pro-social deeds restore relationships with others. The pro-social action tendencies associated with the MCM however, are thought to restore one's moral reputation, rather than specific relationships. Restoring one's reputation will reaffirm one's status as a virtuous member

of the community. According to the MCM, this restoration is primarily driven by concerns about what group members might think (e.g., moral condemnation) and do (e.g., social exclusion) because of one's misbehavior. The MCM posits that participants' concerns about being judged negatively, especially in situations where others witness their morally questionable actions, increase the likelihood that people will engage in restorative actions.

Although the MCM predicts overall condemnation of violations (purity and non-purity), the current results showed that disgust induction affects purity violations in particular. Disgust may have resulted in more severe punishment of purity violations because these violations are disgusting themselves. That is, the disgust felt due to contact with the imitation vomit may have seemed more relevant to the impure violation to be judged. If a feeling is clearly irrelevant to the situation to be judged, it may not influence subsequent moral judgments. Prior research (e.g., Schachter & Singer, 1962; Sinclair, Hoffman, Mark, Martin, Pickering, 1994) shows that unrelated emotions do not influence judgments when participants identify their source as irrelevant to the task at hand. Due to the congruence between the affect experienced as a result of the affective induction and the affect the violation itself induces, the affective symmetry may potentiate judgments about violations of purity.

Evaluation of purity violations during a disgust induction may have also induced disgust more intensely than evaluation of violations unrelated to purity. Indeed, purity violations are thought to elicit disgust themselves (e.g., Rozin et al., 1999), and such disgust combined with that induced via the imitation vomit may have resulted in greater overall disgust while rating purity than non-purity violations. As previously noted, the

intensity with which an emotion is induced can contribute to its influence on associated processes (e.g., (Pavelchak et al., 1988; Schaefer, Fletcher, et al., 2009). The more severe punishment for purity violations may reflect a more intense disgust experience when rating purity versus non-purity violations.

Given the potentially unique role of disgust in judgments about purity-violations, study three examined the influence of its conceptual opposite, cleanliness, in evaluations of such violations. Study three specifically sought to differentiate the role of cleanliness from that of positive affect, and in addition, determine how cleanliness induction, compared to disgust induction, affects judgments about moral violations. Results showed that there were no differences in morality ratings between the clean and the disgust condition but indicated more severe punishment by participants in the disgust condition than by those in the positive condition. Examination of participant end ratings in linear regression analyses showed that across conditions, participants recommended less punishment the cleaner they felt, even after controlling for positivity. However, in the condition where participants felt most clean and positive, cleanliness predicted more severe immorality ratings for purity violations after controlling for the positivity of exposure to the fabric.

The MCM posits that cleanliness induction without prior disgust induction should boost moral character, and this boost is thought to reflect an increase in one's sense of moral superiority (see *Figure 8*).

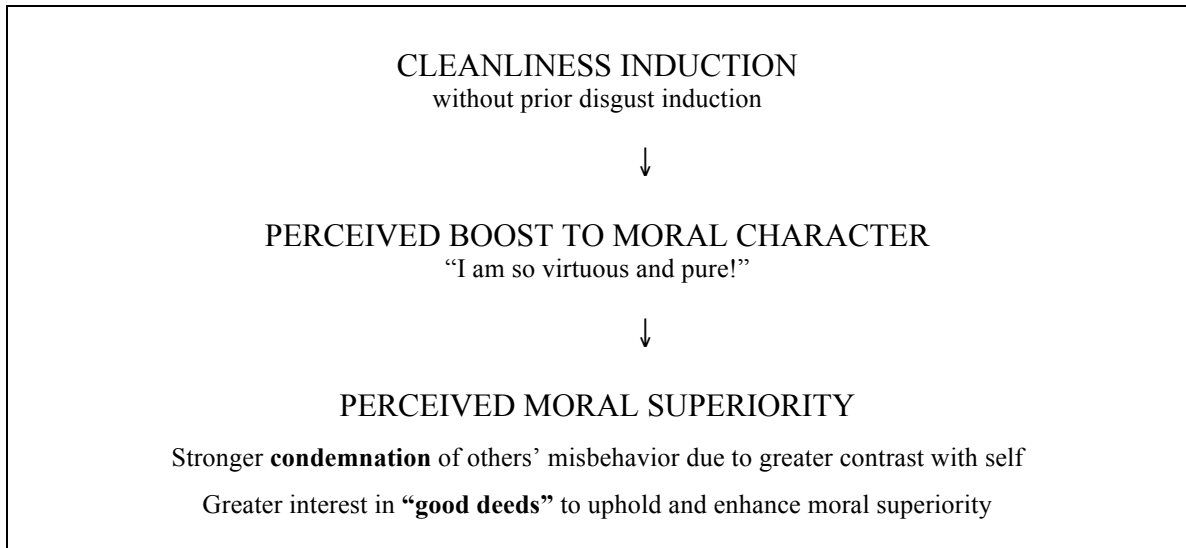


Figure 8. Superiority associated with Cleanliness in a Moral Character Model

Similar to experiencing threats to moral character (e.g., after disgust induction), feeling morally superior may be associated with increased condemnation of others’ morally questionable behaviors. Indeed, recent research has shown that feeling clean renders moral judgments more severe (e.g., Helzer & Pizarro, 2011) and Zhong and colleagues (2010) found that this association between cleanliness and moral condemnation was mediated by elevated moral self-perception. Condemnation by those who feel morally superior may be primarily motivated by a desire to further demonstrate moral virtue. Cleanliness-induced moral virtue may also lead to increased willingness to demonstrate one’s moral virtue via pro-social actions. For example, participants in a clean scented room were more likely than those in a neutral smelling room to treat others more fairly and were more likely to show interest in volunteering for a charity (Liljenquist, Zhong, & Galinsky, 2010). In study three, there were no significant differences between moral judgments of those in the disgust condition and those in the

clean condition, suggesting that both mood states are associated with similar action tendencies, albeit via different motivational processes.

Trait levels of disgust and cleanliness may moderate how these state affect inductions predict moral judgment. People are believed to vary in how prone they are to feeling disgusted (i.e., DS, Haidt, et al., 1994), and this trait may influence the perceived threat or boost to moral character associated with a disgust or cleanliness induction, respectively. Overall, individuals high in DS are morally hypervigilant, actively looking for and quickly detecting threats to morality (Jones & Fitness, 2008). Those high in DS may also be more concerned about threats to their own moral character (Doron et al., 2010). Consequently, they may be more motivated to avert potential threats to their moral reputation and demonstrate their moral virtue than individuals who are less concerned with threats to moral character. Indeed, research has shown that those high in DS make more severe moral judgments about others' questionable behavior (e.g., Inbar et al., 2009; Horberg et al., 2009) and are more religious (Olatunji, Tolin, Huppert, & Lohr, 2005) than those lower in DS. *Figure 9* shows that heightened moral concerns for high DS individuals may be more pronounced during a disgust induction as this experience may more readily signal a threat to one's moral character.

Such threats are often socially relevant (i.e., in the eye of the real or imagined beholder), and are typically thought not to undermine one's self-perceived moral character. When disgust is visibly induced, however, the objective may be one of resolving the discrepancy between one's self-perception and others' perception of the self. This discrepancy between "How you see me" and "How I see me" is often reduced

by active engagement in physical cleansing, pro-social deeds, or condemnation of others' misbehaviors (see *Figure 10*).

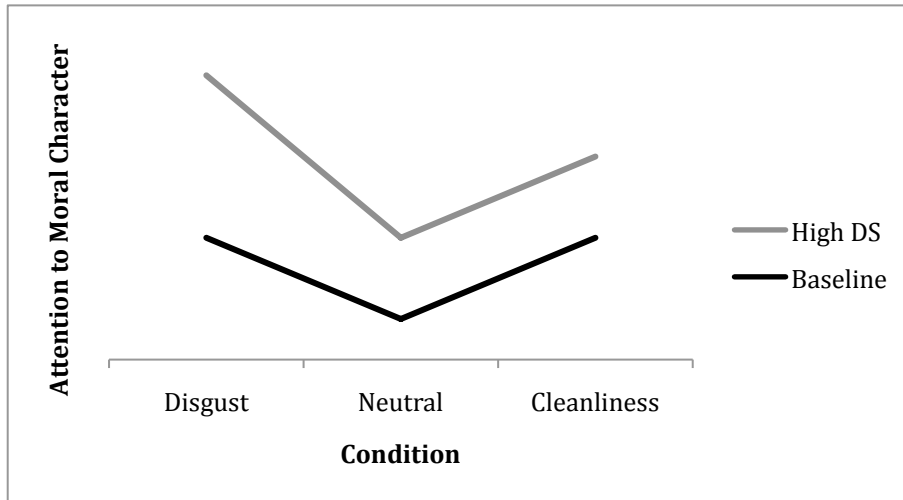


Figure 9. Attention to Moral Character for High DS Individuals

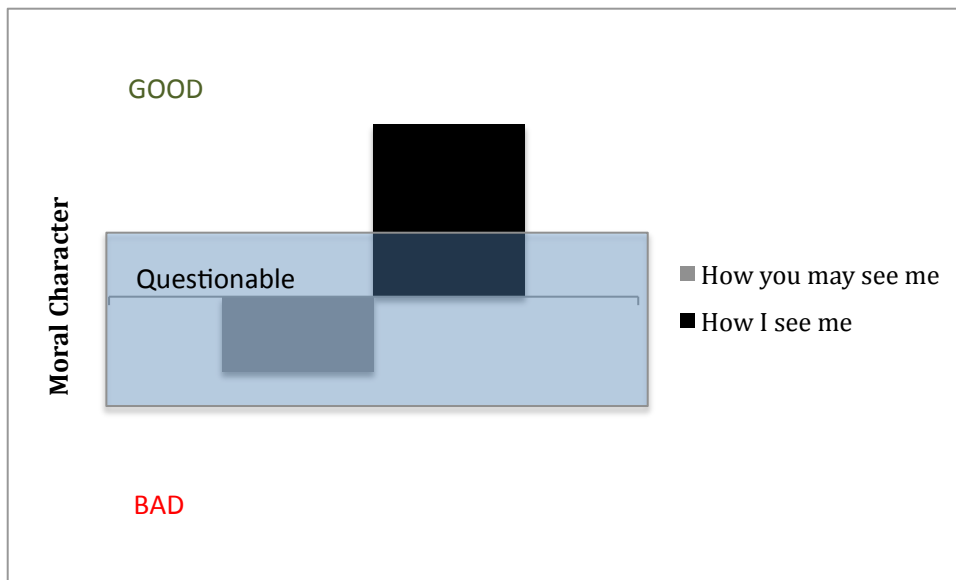


Figure 10. Moral Character as Perceived by Self and Others after Disgust Induction

People high in self-disgust on the other hand see themselves as morally questionable or even inferior, and may lack the motivation to engage in action tendencies typically associated with eliminating threatened moral character. Self-disgust is a personality trait consisting of highly critical evaluation of the self, and the belief that the self or characteristics of the self are disgusting and repulsive (Overton, Markland, Taggert, Bagshaw, & Simpson, 2008). A recent study found that those high in self-disgust failed to condemn severe moral violations (Olatunji, David, & Ciesielski, 2012) suggesting that personal beliefs about one's poor moral character (see *Figure 11*) may decrease motivation to convince others of one's moral virtue, and may consequently be associated with a decreased desire to cleanse, condemn immorality, and engage in pro-social deeds (Olatunji et al., 2012).

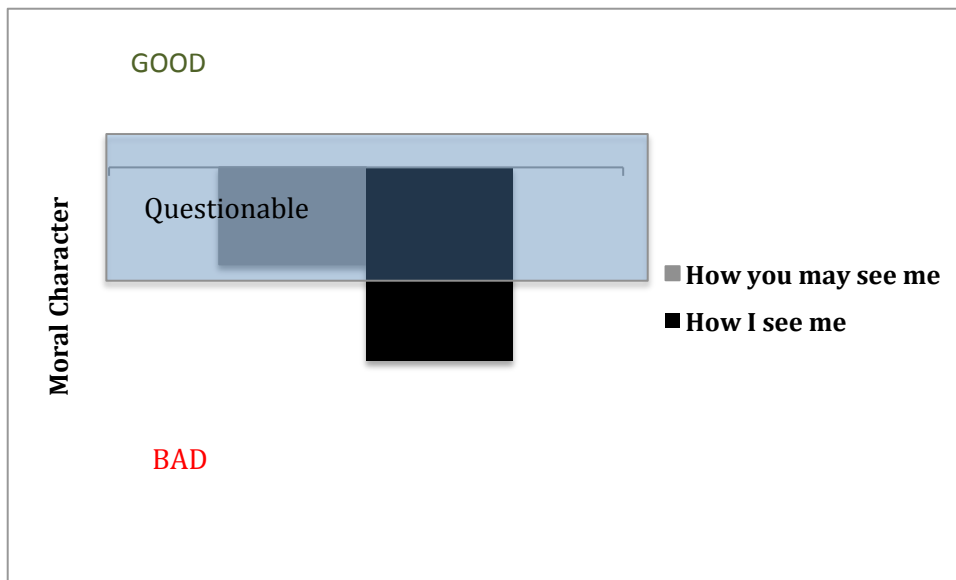


Figure 11. Moral Character as Perceived by Self and Others for Those High in Self-Disgust

Given these internal beliefs about one's moral character and the lack of motivation to engage in action tendencies that are socially prescribed, external changes in cleanliness state (e.g., via disgust induction) for those high in self-disgust may not significantly influence self-perceived moral character and associated moral judgments.

Although it is unclear if trait cleanliness may be conceptualized as a stable propensity to feel clean that is akin to other personality traits, the finding that cleanliness levels across conditions in study three were predictive of reduced moral severity, even after controlling for positivity, suggests that this variable may uniquely inform moral judgments. Individuals who generally feel clean may be less concerned with others' perceptions about their general moral character. This variable may overlap with low DS to some degree as the less prone one is to feeling disgusted, the more prone they may be to feeling clean. However, the findings from study 3 did indicate a small inverse correlation between the two, suggesting that low DS and cleanliness may not be opposing ends of the same continuum. Due to the hypothesized reduced concerns with moral character, the MCM predicts that individuals high in trait cleanliness would judge others less severely. Inducing cleanliness above and beyond baseline levels however (e.g., by offering already clean people some hand sanitizer) may increase severity of punishment due to an artificially elevated moral character. Consistently, findings from study three showed more severe punishment with greater cleanliness in the condition where participants felt most clean, after controlling for positivity.

Limitations

Although the present investigation furthers current knowledge about how and when disgust may influence moral judgments, the results of the current studies should be interpreted in light of some limitations. For example, the affect induction paradigm in study three did not adequately produce the intended emotions, despite an initial pilot investigation justifying the use of the induction paradigms. Also, despite employment of procedures aimed to prevent habituation (i.e., cleaning hand prior to re-submerging it in imitation vomit, or placing hand in lukewarm water prior to re-submerging it in ice water), participants reported habituating to hand submersion in the liquids. Fortunately, this habituation is not thought to have had a systematic influence on moral judgments, since the vignettes were presented in random order.

An additional limitation concerns the significant difference in perceived immorality between purity and non-purity violations. The purity violations selected for the current studies were rated as less morally wrong overall than the non-purity violations. This difference may have resulted from the selection made from the larger pool of violations. The violations used in the current studies represent both harm and purity/non-purity. In order to match perceived overall immorality for purity and non-purity violations, the violations that represented impurity may have been less harmful than those unrelated to impurity, given the inherent association between disgust/impurity and immorality (e.g., Horberg et al., 2009). Future research should aim to identify purity and non-purity moral violations that are truly equal in perceived immorality. However, due to the close association between disgust and immorality, this may be a difficult task.

Another limitation of the current research is that it does not provide a direct test of the underlying mechanisms of the MCM, as the current findings themselves informed its development. Consequently, no data was gathered regarding participants' self-perceived moral character and whether submersion of one's hand in imitation vomit actually poses a threat to this character. The link between cleanliness and moral character was derived from prior studies showing that a boost in moral character motivates pro-social deeds and condemnation (Zhong et al., 2010), and that experimental reduction of participants' moral virtue resulted in increased interest in cleansing (Doron et al., 2012). The findings of the current research fit within the context of the MCM, but further research measuring the proposed causal variable (i.e., moral character) is needed. In future research, manipulation of participants' moral character (e.g., by visually indicating how it compares to moral character of peers, as in Doron et al., 2012) could help test the MCM more directly. By comparing moral judgment of those made to think they are morally questionable with those made to think they are morally virtuous, the motivating role of moral character could be assessed. Incorporation of a condition where participants' attention is not drawn to their moral character (i.e., no manipulation of moral character) would likely serve as an important control comparison. It is expected that judgments of both manipulated groups would not differ significantly from one another, and both would be significantly more severe than those of participants not made aware of their moral character. Assessment of underlying cognitions (e.g., worries about others' perception of one's moral worth, degree of positive and negative affect associated with the moral character manipulation) would further help refine the hypothesized MCM mechanisms. Finally, testing whether a disgust induction leads to a threat to moral character and if a

cleanliness induction leads to a boost, by obtaining moral character ratings before and after the affective inductions, would represent an important component to exploring the principles underlying the MCM.

Implications

Despite the study limitations, the current research findings do indicate that the intensity with which emotions are induced can affect morally relevant decision-making. Comparison of effect sizes suggests that prior research showing the unique effect of disgust on moral judgments consistently induced disgust with greater intensity than it did the comparison emotion (e.g., Horberg et al., 2009; Moretti & di Pellegrino, 2010; Schnall, Haidt, et al., 2008). This indicates that the unique effect of disgust may have been an artifact of these research paradigms and highlights the importance of comparing the role of equally intense emotions. Generating affect induction paradigms that elicit different emotions with the same intensity however may be challenging, in part because some affective states are inherently associated with greater arousal. For example, fear is associated with greater autonomic arousal and intensity in terms of heart rate, skin conductance and respiratory rate than sadness (Kriebig, Wilhelm, Roth, & Gross, 2007). Furthermore, some emotions such as disgust are more easily elicited in the laboratory than others such as anger (e.g., Gross & Levenson, 1995), adding to the difficulties associated with equating intensity of comparison emotions. Some film clip and image databases have been developed to offer researchers affect induction paradigms that may reliably induce equally intense emotions (e.g., Schaefer, Nils, Sanchez, & Philippot, 2009). However, the use of video or images may not always be preferred within a given

research paradigm. In the current studies for example, affect was induced while participants made moral judgments, and under those conditions, inducing disgust with visual cues would have interfered with making such judgments. Further research establishing affect induction paradigms for different sensory modalities that elicit emotions with equal intensity could greatly improve the broad field of emotion research, in particular how emotions influence distinct cognitive and behavioral processes.

Further delineation of the role of disgust in moral judgment may have implications for legal settings, where the presence of disgusting evidence in a criminal case, as well as high trait levels of disgust, has been found to increase mock jurors' conviction rate, and decreases the time or evidence required to decide to convict (Bright & Goodman Delahunty, 2006; Jones & Fitness, 2008). Furthermore, certainty appraisals (Tiedens & Linton, 2001) associated with disgust can reduce jury members' willingness to hear and weigh all of the evidence, such as intent of the offender (Young & Saxe, 2009). Disgust also leads to harsher punishment of stigmatized groups as a recent study demonstrated that disgust toward an African-American defendant predicted agreement with extreme forms of punishment (i.e., severe prison sentences, death penalty) (Pearson, Dovidio, & Pratto, 2007). The results of the current studies suggest that jury members' proneness to experience disgust may be especially important to assess during the *voir dire* process of jury selection for crimes (e.g., rape, bloody fight) or criminals (e.g., homosexual perpetrator, foreign perpetrator) associated with impurity. In court cases that represent harm without impurity however (e.g., high level fraud), DS may be less relevant to assess, as those high and low in DS would likely reach similar verdicts. Providing judges and jury members with wipes or hand sanitizer may prevent premature

conviction or excessive punishment of purity violators. By lowering their disgust via cleansing, according to the MCM, the moral character of judges and jury members would no longer be as threatened, and they would not feel the need to excessively condemn or punish others to restore their own moral virtue.

The MCM may also provide a context for understanding cleansing rituals commonly observed in various cultures. Such rituals may be more intensely practiced by those who are perceived by society as morally inferior but wish to elevate their status, for example, lower caste groups in India (Nemeroff & Rozin, 1994). Also, recent research showed that African American participants have higher levels of DS (Haidt et al., 1994) and more frequently use hand sanitizer (e.g., Williams & Turkheimer, 2007) than their European American counterparts. Under segregation laws, African Americans were prevented from using the same restrooms, waiting rooms, and restaurants as European Americans out of fear that they would contaminate the latter (e.g., Williams, Turkheimer, Magee, & Guterbock, 2008). The demonstrated greater DS and cleanliness concerns in African Americans may reflect an attempt to counteract this historical association between being Black and being a contaminant (Williams, Abramowitz, & Olatunji, 2012).

From the perspective of the MCM, ethnic cleansing might be considered an attempt to maximize the difference between a self-proclaimed morally superior group and a group considered morally questionable. For instance, the Nazis, who deemed themselves morally superior in various ways, may have been disgusted by the presence of those made to appear morally questionable (e.g., homosexuals, gypsies, people of Jewish faith; Nussbaum, 1998). In an attempt to maximize the distance between themselves and

morally questionable others, the Nazis removed their victims from society first by building walls around their living areas, then transferring them to concentration camps, and ultimately attempting to eliminate them. The Nazis' self-perceived moral virtue, in association with their intense efforts to depict their victims as morally and physically disgusting, is thought to have motivated these horrific actions (e.g., Taylor, 2007).

To promote cooperation and community it would seem important to provide cleansing options (e.g., hand sanitizer readily available, showers at work) for people whose employment contains disgusting components, in particular for those professions that consist of significant interactions with others. For example, nurses who clean up their patients' bodily fluids, likely benefit from cleansing opportunities to prevent being overly punitive in their interactions with their ill patients or excessively judging of their co-workers' mistakes. Their exposure to such fluids may threaten their moral character and to restore this without condemning those deemed morally questionable, cleansing may be essential. According to the MCM, volunteer work with the underprivileged may be associated with a lesser need for cleansing because the volunteers are not expected to experience a threat to their moral character due to their pro-social deeds. Charities may want to remind their target audience of times they acted in morally questionable ways to evoke pro-social motivation and associated financial support in them. Alternatively, they may want to offer their target audience a cleanliness experience, to lift their moral character to virtuous and spark an interest in continuing to demonstrate their moral virtue.

These implications illustrate that the influence of disgust in legal, ethical and social areas can be highly divisive and destructive, and that reducing and managing disgust may be crucial to ensure justice and humanity (e.g., Nussbaum, 1998). However,

several scholars have argued that disgust can also be very informative and unique in its ability to draw attention to cruelty (e.g., Kahan, 1998). Indeed, Miller (1997) explained that disgust “marks out moral matters for which we can have no compromise” (pp. 194). Given this duality, lowering disgust may thus only be prudent in certain circumstances. For example, homosexuality is often associated with disgust and impurity (e.g., Inbar et al., 2009), and this disgust may influence how moral transgressions by homosexuals are judged, even when sexual orientation is irrelevant. Experienced disgust may bias decisions and increase motivation to assign negative attributes to the actions of those who are different (Navarrete & Fessler, 2006). This may be the case if homosexual criminals are punished harsher than heterosexuals who committed the same crime, or if offenders of homosexual victims receive less punishment than those of heterosexual victims (e.g., Kahan, 1998; Uhrich, 1999). However, the disgust that motivates harsher judgments of a perpetrator who raped and tortured his victim prior to killing them, compared to a perpetrator who did not engage in such acts before killing his victim, may be informative. The disgust and moral outrage (Carlsmith, Carley, & Robinson, 2002) experienced in response to the first scenario indicates that it is significantly more cruel and repulsive, and perhaps deserving of more severe punishment. Accordingly, eliminating such “wisdom of repugnance” (Kass, 1997) from moral judgments may be undesirable and in all likelihood practically impossible (e.g., Huang & Anderson, 2006).

Rather than attempting to eliminate disgust from the judgments about the transgressions of others, it appears crucial to recognize its existence on the one hand and to manage it appropriately on the other hand. By differentiating between disgust elicited by crimes versus disgust elicited by characteristics of criminals irrelevant to the crime

itself (e.g., facial malformation, sexual orientation, nationality, religious practices), and closely monitoring how the latter in particular may influence moral judgments, we may be better able to utilize the “wisdom” of disgust without letting it destroy our “humanity”.

Conclusions

The current research showed that disgust may only exert a unique influence – distinct from other negative affect – on moral judgments when judging purity violations. Cleanliness predicted more severe judgment of moral violations overall after controlling for the positivity associated with cleanliness. These findings led to formulation of the MCM, which poses that both feelings of disgust and those of cleanliness can result in more severe moral judgments, albeit via different mechanisms (i.e., to avert threat to moral character or to continue to boost moral virtue, respectively). Future studies comparing how inferior or superior moral character as perceived by the self versus others influences cognitions and behavior would be highly informative in this regard. The current findings suggest that development of paradigms that reduce attention to one’s moral character may be an important future research topic, to limit interference of personal motivational processes (i.e., seeming of good moral character) in judgment of other people when these are deemed inappropriate.

APPENDIX A

MORAL VIOLATIONS STUDY ONE

Non-morally Questionable Behaviors

1. A.T. took a friend to the movies
2. D.H. went to lunch with an acquaintance
3. F.W. went for a walk in the park
4. L.E. bought a new lawnmower

Moderate Morally Questionable Behaviors

1. N.D. parked in a handicapped spot
2. T.R. neglected an elderly relative
3. K.D. lied to a good friend
4. Q.P. stole out of the collection plate at church

Severe Morally Questionable Behaviors

1. G.W. murdered 2 people in their own home
2. J.Q. raped a social worker
3. L.T. tortured someone with needles
4. R.Y. beat a homeless person unconscious

APPENDIX B

MORAL VIOLATIONS STUDY TWO AND THREE

Non-purity Violations

1. John lied to a good friend
2. John spread unflattering rumors about a friend
3. John lied about how many hours he worked
4. John ran to knock someone off of a bike
5. John intentionally gave someone wrong directions
6. John cut up someone's jacket
7. John scratched someone's car with a key
8. John broke someone's window with a rock
9. John sold a customer a known-to-be defective product
10. John backed into someone's car and didn't leave a note

Purity Violations

1. John spit into someone's drink
2. John knowingly served someone food past its expiration date
3. John forced someone to drink spoiled milk
4. John pushed someone into a dumpster which was swarming with cockroaches
5. John hazed members of his group by urinating on them
6. John urinated on someone's car door handle
7. John threw someone's cell phone into an unflushed toilet
8. John rubbed someone's toothbrush on the floor of a public restroom
9. John knowingly handled food at a restaurant immediately after using the bathroom
10. John intentionally aimed his vomit onto an air filter at a friend's house

APPENDIX C

QUESTIONNAIRES STUDY ONE, TWO, AND THREE

Disgust Scale – Revised (Haidt, McCauley & Rozin, 1994, modified by Olatunji et al., 2007)

1. I might be willing to try eating monkey meat, under some circumstances.
2. It would bother me to be in a science class, and to see a human hand preserved in a jar.
3. It bothers me to hear someone clear a throat full of mucous.
4. I never let any part of my body touch the toilet seat in public restrooms.
5. I would go out of my way to avoid walking through a graveyard.
6. Seeing a cockroach in someone else's house doesn't bother me.
7. It would bother me tremendously to touch a dead body.
8. If I see someone vomit, it makes me sick to my stomach.
9. I probably would not go to my favorite restaurant if I found out that the cook had a cold.
10. It would not upset me at all to watch a person with a glass eye take the eye out of the socket.
11. It would bother me to see a rat run across my path in a park.
12. I would rather eat a piece of fruit than a piece of paper
13. Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred by a used but thoroughly washed flyswatter.
14. It would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before.

Participants are asked to indicate to what extent they agree with these statements, or how true they are for them, on a 5-point Likert scale, ranging from 0 (strongly disagree – very untrue about me) to 4 (strongly agree – very true about me).

15. You see maggots on a piece of meat in an outdoor garbage pail.
16. You see a person eating an apple with a knife and fork
17. While you are walking through a tunnel under a railroad track, you smell urine.
18. You take a sip of soda, and then realize that you drank from the glass that an acquaintance of yours had been drinking from.
19. Your friend's pet cat dies, and you have to pick up the dead body with your bare hands.
20. You see someone put ketchup on vanilla ice cream, and eat it.
21. You see a man with his intestines exposed after an accident.

22. You discover that a friend of yours changes underwear only once a week.
23. A friend offers you a piece of chocolate shaped like dog-doo.
24. You accidentally touch the ashes of a person who has been cremated.
25. You are about to drink a glass of milk when you smell that it is spoiled.
26. As part of a sex education class, you are required to inflate a new unlubricated condom, using your mouth.
27. You are walking barefoot on concrete, and you step on an earthworm.

Participants are asked to indicate how disgusting they would find each of these experiences on a 5-point Likert scale, ranging from 0 (not disgusting at all) to 4 (extremely disgusting).

Negative Affect Scale of the PANAS (Watson, Clark, & Tellegen, 1988)

1. distressed
2. upset
3. guilty
4. scared
5. hostile
6. irritable
7. ashamed
8. nervous
9. jittery
10. afraid

Participants are asked to indicate to what extent they typically feel each emotion on a 5-point Likert scale, ranging from 1 (very slightly/not at all) to 5 (extremely).

REFERENCES

- Baumeister, R. F. & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529.
- Baumeister, R. F., Stillwell, A. M., & Heatherton, T. F. (1994). Guilt: An interpersonal approach. *Psychological Bulletin, 115*, 243-267.
- Bentham, J. (1781/1988). An introduction to the principles of morals and legislation. *Amherst, NY: Prometheus Books*.
- Berkowitz, L. (1993). Pain and aggression: Some findings and implications. *Motivation and Emotion, 17*, 277-293.
- Blair, R. J. R. (2007). The amygdala and ventromedial prefrontal cortex in morality and psychopathy. *Trends in Cognitive Sciences, 11*, 387-392.
- Bodenhausen, G. V., Gabriel, S., & Lineberger, M. (2000). Sadness and susceptibility to judgmental bias: the case of anchoring. *Psychological Science, 11*, 320-323.
- Bright, D. A., & Goodman Delahunty, J. (2006). Gruesome evidence and emotion: anger, blame, and jury decision-making. *Law and Human Behavior, 30*, 183-202.
- Carlsmith, K. M., Darley, J. M., & Robinson, P. H. (2002). Why do we punish?: Deterrence and just deserts as motives for punishment. *Journal of Personality and Social Psychology, 83*, 284-299.
- Chapman, H. A., Kim, D. A., Susskind, J. M., & Anderson, A. K. (2009). In bad taste: evidence from the oral origins of moral disgust. *Science, 323*, 1222-1226.
- Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment. *Psychological Science, 17*, 1082-1089.
- Doron, G., Sar-El, D., & Mikulincer, M. (2012). Threats to moral self-perceptions trigger obsessive compulsive contamination-related behavioral tendencies. *Journal of Behavior Therapy and Experimental Psychiatry, 43*, 884-890.
- Eccleston, C., & Crombez, G. (1999). Pain demands attention: A cognitive-affective model of the interruptive function of pain. *Psychological Bulletin, 125*, 356-366.
- Eskine, K. J., Kacinik, N. A., & Prinz, J. J. (2011). A bad taste in the mouth: Gustatory disgust influences moral judgment. *Psychological Science, 22*, 295-299.

- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*, 39-66.
- Greene, J. D. (2007). Why are VMPFC patients more utilitarian? A dual-process theory of moral judgment explains. *Trends in Cognitive Sciences*, *11*, 322-323.
- Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, *107*, 1144-1154.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition and Emotion*, *9*, 87-108.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*, 814-834.
- Haidt, J. (2003). The moral emotions. *Handbook of affective sciences*, 852-870.
- Haidt, J. (2007). The new synthesis in moral psychology. *Science*, *316*, 998-1002.
- Haidt, J., Bjorklund, F., & Murphy, S. (2000). Moral dumbfounding: When intuition finds no reason. *Unpublished manuscript, University of Virginia*.
- Haidt, J., & Joseph, C. (2004). Intuitive ethics: How innately prepared intuitions generate culturally variable virtues. *Daedalus*, *133*, 55-66.
- Haidt, J., & Kesebir, S. (2010). Morality. In S. T. Fiske & D. Gilbert (Eds.), *The Handbook of Social Psychology*, 5th Edition.
- Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences*, *16*, 701-713.
- Haidt, J., Rozin, P., McCauley, C., & Imada, S. (1997). Body, psyche, and culture: The relationship between disgust and morality. *Psychology and Developing Societies*, *9*, 107-131.
- Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, *450*, 557-559.
- Harris, L. T., & Fiske, S. T. (2006). Dehumanizing the lowest of the low: Neuroimaging responses to extreme out-groups. *Psychological Science*, *17*, 847-853.
- Helzer, E. G., & Pizarro, D. A. (2011). Dirty liberals!: Reminders of physical cleanliness influence moral and political attitudes. *Psychological Science*, *22*, 517-522.

- Herzog, H. A., & Golden, L. L. (2009). Moral emotions and social activism: The case of animal rights. *Journal of Social Issues, 65*, 485-498.
- Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science, 18*, 691-698.
- Horberg, E. J., Oveis, C., Keltner, D., & Cohen, A. B. (2009). Disgust and the moralization of purity. *Journal of Personality and Social Psychology, 97*, 963-976.
- Huang, P. H., & Anderson, C. J. (2006). Psychology of emotional legal decision making: revulsion and saving face in legal theory and practice, *Minnesota Law Review, 90*, 1045-1059.
- Hutcherson, C. A. & Gross, J. J. (2011). The moral emotions: A social–functionalist account of anger, disgust, and contempt. *Journal of Personality and Social Psychology, 100*, 719–737.
- Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion, 9*, 435-439.
- Inbar, Y., Pizarro, D.A., & Bloom, P. (2012). Disgusting smells cause decreased liking of gay men. *Emotion, 12*, 23-27.
- Jones, A., & Fitness, J. (2008). Moral hypervigilance: The influence of disgust sensitivity in the moral domain. *Emotion, 8*, 613-627.
- Kahan, D. M. (1998). The progressive appropriation of disgust. In S. A. Bandes (Ed.), *The passions of law* (pp. 63-72). New York, NY, US: New York University Press.
- Kant, I., Beck, L. W., & Wolff, R. P. (1986). *Foundations of the Metaphysics of Morals*: Macmillan New York. (Original work published in 1785)
- Kass L. R. (1997). The wisdom of repugnance: why we should ban the cloning of humans. *Valparaiso University Law Review, 32*, 679-705.
- Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., et al. (2007). Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature, 446*, 908-911.
- Kohlberg, L. (1984). *The psychology of moral development* (Vol. II). San Francisco: Harper & Row Publishers.

- Kriebig, S. D., Wilhelm, F. H., Roth, W. T., & Gross, J. J. (2007). Cardiovascular, electrodermal, and respiratory response patterns to fear- and sadness-inducing films. *Psychophysiology*, *44*, 787-806.
- Lee, S. W. S., & Schwarz, N. (2010a). Dirty hands and dirty mouths: Embodiment of the moral–purity metaphor is specific to the motor modality involved in moral transgression. *Psychological Science*, *21*, 1423–1425.
- Lee, S. W. S., & Schwarz, N. (2010b). Washing away postdecisional dissonance. *Science*, *328*, 709.
- Lee, S. W. S., & Schwarz, N. (2011). Wiping the slate clean : Psychological consequences of physical cleansing. *Current Directions in Psychological Science*, *20*, 307-312.
- Lerner, J. S., Goldberg, J. H., & Tetlock, P. E. (1998). Sober second thought: The effects of accountability, anger, and authoritarianism on attributions of responsibility. *Personality and Social Psychology Bulletin*, *24*, 563-574.
- Lieberman, M. D., & Eisenberger, N. I. (2009). Pains and pleasures of social life. *Science*, *323*, 890-891.
- Liljenquist, K., Zhong, C.-B., & Galinsky, A.D. (2010). The smell of virtue: Clean scents promote reciprocity and charity. *Psychological Science*, *21*, 381–383.
- Looy, H. (2004). Embodied and embedded morality: divinity, identity, and disgust. *Zygon*, *39*, 219-235.
- Luo, Q., Nakic, M., Wheatley, T., Richell, R., Martin, A., & Blair, R. J. R. (2006). The neural basis of implicit moral attitude - an IAT study using event-related fMRI. *Neuroimage*, *30*, 1449-1457.
- Mackie, D. M., & Worth, L. T. (1989). Processing deficits and the mediation of positive affect in persuasion. *Journal of Personality and Social Psychology*, *57*, 27-40.
- Miller, L. C., Murphy, R., & Buss, A. H. (1981). Consciousness of body: private and public. *Journal of Personality and Social Psychology*, *41*, 397-406.
- Miller, W. I. (1997). *The anatomy of disgust*. Cambridge, MA: Harvard University Press.
- Moretti, L., & di Pellegrino, G. (2010). Disgust selectively modulates reciprocal fairness in economic interactions. *Emotion*, *10*, 169-180.
- Navarrete, C. D., & Fessler, D. M. T. (2006). Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, *27*, 270–282.

- Nemeroff, C., & Rozin, P. (1994). The contagion concept in adult thinking in the United States: Transmission of germs and of interpersonal influence. *Ethos*, 22, 158-186.
- Nussbaum, M. C. (1998). "Secret sewers of vice": Disgust, bodies, and the law. In S. Bandes (Ed.). *The passions of Law* (pp. 19-62). New York, NY, US: New York University Press.
- Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease-avoidance mechanism. *Psychological Bulletin*, 135, 303-321.
- Olatunji, B. O. (2008). Disgust, scrupulosity and conservative attitudes about sex: Evidence for a mediational model of homophobia. *Journal of Research in Personality*, 42, 1364-1369.
- Olatunji, B. O., Tolin, D. F., Huppert, J., & Lohr, J. M. (2005). The relation between fearfulness, disgust sensitivity and religious obsessions in a non-clinical sample. *Personality and Individual Differences*, 38, 891– 902.
- Olatunji, B. O., David, B., & Ciesielski, B. G. (2012). Who am I to judge: Self-disgust predicts less punishment of severe transgressions. *Emotion*, 12, 169-173.
- Olatunji, B. O., Forsyth, J. P., & Cherian, A. (2007). Evaluative differential conditioning of disgust: a sticky form of relational learning that is resistant to extinction. *Journal of Anxiety Disorders*, 21, 820-834.
- Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., et al. (2007). The Disgust Scale: Item analysis, factor structure, and suggestions for refinement. *Psychological Assessment*, 19, 281-297.
- Overton, P. G., Markland, F. E., Taggart, H. S., Bagshaw, G. L., & Simpson, J. (2008). Self-disgust mediates the relationship between dysfunctional cognitions and depressive symptomatology. *Emotion*, 8, 379 – 385.
- Pavelchak, M. A., Antil, J. H., & Munch, J. M. (1988), The Super Bowl: An investigation into the relationship among program context, emotional experience, and ad recall. *Journal of Consumer Research*, 15, 360–367.
- Pearson, A. R., Dovidio, J. F., & Pratto, F. (2007). Racial prejudice, intergroup hate, and blatant and subtle bias of whites toward blacks in legal decision making in the United States. *International Journal of Psychology and Psychological Therapy*, 7, 145-158.
- Price, D. D. (2000). Psychological and neural mechanisms affective dimensions of pain. *Science*, 288, 1769-1772.

- Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy*, 42, 1227-1255.
- Rilling, J. K., Glenn, A. L., Jairam, M. R., Pagnoni, G., Goldsmith, D. R., Elfenbein, H. A., et al. (2007). Neural correlates of social cooperation and non-cooperation as a function of psychopathy. *Biological Psychiatry*, 61, 1260-1271.
- Rozin, P., Haidt, J., & McCauley, C. R. (2000). Disgust. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions, 2nd edition* (pp. 637 - 653). New York: Guilford Press.
- Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, 76, 574-586.
- Rozin, P., Markwith, M., & McCauley, C. (1994). Sensitivity to indirect contacts with other persons: AIDS aversion as a composite of aversion to strangers, infection, moral taint, and misfortune. *Journal of abnormal psychology*, 103, 495-504.
- Rozin, P., Markwith, M., & Stoess, C. (1997). Moralization and becoming a vegetarian: The transformation of preferences into values and the recruitment of disgust. *Psychological Science*, 8, 67-73.
- Rozin, P., & Singh, L. (1999). The moralization of cigarette smoking in the United States. *Journal of Consumer Psychology*, 8, 339-342.
- Sanfey, A. G., Rilling, J. K., Aronson, J. A., Nystrom, L. E., & Cohen, J. D. (2003). The neural basis of economic decision-making in the Ultimatum Game. *Science*, 300, 1755-1758.
- Schachter, S. & Singer, J. E. (1962). Cognitive, social and physiological determinants of emotional state. *Psychological Review*, 69, 379-399.
- Schaefer, A., Nils, F., Sanchez, X., & Philippot, P. (2009). Assessing the effectiveness of a large database of emotion-eliciting films: A new tool for emotion researchers. *Cognition and Emotion*, 1464-0600.
- Schaefer A.; Fletcher, K.; Pottage, C.; Alexander, K. & Brown, C. (2009). The effects of emotional intensity on ERP correlates of recognition memory. *Neuroreport*, 20, 319-324.
- Schwarz, N., & Clore, G.L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45, 513-523.

- Schnall, S., Benton, J., & Harvey, S. (2008). With a clean conscience: Cleanliness reduces the severity of moral judgments. *Psychological Science, 19*, 1219-1222.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality and Social Psychology Bulletin, 34*, 1096-1109.
- Sinclair, R. C., Hoffman, C., Mark, M. M., Martin, L. L., & Pickering, T. L. (1994). Construct accessibility and the misattribution of arousal: Schachter and Singer revised. *Psychological Science, 5*, 15-19.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of personality and social psychology, 48*, 813-838.
- Stein, R. I., & Nemeroff, C. J. (1995). Moral overtones of food: Judgments of others based on what they eat. *Personality and Social Psychology Bulletin, 21*, 480-490.
- Tapias, M. P., Glaser, J., Keltner, D., Vasquez, K., & Wickens, T. (2007). Emotion and prejudice: Specific emotions toward out-groups. *Group Processes and Intergroup Relations, 10*, 27-39.
- Taylor, K. (2007). Disgust is a factor in extreme prejudice. *British Journal of Social Psychology, 46*, 597-617.
- Terrizzi, J. A. Jr., Shook, N. J., & Ventis, W. L. (2010). Disgust: A predictor of social conservatism and prejudicial attitudes toward homosexuals. *Personality and Individual Differences, 49*, 587-592.
- Tetlock, P. E. (1985). Accountability: A social check on the fundamental attribution error. *Social Psychology Quarterly, 48*, 227-236.
- Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing. *Journal of Personality and Social Psychology, 81*, 973-988.
- Tsao, S. D. & McKay, D. (2004). Behavioral avoidance tests and disgust in contamination fears: distinctions from trait anxiety. *Behaviour Research and Therapy, 42*, 207-216.
- Tybur, J.M., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology, 97*, 103-122.
- Uhrich, C. L. (1999). Hate Crime Legislation: A Policy Analysis. *Houston of Law Review, 36*, 1467-1867.

- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.
- Wheatley, T., & Haidt, J. (2005). Hypnotic disgust makes moral judgments more severe. *Psychological Science, 16*, 780-784.
- Williams, M. T., Abramowitz, J. S., & Olatunji, B. O. (2012). The relationship between contamination cognitions, anxiety, and disgust in two ethnic groups. *Journal of Behavior Therapy and Experimental Psychiatry, 43*, 632-637.
- Williams, M. T., & Turkheimer, E. (2007). Identification and explanation of racial differences in contamination anxiety. *Behaviour Research and Therapy, 45*, 3041–3050.
- Williams, M. T., Turkheimer, E., Magee, E., & Guterbock, T. (2008). The effects of race and racial priming on self-report of contamination anxiety. *Personality and Individual Differences, 44*, 746-757.
- Young, L., & Saxe, R. (2009). An fMRI investigation of spontaneous mental state inference for moral judgment. *Journal of Cognitive Neuroscience, 21*, 1396-1340.
- Zhong, C. B., & Liljenquist, K. (2006). Washing away your sins: threatened morality and physical cleansing. *Science, 313*, 1451-1452.
- Zhong, C. B., Strejcek, B., & Sivanathan, N. (2010). A clean self can render harsh moral judgment. *Journal of Experimental Social Psychology, 46*, 859-862.

ⁱ To identify non-purity and purity violations that are moderate in severity, 20 undergraduate participants (67% female, 78% Caucasian) were asked to rate 56 moral transgressions (28 representing impurity, 28 not representing impurity), in terms of immorality, disgust and punishment on an 8-point scale ranging from 0 (not at all morally wrong / disgusting / deserving of punishment) to 7 (extremely morally wrong / disgusting / deserving of punishment). Transgressions in the purity and non-purity category were matched in terms of proportion of violations occurring toward a person (70%) or property (30%), and were all described as intentional (as opposed to accidental). Word count of non-purity transgressions was matched to that of purity transgressions. Purity ($M = 4.60$, $SD = 1.44$) and non-purity violations ($M = 4.63$, $SD = .89$) were rated as equally morally wrong, $F(1, 18) = .02$, *n.s.*, and purity violations ($M = 5.89$, $SD = .86$) were considered significantly more disgusting than non-purity violations ($M = 3.73$, $SD = 1.17$), $F(1, 18) = 56.26$, $p < .001$. Finally, purity violations ($M = 4.11$, $SD = 1.38$) and non-purity violations ($M = 4.01$, $SD = .99$) were considered equally deserving of punishment, $F(1, 18) = .28$, *n.s.*

ⁱⁱ To identify a disgust induction paradigm that elicited disgust with the same intensity as the ice water induction paradigm elicited discomfort, a pilot study was conducted where 15 participants (78% female, 67% Caucasian) placed their left hand, without a glove, in 50-degree ice water, 80-degree lukewarm water, room temperature imitation vomit, room temperature “real” pig intestines and room temperature “fake” pig intestines, and rated disgust and discomfort of each of these textures on a scale from 0 (not at all) to 7 (extremely). Both types of intestines consisted of sausage casing stuffed with a mixture of mashed potatoes, gravy and red dye. They differed from one another only by the color and density of the stuffing, and one was labelled “real” while the other was identified as “fake”. The textures were presented in random order and were rated twice by each participant, to account for order and comparison effects, and to measure habituation that may occur due to repeated exposure. There was a significant rating (disgust, discomfort) X liquid (lukewarm water, ice water, fake intestines, real intestines, imitation vomit) interaction $F(4, 56) = 24.54$, $p < .001$. Follow-up repeated measures ANOVAs demonstrated a main effect of texture for disgust ratings, $F(4, 56) = 112.81$, $p < .001$ as well as discomfort ratings $F(4, 56) = 49.57$, $p < .001$. The primary aim of this pilot study was to identify emotion-induction paradigms that differed in terms of induced disgust, but not in terms of induced discomfort, and that induced disgust with the same intensity as ice water did discomfort. Pairwise comparisons showed that imitation vomit induced significantly more disgust ($M = 5.07$, $SD = 1.29$) than did ice water ($M = .40$, $SD = .54$, $p < .001$), while imitation vomit ($M = 4.47$, $SD = 1.14$) and ice water ($M = 4.57$, $SD = 1.43$, *n.s.*) elicited equal levels of discomfort, indicating the suited nature of these paradigms. In addition, exposure to lukewarm water elicited no disgust ($M = 0.00$, $SD = 0.00$) or discomfort ($M = 0.00$, $SD = 0.00$), motivating the use of lukewarm water in the neutral condition.

ⁱⁱⁱ These emotion induction procedures were selected on the basis of a pilot study designed to identify a cleanliness induction that induced greater levels of cleanliness than a positive affect induction, but similar levels of positivity. Participants ($N = 13$, 62 % female, 77 % Caucasian) evaluated 110-degree soapy water, 90-degree soapy water,

unheated soft fabric, and heated soft fabric in terms of positivity, cleanliness, and intensity on a scale from 0 (not at all positive / clean / intense) to 7 (extremely positive / clean / intense). The textures were presented in random order and were rated twice by each participant. Analysis revealed a significant rating (cleanliness, positivity, intensity) by texture (unheated soft fabric, heated soft fabric, 90-degree soapy water, 110-degree soapy water) interaction, $F(6, 72) = 6.45, p < .001$. Follow-up repeated measure analyses showed no main effect of texture for positivity ratings, $F(3, 36) = 1.98, n.s.$, indicating that participants found 110-degree soapy water ($M = 4.85, SD = 1.46$), 90-degree soapy water ($M = 3.46, SD = 1.27$), unheated soft fabric ($M = 4.23, SD = 2.09$), and heated soft fabric ($M = 3.69, SD = 2.32$) equally positive. The heated soft fabric and 90-degree soapy water were most similar in positivity (Mean difference = .23). Follow-up repeated measure analyses did reveal a significant main effect of texture for cleanliness ratings, $F(3, 36) = 18.95, p < .001$, and pairwise comparisons indicated that participants rated 110-degree soapy water more clean ($M = 5.77, SD = .93$) than 90-degree soapy water ($M = 4.77, SD = 1.09, p = .003$), unheated soft fabric ($M = 3.54, SD = 1.51, p < .001$), and heated soft fabric ($M = 2.46, SD = 1.76, p < .001$). The 90-degree soapy water was rated as significantly cleaner than the heated soft fabric ($p < .001$). Finally, there was no main effect of texture for intensity ratings, $F(3, 36) = 2.13, n.s.$, suggesting that exposure to all four textures was rated as equally intense. Because the (non-significant) difference in positivity was the smallest between heated soft fabric and 90-degree soapy water, and 90-degree soapy water was rated as significantly more clean than heated soft fabric (which, in fact, was rated as least clean texture of all four), 90-degree soapy water was selected for the cleanliness condition and heated soft fabric for the positivity condition.