

Two Kinds of Disgust:
Physical Disgust is to Fear as Moral Disgust is to Anger
by
Madeline C. Lupei

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Advisor: Dr. Phoebe Ellsworth

Abstract

From feces and vomit to racism and incest, the term disgust is used to describe a wide array of offensive situations. This paper explores the existence and profiles of two overlapping but different types of disgust, physical disgust and moral disgust. In three studies, participants read or wrote about situations designed to elicit a feeling of physical disgust or moral disgust, and then completed measures of emotions, subjective feelings, and action tendencies. Results indicated that physical and moral disgust involved different emotional profiles and action tendencies. Physical disgust elicited more fear and avoidance tendency, whereas moral disgust elicited more anger and approach tendency. Moral disgust also had a more complex profile of negative emotions. By showing how physical disgust resembles fear and moral disgust resembles anger, these findings can be used to better understand and predict the effects of different disgusting situations on social judgments and behaviors. (147 words)

Two Kinds of Disgust:

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Imagine you are running through your backyard barefoot and suddenly feel something squishy and warm underneath your toes. You look down, only to find that you have stepped in a pile of dog poop. You likely feel a wave of nausea come over you and a desperate urge to get rid of the thing that disgusted you as your face involuntarily contorts into the expression one makes before throwing up. Now imagine you have just heard a story on the news about a man convicted of raping his daughter since she was twelve years old. While you may describe this as “disgusting,” your emotions and judgment of the situation are probably more complex, with the urge to approach and punish the perpetrator while at the same time maintaining a safe distance.

Disgust has traditionally been described as a feeling of revulsion and rejection in response to offensive stimuli, and it is so commonly experienced that it is considered one of the most basic emotions and its correlated facial expression universally recognized (Rozin, Haidt, & McCauley, 2000; Tybur, Lieberman, & Griskevicius, 2009). While stimuli that pose a physical threat to the body and are physically repulsive (e.g. feces and vomit) and are universally recognized as disgust elicitors, those that threaten social order and personal morals (e.g., rape and cheating) are less universally recognized as disgust elicitors (Bloom, 2004; Nabi, 2002; Royzman & Sabini, 2001). There is much debate centered around whether or not the feeling such situations and behaviors elicit is truly disgust. Some theorists argue that only substances like vomit and feces elicit the emotion disgust, and thus only physical disgust is the true emotion of disgust. Others argue that the feeling brought on by acts of pedophilia and the sight of vomit are the same, and that disgust should be used as an umbrella term to describe the emotion elicited by both types of elicitors.

Our research recognizes evidence from both sides and argues for the existence of two types of disgust, physical and moral, that are similar yet different. We argue that elicitors of the two types of disgust are appraised differently and result in observable differences in subjective feelings and action tendencies. Furthermore, we propose that the features of physical disgust and moral disgust resemble different basic emotions. Specifically, physical disgust resembles fear, and moral disgust resembles anger. A much greater amount of research has been done on anger and fear than on disgust. If anger does resemble moral disgust and fear resembles physical disgust, then we can draw on the known correlates of these emotions to better understand and predict the effects these two types of disgust have on people's behavior and thinking. This paper will explore theorizing and research that suggest the existence of two types of disgust and their resemblance to fear and anger.

The Origin and Evolution of Disgust

Darwin was one of the first to study disgust and he theorized disgust to be a biological adaptation that evolved as a way to protect people from certain infectious or harmful substances like feces, vomit, and rotten meat (Danovitch & Bloom, 2009). While this evolutionary theory of disgust has become the standard view, there is disagreement as to what disgust originally evolved in response to. Some theorists argue that disgust originated as a defense against infection and point to contamination sensitivity of disgust as support for this (e.g., Curtis & Biran, 2001, cited in Rozin et al., 2000). Freud linked the origin of disgust to sex and clumped disgust, shame and morality together as "reaction formations" that evolved to block unconscious urges and libidinal desires, like incest, that are socially unacceptable (Bloom, 2004; D'Amato, 1998; Rozin et al., 2000). One of the most popular arguments is that disgust, which literally means "bad taste", evolved as an oral rejection response to bad food (Bloom, 2004). Supporters of this

theory point to the universally recognized disgust facial expression, which can be seen in newborn babies in response to bitter foods. They argue that the wrinkled nose and the feeling of nausea function as a rejection of unwanted foods and odors in that they discourage entry into the body and encourage discharge (Bloom, 2004; Rozin et al., 2000). A study by Rolls (1994, cited in Rozin et al., 2000) provides neurological support for this. The study found that the anterior insula, the brain region that functions as the gustatory cortex in primates, is also activated in non-food related studies of disgust.

While the origin of what disgust evolved from is debated, it is generally accepted that disgust evolved as a response to protect us from potentially dangerous or unhealthy physical substances, whether it be food rejection or fear of infection, and that this response further evolved to protect the body in general (Rozin et al., 2000). Of continual debate, however, is how far this feeling of disgust can be extended and the types of stimuli accepted as eliciting this disgust. While once used to describe only offensive sensory experiences that directly threaten the physical body (e.g., feces, infection), the use of the term disgust has expanded and is used in conversation to describe immoral behaviors (e.g., racism, incest, cheating) that do not directly threaten the body but rather threaten the social order (Danovitch & Bloom, 2009) or, as some theorists called it, “the soul” (Rozin, Haidt, & McCauley, 1999, p. 429). There is much disagreement as to whether or not such behaviors, which fall into the sociomoral domain rather than the physical domain, should be considered elicitors of the emotion disgust (Pizarro, Inbar, & Helion, in press).

Moral Disgust: Metaphoric and Not Real Disgust

One theory is that the use of the word disgust to describe immoral behavior is only a metaphorical extension of the term, and that behaviors in this domain do not elicit the same

emotion that physical stimuli do. Supporters of this theory argue that the use of this word is simply a quirk of the English Language, with disgust used to demonstrate one's extreme disapproval (e.g., Nabi, 2002; Royzman & Sabini, 2001). Under this argument, to say a politician makes us nauseous is the same as saying we have a thirst for knowledge; in both cases we do not actually mean people to take the literal meaning, but rather use the analogy to demonstrate our extreme feeling (Miller, 1997, cited in Danovitch & Bloom, 2009).

Moral Disgust: More than Metaphoric

Other theorists, however, argue that the use of the word disgust to describe moral violations is more than just a metaphorical extension or quirk of the English language. For one thing, the use of disgust to describe rapists and murderers is not limited to the English language but rather extends to numerous other cultures and languages (Danovitch & Bloom, 2009). Furthermore, Danovitch and Bloom (2009) found that children as young as kindergarten who read scenarios about physical behaviors and moral violations not only judged the scenarios they read about immoral actions as disgusting but also indicated that a picture of a face with a disgusted facial expression, not just the word disgust, fit the scenario. Sherman, Haidt, and Coan (2007, cited in Rozin et al., 2000) exposed participants to a video about American neo-Nazis and found that not only did the video elicit very high ratings of disgust, but also participants' physiological reaction, decreased heart rate, was that expected of a response to disgust. Similarly, Chapman, Kim, Susskind and Anderson (2009) found the same oral-nasal rejection facial expression in response to both physical contamination and moral violations. The similarity in physiological responses and facial expressions elicited by physical stimuli and immoral behavior suggests the use of disgust to describe moral violations is not simply a metaphorical

extension but rather a real, concrete extension of disgust to include more than just physical disgust elicitors.

Moll et al. (2005) recognize the use of disgust to describe immoral behavior as more than just a metaphorical extension. They recognize the existence of this moral disgust, but argue that rather than being included in the definition of disgust, which they reserve for offensive sensory experiences, it should be considered a moral emotion affiliated with disgust, but not a part of it. Thus, they labeled this type of disgust *indignation*, which gives disgust its moral connotation, and argued that “pure” disgust (i.e., physical disgust) is devoid of this (Moll et al., 2005, cited in Lee & Ellsworth, in press). Moll et al. (2005) used written statements to test whether the experience of “pure” disgust can be subjectively and behaviorally differentiated from the experience of indignation. They found that “pure” disgust could be evoked with or without indignation and that “pure” disgust and indignation activated both overlapping and distinct brain regions. This research provides neurological evidence that while moral disgust is indeed something more than just a metaphorical extension of physical disgust, it is also something different.

Moral Disgust: An Extension of Physical Disgust

Some theorists argue that disgust has evolved and moved from a defense that protects the physical body to a more abstract defense that protects the soul and social order. What once started as a defense against food, body products and animals, they argue, has developed into a defense against “social parasites” that violate certain moral offenses and threaten social order (Bloom, 2004; Curtis & Biran, 2001, cited in Lee & Ellsworth, in press; Rozin et al., 2000). This more abstract defense that disgust has arguably developed into is commonly referred to as moral disgust, and there is ongoing debate as to whether or not it should be included in the term

disgust. Given the evidence that moral disgust and physical disgust can elicit similar facial expressions, physiological responses, and brain activity, some theorists argue they are the same emotion and disgust should be used as an umbrella term to describe both physical and moral disgust. Other theorists, however, point to the differences in elicitors and brain activity and rather argue that the two are not the same.

Moral Disgust: A Different Kind of Disgust

Rozin and his colleagues proposed a four-factor taxonomy of disgust that classified disgust elicitors into four categories: core disgust, animal-nature disgust, interpersonal disgust, and moral disgust (Rozin et al., 2000). Other scientists have argued for the existence of two broad clusters of disgust: primary, core disgust and complex, sociomoral disgust. In general, core disgust can be thought of as the original disgust that evolved to protect the physical body, with complex, sociomoral disgust an extension of this original disgust whose protective purpose expanded through cultural development (Curtis & Biran, 2001, cited in Rozin et al., 2000; Marzillier & Davey, 2004).

More specifically, core disgust has been defined as an oral defense that functions to protect the body from disease or infection through its rejection of foods presumed to be distasteful or dangerous and avoidance of things that can easily contaminate food (e.g., animals and body products) (Rozin et al., 2000). Three criteria they argue to be required of an appraisal that elicits this core disgust include: a sense of oral incorporation, a sense of offensiveness, and contamination potency (Angyal, 1941, Rozin & Fallon, 1987, cited in Rozin et al., 2000).

Moral disgust elicitors share the same properties of offensiveness and contamination potency with core disgust elicitors (Rozin et al., 2000). Rozin, Markwith, and McCauley (1994, cited in Rozin et al. 2000) found that indirect contact with moral offenders (e.g., murderer)

evoked a similar negative feeling as contact with an individual who has a seriously contagious disease.

However, unlike core disgust elicitors, which are generally universal (e.g., eating feces or vomit is disgusting), moral disgust elicitors tend to have more cultural variation (e.g., premarital sex, a two-year-old breastfeeding, prostitution) (Rozin et al., 2000). Furthermore, elicitors of moral disgust often do not involve the body at all and rather tend to be behaviors that violate accepted moral or social values and threaten well being and social order (e.g., cruelty, discrimination, hypocrisy) (Marzillier & Davey, 2004; Moll et al., 2005).

This two-cluster theory of disgust is the basis for our research, with core disgust referring to what we call physical disgust, and complex disgust referring to what we call moral disgust. Like this theory, we include moral disgust as an emotion that shares properties with physical disgust but also has unique properties of its own that arguably make it an emotion separate from physical disgust.

Beyond Disgust Elicitors: Moral Disgust vs. Physical Disgust

While there is a lot of evidence and knowledge about the difference in elicitors that evoke moral disgust versus physical disgust, less is known about the appraisal, and in turn consequences, of these elicitors. Appraisal theory is the idea that how someone appraises a situation determines his or her emotional reaction (Scherer, 1984). From an appraisal theory viewpoint, if different situations involve different appraisals, then the experiences will also differ (Lee & Ellsworth, in press). In theory then, if physical disgust elicitors (e.g., dog poop) and moral disgust elicitors (e.g., incest) involve different appraisals, then their consequences should also be different at a behavioral, subjective, and motivational level.

At a behavioral level, it is fairly obvious that one's response to feces would vary greatly from one's response to news of an incestuous rape. If you saw feces on the ground, your automatic response would be one of avoidance, as this poses a physical threat. News of rape, on the other hand, would likely ignite a more complex response with the desire to punish the perpetrator while at the same time maintaining a safe distance. Research by Moll et al. (2005) found this to be the case, in that while both physical disgust and moral disgust involve a motivation to avoid or remove the disgust elicitor, moral disgust motivation extends to a desire to approach and harm or destroy the disgust elicitor. Moral disgust, unlike physical disgust, requires the presence of an agent who violates norms or personal standards. The fact that the threat is controlled by human agency, rather than chance or something non-human, presents an opportunity to restore normality by punishing or destroying the perpetrator (Lee & Ellsworth, in press). Such actions that focus on the perpetrator can also be seen as an attempt to stop the behavior from happening again. The desire to restore social order is also a motivation behind this approach orientation of moral disgust, and actions that target the victim (e.g. help the victim) aim to do this by bringing the victim back to their original place in society (Haidt & Kesebir, 2010).

The existence of human agency in moral disgust situations means that someone is blameworthy. Thus in morally disgusting situations, people are seen as the threat, with consequences of ostracism and punishment a possibility. The need to prove one's disgust with the perpetrator as means to show that one recognizes a threat to the social order is often experienced as a result (Lee & Ellsworth, in press). Exaggerating the expression of one's disapproval provides an opportunity to prove one's own morality and compliance with social norms, and Lee and Ellsworth (in press) found that people were more motivated to exaggerate

their expression of disapproval when reading about instances of immoral behavior like racism or stealing compared to physically offensive substances.

The appraisals involved in moral disgust and physical disgust also differ in complexity. Recognition of physical disgust stimuli is more automatic and universal; the appraisal involved is more straightforward and generic (Lee & Ellsworth, in press; Rozin, et al., 2000). Situations that elicit moral disgust, on the other hand, are more socially complex and involve more complex appraisals. There is a wider range of moral disgust elicitors (e.g., sex to dishonesty to murder), which involve violation of social or personal norms that vary by culture (Rozin et al., 2000). In addition to the variety of elicitors, moral disgust also requires appraisal of various aspects (e.g., victim and perpetrator), altogether making the appraisal involved in moral disgust more complex (Lee & Ellsworth, in press).

The emotions people experience in congruence with moral disgust and physical disgust also differ. Research by Marzillier and Davey (2004) found that while physical disgust evoked a fear of oral incorporation, only moral disgust elicitors evoked increased levels of a broad range of negative emotions, including sadness, contempt, fear and anger. Sadness, fear and anger are generally experienced separately from one another and are elicited by very different situations. The fact that all of these emotions are experienced simultaneously and are elicited by the same situation suggests moral disgust does indeed have a complex emotional profile. From an appraisal theory viewpoint this makes logical sense, in that more complex appraisal would result in a more complex emotional profile. From this point of view, the specific features of the situation would elicit different emotional reactions. That is, focus on the victim would likely elicit a sympathetic emotional reaction, while focus on the perpetrator would likely elicit an emotional reaction characterized by anger. The judgment of immoral behaviors is much more

value-laden, and given the diversity in elicitors and complexity of appraisal, it is no wonder the emotional profile of moral disgust is more complex than, and different from, physical disgust (Lee & Ellsworth, in press).

If physical disgust and moral disgust have different consequences and emotional profiles, may these distinct consequences in turn shed light on the nature of physical and moral disgust in relation to other emotions?

Physical Disgust is to Fear As Moral Disgust is to Anger

Physical disgust originated as a defense of the physical body, to protect it from things like vomit and feces, which pose threat of contamination (Rozin et al., 2000). This threat of contamination, whether it is disease, physical illness, or uncleanness, would automatically evoke a sense of fear. While moral disgust can evoke a sense of fear, the presence of a blameworthy perpetrator means not only that the threat can be diminished via punishment, but also anger is a likely automatic response to a person behaving wrongfully (Kuppens, Mechelen, Smits, De Boeck, 2003; Lee & Ellsworth, in press). Lee and Ellsworth (in press) explored this association of physical disgust with fear and moral disgust with anger and provide preliminary evidence for each association.

At a behavioral level, physical disgust resembles fear. Physical disgust is considered by many a behavioral mechanism to avoid contamination or disease, and this avoidance orientation is characteristic of fear as well (Lee & Ellsworth, in press; Ohman, 2000). In both cases the motivation to protect the body is the driving force for this avoidance orientation, and its presence in situations ranging from the sight of dog poop to unsafe neighborhoods or dark alleys makes behavioral sense.

At a behavioral level, moral disgust and anger also resemble each other. The approach and punish action tendency of moral disgust is characteristic of anger as well (Lee & Ellsworth, in press; Mechelen et al., 2003). The motivation to exaggerate the expression of moral disgust was also found in anger, as in both cases people wish to communicate their disapproval. This motivation to exaggerate expression was absent in both fear and physical disgust situations, in which avoiding contact is of main concern (Lee & Ellsworth, in press).

In terms of appraisal, human agency was seen as playing a greater role in anger and moral disgust events, compared to physical disgust, in which situational forces and chance were seen as playing a greater role (Lee & Ellsworth, in press). Value-laden appraisals of violation of social norms, personal values, and unjust treatment were consequences of both anger and moral disgust elicitors, but absent in fear and physical disgust elicitors which do not require value judgments but rather involve an automatic response to protect the self (Lee & Ellsworth, in press). Overall, these results provide evidence that anger and moral disgust are appraised in a similar manner and fear and physical disgust are appraised in a similar manner.

Thus far, we have explored evidence for the existence of two different types of disgust and the distinct features that differentiate physical disgust from moral disgust (appraisal, action tendency, emotional profile, subjective feeling). We have also explored preliminary evidence from Lee and Ellsworth (in press) that features of physical disgust overlap with fear and features of moral disgust overlap with anger. However, the current correlational evidence for physical disgust-fear and moral disgust-anger association is indirect, and direct evidence is needed.

The Present Research

This present research was designed to expand on preliminary research that explored similarities and differences between physical disgust, fear, moral disgust, and anger. This

research explores features that make physical disgust distinct from moral disgust, features of physical disgust that overlap with fear, and features of moral disgust that overlap with anger. Study 1 explores the emotional correlates of physical disgust, moral disgust, fear and anger. Study 2 investigates the effects personal experiences of physical disgust and moral disgust have on emotions, action tendencies, and social judgment. Study 3 is an expansion of Study 2 and explores the effects that physical disgust, fear, moral disgust, anger, and sadness have on feelings, emotions and action tendencies. Overall, it is expected that physical disgust differs from moral disgust, physical disgust is similar to fear, and moral disgust is similar to anger.

Study 1

Study 1 investigated the emotional reactions to situations that elicited physical disgust, moral disgust, fear, and anger by asking participants to rate situations on nine different emotions. Correlational analyses explored whether the emotional profiles of physically and morally disgusting situations differed, and whether physically disgusting situations tended to elicit fear and morally disgusting situations tended to elicit anger.

Method

Participants. Eighty-two University of Michigan undergraduate students (48 men, 34 women) enrolled in an introductory psychology course participated in the study for course credit.

Materials and procedure. Participants read a series of 42 situations that were constructed to elicit physical disgust, moral disgust, or both. Participants then rated how intensely they would feel nine emotions (fear, anger, disgust, shame, amusement, pity, contempt, anxiety and hate) in each situation. They rated how intensely they would feel each emotion on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*) for every situation.

Participants then completed a demographics section, in which they provided information about their age, gender, ethnicity, ethnic language, educational level, political orientation, religion, and sexual orientation.

Lastly, participants received a debriefing form that explained the purpose of the study.

Results

To explore the distributions of all situations along the dimensions of fear and anger, we examined the scatter plot (see Figure 1). Eyeballing suggested that using 3.15 as the cutoff rating for high versus low fear and 3.60 as the cutoff rating for high versus low anger would categorize situations into four quadrants (i.e., high fear/high anger, high fear/low anger, low fear/high anger, low fear/low anger). Within each quadrant, we analyzed the within-item, between-subjects correlations to see whether disgust ratings correlated more closely with fear ratings than anger ratings for physically disgusting situations, but more closely with anger ratings than fear ratings for morally disgusting situations. All correlation coefficients included below were significant at $p < .05$ unless otherwise specified.

All situations classified as high anger, low fear were those written to elicit moral disgust (see Table 1, first panel). Within-item, between-subjects analysis of the high-disgust situations in this category reveals higher anger-disgust correlation on average ($r = .55$) than fear-disgust correlation ($r = .23$), suggesting that participants' disgust experience was more closely associated with anger than with fear. Not surprisingly, we also found within-item, between-subjects correlations of disgust with hate ($r = .43$).

All situations classified as low anger, high fear were those written to elicit physical disgust (see Table 1, second panel). Within-item, between-subjects analysis of the high-disgust situations in this category reveals higher fear-disgust correlation on average ($r = .52$) than anger-

disgust correlation ($r = .40$), suggesting that participants' disgust experience was more closely associated with fear than with anger. Not surprisingly, we also found within-item, between-subjects correlations of disgust with anxiety ($r = .46$).

Situations classified as high fear, high anger include one situation written to elicit moral disgust (see Table 1, third panel) and one situation written to elicit physical disgust (see Table 1, fourth panel). Within-item, between-subjects analysis of the high-disgust moral disgust situation reveals higher anger-disgust correlation on average ($r = .56$) than fear-disgust ($r = .03$, *n.s.*), suggesting that participants' disgust experience was more closely associated with anger than fear. We also found within-item, between-subject correlations of disgust with hate ($r = .49$). Within-item, between-subjects analysis of the high-disgust physical disgust situation reveals comparable fear-disgust correlation ($r = .26$) and anger-disgust correlation ($r = .23$). We also found within-item, between-subject correlations of disgust with anxiety ($r = .29$).

Situations classified as low fear, low anger also include those written to elicit moral disgust (see Table 1, fifth panel) and physical disgust (see Table 1, sixth panel). Within-item, between-subjects analysis of the high-disgust moral disgust situations reveals higher anger-disgust correlation on average ($r = .47$) than fear-disgust ($r = .37$), suggesting that participants' disgust experience was more closely associated with anger than fear. We also found within-item, between-subject correlations of disgust with hate ($r = .32$). Surprisingly, within-item, between-subjects analysis of the high-disgust physical disgust situations also reveals higher anger-disgust correlation on average ($r = .42$) than fear-disgust ($r = .32$), suggesting that when there was little fear or anger, participants' disgust experience in general might be more closely associated with anger than fear.

Finally, between-item analysis of emotional profiles reveals high correlations for fear-anxiety ($r = .87$), anger-shame ($r = .45$), anger-contempt ($r = .95$), and anger-hate ($r = .96$), suggesting that the situations in general elicited expected emotions.

Discussion

Within-item, between-subjects analysis of the 42 situations revealed a higher fear-disgust correlation for physically disgusting situations and a higher anger-disgust correlation for morally disgusting situations. Analysis also revealed a stronger anxiety-disgust correlation in physically disgusting situations and a stronger hate-disgust correlation in morally disgusting situations. These correlations suggest an association between fear with physical disgust and anger with moral disgust and provide support for our hypothesis that physical disgust elicits fear while moral disgust elicits anger. Furthermore, the correlations between fear-anxiety, anger-contempt, anger-hate, and anger-shame show that participants are responding in way we would expect. That is, we would expect that feelings of contempt, hate, and shame would be more prevalent in situations that elicit anger, and that anxiety would accompany fear.

The finding that the only items in which disgust did not correlate with anger were those written to elicit physical disgust (e.g., bugs in bed, exposed intestines, touching a dead body, maggots) provides further support that moral disgust is distinct from physical disgust and that moral disgust (rather than disgust in general) elicits anger.

A deeper analysis of the content of the situations reveals specific features that are associated with eliciting anger and also provides evidence for features of moral disgust and anger that overlap. Whenever an agent is, could be, or could have been involved, anger correlates with disgust (e.g., doctor fondles patient's breasts, racist banker, romantic partner cheating). Human agency means that someone is responsible and blameworthy for the feeling of disgust. Human

agency is a key feature in both moral disgust and anger and without it anger serves no functional purpose (Kuppens, Mechelen, Smits, & De Boeck, 2003; Lee & Ellsworth, 2009; Scherer & Ellsworth 2003).

Subjects are less angry when a situation lacks personal responsibility or intentionality (e.g., retarded patient strangles chicken to death, person next to me vomits), crosses cultural boundaries (e.g., Chinese chef kills and gouges out snake gall bladder), or causes no obvious direct harm (e.g., neighbor changes underwear only once a week, someone clears a throat full of mucous). It could be that in these situations factors out of the elicitors control are included in the appraisal. This would make the human seem less blameworthy and in turn make a reaction of anger less warranted. These findings are consistent with other studies that have found that appraisal of agency is a key characteristic of both anger and moral disgust (Kuppens et al., 2003; Lee & Ellsworth, 2009).

Study 2

To go beyond hypothetical situations and ratings on emotion terms, this study examines the action tendencies and emotions in personal experience of physical disgust and moral disgust (between-subjects). We also explored the consequences of physical disgust and moral disgust for social judgments (risk perception & risk-seeking choice).

Method

Participants. One hundred and eighty-six University of Michigan undergraduate students (81 men, 104 women, 1 unspecified gender) enrolled in an introductory psychology course participated in the experiment for course credit and were randomly assigned to two between-participants conditions (physical disgust vs. moral disgust).

Materials and procedure. Participants were prompted to write about a time they felt disgusted for physical reasons or for moral reasons, depending on the condition. Participants were asked to include details such as what they were feeling and thinking, what they did and said, what they felt like doing, and what other emotions they felt.

Immediately after the emotion induction, participants in both conditions completed a risk-seeking task. Participants read a scenario (Tversky & Kahneman, 1981) about the outbreak of an unusual disease expected to kill 6000 people in the United States and then read about two proposed alternative programs to combat the disease, one of which was risk-seeking (Program A) and the other was risk-averse (Program B), and rated which program they favored on a scale from 1 (*very much favor Program A*) to 6 (*very much favor Program B*).

Participants then completed the risk perception task (Lee & Schwarz, 2010). They rated the likelihood that a series of favorable and unfavorable events would happen to them at some point in their lives (e.g., I die from crime or accident, my achievements are written up in a newspaper; see Appendix A) on an 11-point scale. The scale ranged from 0% (*the event is impossible*) to 100% (*the event is certain to happen*).

Following this task, participants re-read the event they described (so as to re-induce the feeling of physical or moral disgust) and then rated their action tendencies, i.e., what they felt like doing at the time of the event (e.g., I felt like sharing my feelings, I felt like escaping from the situation; see Appendix B) on a 9-point scale from 0 (*not true at all*) to 8 (*very true*) (Ellsworth & Scherer, 2003, adapted from Frijda, Kuipers, & ter Schure, 1989; Frijda, 2006).

Participants were then asked how intensely they felt nine emotions (e.g., fear, anger, disgust, shame, amusement, pity, contempt, anxiety, hate) and what the main emotion they felt

during the disgusting event was. They rated how intensely they felt each emotion on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*).

Participants then completed a demographics section, in which they provided information about their age, gender, ethnicity, ethnic language, educational level, political orientation, religion, and sexual orientation.

Lastly, participants received a debriefing form that explained the purpose of the study.

Results

A factorial ANOVA with two between-subjects conditions (physical vs. moral disgust) was used to analyze the effect physical disgust versus moral disgust had on emotions, action tendencies and social judgments (risk perception and risk-seeking choice).

Emotions. Participants in the moral disgust condition reported significantly higher feelings for the following emotions compared to participants in the physical disgust condition: anger ($F(1, 184) = 31.07, p < .001$), pity ($F(1, 184) = 4.54, p < .04$), contempt ($F(1, 182) = 12.29, p < .001$), and hate ($F(1, 183) = 19.66, p < .001$). These results are consistent with findings in Study 1 for a higher anger-disgust and hate-disgust correlation in moral disgust situations compared to physical disgust situations. There was no significant difference between the two groups' rating of disgust ($F(1, 184) = .67, p = .42$), suggesting that the intensity of disgust experienced is not a confounding factor.

Action tendencies. Participants in the moral disgust condition reported significantly higher desire to take the following actions compared to participants in the physical disgust condition: help someone, hurt someone (by yelling, hitting or criticizing), punish someone, boil inwardly (all $F_s(1, 184) > 6.61$, all $p_s < .01$) and understand what happened ($F(1, 183) = 8.01, p < .01$). Participants in the physical disgust condition reported significantly higher desire to

leave, withdraw, or get away from the situation ($F(1, 184) = 4.99, p = .03$). This suggests that moral disgust elicits an approach and punish orientation while physical disgust elicits an avoidance orientation.

Social Judgment. The factorial ANOVA does not provide evidence for a significant main effect of physical vs. moral disgust condition on risk perception and risk taking. Exploratory analyses, however, revealed surprising patterns. Submitting risk perception and risk taking measures to a 2 (condition: physical vs. moral disgust) x 2 (political orientation: conservative vs. liberal) ANOVA, we found a consistent pattern of interaction effects. For participants in the moral disgust condition, political orientation has no effect on risk perception or risk taking. For participants in the physical disgust condition, however, there is a significant effect on risk perception and risk taking. Compared to conservatives, liberals perceive more risks ($F(1, 137) = 5.70, p < .02$) (see Figure 1) and are willing to take more risks in the physical disgust condition ($F(1, 135) = 4.29, p = .04$) (see Figure 2).

Discussion

The factorial ANOVA (physical disgust x moral disgust) revealed significant differences in action tendencies and emotions elicited by personal experiences with moral disgust and physical disgust that support our hypothesis.

Morally disgusted participants reported more intense experiences of several negative emotions than physically disgusted participants did. From an appraisal theory point of view, emotional reactions are the result of appraisals (Scherer, 1984). Unlike physical disgust, moral disgust includes both a victim and a perpetrator. Morally disgusted participants' more intense experiences of pity, anger, contempt and hate suggest that the appraisal involved in moral disgust is complex and can involve not only an evaluation of the perpetrator (which would elicit anger)

but also the victim (which would elicit pity). This is consistent with other self-report measures of emotions that have consistently found that moral disgust has a more complex emotional profile and involves more complex appraisal compared to physical disgust (Lee & Ellsworth, in press; Marzillier & Davey, 2004).

The specific emotions that morally disgusted participants experienced more intensely than physically disgusted participants did in both Study 1 (hate and anger) and Study 2 (anger, contempt, hate) provide support for a moral disgust-anger association. This association is further supported by Study 1 findings of strong anger-hate and anger-contempt correlations.

In terms of action tendencies, the main difference found in Study 2 was that morally disgusted participants' responses were characterized by an approach and punish orientation while physically disgusted participants' responses were characterized by an avoidance orientation. This is consistent with other self-report measures of physical disgust and moral disgust action tendencies (Lee & Ellsworth, 2009; Moll et al., 2005). This approach and punish orientation has also been found to be characteristic of anger. In both cases the presence of a blameworthy agent gives this approach and punish orientation functional sense (Kuppens et al., 2003). Morally disgusted participants reported stronger desires to hurt and yell at someone, punish someone, and the feeling of "boiling inwardly," providing support for a resemblance between moral disgust and anger. Similarly, the avoidance orientation of physical disgust is also characteristic of action tendencies elicited by fear (Ohman, 2000). Physically disgusted participants higher reported desire to escape from and leave the situation provides support for physical disgusts' resemblance to fear.

Morally disgusted participants' desires to understand what happened and to help someone show that moral disgust goes beyond a simple desire to punish. Specifically, these actions

provide support that the approach orientation of moral disgust is more generally motivated by a desire to restore normality. The presence of a human agent in moral disgust means the situation is controllable and thus normality can be restored. In order for normality to be restored, however, an understanding of the situation is required so that proper and effective action can be taken. This finding that morally disgusted participants' report a higher desire to understand what happened is consistent with other research that has found moral disgust, and specifically the presence of human agency, to be associated with a desire to restore normality (Lee & Ellsworth, in press). The desire to help someone is also indicative of this, in that by helping the victim one is trying to undo the damage caused by the perpetrator, and as a result restoring things back to the way they were.

We found surprising interaction effects between physical-moral disgust and political orientation on risk perception and risk taking.. Based on results from this study that support physical disgust's resemblance to fear and moral disgust's resemblance to anger in terms of emotional experience and action tendency, we would expect social judgment of conservatives and liberals alike to follow this same pattern. The typical relationship between risk perception and risk taking is one in which people who perceive the world as more risky are less willing to take risks and people who perceive the world as less risky are more willing to take risks (Lerner & Keltner, 2001; Lerner, Gonzalez, Small & Fischhoff, 2003). In this case, we would expect physical disgust to elicit the fear effect and moral disgust to elicit the anger effect. The finding that when liberals feel physically disgusted they perceive more risk and are more willing to take risks contradicts this pattern in an unexpected way. The cognitive underpinnings of sociopolitical ideologies may shed light on this pattern of results. Liberals are more willing to admit and accept uncertainty compared to conservatives who are motivated by needs to manage

uncertainty and threat (Jost, Glaser, Kruglanski & Sulloway, 2003). Compared to moral disgust, which involves complex appraisal, physical disgust is more straightforward. Perhaps then, physical disgust elicits participants' natural instincts. For conservatives, who are less tolerant of uncertainty, this would elicit their natural motivation to manage uncertainty by not acknowledging its existence. In this condition, even if conservatives perceived the same amount of risk as liberals, their need to control uncertainty and risk might cause them to unconsciously underreport risk perception as means to falsely manage uncertainty. For liberals, who have a higher acceptance of uncertainty, this would elicit their natural willingness to acknowledge and admit perception of risk.

Liberals' natural tendency to accept uncertainty also explains their higher reported willingness to seek risks. Taking risks means putting oneself in a situation where the outcome is unknown. From an appraisal theory viewpoint, if uncertainty is perceived in a more negative way, as is the case for conservatives, then the emotional reaction will be more negative (e.g., fear). Conservatives are motivated to manage threat and uncertainty, and not taking risks is one way to do this. Under the appraisal theory viewpoint, liberals, who are more tolerant of uncertainty, would thus appraise risks more positively and as a result be more willing to engage in such uncertain, risky behaviors.

Study 3

To go beyond hypothetical comparisons of physical disgust to fear and moral disgust to anger, this study explores the similarities and differences in consequences of physical disgust, moral disgust, fear, and anger in terms of action tendencies and emotions they had actually experienced in their own lives. It also provides separate measures of physical disgust and moral disgust, rather than only general disgust.

Method

Participants. One hundred and twelve people (42 men, 70 women) completed an online survey for monetary compensation of \$1 on Amazon Mechanical Turk. Participants were told that the study was about people's life experiences and their perceptions of social life. Participants were randomly assigned to five emotion-induction conditions (physical disgust vs. moral disgust vs. sadness vs. anger vs. fear).

Materials and procedure. First, participants were instructed to read 2 short stories and indicate which of the two stories is closer to something they had experienced. They were then asked to write briefly about a similar experience they have had. The stories that participants read and wrote about were different for each condition (e.g., physical disgust condition would read about dog poop or mold, moral disgust would read about rape, sadness would read about a family member dying; see Appendix C). This was an emotion induction task designed to induce the emotion corresponding to the participant's assigned condition.

Immediately after the emotion induction, participants were asked how intensely they experienced each of 22 emotions and feelings (e.g., weak, contemptuous, powerful, nauseous; see Appendix D). They rated how intensely they felt each item on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*).

Following this task, participants completed another emotion induction task in which they read about 2 new stories and wrote about a similar personal experience. Participants then rated their action tendencies, i.e., what they currently felt like doing at that moment. Participants rated how much they felt like doing each item on a 9-point scale from 0 (*not true at all*) to 8 (*very true*). Items were similar to those used in Study 2 (e.g., I feel like swearing, I feel like waiting

and doing nothing; see Appendix E) (Ellsworth & Scherer, 2003, adapted from Frijda, Kuipers, & ter Schure, 1989; Frijda, 2006).

Participants then completed a demographics section, in which they provided information about their age, gender, ethnicity, ethnic language, educational level, political orientation, religion, and sexual orientation.

Lastly, participants received a debriefing form that explained the purpose of the study.

Results

Planned contrasts were used to compare the effects of the five emotion conditions (physical disgust, moral disgust, fear, anger, sadness) on reported emotions and action tendencies. The results support the hypothesis that moral disgust resembles anger and differs from physical disgust and fear.

Participants in the physical disgust and moral disgust condition reported significantly higher feelings for nausea and feeling grossed out compared to participants in fear, anger, and sadness conditions (all $t_s(107) > 3.75$, all $p_s < .001$). This suggests that these two conditions are indeed eliciting disgust. Participants in both physical and moral disgust conditions did actually feel disgusted, and significantly more so than participants in the other three conditions, as was expected.

Participants in the moral disgust condition reported significantly higher levels of the following emotions than participants in the fear and physical disgust conditions: sad, weak, anger, contemptuous, moral disgust (all $t_s(107) > 2.38$, all $p_s < .03$) and hate ($t(106) = 3.503$, $p < .001$). This suggests moral disgust elicits more complex, negative emotional responses. The high rating of moral disgust provides evidence that participants in the moral disgust condition are experiencing moral disgust distinctively from general disgust.

In terms of action tendencies, participants in the moral disgust condition reported significantly higher desire to take the following actions than participants in the fear and physical disgust conditions: helping someone, swearing, punishing someone (all $t_s(107) = 1.99$, all $p_s < .05$). This not only suggests moral disgust elicits an approach and punish orientation, but also the variety of action tendencies (e.g., help someone) provides support for moral disgusts complex appraisal.

Discussion

Study 3 was the first of the studies to measure whether a feeling of disgust was elicited by other emotions besides physical and moral disgust. The finding that moral and physical disgust elicit a significantly higher feeling of disgust compared to sadness, fear, and anger provides evidence that participants are experiencing disgust when they should be (i.e., in situations intended to elicit disgust). Participants' significantly higher rating of moral disgust in the moral disgust condition provides support for moral disgust's existence as an emotion separate from general disgust.

In terms of emotions, morally disgusted participants responded more intensely across negative emotions compared to physically disgusted and fearful participants. The higher ratings of hate, anger and contempt are consistent with the responses moral disgust elicited in both Study 1 (hate and anger) and Study 2 (anger, contempt, hate) and thus provide further support for our hypothesis that moral disgust resembles anger.

Morally disgusted participants' more intense experiences of sadness and weakness provide further evidence of moral disgust's complex emotional profile. While Study 1 and Study 2 have shown morally disgusted participants experienced negative emotions more intensely, these emotions are largely associated with anger (e.g., contempt, hate, anger). Sadness and

weakness are generally experienced separately from anger, hate, and contempt, making the elicitation of this variety of emotions uniquely complex. This finding is consistent with other self-report measures of emotions that have found moral disgust to have a complex emotional profile and provides further evidence that the victim is included in the appraisal of morally disgusting situations (Marzillier & Davey, 2004).

In terms of action tendencies, morally disgusted participants' responses were characterized by an approach and punish orientation (e.g., desire to swear at someone, desire to punish someone) and provide support for our hypothesis that moral disgust resembles anger. These findings mimic those of Study 2 and are consistent with other self-report measures, which have found this approach and punish orientation to be characteristic of both anger and moral disgust action tendencies (Kuppens, et al., 2003; Lee & Ellsworth, in press; Moll et al., 2005). Morally disgusted participants' strong desire to help someone is consistent with findings from Study 2 and provides further evidence that the approach orientation extends beyond punishing the perpetrator and includes helping the victim as means to restore normality.

In both study 2 and study 3, morally disgusted participants experienced significantly more sadness, weakness and pity, and had a stronger desire to help someone than physically disgusted participants did. This pattern suggests that moral disgust elicits sympathetic emotions and action tendencies, presumably when people are focusing on the victim. This further supports moral disgust's complexity not only in terms of appraisal but also, consequently, in terms of the emotions and action tendencies that are elicited.

General Discussion

The studies reported in the present paper used self-report measures to explore the similarities and differences between physical disgust, moral disgust, fear, and anger in terms of

action tendencies, emotions and social judgment. In general, we expected that moral disgust would differ from physical disgust, moral disgust would resemble anger and physical disgust would resemble fear. Study 1 was a correlational study in which participants read a series of situations that were written to elicit physical disgust, moral disgust, fear, or anger. Results support our hypothesis, in that items written to elicit moral disgust showed a higher anger-disgust correlation compared to items written to elicit physical disgust, which showed a higher fear-disgust correlation. Study 2 was an experiment designed to compare the direct impact that personal experiences of physical disgust and moral disgust have on emotions, action tendencies, and social judgment. Results from this study showed a significant difference in terms of the emotions and action tendencies, and provide further support for a moral disgust-anger and physical-disgust fear association. In Study 3 participants wrote about personal experiences and read about situations to elicit moral disgust, physical disgust, fear, anger, or sadness (control). The purpose of this experiment was to gain a better understanding of how physical disgust and moral disgust are experienced. This was the first of our studies that actually measured whether moral disgust was experienced distinct from physical disgust (i.e., the past studies only measured general disgust), and results showed this to be the case. Furthermore, the emotions and action tendencies elicited by moral disgust provide support for moral disgust's resemblance to anger.

Two Types of Disgust: Moral Disgust vs. Physical Disgust

Moral disgust is more complex than physical disgust in terms of appraisal and emotional profile. In all three studies, moral disgust elicited a greater variety of negative emotions than physical disgust. Specifically, morally disgusted participants reported significantly higher responses to hate, anger, contempt, weakness, sadness and pity. These results are consistent with

other self-report measures that have found moral disgust to have a more complex emotional profile (e.g., Lee & Ellsworth, in press; Marzillier & Davey, 2004).

From an appraisal theory point of view, the complex emotional profile of moral disgust suggests that the appraisal involved in moral disgust is much more complex, and thus different from, that involved in physical disgust. One specific way in which appraisal of physical disgust and moral disgust differ is in terms of human agency. The appraisal of human agency has been found to be a key feature in situations that elicit moral disgust. The presence of a human agent not only means that someone is blameworthy, but it also means that the situation is controllable and normality can be restored (Lee & Ellsworth, in press). Researchers have posed this desire to restore normality as the motivation behind the approach and punish orientation that characterizes moral disgust action tendencies (Lee & Ellsworth, in press). Results from Study 2 and Study 3 provide support for this, in that all of the moral disgust action tendencies are characterized by an approach and punish orientation (e.g., punish someone, hurt someone) and desire to restore normality (e.g., understand the situation, help someone). Action tendencies may serve as the means to restore normality, geared towards both the victim and the perpetrator. From an appraisal theory point of view, focus on the victim would elicit sympathetic emotional reactions (e.g., pity, sadness, weakness) while focus on perpetrator would elicit angry emotional reactions (e.g., anger, contempt, hate). This makes sense of the emotional complexity of moral disgust and provides support that moral disgust is indeed different from physical disgust.

The appraisal of human agency is absent in physical disgust, which tends to include physically offensive stimuli or threats to the physical body. Researchers have found these stimuli are more often appraised as situational and due to chance (Lee & Ellsworth, in press). The avoidance orientation that characterizes physical disgust action tendencies (e.g., avoid and

escape) thus makes sense. That is, if the situation were not modifiable, approaching the elicitor would simply increase one's risk, while avoidance would decrease risk.

The complexity of moral disgust appraisals has theoretical implications. From an appraisal theory point of view, the specific features of the event that the person focuses on (e.g., victim or perpetrator) not only elicit different emotional reactions but also result in different action tendencies as well. This means that two people could be watching the same news story (e.g., about a father who rapes his daughter), but experience different appraisals, emotional reactions, and action tendencies if their focus of attention is different. In this case, it is likely that the focus on the perpetrator would trigger an emotional reaction of anger and hate, while a focus on the victim would trigger a sympathetic emotional reaction. Furthermore, even if both parties are motivated by a desire to restore normality, appraisal and emotional reaction would likely influence the first person to believe this is better achieved by punishing the perpetrator and the second person to believe this is better achieved by helping the victim. This finding has potential implications for better understanding the motivation behind criminal and altruistic behavior.

Physical Disgust Resembles Fear

In terms of action tendencies and emotions, physical disgust resembles fear. There was a higher disgust-fear correlation in situations written to elicit physical disgust compared to situations written to elicit moral disgust (Study 1). The avoidance orientation that characterized physical disgust action tendencies (e.g., desire to escape and leave the situation) is also characteristic of action tendencies elicited by fear (Ohman, 2000). This avoidance makes functional sense given that physical disgust originated as a fear of threat to the physical body (Rozin et al., 2000). This avoidance orientation of physical disgust is consistent with other self-

report measures and further provides evidence for a physical disgust-fear association at a motivational and behavioral level (e.g., Lee & Ellsworth, in press).

This resemblance of physical disgust to fear in terms of avoidance orientation has theoretical implications. It can be used in behavioral psychology to understand why two seemingly incomparable situations (e.g., dog poop and news of a murderer on the loose) elicit similar action tendencies.

Moral Disgust Resembles Anger

In terms of action tendencies and emotions, moral disgust resembles anger. In all three studies, moral disgust was associated with higher ratings of anger, hate, and contempt, suggesting that moral disgust not only resembles anger, but also evokes a feeling of anger. The approach and punish orientation that characterized moral disgust action tendencies is also characteristic of action tendencies elicited by anger (Kuppens et al., 2003). Morally disgusted participants' higher reported desire to hurt and yell at someone, punish someone, swear at someone, and the feeling of "boiling inwardly" provide support for a resemblance between moral disgust and anger.

In addition to similar action tendencies, there appears to be a distinctive feature required to elicit anger, which only moral disgust has. Study 1 found that whenever an agent was involved, anger correlated with disgust. In situations that lacked personal responsibility or intentionality, anger was weakly correlated with disgust. Given that appraisal of human agency is characteristic only of moral disgust situations (not physical disgust), this suggests that human agency is a key feature that moral disgust and anger share. This provides further support for an association between moral disgust and anger.

Limitations

One limitation of Study 1 is that participants had to imagine that they were experiencing the situation, which might result in unrealistic responses in terms of emotions the participant predicts they would experience. However, in Study 2 and Study 3 participants write about personal experiences to induce the emotion, and results between all three studies show similar outcomes in terms of emotional profiles and action tendencies.

A second limitation of Study 1 and Study 2 is that moral disgust distinct from general disgust is not measured. As a result, we cannot be sure that the situations or personal experiences they wrote about to induce this emotion actually did induce moral disgust. This would mean that the difference we found in terms of emotions and action tendencies is not due to a difference between moral disgust versus physical disgust. However, Study 3 was the first to measure moral disgust and physical disgust distinctively, and it showed that participants were indeed experiencing moral disgust when they should be.

A third limitation, of all three studies, is that self-report measures are used to measure emotional reactions. Self-report scales can be flawed in many ways. For one, the presence of an experimenter or the pressure of partaking in a study might make participants feel pressure to respond in a way they think the experimenter expects and thus provide false emotion ratings. It is also possible that participants give inadequate emotion ratings simply because they are nervous or have difficulty distinguishing how they really feel. However, the universality of basic emotions and related facial expressions suggests that people do not have a hard time distinguishing emotions (Marzillier & Davey, 2004). Furthermore, given that one of the main purposes of all three studies was to better understand the emotional profiles of these two types of disgusts, multiple emotions needed to be measured at once. Compared to other methods of

assessment, such as physiological and neurological, self-report measures provide the greatest possibility to measure multiple emotions at one time.

Nevertheless, despite limitations, the findings of this research extend previous work and deepen our understanding of two kinds of disgust. The results from the three studies provide evidence for the existence of physical and moral disgust, which involve different appraisals and have different emotional profiles. The experiences of both are not the same and, as this study showed, have different consequences for how people feel and behave. These findings highlight the importance of going beyond the extant literature's focus on difference in elicitors and beginning to consider their experiential and behavioral consequences. Furthermore, the evidence these studies have provided for moral disgust's resemblance to anger and physical disgust's resemblance to fear opens up new empirical possibilities. More research has been done on fear and anger than on physical and moral disgust, and as a result a comparison to these well-researched emotions will allow us to better understand, and predict, the consequences of the two kinds of disgust.

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Author Note

Madeline C. Lupei, Department of Psychology, University of Michigan, Ann Arbor.

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Address for correspondence: 204 South Scoville Avenue, Oak Park, IL, 60302.

Table 1

Study 1 disgust-eliciting situations categorized by emotional correlations

<p>Low Fear, High Anger, Moral Disgust</p>	<ol style="list-style-type: none"> 1. Hearing your roommate's slight moaning and groaning while "secretly" masturbating under a blanket. 2. When you are in the final round of a prestigious competition, you notice an old friend's name and see a number of credentials on his resume that you know are faked. 3. Your best friend betrays you and reveals your secrets to others behind your back. 4. Realizing your romantic partner, behind your back, has been frequently flirting with opposite-sex friends and using his/her attractiveness to get physically close to them, to be the "hot one." 5. Your GSI makes fun of your paper in front of the whole class. 6. Your neighbor's loud music at 4am makes it impossible for you to sleep every night. 7. Seeing your neighbor angrily kick their dog. 8. After Independence Day, your neighbor no longer needs the American flag and cuts it up into pieces, uses the rag to clean the bathroom, and asks you if you want some of the pieces for cleaning too. 9. Learning that your foreign neighbors encourage incestuous relationships as part of their family sex education. 10. A Jewish banker in downtown Chicago says to a Black man, "We don't
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serve niggers in this bank.” 11. Seeing a doctor hold and fondle an anesthetized female patient’s breasts before an operation when he thinks no one is around.

12. A politician who vigorously opposes gay rights is caught having sex with another man in a public men’s room.

13. You are in a hurry for a class. You have been waiting in a long line to buy lunch. Somebody cuts in line and the cashier is OK with it.

14. Hearing about a 50-year-old man who has a sexual relationship with a 12-year-old girl.

15. Your friend’s family dog is killed by a car in front of their house. They have heard that dog meat is delicious, so they cut up the dog’s body and cook it and eat it for dinner.

<p>High Fear, Low Anger, Physical Disgust</p>	<p>1. When you are in the middle of the street at night, a car turns around the corner and is driving right towards you at 90mph.</p> <p>2. You think you are alone at home but suddenly hear somebody walking slowly.</p> <p>3. Seeing a mentally-retarded patient strangle a chicken to death.</p> <p>4. Touching a dead body.</p> <p>5. While taking a shower, you suddenly notice a big, thick-hairy spider hanging on the wall crawling towards you.</p> <p>6. Realizing hundreds of invisible bugs live in your bed and feed on your flesh.</p>
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	<p>7. Seeing a man with his intestines exposed after an accident</p> <p>8. Drinking a glass of milk and suddenly seeing a small cockroach at the bottom.</p> <p>9. Watching a chef at a Chinese restaurant tie a snake on the table while it's still alive and moving, cut it right at the middle, gouge out its gall bladder, and serve it fresh and juicy for you.</p> <p>10. Your neighbor's pet cat dies, and you have to pick up the dead body with your bare hands.</p>
<p>High Fear, High Anger, Moral Disgust</p>	<p>1. When you are sitting alone at a bar, a drunken man comes in holding a gun and yelling at people angrily.</p>
<p>High Fear, High Anger, Physical Disgust</p>	<p>1. Eating a bowl of hot cereal with someone else's scabs in it.</p>
<p>Low Fear, Low Anger, Moral Disgust</p>	<p>1. Seeing two 3-year-olds massage and kiss each other's genitals.</p> <p>2. Hearing that your arts professor who claims he can only enjoy classical music actually loves pop music, especially Britney Spears.</p> <p>3. Realizing that your classmate who claims to be vegetarian has been eating meat privately all along.</p> <p>4. Hearing about a wild after-conference party where some of your professors get completely drunk, dance hot, and behave very sexually.</p> <p>5. Two of your friends who just got to know each other at your house party</p>

start making out and French-kissing passionately on the sofa.

6. Hearing that prisoners often engage in homosexual behaviors with inmates.

7. As your kitten crawls around, it starts rubbing your genitals and making a purring sound and you gain sexual pleasure from it.

Low Fear,

Low Anger,

Physical Disgust

1. Hearing someone clear a throat full of mucous.

2. Walking through a tunnel under a railroad track that stinks of urine and feces.

3. Seeing maggots swarming on a piece of meat in your garbage pail.

4. Discovering your neighbor changes underwear only once a week.

5. The person sitting next to you on the bus vomits on the floor.

6. Eating a plate of spaghetti and meatballs with your fingers.

7. Seeing two fat, ugly 50-year-olds make out and French kiss on Diag.

8. Walking barefoot on concrete and stepping on an earthworm.

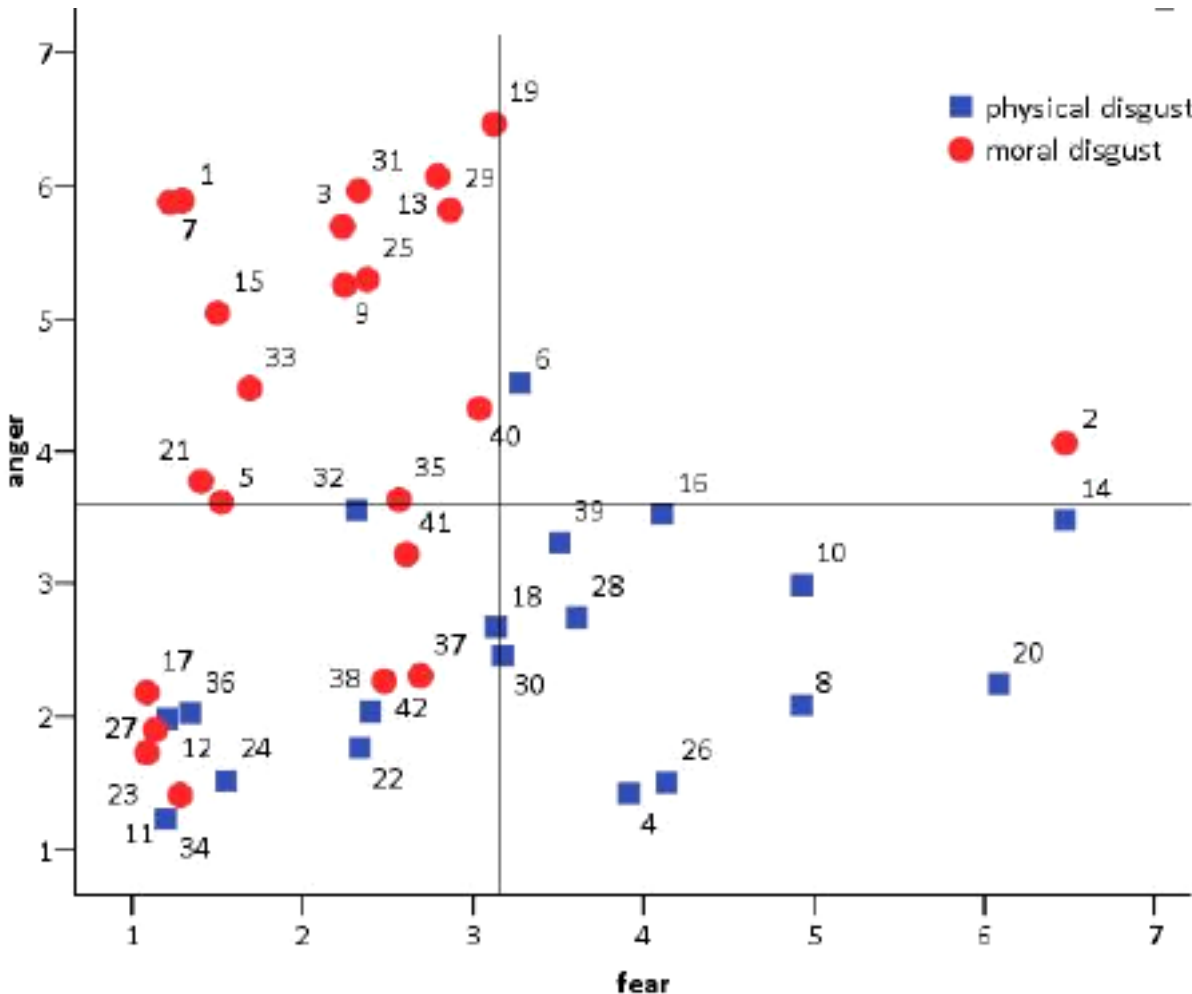


Figure 1. Distribution of Study 1 situations in terms of how much fear and anger participants rated the situations as eliciting.

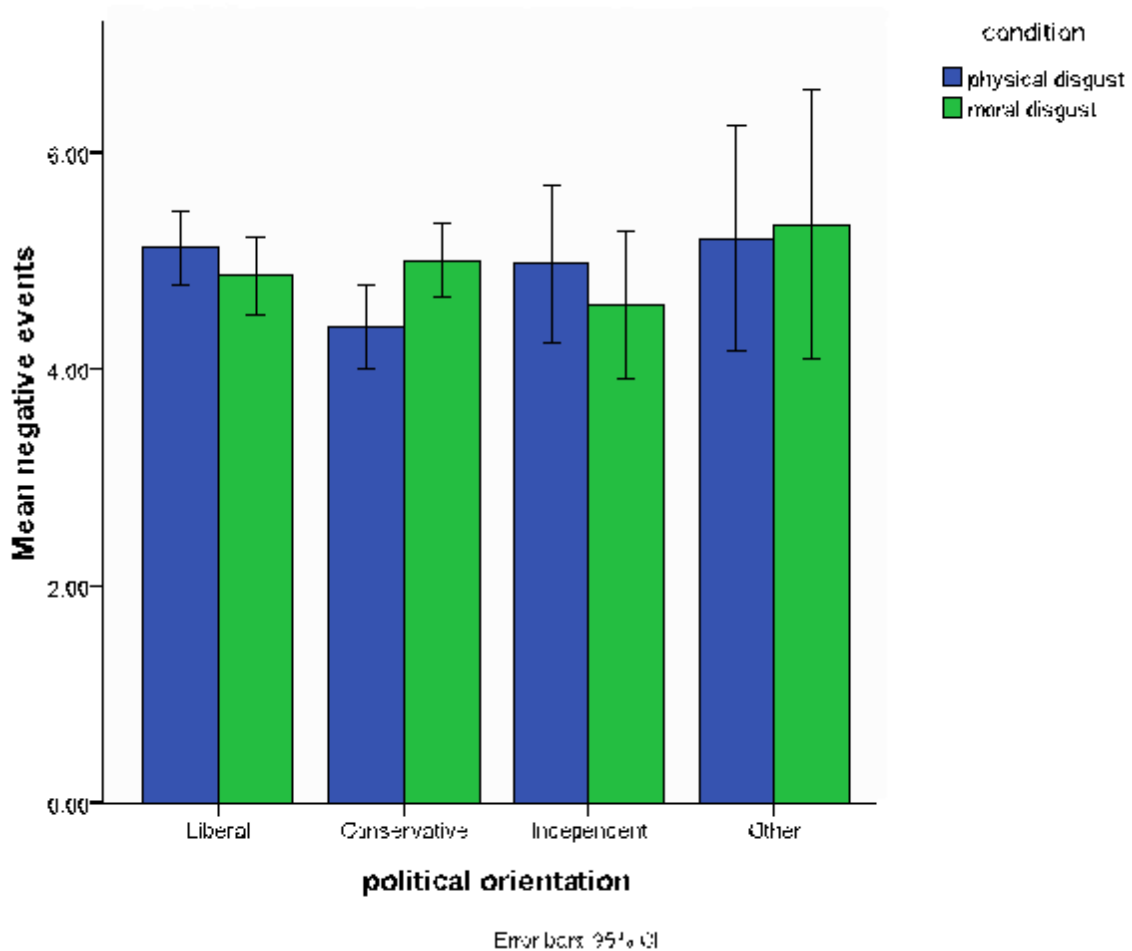


Figure 2. Interactive effect of political orientation and disgust condition in terms of risk perception. Bar 2 and bar 4 show that in the moral disgust condition there is no difference in terms of risk perception between conservatives and liberals. Bar 1 and bar 3 show that in the physical disgust condition, liberals report higher risk perception compared to conservatives.

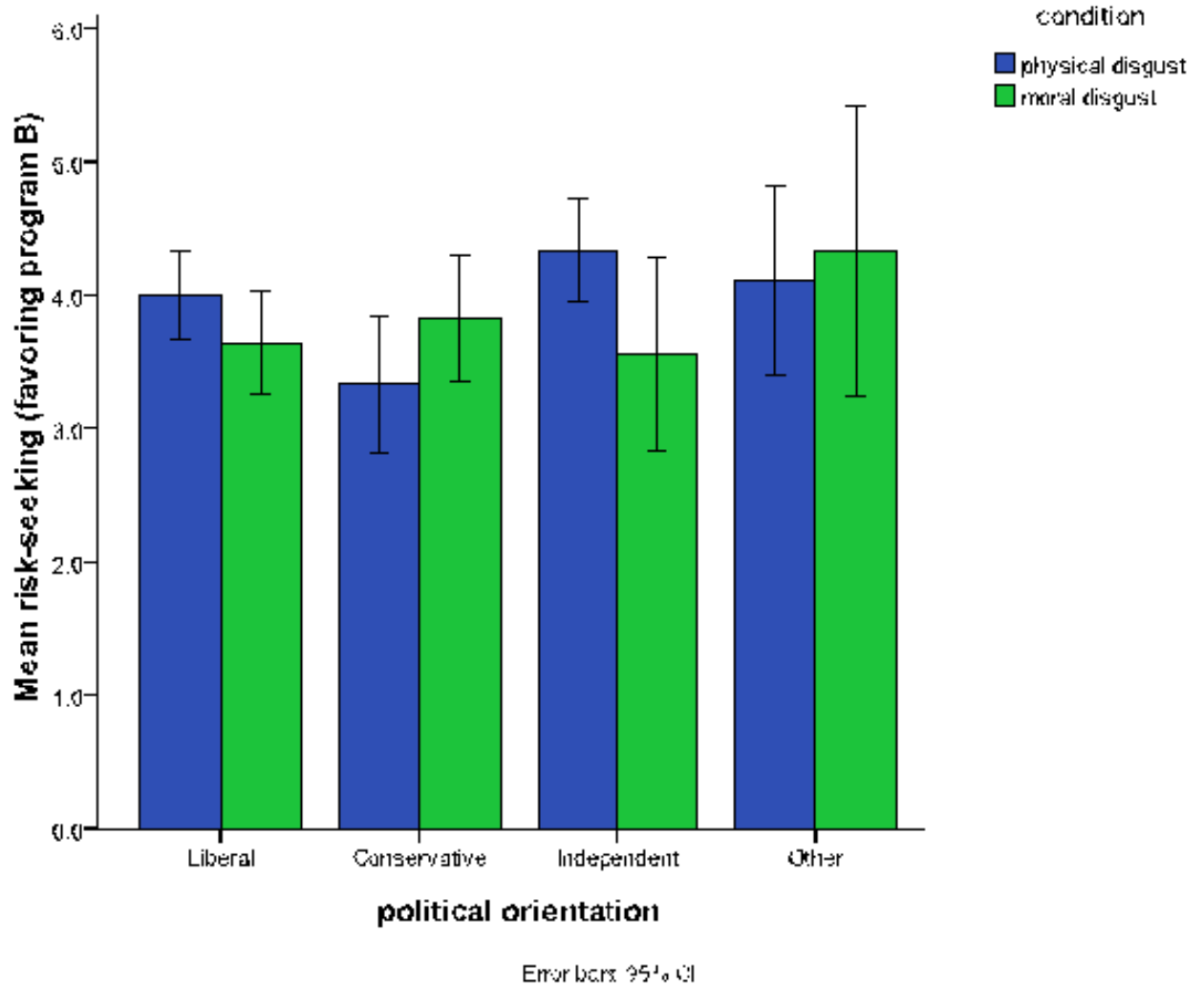


Figure 3. Interactive effect of political orientation and disgust condition in terms of risk seeking.

Bar 2 and bar 4 show that in the moral disgust condition there is no difference in terms of risk seeking between conservatives and liberals. Bar 1 and bar 3 show that in the physical disgust condition, liberals report higher risk seeking compared to conservatives.

Appendix A

Study 2 Risk Perception Scale Items

1. I contract a serious disease
2. I have a heart attack before age 50
3. I die from crime or accident
4. I receive statewide recognition in my profession
5. My achievements are written up in a newspaper
6. I am on an airplane that encounters severe turbulence
7. I receive favorable medical tests at 60
8. I say something idiotic in front of my classmates or colleagues
9. I choose the wrong profession
10. I get lost at night for over an hour
11. I marry someone wealthy

Appendix B

Study 2 Action Tendency Scale Items

1. I wanted to accept anything that happened
2. I felt like sharing my feelings with other people
3. I felt like hiding my feelings from other people
4. I felt like apologizing to another person
5. I felt like helping someone else
6. I felt like hurting someone by hitting, yelling or criticizing
7. I boiled inwardly
8. I felt like leaving, withdrawing, or getting away from the situation
9. I wanted to punish someone
10. I wanted to understand what happened
11. I wished the situation had never happened
12. I felt like waiting, doing nothing yet

Appendix C

Study 3 Emotion Induction Items

Fear

1. You find a mole on your skin that looks suspicious and go to a doctor who tells you it might be cancerous...you are waiting for the results of the biopsy.
2. You feel as though you are being followed, and every time you turn around, the footsteps stop.
3. You are on a camping trip and find a snake in your sleeping bag.
4. You are in the shower and see a big spider on the wall.
5. You are visiting a foreign country and lose your cell phone, wallet and passport. You have no idea how you can return to the United States or who to ask for help.
6. It is dark out, you are alone and hear something in the bushes.
7. You are driving and your car suddenly starts making a loud, bad noise.
8. Someone in your office or class has been diagnosed with a serious and contagious disease.
9. You are lost in a bad neighborhood.
10. As you are proofreading a major document that you have to turn in, the computer screen suddenly goes blank.
11. You have applied for a position that you really want. Others have been notified of their results already, and you are still waiting for the call or email to come.
12. You are about to give a presentation on a topic you don't know well enough.

Anger

1. Your partner is mad at you for canceling the movie night because your boss gave you a

last minute project right when you were about to leave.

2. Your coworker stole your idea and proposed it to your boss as his own.
3. You are driving and are rear-ended by another driver who then gives you the finger.
4. Your neighbors had a party that kept you awake all night and when you walk outside there is trash all over your lawn.
5. Your colleague made fun of your work publicly.
6. You just found out your best friend has been telling everybody personal things about you that you told him/her in confidence.
7. One month after your friend told you to break up with your ex, they started dating.
8. You just found out your best friend, who has been working at the same job as you for less time, negotiated for a higher salary than yours.
9. Your supervisor has always been biased against you. You just submitted a proposal and you know you did a good job on it, but your supervisor gives you unusually harsh evaluation.
10. A member on your team promised to get his/her part done, but failed in the end.
11. You have been waiting in line for at least half an hour. The next person says hi to a bunch of friends and they cut in front of you.
12. You have a presentation early the next morning but cannot fall asleep because your neighbor's dog will not stop barking and your neighbor will not do anything about it.

Sadness

1. You just learned that your best friend from college was seriously injured in a car accident.
2. Your parents called to tell you that a close relative just passed away while still in pain.

3. You are working at a soup kitchen and the place runs out of soup. You see the homeless people sigh, turn back, and walk away. You want to help but there's nothing you can do.
4. You see a commercial on television for starving children in Darfur.
5. A friend or family member has been trying to conceive for years. She has just told you she lost the baby at 3 months.
6. A friend or family member has just been diagnosed with cancer.
7. The company you work at is downsizing. Your boss really wants to keep you and has done everything he could, but in the end, he has to let you go.
8. Your significant other just broke up with you. It was an amicable break up but you still really miss and want to be with him/her.
9. You see a homeless child all alone on the street in winter. She tells you she has been unable to find her parents and has not eaten for two days.
10. You just found out your father lost his job, the job that he has been working at for the past forty years.
11. You have been looking forward to meeting up with a close friend during your weeklong vacation. The day before you leave town, she calls and apologizes for having to cancel it because her dad is feeling weaker and weaker.
12. You go back to the town where you grew up. When you arrive at the block you used to live on, you find out your childhood house burned down years ago.

Physical Disgust

1. You are walking barefoot through your yard and feel something warm and squishy. You look down and see that you have just stepped in dog poop.
2. You are on a boat with your friend. He gets motion sickness and starts throwing up. You

watch as the fish eat his vomit.

3. You are sitting next to a homeless person on a crowded bus who smells of feces and urine.
4. You had a party at your house and when you wake up you step in a pile of vomit.
5. You packed lunch for work and after you have taken a bite of your sandwich, you realize there is mold on the bread.
6. You are on the train and see an old man pick his nose and then eat it.
7. Your pet is sick and has diarrhea all over the carpet. You have to clean it up yourself.
8. You come home from vacation and open the garbage can in your kitchen to find hundreds of maggots.
9. You see an animal with its intestines exposed on the road.
10. You open the window and find a dead bird on the windowsill. You have to move it with your bare hands.
11. You gulp down some milk and suddenly notice it smells sour and feel small chunks in your mouth.
12. You hear the person sitting next to you clear a throat full of mucus.

Moral Disgust

1. You find out that a charity that claims to raise money for starving children is actually stealing money for their own profits.
2. You hear on the news that a young boy was raped by an old man.
3. Your 8-year-old cousin tells you that your uncle tried to touch her between her legs.
4. You see a well-dressed man stealing money from a beggar when she is not looking.
5. You see a group of children making fun of a mentally disabled child.

6. You read in the news that interviewers for the President's Education Awards Program have been giving awards to only girls who have sex with them.
7. You see an old lady almost get hit by a car and fall over, and the car drives off without stopping to help.
8. You overhear a coworker telling his friend that he gains sexual pleasure from rubbing peanut butter on his genitals and having his dog lick it off.
9. You are walking down the street and see someone with a swastika tattoo.
10. You hear about an adult woman who has sex with her father.
11. You see in the news that some doctors fondle anesthetized female patients' breasts before an operation when they think no one is around.
12. You just found out that one of the teachers at your child's school is racist and constantly makes racist comments about Black students in class.

Appendix D

Study 3 Feelings & Emotions Scale Items

1. Weak
2. Sad
3. Powerful
4. Physically disgusted, grossed out
5. Outraged, full of hate
6. Morally disgusted
7. Happy
8. Nauseated, sick to my stomach
9. Excited
10. Anxious
11. Compassionate
12. Bored
13. Ashamed
14. Scared
15. Angry
16. Frustrated
17. Afraid
18. Irritated
19. Amused
20. Good
21. Worried

22. Contemptuous

Appendix E

Study 3 Action Tendency Scale Items

1. I feel like sharing my feelings with other people
2. I feel like banging my fists against the table
3. I feel like helping someone else
4. I feel like swearing
5. I feel like yelling at someone
6. I feel like leaving, avoiding, or getting away
7. I feel like punishing someone
8. I feel like relaxing
9. I feel like hiding my feelings from other people
10. I feel like hurting someone by hitting, yelling, or criticizing
11. I feel like waiting and doing nothing