# Anger, disgust and presumption of harm in reaction to taboo breaking behaviours

**Roberto Gutierrez, Roger Giner-Sorolla**

Three experiments investigated the relationship between the *presumption of harm* in harm free violations of creatural norms (taboos) and the moral emotions of anger and disgust. In Experiment 1, participants made a presumption of harm to others from taboo violations, even in conditions described as harmless and not involving other people; this presumption was predicted by anger and not disgust. Experiment 2 manipulated taboo violation and included a cognitive load task to clarify the post hoc nature of presumption of harm. Experiment 3 was similar but more accurately measured presumed harm. In Experiments 2 and 3, only without load was symbolic harm presumed, indicating its post hoc function to justify moral anger, which was not affected by load. In general, manipulations of harmfulness to others predicted moral anger better than moral disgust, whereas manipulations of taboo predicted disgust better. The presumption of harm was found on measures of symbolic rather than actual harm when a choice existed. These studies clarify understanding of the relationship between emotions and their justification when people consider victimless, offensive acts.

KEYWORDS:anger, disgust, moral emotions, presumption of harm

In Western society today, a common liberal standard of tolerable behavior is rights based: People can do as they please, as long as they do not violate other people's rights (e.g., of consent) by doing so. But in 2003, this standard was put to a severe test by the German court case of Armin Meiwes, a cannibal who apparently only sought out willing victims. Meiwes had found one such individual through the Internet, Bernd Brandes, who after videotaping his consent to the act, was dismembered, cooked and partially eaten by Meiwes. The initial lesser sentence of manslaughter eventually imposed by the court reflected the finding that the act was consensual. According to the judge in the case, "(t)here was an agreement between them. This was the killing of a person without murder" (Harding, 2004). Many commentators, however, found it paradoxical that such an act should still appear to meet the rights- and consent-based standards of liberal morality. One piece was subtitled "If everything is permissible between consenting adults, why not?" and went on to comment that "(t)he case is a *reductio ad absurdum* of the philosophy according to which individual desire is the only thing that counts in deciding what is permissible in society" (Dalrymple, 2004). Although the Meiwes case may be bizarre, it nonetheless touches on a basic ambivalence that troubles advocates of a purely rights-based morality: that this moral code may condone behavior that one personally finds extremely repugnant.

Beyond this extreme example, Western society shows a general tendency to disapprove of actions that violate taboos about sexuality or other uses of the body, even in cases in which the action is consensual, private, and has no negative consequences for other people. For example, in April 2003, then-U.S. Senator Rick Santorum commented on the Supreme Court's deliberations that would eventually strike down the Texas law against sodomy: "If the Supreme Court says that you have the right to consensual sex within your home, then you have the right to bigamy, you have the right to polygamy, you have the right to incest, you have the right to adultery". (Santorum, as quoted in Cooperman, 2003, p. A4)

This line of argument draws a parallel between the debatably immoral behavior of consensual homosexual relations and taboo actions toward which there exists a greater consensus of disapproval, including incest and (later on in the same interview) bestiality.

We use the term *taboo* here in reference to norms whose violation can be expected to provoke inflexible, disgust-related responses and, in particular, norms related to the body, food, and sexuality. This follows from research identifying such norm violation as a key elicitor of disgust (Haidt, McCauley, &Rozin, 1994). Research also provides numerous examples that such responses are fairly inflexible, at least in the short term; for example, a sweater worn by someone who had died of cancer is repugnant, even to educated people who know that cancer is not contagious (Rozin, Millman, &Nemeroff, 1986); prejudice against a person with a disability—even one sustained from an injury—is intensified by concerns about contagious disease (Park, Faulkner, & Schaller, 2003); and a bonbon shaped like dog feces is disgusting, although its only fault is an unfortunate resemblance (Haidt et al., 1994).

Research based on moral judgments has coined the term *moral dumbfounding*(Haidt, Koller, & Dias, 1993), which describes the reactions of many participants when being interviewed about harmfree scenarios that violate a strongly held taboo norm, such as a consensual, private, one-time act of incest between a brother and sister using contraception (Haidt, Björklund& Murphy, 2000; Haidt&Hersh, 2001). In contrast to a non-taboo-violating situation such as the classic Heinz dilemma(Kohlberg, 1981), interviewees immediately expressed disapproval of the act but were less fluent in justifying their disapproval with reasons. These participants sometimes gave reasons why the action might be harmful, but these reasons contradicted the details of the story: for example, mentioning that the incest might lead to deformed offspring even though two methods of contraception were described, or mentioning that their family might be offended even though the incest was described as completely secret. These reasons tended to be retracted after the interviewer pointed out their implausibility, but participants nonetheless condemned the action. The moral dumbfounding effect, then, suggests some degree of ambivalence between condoning an action because it is consensual and private and condemning it because it violates taboo norms. This ambivalence occurs even when the action is described as completely harmless.

One way of resolving the ambivalence aroused by the moral dumbfounding effect, as these studies show, is to infer or *presume* some degree of harm to other people, even in cases in which no harm is present. The *presumption of harm* makes the condemnation of harmless actions easier by insisting that, in some way, harm to other people occurs in such an action. For example, research on moral judgmentshas shown that violations of sexual norms (e.g., homosexuality) are perceived by some

participants as harmful to other people, even when they are described as private and consensual (Haidt&Hersh, 2001). In those studies, the presumption of harm shared most of its variance with emotional reactions to the act. However, the studies did not attempt to establish which reaction came first, nor did they investigate the role of specific moral emotions of condemnation such as anger and disgust.

### Anger and Disgust as Moral Emotions

Anger and disgust have been investigated chiefly as separate emotions, experienced in situations that directly affect the individual feeling them (Berkowitz, 1999;Roseman & Smith, 2001; Scherer, 1999), but they have also been studied as moral emotions that can respond to violations of norms endorsed by a group or society (e.g., Tangney, Stuewig, &Mashek, 2007). Together with contempt, they are considered part of the "other-condemning" family of emotions (Haidt, 2003) that are used to express different types of disapproval for the actions of other people.

One idea specific to moral emotions, the CAD triad hypothesis (Rozin, Lowery, Imada, &Haidt, 1999), argues that moral anger, as opposed to disgust or contempt, is elicited specifically by the perception of harm to others, including symbolic harm such as violation of rights. The CAD triad hypothesis draws a correspondence between the emotions of contempt, anger, and disgust, and three types of moral violation with the same initials: community, autonomy, and divinity (Shweder, Munch, Mahaptra, & Park, 1997). In this research, participants gave their reactions to acts that violated "ethics of divinity" (violations of the concept of purity, eating behavior, and the sanctity of the body, similar to the aforementioned taboo norms), "ethics of autonomy" (violations of the rights of others, including harmful acts), or "ethics of community" (public violations of group norms). Results showed that divinity violations principally evoked disgust, autonomy violations evoked anger, and community violations evoked contempt. These results were similar when participants used emotion words and when they endorsed facial expressions of these emotions.

One limitation of these studies, however, is that they manipulated different moral norms holistically by using various scenarios that were later rated to primarily evoke those norms. The exact question of what features of those autonomy ethics violations evoked anger, and what features of divinity ethics violations evoked disgust, remained unclear. This question is especially relevant to scenarios creating a presumption of harm, because such a presumption implies that the act is seen to violate autonomy ethics although it is only described as violating divinity ethics. If the presumption of harm to others is made toward a violation of divinity ethics, then would anger accompany it? The data reported in Rozin et al. (1999) cannot tell us this; they reported only the most frequent category of emotion for each scenario and did not measure the extent to which harm to others was inferred by the same participants who rated anger and disgust.

The first aim in our present research, then, was to carry out a more rigorous test of the CAD hypothesis, manipulating the presence or absence of harm to others in comparable scenarios and measuring the degree of anger and disgust separately. The manipulation of harm to others should affect anger to a greater degree than disgust when the two are measured simultaneously. Similarly, a manipulation of the presence or absence of taboo violations involving the body should affect disgust to a greater degree than anger. These findings would more definitively establish that*moral* anger, in particular, responds to harm to others. This is a more specific prediction than given by the preponderance of appraisal models, which, in describing anger more generally, most consistently implicate other-agency and a negative outcome (e.g., Ortony, Clore, & Collins, 1988; Weiner, 1986).

The simultaneous measurement of anger and disgust also responds to the concerns raised by Nabi (2002), who found that when participants were asked to described a situation that made them feel "disgusted," they often described episodes more akin to anger. These results, and those of Russell and Fehr (1994) in which participants gave "disgusted" as a synonym for anger, show the need to examine the separate contributions of these emotion terms statistically and, ultimately, to use non-language-based means of measuring them. Other studies providing support for the concept of noncreatural moral disgust have likewise depended only on the word*disgust* and its close synonyms (Marzillier& Davey, 2004), rather than on facial expressions and words as Rozin and colleagues did (1999). It is thus important to study disgust separately from anger through a variety of methods.

### The Nature of the Presumption of Harm

The second concern in this research deals with how, when, and why the presumption of harm is made. As previously mentioned, Haidt and Hersh (2001)showed that some of their participants reacted to descriptions of unconventional sexual practices with a presumption of harm. Moreover, these results showed thatmoral judgment was not predicted by harm-based reasons independent of affectivereactions. They concluded that arguments about harm were a post hoc attempt to justify initial emotion-based negative moral judgments. However, their results do not prove that the presumption of harm was post hoc, because they are also consistent with a model in which affective reactions fully mediate between an a priori judgment of harm and a moral disapproval outcome (Spencer, Zanna, & Fong, 2005). It is therefore desirable to demonstrate more conclusively that arguments about harm to others, in a case where none is described, represent a post hoc justification of affect and—specifically because of the correspondence between anger and harm—a justification of anger and not disgust.

Research on anger has focused mainly on investigating the emotion as a personal reaction toward specific stimuli affecting the individual, as opposed to the research on moral anger described earlier. Previous research on personal anger has revealed that—in a very simple manner—it is a reaction associated to a negative event that can be attributed to an external agency, while the person has the resources to confront the event (Lazarus, 1991; Ortony et al., 1988; Roseman, Antoniou, & Jose, 1996; C. A. Smith & Ellsworth, 1985; Weiner, 1986). Research has also revealed that anger can additionally respond to a larger set of appraisals, elicitors, and conditions, such as goal obstacle, control, and unfairness (Kuppens, Van Mechelen, Smits, & De Boeck, 2003). However, Kuppens et al. (2003) found that none of the single appraisals studied were necessary or sufficient to elicit anger, suggesting that the elicitors of anger are complex and possibly dependent on the situation or individual.

Anger can also become associated with a social group or action independent of any appraisal of the situation, as part of an affective attitude. In a recent study, for example, Tapias, Glaser, Keltner, Vasquez, and Wickens (2007, Study 3), primed social groups stereotypically associated either with anger (African Americans) or disgust (gay men) and showed corresponding effects on measures of emotions. Considering that most discussions of taboo subjects such as incest or cannibalism involve examples where someone really is unjustly harmed, leading to anger, it is not surprising that anger should be associated with these taboo violations even when they are presented as absolutely harmfree. We propose that the presumption of harm, then, is a post hoc elaboration made to justify anger that initially arises either from previous associations to the act or from the simple consideration that another person is responsible for a negative act. If moral anger usually arises from

a situation in which someone is harmed or rights are violated, it is reasonable that, when justifying anger in a moral situation lacking these features, its characteristic appraisals will be invoked. With sufficient cognitive resources, this anger becomes moralized, introducing an elaborated appraisal element of harm to others that is more suitable to moral than personal anger.

Our model is consistent with the social intuitionist model (Haidt, 2001), in that the presumption of harm to others is one example of a post hoc justification of an initial intuitive negative reaction based on the taboo violation. The social intuitionist model also proposes that the intuitive emotional reaction is fast and effortless, compared with the effortful rational justification of actions based on their consequences. If this is indeed the case, a cognitive constraint should diminish the effortful post hoc process, the presumption of harm, while sparing the effortless process—in this case, the intuitive emotional reactions. In a similar manner, Alicke's (2000) culpable control model also proposes that judgments of harm and responsibility form a schema together with negative emotions of blame such as anger, in which the presence of each element increases the likelihood that the others will be perceived. Empirical support for culpable control shows, for example, that when harm is greater, people also ascribe more responsibility to the person on an aposterioribasis. Focusing more closely on anger, other research based on the "intuitive prosecutor" hypothesis has shown that unresolved anger at unpunished crimes leads to greater inferences of harm in subsequent unrelated cases (Goldberg, Lerner, &Tetlock, 1999). Also, in support of the social-intuitionist model, other research has shown that manipulations of disgust lead to more extreme moral judgments(Wheatley &Haidt, 2005). Although these results are suggestive, none of these previous models have drawn a distinction between anger and disgust as a trigger for the specific presumption of harm to others; our model specifically implicates anger, as opposed to the closely related emotion of disgust, in presumption of harm.

In summary, we propose that, when a taboo-breaking act elicits both anger and disgust, it is anger specifically that can create the presumption of harm where none is described by completing a schema, motivated or otherwise, in which moral anger requires justification through harm to others. When harm is described explicitly (seeFigure 1A),there would be no need to presume harm, and the taboo-violating nature of an act would not affect inferences of harm or anger. Conversely, we predicted that in conditions in which no harm to others is described (see **Figure 1B**), the presumption of harm is a post hoc process used to justify a more intuitive anger reaction. Although we expect a large main effect of described harmfulness on perceptions of harm, there should also be an interaction: a smaller increase in anger and perceptions of harm when no harm is described, if the act described violates a taboo (see **Figure 1C**). In this case, anger but not disgust should predict presumption of harm.

The presumption of harm explored here presents a novel alternative for investigating the relationship between harm and emotions. Although harm has been identified as one of the appraisals preceding the experience of anger, the use of harm as a justification for anger, rather than as a reaction, has received less attention. Our view of harm as a post hoc, effortful justification would be supported by finding a presumption of harm to others from a taboo-breaking act when no harm is explicitly described, and by the reduction of mean levels of presumption of harm, but not of emotions or judgments of moral wrongness, under conditions of cognitive constraint.

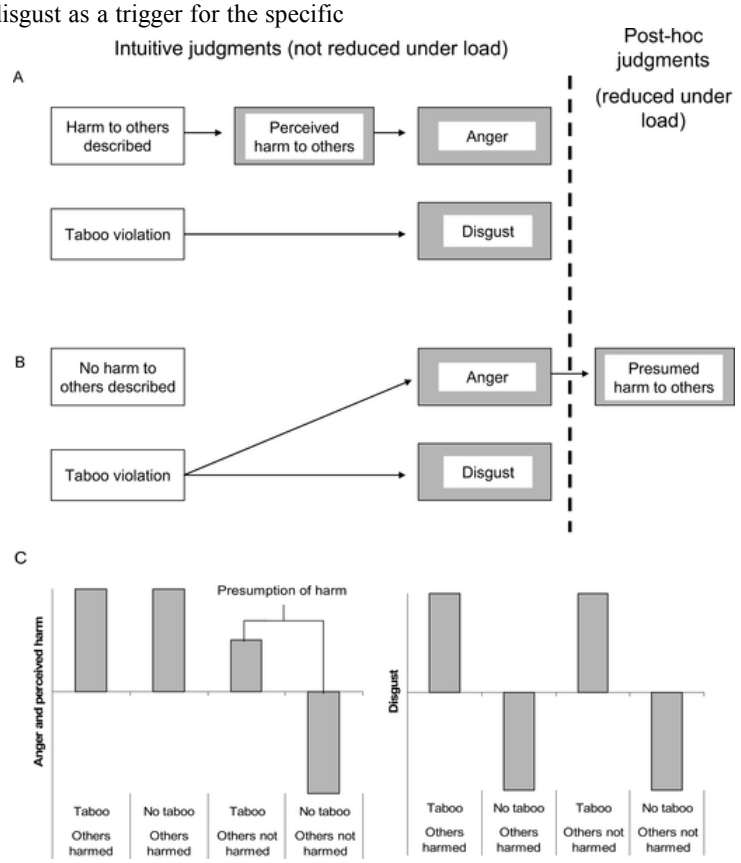


Figure 1. Theoretical model predicting (A) independent contribution of harm to others and taboo violation to anger and disgust reactions; (B) when no harm to others is described, presumption of harm from mere taboo violation as a post hoc response; and (C) graphical representation of predictions for anger and perceived harm and for disgust.

## Present Research: Overview

The present research has two main objectives. The first one is to clarify the relationship between anger, disgust, and harm in moral judgment by manipulating the presence or absence of harm to others and taboo violations. Measuring both anger and disgust at the same time, rather than offering a forced choice, allows us to compare the effects of the manipulations on both

emotions and to control for any correlation between them. To further clarify the difference between these two emotions, we included measures of action tendencies shown in previous research to be differentially associated with them: attack and punishment for anger and avoidance for disgust (Frijda, 1986; Lazarus, 1991; Mackie, Devos, & Smith, 2000). We expected that these action tendencies would respond to the manipulations of taboo and harm to others as the emotions would.

The second objective is to establish the existence of anger and the role of presumption of harm in reactions to taboo actions that do not harm other people. The relationship between intentionally caused negative outcomes and personal anger has previously been established, mostly by appraisal theories (e.g., Frijda, 1986; Lazarus, 2001; Roseman& Smith, 2001). However, these theories did not predict that anger in a moral situation specifically responds to harm to others (as opposed to negative outcomes in general) or that presumptions of harm are made post hoc to justify anger. In research, the specific appearance of moral anger toward taboo violations described as consensual and private has not yet been shown to accompany presumption of harm to others and has not been demonstrated through experimental manipulations of different kinds of described harm and taboo violations. In the experiments presented here, we aimed to address these unknowns.

In Experiment 1, we manipulated scenarios of different taboo violations to contain descriptions of harm to others, harm to the perpetrator of the action, and no harm for anyone. The main aims in this experiment were to establish the link between harm to others and anger, as opposed to disgust, and to see whether presumption of harm to others occurred even in conditions in which no harm to others was present.

In Experiment 2, the described harm to others and taboo-breaking nature of an act were both manipulated orthogonally with two main aims. First, we wanted to clarify the effect of each independent manipulation on the presumption of harm to others. In addition to main effects of manipulated harmfulness on anger, and of taboo violation on disgust, an interaction between the manipulations of harm and taboo was expected so that more harm would be *presumed* as a result of the taboo action only when no harm to others was described (see **Figure 1C**). The second aim was to investigate the post hoc nature of this presumption of harm using a cognitive load manipulation. If harm is presumed through an effortful post hoc process in order to justify an intuitive emotional moral judgment (see **Figure 1B**), cognitive load should eliminate the effect of the taboo violation manipulation on mean levels of presumed harm, but not on mean levels of reported emotions or moral judgment, when judging a scenario described without harmful consequences. In Experiment 2, we included measures of actual and symbolic harm, expecting that the latter would be easier to use as a justification because no actual harm was described.

Experiment 3 was a partial replication of Experiment 2 that improved the wording of one of the questions about harm to allow direct comparisons between the types of harm described and to solve a potential problem with nonequivalence of the different harm questions.

## Experiment 1

In our first experiment, we investigated to what extent angry and disgusted reactions to taboo violations are affected by different descriptions of harm and to what extent harm to others is presumed on the basis of the description of the taboo-violating action when no harm to other people is described. The experiment contained three different scenarios describing taboo violations: one involvingnecrophilia; another one involving consensual incest, based on Haidt et al.'s (1993)study; and a third scenario involving nonharmful cannibalism (eating a human steak grown from a cell culture). We manipulated the extent of harm by creating a version of each scenario in which people other than the actors were explicitly psychologically harmed, as well as a version in which nobody was harmed. A third harm condition presented each action as causing psychological harm to the actors in the scenario but to nobody else. This condition was meant to demonstrate that anger in this situation specifically responded to harm to others, rather than just the negative outcome of harm in general.

We predicted the most negative emotional responses and judgments of harm to others in the condition in which others were harmed. However, we also expected some degree of presumption of harm to others in the remaining conditions, even when no such harm was described, and expected that this presumption would primarily be linked to anger rather than disgust. Finally, we predicted that anger and punishment would be more strongly influenced by our manipulation of harm to others, relative to disgust and avoidance.

### Method

#### *Participants*

Ninety-four undergraduate psychology students at the University of Kent, United Kingdom, participated in the experiment in one of three sessions of a lecture. Seventy-two participants were female, and 22 were male.

#### *Materials*

The questionnaire presented three fictitious stories in which the main character or characters violated a different creatural taboo or social norm involving the body. The described consequences of these actions were manipulated to create three different harmfulness conditions. In the *no-consequences* condition, there were no described negative consequences for anyone. In the *harm-self* condition, the main character of the story was psychologically harmed, but no one else was harmed. In the *harm-others* condition, the main character was not harmed, but someone else was harmed psychologically (see Appendix 1). Thus, the main independent variablewas a three-level within-participants factor.

The questionnaires were counterbalanced so that each participant received one variation (no consequences, harm to the self, and harm to others) of each of the three different stories. Thus, each participant had one questionnaire consisting of one story with no consequences, another different story with the harm-self variation, and a third different story with the harm-others variation. No participants received repeated scenarios or repeated variations of any of them.

#### *Procedure*

Participants were asked to read each story and, immediately afterward, to indicate whether the action of the main character was right or wrong. After this, participants were asked to indicate whether the action of the main character was beneficial or harmful to himself or herself (harm-self manipulation check) and to people other than the main character (harm-other manipulation check). Both judgments were made on bipolar scales ranging from 1 (*much more benefit than harm*) to 9 (*much more harm than benefit*). Participants also indicated how much they would like to punish, and how much they would like to avoid, the main character of each story on bipolar scales ranging from 1 (*not at all*) to 9 (*very much*). After this, participants were asked to indicate to what extent each story made them feel the following emotions: anger, compassion, depression, disgust, happiness, infuriation, outrage, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, "grossed out," and contempt. These measures used a scale ranging from 1 (*not at all*) to 8 (*very much*).

## Results

### *Manipulation Checks*

We conducted an analysis of variance (ANOVA), using the harmfulness manipulation as a three-level within-participant factor to examine responses to the harm-others manipulation check. This analysis (see Table 1)revealed a significant effect of harmfulness, $F(2, 186) = 57.24$, $MSE = 121.53$, $p < .001$; as expected, harm-others stories were judged as more harmful to others than no-consequences or harm-self stories were. A similar analysis on perception of harm to self also revealed a significant effect of the manipulation, $F(2, 186) = 12.71$, $MSE = 39.94$, $p < .001$; protagonists of the harm-self stories were perceived as more harmed than those of the no-consequences and harm-others stories.

Table 1
*Means (and Standard Deviations) of Harm, Moral Judgment, Emotions, and Action Tendencies by Harm Condition, Experiment 1*

| Reaction | No harm | Harm self | Harm others |
|---|---|---|---|
| Moral judgment | $6.92\ (2.19)_a$ | $7.51\ (1.90)_b$ | $8.31\ (1.32)_c$ |
| Harm to others | $6.07\ (1.64)_a$ | $5.99\ (1.54)_a$ | $8.00\ (1.55)_b$ |
| Harm to self | $5.95\ (2.33)_a$ | $7.24\ (1.94)_b$ | $6.49\ (2.11)_c$ |
| Anger | $3.77\ (2.08)_a$ | $3.62\ (1.87)_a$ | $4.97\ (2.06)_b$ |
| Disgust | $5.32\ (2.36)_a$ | $5.08\ (2.22)_a$ | $5.92\ (2.13)_b$ |
| Disgust minus anger | $1.54\ (1.52)_a$ | $1.46\ (1.40)_a$ | $0.95\ (1.27)_b$ |
| Punishment | $3.55\ (2.40)_a$ | $3.19\ (2.23)_a$ | $4.96\ (2.66)_b$ |
| Avoidance | $5.76\ (2.95)_{a,b}$ | $5.53\ (2.70)_a$ | $6.38\ (2.72)_b$ |
| Avoidance minus punishment | $2.20\ (2.26)_a$ | $2.34\ (2.34)_a$ | $1.42\ (2.15)_b$ |

*Note.* Standard deviations are in parentheses; means with different subscripts are different from each other by Tukey's least significant difference, $p < .05$.

Table 1. Means (and Standard Deviations) of Harm, Moral Judgment, Emotions, and Action Tendencies by Harm Condition, Experiment 1

### *Moral Judgment*

The effect of harmfulness on participants' moral judgment of the act's wrongness was significant, $F(2, 186) = 19.14$, $MSE = 46.03$, $p < .001$. Each level differed significantly from each other; the harm-others versions were judged the most wrong; harm-self, second most wrong; and no-consequences, least wrong (see Table 1).

### *Anger and Disgust*

For the index of all three anger items (angry, outraged, and infuriated), Cronbach's $\alpha = 0.91$; for the index of all four disgust items (disgusted, sickened, repulsed, and grossed-out), Cronbach's $\alpha = 0.95$. Correlations between these indexes were computed for each of the three harmfulness conditions and were high across all three conditions: no consequences, $r(92) = .77$; harm self, $r(92) = .78$; harm others, $r(92) = .82$. In varimax-rotated principal components factor analyses, when only the anger and disgust items were analyzed and the model was constrained to produce two factors, all three conditions showed the three anger items principally loading on one factor and the disgust items on the other. Thus, although anger and disgust were closely related, the items also could be reliably differentiated.

To investigate whether harmfulness influenced relative levels of anger versus disgust, we conducted a mixed-model 2 × 3 ANOVA, with the harm manipulation as a three-level within-participant factor and anger versus disgust as a two-level within-participant factor. The main effect of anger versus disgust was significant,$F(1, 186) = 139.52$, $MSE = 1.76$, $p < .001$, indicating higher overall levels of disgust than anger; harmfulness also had a significant main effect, $F(2, 186) = 13.22$, $MSE = 4.87$, $p < .001$, indicating more negative affect in harm-others versus no-consequences conditions. Of greater importance, the interaction of harmfulness with anger versus disgust was significant, $F(2, 186) = 8.09$, $MSE = 0.61$, $p < .001$. The means (see Table 1) showed that levels of anger, relative to disgust, were more influenced by the manipulation of harm to others so that the difference between anger and disgust grew smaller in the harm-others condition relative to the other two conditions. To confirm the effect of the harmfulness manipulation on anger, but not on disgust—given that the emotions were highly correlated—we also conducted a multilevel data analysis (Kenny, Kashy, & Bolger, 1998). This revealed that harmfulness influenced anger independently of disgust, $F(2, 277) = 26.97$, $MSE = 1.08$, $p < .001$. Specifically, harm-others scenarios evoked more anger ($M_{adjusted} = 4.75$, $SE = 0.11$) than did no-consequences ($M_{adjusted} = 3.83$, $SE = 0.11$) or harm-self ($M_{adjusted} = 3.79$, $SE = 0.11$) scenarios; both comparisons were significant ($p < .001$). The manipulation did not affect disgust independently of anger, $F(2, 277) = 0.49$, $MSE = 1.15$, *ns*.

### *Presumption of Harm*

The item regarding harm to others was used to test for the presumption of harm in the no-consequences and harm-self conditions. On the 9-point scale used, the reported harm to others in the no-consequences conditions (6.07) was significantly higher than the midpoint of the scale (i.e., toward the "harmful" side), $t(93) = 6.32$, $p < .001$. In the harm-self condition, the overall mean (5.99) was also significantly higher than the midpoint of the scale, $t(93) = 6.20$, $p < .001$. It is important to note that these effects were present in each scenario separately.

We had predicted that harm to others would be associated with anger but not with disgust. Anger and disgust were used as simultaneous predictors of harm to others for the two conditions in which harm to others was presumed rather than described: no consequences and harm self. A multilevel data analysis was again used, revealing that among the no consequences scenarios, anger was associated with perceived harm to others, $\beta = .36$, $p < .05$, but disgust was not, $\beta = .04$, $p = .78$. Likewise, among the "harm self" stories, anger was associated with perceived harm to others, $\beta = .38$, $p < .05$, but disgust was not, $\beta = -.12$, $p = .44$. This indicates that when harm to others was not explicitly described, anger but not disgust was associated with the presumption of harm.

### *Action Tendencies*

A 2 × 3 analysis similar to the one used for the emotion items was performed on theaction tendencies, substituting the emotions for the action tendencies as a within-participants factor. The main effect of punishment versus avoidance was significant, $F(1, 186) = 152.26$, $MSE = 558.01$, $p < .001$, indicating higher overall levels of avoidance than punishment. Harmfulness also had a significant main effect,$F(2, 186) = 9.20$, $MSE = 88.67$, $p < .001$, indicating more general willingness to take any kind of action in harm others versus the other conditions. The expected interaction of harmfulness with punishment versus avoidance was also significant,$F(2, 186) = 5.73$, $MSE = 11.43$, $p = .004$. The harm manipulation increased punishment more so than avoidance, leading to a lower difference between the two in the harm others conditions (see Table 1).

We performed regression analyses for the whole sample to test our general predictions about the correspondence between emotions and action tendencies. These analyses followed the multilevel analytic model of the previous section because the tendencies of avoidance and punishment were correlated across scenarios ($r = .64$). As expected, only anger ($\beta = .39$, $p < .001$) and not disgust ($\beta = -.12$, $p < .05$) positively predicted punishment independent of avoidance. Also, disgust ($\beta = .31$, $p < .001$) but not anger ($\beta = .07$, $p = .30$) predicted avoidance

independent of punishment. These findings reinforce the expected correspondence between emotions and action tendencies and provide another basis for differentiating between these two highly correlated emotions.

## Discussion

Results of this experiment supported our prediction regarding presumption of harm. As expected, the highest level of harm to others was reported in the harm-others conditions. However, harm (vs. benefit) to others was higher than the scalemidpoint in the no-consequences and the harm-self conditions, suggesting presumption of harm. These presumptions of harm were associated with anger but not with disgust, although the two emotions were highly correlated in all the conditions. This effect was especially clear when the harm was presumed and not described. Despite the high correlation between the two emotions, in regression analyses, the harm-others manipulation affected anger independent of disgust but not vice versa. It is important to note that the harm-self manipulation did not have this effect, showing that moral anger depends on more than a negative outcome.

Our predictions about action tendencies were also supported. Results showed that anger was associated with punishment but not avoidance, whereas disgust was associated with avoidance but not punishment, when the shared variance between the two action tendencies was controlled for. These results in the domain of moral emotions further support existing findings on the difference in appraisals and action tendencies between these two emotions, and they make the distinctions between these emotions more clear.

Despite these findings using regression methods, the high correlation between the separate measures of disgust and anger still presented a limitation. We thought it probable that the use of verbal measures alone was responsible for the high correlation, on the basis of the tendency to use words and synonyms related to the emotion of disgust as metaphors for feelings more akin to the emotion of anger (Nabi, 2002). Fortunately, because disgust and anger are considered basic emotions, it was also possible to differentiate them on the basis of emotional facial expressions. Therefore, measures of these emotions using endorsement of both words and facial expressions were included in our further experiments.

## Experiment 2

All the scenarios in Experiment 1 contained elements of taboo violation (e.g., inappropriate sexual acts, unusual food, and contact with the dead), but only in some conditions were they described as harming others. Although results suggested a presumption of harm to others in the three stories used, Experiment 1 did not include any control conditions in which no taboo violations were described. In addition, a clearer demonstration of the effect of presumption of harm might be expected as a result of manipulating the content of only a single story (the "scientist" story from Experiment 1). In order to more clearly confirm a presumption of harm based only on taboo violation, in Experiment 2 the presence of harm to others and taboo violation were manipulated orthogonally, so that their independent effects could be assessed. We expected to find a greater presumption of harm because of the taboo manipulation in the conditions in which harm was not described but equal inference of harm in the taboo and non-taboo conditions where harm was explicitly described. As in Experiment 1, the manipulation of harmfulness to others should affect anger and punishment more strongly than disgust and avoidance. In addition, we predicted that the manipulation of taboo would affect disgust and avoidance more strongly than anger and punishment but that it would create a minor increase in anger and presumed harm in conditions when there was no actual harm to others described—in other words, a Harmfulness × Taboointeraction effect (see Figure 1C).

Another improvement in Experiment 2 is related to investigating the nature of presumed harm. As defined by Rozin et al. (1999), autonomy ethics state that an action is wrong "because it directly hurts another person, or infringes upon his or her rights or freedoms as an individual" (p. 575). Results from Experiment 1 left unclear whether the presumption of harm related to anger was literal or symbolic (e.g., infringing rights). This distinction is important because symbolic harm, rather than actual harm, would be more plausible in this context to use as a justification of a negative reaction, as predicted by the social intuitionist model. We therefore added a symbolic harm measure of rights violation.

A third improvement in Experiment 2 was a manipulation of cognitive load. Cognitive processing performed with a concurrent "load" task, such monitoring text or remembering a long number, tends to rely on more automatic and less effortful processes, without the benefit of deliberative correction (e.g., Gilbert, Tafarodi, & Malone, 1993). Therefore, in our model, cognitive load should impair the process of justifying the negative intuitive moral judgment but not the judgment itself. We should see that in the harmfree conditions, the effect of taboo violation on mean levels of presumed harm is high without cognitive load but reduced under cognitive load, whereas there is no such reduction of emotional or moral disapproval. Moreover, because we expect that harm to symbolic entities—in this case the rights of other people—will be easier to justify than actual harm, it is symbolic rather than actual harm judgments that should be reduced by cognitive load in the expected way.

Finally, a fourth improvement, to reduce the high correlation between anger and disgust, was the measurement of these emotions through judgments of facial expression images. Although the multiple regression techniques we used in Experiment 1 address this potential problem by excluding variance shared by words of anger and disgust, in Experiment 2, we included measures of endorsement of emotional expressions to supplement our verbal measures. These expressions were similar to those used by Rozin et al. (1999). We expected a reduction in the correlation between anger and disgust once expression-based measures were included.

It was expected that these four improvements (the orthogonal design of the manipulations, the inclusion of facial expressions of emotions, the manipulation ofcognitive load, and the differences between symbolic and actual harm) would clarify the role of the presumption of harm to others and reveal its post hoc nature. We also sought to replicate the relationship between harm and anger in conditions in which harm to others was not described but rather presumed.

### Method

#### *Participants*

One hundred ninety-four undergraduate psychology students from the same university as Experiment 1's participants (165 female, 29 male) received partial course credit in return for participation.

#### *Design*

This experiment had a 2 (harmfulness: no harm to others vs. harm to others) × 2 (taboo: taboo action vs. non-taboo action) × 2 (load: load vs. no load) between-participants design.

#### *Materials*

The questionnaire presented a fictitious scenario that was manipulated to create four different variations based on two criteria: whether someone other than the main character was harmed and whether the action performed by the main character

broke a taboo (in this case, the one against eating human flesh; seeAppendix 2). The scenario was based on the no-harm and harm-to-others versions of the "scientist" scenario used in Experiment 1.

All responses were given on 9-point bipolar semantic differential scales, unless otherwise indicated. The order in which the questions were presented was partially counterbalanced in three different forms so that evaluations, harm, and emotions each came first for approximately a third of the sample, with the other questions following in cyclical order (e.g., emotions first, then evaluations, then harm). Action tendencies and load manipulation checks, however, always came last.

*Moral disapproval*

The questionnaire contained four moral evaluation items: completely right/completely wrong, good/bad, correct/incorrect, and positive/negative.

*Harm*

Two questions regarding the perceived level of harm to others were included: "Do you think the action of the scientist was harmful or beneficial for any other people apart from her?" (completely harmful/completely beneficial) and "Do you think the action of the scientist violated the rights of any other people apart from her?" (not at all/extremely).

*Emotion items*

In the *face emotion* items, two photographs of female faces were shown, one showing disgust in the full form and the other showing anger in the open mouth form. The photos were 70 mm × 55 mm in black and white and were taken from Rozin et al. (1999). Participants were instructed to "select the face that best describes your feelings toward the scientist now" and then asked to indicate separately how much of each of the feelings represented by each face (anger or disgust) they had toward the scientist (not at all/extremely). In the *verbal emotion* items, participants were asked to indicated to what extent each story made them feel anger, compassion,depression, disgust, happiness, infuriation, outrage, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, grossed out, and contempt. These measures used scales ranging from 1 (*not at all*) to 8 (*very*).

*Action tendencies*

Participants then were asked to indicate two action tendencies, punishment and avoidance; each one was measured with two items. For punishment, the items were "How much would you like to punish the scientist?" and "How much would you like to publicly condemn the scientist?" For avoidance, they were "How much would you like to avoid the scientist?" and "How much would you like to move away from the scientist?"

*Load manipulation checks*

At the end of the experiment, participants were requested to write down the number they were asked to memorize and to answer four 9-point items that measured the extent to which being asked to remember the number was irritating, annoying, difficult, and distracting (1 = not at all; 9 = extremely).

Procedure

Participants were tested in groups of between 10 and 25, and they did not interact with each other. The experiment was introduced as a study to measure how well people could judge the actions of someone while they had to remember a number. Each group was randomly assigned to one of two cognitive load conditions: load or no load.

At the beginning of the session, the experimenter presented a large piece of paper showing a number to the participants for 90 s and asked them to remember it for the duration of the experiment. A seven-digit number was presented in thecognitive-load condition, and the numeral 1 was presented in the no-load condition.

After the presentation of the number, participants were given a packet of printed materials. They first read the scenario corresponding to their experimental condition and then completed the response measures as described earlier.

## Results

*Cognitive Load*

Of the 194 participants, 12 reported the load number incorrectly, all of them in the load condition. These were excluded from the analyses.

The two items related to the difficulty of the task (if the task was difficult and distracting), being correlated at $r(180) = .77$, were averaged to create a single score. A 2 (harmfulness) × 2 (taboo) × 2 (load) between-participants ANOVA revealed a significant main effect of load, $F(1, 174) = 144.50$, $MSE = 3.15$, $p < .001$, with no other effects significant, showing that the load manipulation increased subjective difficulty.

The "irritating" and "annoying" items, correlated at $r(180) = .88$, were averaged and subjected to the same ANOVA; only load affected this variable, $F(1, 174) = 54.30$,$MSE = 3.92$, $p < .001$, so that participants under load reported the number task to be more irritating, $M = 3.99$, $SD = 2.39$, than participants under no load, $M = 1.82$,$SD = 1.46$. However, load irritation was not significantly related to anger, $r(180) = -.08$, *ns*; to disgust, $r(180) = .00$; or to any of the other dependent variablesstudied. Therefore, it is unlikely that irritation from load itself influenced emotional responses.

*Moral Judgment*

The four moral judgment items formed a reliable scale (Cronbach's $\alpha = .90$) and so were combined to create one single score, in which high numbers meant more judged wrongness. An ANOVA on this score showed significant main effects of harmfulness, $F(1, 174) = 27.50$, $MSE = 2.19$, $p < .001$, indicating more negative evaluation in the harmful condition than in the harmless one; and significant main effects of taboo, $F(1, 174) = 8.70$, $MSE = 2.19$, $p < .01$, showing more negative evaluation for the taboo action than for the non-taboo one. A marginally significant interaction between these two factors was also present, $F(1, 174) = 3.76$, $MSE = 2.19$, $p = .054$. Simple effects analysis revealed that only in the harmless condition did the type of action affect the evaluation, showing an evaluation of the harmless but taboo action ($M = 6.39$, $SD = 1.59$) that was more negative than when the action was not taboo ($M = 5.29$, $SD = 1.48$); this was in line with the pattern shown in Figure 1C. Load did not moderate any of these effects, which was consistent with an interpretation of moral judgment as relatively intuitive.

*Presumption of Harm*

The items measuring actual harm versus benefit to others and symbolic harm (violation of rights) were correlated at $r(180) = .51$, $p < .001$. An additional within-participant factor of item (actual harm vs. symbolic harm) was added to the basic design. Overall, there was a main effect of the harmfulness manipulation, $F(1, 174) = 198.52$, $MSE = 4.29$, $p < .001$, so that it raised judgments both of actual harm and violation of rights. There was also a significant Harmfulness × Item interaction,$F(1, 174) = 128.40$, $MSE = 1.98$, $p < .001$. The effect of the harmfulness manipulation increased symbolic harm (difference between harmful and not harmful$M$s = 4.73) more than it did actual harm (difference between $M$s = 1.37). Finally, there was a significant Harmfulness × Taboo × Item interaction

corresponding to the predicted presumption of harm effect, $F(1, 174) = 4.04$, $MSE = 1.98$, $p < .05$.Simple effects analysis of each type of harm within each level of harmfulness showed that only for symbolic harm was there a significant presumption of harm based on the effects of the taboo manipulation, and only in the condition in which no harm to others was described, $F(1, 174) = 5.77$, $p < .05$.

It was expected that cognitive load would moderate the presumption of harm. We investigated this prediction by further breaking down the previous result by load, which revealed that the simple effect of taboo on symbolic harm was significant when no harm to others was presented and without cognitive load, $F(1, 174) = 4.54$, $p < .05$ (see Figure 2),whereas the comparable effect under load was not significant, $F(1, 174) = 1.38$, $p = .23$. However, as the overall interaction of harmfulness, taboo, and load on symbolic harm was not significant, $F(1, 174) = .08$, $MSE = 3.42$, $p = .78$, this result must be interpreted cautiously.

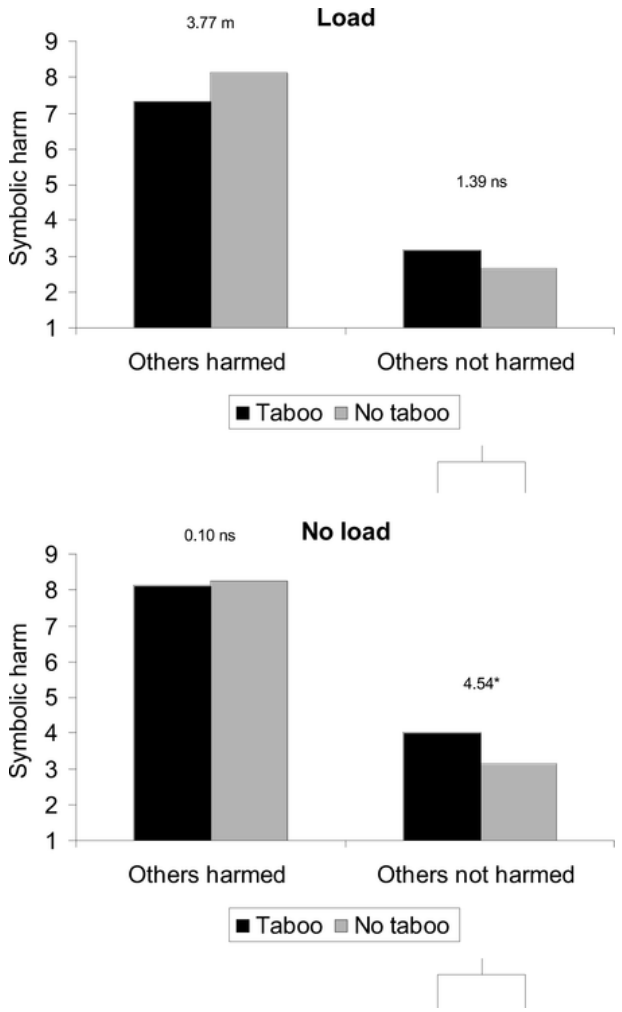


Figure 2. Experiment 2: Effects of harm, taboo, and load manipulations on symbolic harm. Numbers are $F(1,178)$ for simple effect of taboo within harm on that dependent variable. $^{m}p < .10$. $*p < .05$. *ns* = $p > .10$.

*Anger and Disgust*

Words for anger ($\alpha = 0.89$) and disgust ($\alpha = 0.95$) once again formed reliable indices. Anger words correlated more strongly with the scaled endorsement of the anger face, $r(180) = .38$, $p < .001$, than disgust words did, $r(180) = .22$, $p < .01$; and the difference between dependent correlations was significant, $t(179) = 2.84$, $p < .01$. Likewise, disgust words were correlated more strongly with the disgust face,$r(180) = .49$, $p < .001$, than anger words did, $r(180) = .19$, $p < .05$; this difference was also significant, $t(179) = 5.78$, $p < .001$. On this basis, two composite emotion measures were created, averaging the standardized score for each word index with the standardized score for its corresponding facial measure. These indices were correlated less strongly than the indices in Experiment 1, $r(180) = .33$,[1] so we did not feel it necessary to use the other emotion as a covariate.

A Harmfulness × Taboo × Load ANOVA on anger showed a significant main effect of harmfulness, $F(1, 174) = 17.81$, $MSE = 0.59$, $p < .001$; scenarios described as harmful to others aroused greater anger. Taboo did not have a main effect on anger, $F(1, 174) = 2.17$, $MSE = 0.59$, $p = .14$, but there was a significant Harmfulness × Taboo interaction, $F(1, 174) = 9.78$, $MSE = 0.59$, $p < .01$. Simple effects tests (see Figure 3)indicated that, when no harm to others was described, the taboo nature of the act increased anger but that there was no such effect in conditions describing harm to others. Load had no significant main or interactive effects.

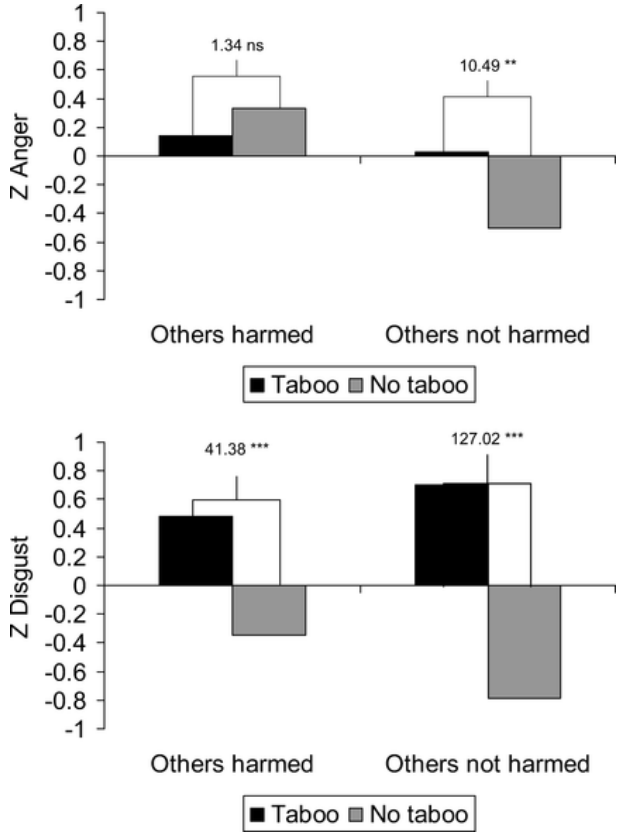


Figure 3. Experiment 2: Effects of harm and taboo manipulations on anger and disgust. Numbers are$F(1,178)$ for simple effect of taboo within harm on that dependent variable. $**p < .01$. $***p < .001$. ns = $p > .10$.

A similar ANOVA on disgust showed a significant main effect of taboo, $F(1, 174) = 157.23$, $MSE = 0.39$, $p < .001$; taboo scenarios aroused greater disgust. Harmfulness did not have a main effect on disgust, $F(1, 174) = 1.56$, $MSE = 0.39$, $p = .21$; but there was a significant Harmfulness × Taboo interaction, $F(1, 174) = 12.37$, $MSE = 0.39$, $p < .01$. Simple effects tests (see Figure 3) indicated that, when both harm and no harm were described, taboo increased disgust but that the effect of taboo was larger when no harm was described. Again, there were no significant main or interactive effects of load on disgust. An analysis adding anger versus disgust (emotion) as a within-participant factor to the basic design confirmed that anger and disgust showed different patterns of influence by the manipulations of harm to others: Emotion × Harmfulness, $F(1, 174) = 8.54$, $MSE = 0.34$, $p < .01$; and by taboo violation: Emotion × Taboo, $F(1, 174) = 63.56$, $MSE = 0.34$, $p < .001$. Taken together, these main and interactive effects confirm our predictions for anger and disgust in Figure 1C.

On the basis of the findings of Experiment 1, it was predicted that anger and not disgust would be associated with presumed harm to others. As in Experiment 1, focusing on the taboo violation/no-harm condition, a regression analysis using anger and disgust as predictors of symbolic harm confirmed that anger was associated with symbolic harm, $\beta = .46$, $p < .01$, independent of disgust, which was not associated with symbolic harm, $\beta = -.18$, *ns*. When actual harm versus benefit was used as the dependent variable, neither anger nor disgust showed significant effects.

*Action Tendencies*

The two punishment items were correlated at $r(180) = .68$, and the two avoidance items were correlated at $r(180) = .78$, so each pair of items was averaged. Because of the high correlation between punishment and avoidance ($r = .58$), each one was added as a covariate in the analysis of the other.

A Harmfulness × Taboo × Load ANOVA on punishment showed significant main effects of harmfulness, $F(1, 173) = 8.38$, $MSE = 2.85$, $p < .01$; and load, $F(1, 173) = 9.58$, $MSE = 2.85$, $p < .01$; but not taboo, $F(1, 173) = 0.01$, $MSE = 2.85$, $p = .93$. As expected, punishment increased when harm was described ($Ms_{adjusted} = 3.54$ for no harm and 4.29 for harm). No interactions were significant.

A similar analysis on avoidance revealed significant main effects of Taboo, $F(1, 173) = 11.53$, $MSE = 3.55$, $p < .001$; but not harmfulness, $F(1, 173) = 2.44$, $MSE = 3.55$, $p = .12$; qualified by a significant interaction between them, $F(1, 173) = 9.89$, $MSE = 3.55$, $p < .01$. The pattern of this interaction showed a greater effect of taboo on avoidance when harm was not described (no taboo $M_{adjusted} = 3.67$, taboo $M_{adjusted} = 5.72$) than when it was described (no taboo $M_{adjusted} = 5.29$, taboo $M_{adjusted} = 5.22$). No effects involving load were significant.

As in Experiment 1, regression analyses confirmed that only anger ($\beta = .30$, $p < .001$), and not disgust ($\beta = .00$, $p = .98$), predicted punishment independent of avoidance. Conversely, disgust ($\beta = .16$, $p < .05$), but not anger ($\beta = .05$, $p = .48$), predicted avoidance independent of punishment.

## Discussion

The independent manipulations of taboo and harm to others in Experiment 2 allowed us to further investigate the relationship between taboo violations and harm. As in Experiment 1, the manipulation of harm to others influenced anger and punishment overall as a main effect but did not influence disgust. Likewise, the manipulation of taboo violation affected disgust and avoidance but not anger. Disgust was also related to avoidant action tendencies, whereas anger was related to attack action tendencies, drawing a further distinction between these two correlated emotions. Moreover, emotional responses were not moderated by load, suggesting that they were preserved even under cognitive constraint.

The results further clarified the nature of the harm inferred from our manipulations. When participants were able to judge symbolic as well as actual harm to others, the manipulation of taboo affected symbolic harm to a greater extent than the measure assessing harm versus benefit. The presumption of harm based on the taboo violation was significant only for the measure of rights violation, which in turn was significant only without cognitive load, as we predicted. However, the difference between load and no-load conditions was not reflected in the expected significant interaction.

As predicted, and replicating the findings of Experiment 1, anger was the only emotion associated with presumed harm from a taboo violation that does not harm other people. It is important to note that anger was associated only with symbolic harm, not with actual harm versus benefit, and disgust was not a significant predictor of harm.

## Experiment 3

Although Experiment 2 further clarified the presumption of harm to others based on a taboo violation, it was expected that this effect would be moderated by cognitive load. Indeed, the effect was significant under a no-load condition and not under a load condition, but the expected higher order interaction did not emerge as significant. One limitation is that the measure of actual harm was not equivalent to the measure of symbolic harm, because the actual harm measure was bipolar, asking for a judgment of harm versus benefit. It is plausible to think that the benefit associated with the action (e.g., seeing the actions of the scientist as a valuable experiment) was involved in judgments of the actual harm measure, whereas this complication was not present in the symbolic harm measure.

An improvement would present measures of symbolic and actual harm that were worded in exact parallel, so that deliberative thought could conclusively reject the implausible judgment of actual harm in favor of the more plausible judgment of symbolic harm. This improvement would also allow us to compare the measures of harm more clearly. To address this issue, Experiment 3 partially replicated Experiment 2, focusing on the conditions that did not describe harm while retaining the factors of taboo and load. The bipolar measure of actual harm and benefit was substituted by unipolar measures. We expected that, with this procedural change, the findings of Experiment 2 would be replicated—a presumption of symbolic harm without harm to others and only without cognitive load—but that the effect of cognitive load would be present not only as a difference between simple effects but as a significant interaction that would indicate post hoc reasoning.

## Method

*Participants*

One hundred nine undergraduate psychology students at the University of Kent and the University of Sussex in Brighton, United Kingdom, participated in the experiment for partial course credit. Of these, 93 were female and 16 were male.

*Design*

The experiment had a 2 (taboo: taboo action vs. no taboo action) × 2 (load: no load vs. cognitive load) between-participants design.

*Materials*

This experiment was presented through a program on a personal computer. The measures and procedure were identical to those of Experiment 2 except that all participants were in the conditions that did not describe harm to others. The questions associated with measures of perceived harm were changed: "To what extent do you think the action of the scientist was harmful to herself?" "To what extent do you think the action of the scientist was beneficial to herself?" "To what extent do you think the action of the scientist was harmful to anyone else apart from the scientist?" "To what extent do you think the action of the scientist was beneficial to anyone else apart from the scientist?" and "Do you think the action of the scientist violated the rights of anyone apart from her?" The analyses will focus on the questions about harm rather than benefit, and on harm to others rather than self.

*Procedure*

Participants were tested in groups of 5 to 20. In each session, individual participants were asked to sit in front of one computer on which the questionnaire was presented. Participants were

randomly assigned to one of the two conditions and also to one of the two tasks.

## Results

### *Manipulation Check*

Fourteen participants, all in the cognitive-load condition, reported the cognitive load number incorrectly and were excluded from the analyses, leaving 95 participants.

### *Presumption of Harm*

We analyzed the perceived harm to others and symbolic harm items using a mixed-model ANOVA with a 2 (harm type: others vs. symbolic, within participant) added to the basic design. Results showed a significant main effect of harm type, $F(1, 91) = 8.20$, $MSE = 1.12$, $p < .01$, showing a higher overall perception of harm to others ($M = 3.41$, $SD = 2.23$) than symbolic harm ($M = 3.00$, $SD = 2.09$). More important, a significant Harm Type × Taboo interaction was present, $F(1, 91) = 6.31$, $MSE = 1.12$, $p < .05$. As in Experiment 2, simple effects analyses showed that perceptions of symbolic harm were higher for the taboo scenario ($M = 3.45$, $SD = 2.47$) than for the non-taboo scenario ($M = 2.56$, $SD = 1.53$), $F(1, 91) = 16.58$, $p < .001$. Moreover, taboo had no effect on perceptions of actual harm, $F(1, 91) = 0.19$, $p = .67$. As expected, this effect was further moderated by a significant Harm Type × Taboo × Load interaction, $F(1, 91) = 8.23$, $MSE = 1.12$, $p < .01$. Simple effects analyses comparing actual with symbolic harm showed that under load, the taboo manipulation increased symbolic harm, $F(1, 91) = 4.43$, $p < .05$; although this increase did not occur without load, $F(1, 91) = 1.27$, $p = .26$ (see Figure 4).Therefore, as predicted, only symbolic harm was presumed and only under no load.

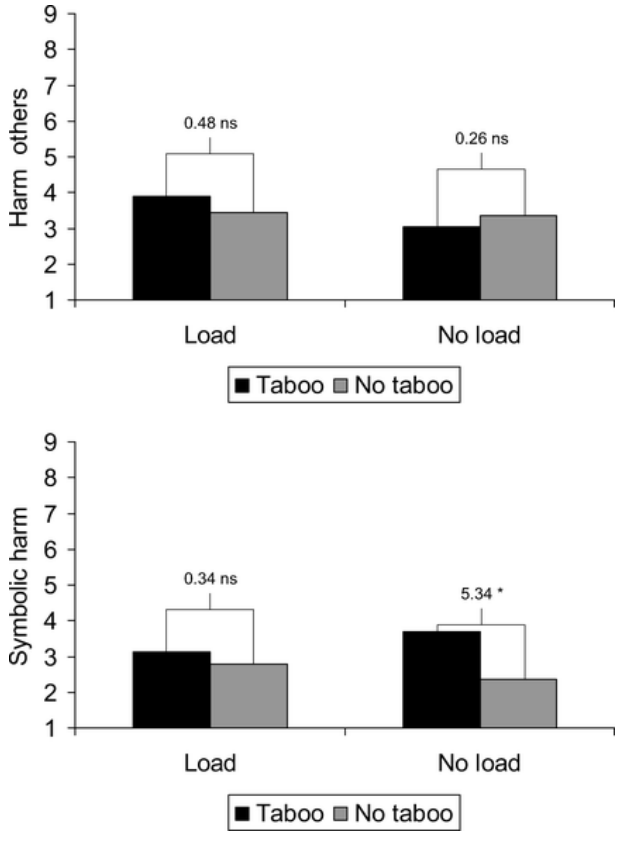


Figure 4. Experiment 3: Effects of taboo and load manipulation on perceived actual and symbolic harm. Numbers are $F(1, 91)$ for simple effect of taboo. *$p < .05$. ns = $p > .10$.

### *Moral Judgment*

The four items measuring moral judgment (Cronbach's α = .90) were averaged and analyzed, revealing a significant main effect of taboo, $F(1, 91) = 8.26$, $MSE = 2.16$,$p < .01$, indicating that the taboo action was evaluated as more wrong ($M = 6.12$,$SD = 1.34$) than the non-taboo action ($M = 5.27$, $SD = 1.57$). The main effect of load and the interaction between the two factors were not significant (all *p*s> .25).

### *Anger and Disgust*

As in Experiment 2, the anger face was more correlated with anger words, $r(93) = .73$, than with disgust words, $r(93) = .52$; and the difference between correlationswas significant, $t(92) = 3.70$, $p < .001$, whereas disgust words were more correlated with the disgust face, $r(93) = .76$, than anger words were, $r(93) = .54$, $t(92) = 4.16$, $p < .001$. The same procedure as in Experiment 2 was used to create one index for each emotion. These indices were correlated at $r = .64$.

A 2 (Taboo) × 2 (Load) ANOVA on anger revealed a marginal main effect of taboo,$F(1, 91) = 3.19$, $MSE = 0.93$, $p = .08$; taboo tended to increase mean levels of anger (see Figure 5).

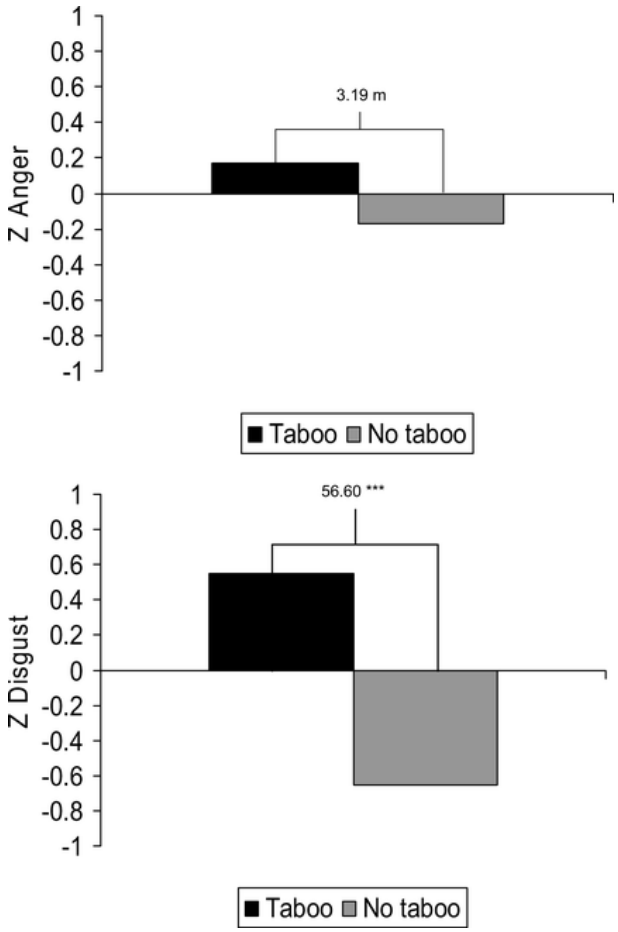


Figure 5. Experiment 3: Effects of taboo manipulation on anger and disgust. Numbers are$F(1, 91)$ for simple effect of taboo. $^{m}p < .10$. ***$p < .001$.

A similar analysis on the disgust index revealed a much stronger significant main effect of taboo, $F(1, 91) = 56.60$, $MSE = 0.62$, $p < .001$ (see Figure 5); the taboo condition aroused more disgust than the control condition. These results, within Experiment 3's partial design, again confirm the predictions of Figure 1C. Finally, adding a within-participant factor of emotion (anger vs. disgust) to the design yielded a significant Taboo × Emotion interaction confirming that the taboo manipulation affected disgust more than anger, $F(1, 91) = 34.50$, $MSE = 0.25$, $p < .001$. The main effect of load and those of the interactions with load were not significant for either emotion (all *p*s> .40).

As in Experiment 2, we used regression analysis to investigate the effect of anger and disgust on the presumption of harm. Anger was again associated with perceived symbolic harm,

β = .64, $p < .001$; whereas disgust was not, β = −.09, *ns*. This pattern was repeated for actual harm (for anger, β = .57, $p < .01$; and for disgust, β = −.09, *ns*). Again, moral anger and not disgust was associated with the presumption of harm.

*Action Tendencies*

The two items regarding punishment, $r(93) = .84$, $p < .001$, and the two items regarding avoidance, $r(93) = .87$, $p < .001$, were each averaged to create one index for each action tendency, and these indices were correlated at $r = .58$. A 2 (taboo) × 2 (load) ANOVA on punishment controlling for avoidance revealed no significantmain effects or interactions (all *p*s> .36). A similar analysis on avoidance showed only a significant main effect of Taboo, $F(1, 90) = 12.97$, $MSE = 3.40$, $p < .001$, so that avoidance was higher in the taboo condition ($M_{adjusted}$) = 4.36 than in the non-taboo condition ($M_{adjusted} = 3.68$). Across all conditions, anger (β = .47, $p < .001$) but not disgust (β = .07, $p = .53$) predicted punishment. Only disgust (β = .53, $p < .001$), but not anger (β = .03, $p = .77$), was a significant predictor of avoidance.

## General Discussion

*Presumption of Harm*

Results of these three experiments supported our model explaining the presumption of harm to others from a taboo violation as a post hoc justification of anger. In Experiment 1, taboo-violating scenarios explicitly described as being private and consensual nonetheless led to levels of presumed harm to others higher than themidpoint of the scale. Although this result was suggestive rather than conclusive, Experiments 2 and 3 confirmed the presumption of harm based on independent manipulations of harm to others and taboo violation. In conditions in which taboo violation and no harm to others was described, participants nonetheless inferred harm to others. This inference took the form of violation of rights when such an option was offered, plausibly because it was a more defensible inference than actual harm to others, under conditions in which the act was explicitly described as private and not involving others at all. It is important to note that this presumption of harm was associated with the emotion anger and not disgust across all studies. Our results more systematically confirm previous findings in which harm was inferred in connection to a private, consensual taboo violation. They establish the presumption of harm as a reaction to taboo violations only when harm is not explicitly described; establish the presumption of harm as linked specifically to anger; and show that, when given the option to do so, participants will describe the presumed harm as symbolic rather than actual.

When actual harm was measured separately from benefit in Experiment 3, the interaction between harm, cognitive load, and taboo violation showed that participants presumed symbolic rather than actual harm from a harmless taboo violation without cognitive load, whereas under load there was no such tendency. Moreover, cognitive load did not moderate the reported levels of anger or disgust or the moral judgment of the act as right or wrong. These results support our hypothesis regarding the post hoc nature of the presumption of harm based on the social intuitionist model, in the sense that an immediate and intuitive emotional moral response to the taboo violation was later justified through the presumption of harm, to the extent that it specifically involved anger rather than disgust. When cognitive load was present, the presumption of symbolic harm as a form of justification was not made.

*Emotions and Action Tendencies*

The moderate to high correlations we found between anger and disgust further support their categorization within the family of moral emotions (Haidt, 2003). However, these experiments provided evidence for distinct antecedents of moral anger and moral disgust. The manipulations of harm to others consistently affected anger and punishment more than disgust and avoidance. Likewise, manipulations of taboo violations affected disgust and avoidance to a greater degree than anger and punishment. Supporting our explanation of presumption of harm, the manipulations of taboo also elicited a certain degree of anger when no harm was explicitly described, which was uniquely associated with presumed harm to others.

Despite high correlations between the action tendencies of punishment and avoidance, it is important to notice that, across our studies, anger predicted the action tendency toward punishment independent of disgust. Likewise, disgust predicted the action tendency toward avoidance independent of anger. Although these relationships can be theoretically predicted, the inclusion of measures of action tendencies further clarified the distinctions between anger and disgust in conditions wherein these emotions were highly correlated.

*Theoretical Implications*

The results presented here remind us not only that emotions can be studied as a response toward specific situations or appraisals but also that emotions can also have influence on appraisals and judgments. In particular, the strong association between harm and anger indicates that harm can be seen not only an elicitor of anger but also as a response to it, based on the disappearance of presumption of harm (but not anger) under cognitive load. These findings reinforce the assumptions of the social intuitionist model, the "intuitive prosecutor" hypothesis, and related ideas (e.g., Lerner &Tiedens, 2006) by showing that presumption of harm can be used as an elaborated justification to an emotional reaction. These results also give empirical support to the post hoc nature of such processes previously assumed byHaidt and Hersh (2001) and demonstrated by Goldberg et al. (1999) but additionally manipulating the nature of the violation to more clearly investigate the roles of anger and disgust and the important association of anger with harm.

More specifically, these results extend and clarify the roles of anger and disgust as moral emotions as proposed by the CAD triad hypothesis (Rozin et al., 1999). The use of independent ratings of emotions rather than of forced choices, and the manipulation of the contents of similar scenarios rather than the comparison of holistically different ones, confirm the assertion that moral anger primarily arises from transgressions of the ethics of autonomy, including harm and violations of rights. Similarly, Experiments 2 and 3 showed that systematically varying the extent to which an act constituted a creatural taboo violation involving the body (cannibalism) led to increased disgust. Although our results mostly support the proposals of the CAD hypothesis, it may be premature to limit the emotional response of disgust to the ethics of divinity and anger to the ethics of autonomy. The discovery of lesser but significant increases in anger when a harmless taboo violation was described indicates that, although such a scenario may arouse disgust as the prevailing response, it also brings up some degree of anger when compared with a harmless act that does not involve violating a taboo.

The results presented here raise the question of whether anger comes from socially learned associations to a taboo act or from basic reactions to it. On one hand, it is plausible to think that most cases of cannibalism, for example, are indeed harmful to others, so that anger is associated with any thought of eating human meat, even if technology renders it innocuous. On the other hand, it is also plausible to think that acts such as incest and cannibalism are noxious to contemplate, so that a basic nonmoral form of anger is evoked in more primitive reactions to these stimuli (Berkowitz, 1999). The degree to which these processes

each contribute to anger toward harmless taboo violations awaits future clarification.

*General Implications*

Investigating the differences between anger and disgust is important not only in terms of theory but also in practical applications to intergroup relations. Although these experiments used extreme and even bizarre cases to explore the presumption of harm, other results show that homosexuality can elicit an equally visceral disgust reaction (Cottrell &Neuberg, 2005; Haidt&Hersh, 2001). In fact, we used our more arcane examples because we wanted to tap into issues in which social normsagainst prejudice would not interfere with honest expression of emotional reaction and moral judgment. Therefore, describing behaviors that are not protected by even the most liberal norms of tolerance can possibly shed some light on the role of the emotions among those who themselves reject norms of tolerance toward gays and other sexual minorities.

Extending existing results on sexual prejudice, we showed that the reactions to taboo violations are not limited to the avoidance of the person performing the action but that anger and punitive action tendencies can also occur, even in cases when the actions are harmless, private, and consensual. These results can partially explain some of the hostile reactions toward some groups, such as homosexuals, which are based mostly on the violations of symbolic values and moral norms and not on actual harm to other people. These reactions may be intensified by the usual relationship between taboo violations and actual harm. In most cases of creatural taboo transgressions, such as cannibalism or incest, the result is usually direct harm to others, creating a strong association between harm and anger. It is plausible to think that this association is present even when there is no harm described, so that when anger is evoked, harm is related to it (Alicke, 2000). It is not out of the question that similar anger reactions could be associated with gay men for a person raised to think that homosexuals were especially likely to molest children, sexually transmit disease, and spread their lifestyle to unwilling others—all beliefs characteristic of antigay attitudes (Herek, Widaman, &Capitanio, 2005).

The distinction between symbolic and actual harm revealed that a taboo violation can be perceived as having negative consequences for others, even as the result of private and consensual actions. Although our research does not directly address the extent to which post hoc presumption of harm is a motivated process explicitly driven by values, rather than a mere byproduct of emotional associations, other research does show that violations of sexual morality elicit presumption of harm primarily among political conservatives (Haidt&Hersh, 2001). This points to an effect that, in some domains, interacts with systems of values and morality. Cultural conservatives, for example, often claim that opposite-sex marriages are somehow harmed by extending marriage rights to same-sex couples, as shown by the title of the "Defense of Marriage Act." Arguments such as this, baffling as they may be to supporters of liberal standards, make sense to those who believe that respect to symbolic entities is more important than the right of individual decisions and actions.

Although our results linked the presumption of harm to anger, it is also possible that presumption of harm may sometimes work to justify reactions based on disgust. For example, some scholars such as Kass (1997) have argued that feelings of repugnance alert us to important considerations outside a utilitarian cost-benefit analysis, and that while these feelings should be weighed against pragmatic concerns, they explain why society does and should recoil from practices such as human cloning. Presuming harm may also serve important social and motivational functions, intensifying sanctions against those who transgress taboo norms (Neuberg, Smith, & Asher, 2000) or reacting aggressively against reminders of our animal nature (Goldenberg, Pyszczynski, Greenberg, et al., 2001; Goldenberg, Pyszczynski, McCoy, et al., 1999). This post hoc presumption can also be used to justify moral judgments based on ideology, political, or religious beliefs. For example,Haidt and Hersh (2001) reported that conservatives tend to use all three moral codes proposed by the CAD triad hypothesis, whereas the moral domain of liberals was limited only to the ethics of autonomy.

Although these results highlight the effect of taboo violations on reactions of anger and harm, these experiments did not test the possibility that noncreatural actions associated with sociomoral disgust—such as racism or cheating—could have similar effects or whether noncreatural actions associated with divinity violations could have these effects as well. Our examples, as well as the divinity ethics violations in Rozin et al.'s (1999) study, all involved violation of some bodily norm about food (meat in particular), disease, or sexuality. A true test of whether disgust is essentially creatural (vs. divinity related) would involve violations of purity in aesthetic and religious rather than bodily realms. Future research should focus on investigating whether sociomoral disgust can arise reliably, as its implications for prejudice and racism are important. If some hostile reactions toward other groups are based on perceived harm to symbolic entities, research on intergroup violence and discrimination can benefit from research on moral emotions, as the presumption of harm will be associated with anger, and anger with punitive action tendencies.

## References


Alicke, M. D. (2000). Culpable control and the psychology of blame. *Psychological Bulletin*, *126*(4), 556–574.

Berkowitz, L. (1999). Anger. In T. Dalgleish & M. Power (Eds.), *Handbook of cognition and emotion* (pp. 411–428). New York: Wiley.

Cooperman, A. (2003, April 22). Santorum angers gay rights groups. *The Washington Post*, p. A04.

Cottrell, C. A., & Neuberg, S. L. (2005). Different emotional reactions to different groups: A sociofunctional threat-based approach to "prejudice." *Journal of Personality and Social Psychology*, *88*, 770–789.

Dalrymple, T. (2004, January 5). The case for cannibalism. [Electronic version]. *City Journal*, *14*, page 2. Retrieved April 26, 2004, from http://www.city-journal.org/html/eon_01_05_04td.html

Frijda, N. H. (1986). *The emotions*. Cambridge, United Kingdom: Cambridge University Press.

Gilbert, D. T., Tafarodi, R. W., & Malone, P. S. (1993). You can't not believe everything you read. *Journal of Personality and Social Psychology*, *65*, 221–233.

Goldberg, J. H., Lerner, J. S., & Tetlock, P. E. (1999). Rage and reason: The psychology of the intuitive prosecutor. *European Journal of Social Psychology*, *29*, 781–795.

Goldenberg, J. L., Pyszczynski, T., Greenberg, J., Solomon, S., Kluck, B., & Cornwell,R. (2001). I am not an animal: Mortality salience, disgust, and the denial of human creatureliness. *Journal of Experimental Psychology: General*, *130*, 427–435.

Goldenberg, J. L., Pyszczynski, T., McCoy, S. K., Greenberg, J., & Solomon, S.(1999). Death, sex, love, and neuroticism: Why is sex such a problem? *Journal of Personality and Social Psychology*, *77*, 1173–1187.

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. In R. Davidson, J, K. R. Scherer, & H. H.Goldsmith (Eds.), *Handbook of affective sciences* (pp. 852–870). Oxford, United Kingdom: Oxford University Press.

Haidt, J., Björklund, F., & Murphy, S. (2004). *Moral dumbfounding: When intuition finds no reason*. Unpublished manuscript, University of Virginia.

Haidt, J., & Hersh, M. A. (2001). Sexual morality: The cultures and emotions of conservatives and liberals. *Journal of Applied Social Psychology*, *31*, 191–221.

Haidt, J., Koller, S. H., & Dias, M. G. (1993). Affect, culture, and morality, or is it wrong to eat your dog? *Journal of Personality and Social Psychology*, *65*, 613–628.

Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling 7 domains of disgust elicitors. *Personality and Individual Differences*, *16*, 701–713.

Harding, L. (2004, January 31). Cannibal who cooked victim in garlic is cleared of murder. *The Guardian*, p.2.

Herek, G. M., Widaman, K. F., & Capitanio, J. P. (2005). When sex equals AIDS: Symbolic stigma and heterosexual adults' inaccurate beliefs about sexual transmission of AIDS. *Social Problems*, *52*, 15–37.

Kass, L. R. (1997). The wisdom of repugnance. *The New Republic*, *216*, 17–26.

Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology, 4th ed.*(*Vol. 1*, pp. 233–265). Boston: McGraw-Hill.

Kohlberg, L. (1981). *The philosophy of moral development: Moral stages and the idea of justice*. San Francisco: Harper & Row.

Kuppens, P., Van Mechelen, I., Smits, D. J. M., & De Boeck, P. (2003). The appraisal basis of anger: Specificity, necessity and sufficiency of components. *Emotion*, *3*, 254–269.

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford, United Kingdom: Oxford University Press.

Lazarus, R. S. (2001). Relational meaning and discrete emotions. In K. R. Scherer, A.Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion* (pp. 37–67). Oxford, United Kingdom: Oxford University Press.

Lerner, J. S., & Tiedens, L. Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making*, *19*, 115–137.

Mackie, D. M., Devos, T., & Smith, E. R. (2000). Intergroup emotions: Explaining offensive action tendencies in an intergroup context. *Journal of Personality and Social Psychology*, *79*, 602–616.

Marzillier, S. L., & Davey, G. C. L. (2004). The emotional profiling of disgust-eliciting stimuli: Evidence for primary and complex disgusts. *Cognition and Emotion*, *18*, 313–336.

Nabi, R. L. (2002). The theoretical versus the lay meaning of disgust: Implications for emotion research. *Cognition & Emotion*, *16*, 695–703.

Neuberg, S. L., Smith, D. M., & Asher, T. (2000). Why people stigmatize: Toward a biocultural framework. In T. F. Heatherton, R. E. Kleck, & M. R. Hebl (Eds.), *The social psychology of stigma* (pp. 31–61). New York: Guilford Press.

Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. Cambridge, United Kingdom: Cambridge University Press.

Park, J. H., Faulkner, J., & Schaller, M. (2003). Evolved disease-avoidance processes and contemporary anti-social behavior: Prejudicial attitudes and avoidance of people with physical disabilities. *Journal of Nonverbal Behavior*, *27*, 65–87.

Roseman, I. J., Antoniou, A. A., & Jose, P. E. (1996). Appraisal determinants of emotions: Constructing a more accurate and comprehensive theory. *Cognition & Emotion*, *10*, 241–277.

Roseman, I. J., & Smith, C. A. (2001). Appraisal theory: Overview, assumptions, varieties, controversies. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.),*Appraisal processes in emotion: Theory, methods, research* (pp. 3–19). Oxford, United Kingdom: Oxford University Press.

Rozin, P., Millman, L., & Nemeroff, C. (1986). Operation of the laws of sympathetic magic in disgust and other domains. *Journal of Personality and Social Psychology*,*50*, 703–712.

Russell, J. A., & Fehr, B. (1994). Fuzzy concepts in a fuzzy hierarchy: Varieties of anger. *Journal of Personality and Social Psychology*, *67*, 186–205.

Scherer, K. R. (1999). Appraisal theory. In T. Dalgleish & M. Power (Eds.), *Handbook of cognition and emotion* (pp. 637–663) New York: Wiley.

Shweder, R. A., Munch, N. C., Mahaptra, M., & Park, L. (1997). The "big three" of morality (autonomy, community, divinity) and the "big three" explanations of suffering. In A. Brandt & P. Rozin (Eds.), *Morality and health* (pp. 119–169). New York: Routledge.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion.*Journal of Personality and Social Psychology*, *48*, 813–838.

Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, *89*, 845–851.

Tangney, J. P., Stuewig, C. S., & Mashek, D. J. (2007). Moral emotions and moral behavior. *Annual Review of Psychology*, *58*, 345–372.

Tapias, M. P., Glaser, J., Keltner, D., Vasquez, K., & Wickens, T. D. (2007). Emotion and prejudice: Appraisal tendencies and specific emotions toward outgroups. *Group Processes and Intergroup Relations*, *10*, 27–40.

Weiner, B. (1986). *An attributional theory of motivation and emotion*. New York: Springer.

Wheatley, T., & Haidt, J. (2005). Hypnotically induced disgust makes moral judgments more severe. *Psychological Science*, *16*, 780–784.

## Appendix A: Scenarios Used in Experiment 1

*Incest*

Julie and Mark are brother and sister. They are traveling together in France on a summer vacation from college. One night they are saying alone in a cabin near the beach. They decide that it would be interesting and fun if they tried making love. At very least it would be a new experience for each of them. Julie was already taking birth control pills, but Mark uses a condom too, just to be safe. They both enjoy making love, but they decide not to do it again.

*No consequences:* Julie and Mark have no regrets about that night and keep it as a special secret between them, which makes then feel even closer to each other. Eventually, they move on and are able to form successful long-term committed relationships with other people. Nobody ever finds out about what they did on their holiday.

*Harm to self:* Julie and Mark develop deep regrets about that night and keep it as a dark secret, which complicates the relationship between them. Eventually, they are unable to form successful long-term committed relationships with other people. Nobody ever finds out about what they did on their holiday.

*Harm to others:* Julie and Mark have no regrets about that night and try to keep it as a special secret between them, which makes then feel even closer to each other. Eventually, they move on and are able to form successful long-term committed relationships with other people. However, their family eventually finds out and they are very hurt by what Julie and Mark have done.

*Necrophilia*

A man belongs to a necrophilia club that has devised a way to satisfy the desire to have sex with dead people. Each member donates his or her body to the club after death so that the other members of the club can have sex with the corpse. The man has sex with a dead woman who gave her body to the club.

*No consequences and no harm to self:* She had no surviving family members. The man and all other members of the club use adequate protection so there is no risk of disease being spread. After they are done, they cremate the woman's body, following her final instructions to them.

*No consequences:* The man and his fellow club members have no regrets or mental anguish about what they are doing. They understand that it's important to keep their club a secret and they are very successful in making sure nobody in the "outside world" finds out about it. Also, they know the limits of the club, and they are never tempted to harm living people or engage in sex with corpses whose owners did not consent beforehand.

*Harm self:* The man and his fellow club members are tormented by regret and mental anguish about what they are doing. They understand that it's important to keep their club a secret and they are very successful in making sure nobody in the "outside world" finds out about it. Also, they know the limits of the club, and they are never tempted to harm living people or engage in sex with corpses whose owners did not consent beforehand.

*Harm others:* The man and his fellow club members have no regrets or mental anguish about what they are doing. They try to keep their club a secret, but the family of the dead woman eventually finds out and is deeply hurt. Also, some of the members of the club are tempted to break the rules and engage in sex with corpses whose owners did not consent beforehand.

*Scientist*

A scientist studying recent advances in cell cloning technology takes a group of muscle cells from her arm and clones them in a vat. The cells grow into a strip of human muscle tissue about the size of a steak. When the process is finished, she is curious about the meat's taste, so she takes the strip of tissue and grills it on a barbecue.

*No consequences and harm self:* She eats it alone for dinner.

*Harm to others:* She gives it to her friends without their knowledge. She knows she is free of any communicable diseases.

*No consequences:* The scientist does not develop a taste for human flesh, and she is never tempted to harm people. Her curiosity is satisfied and she goes on with her research. She has no regrets or worries about what she has done, as it was all in the name of science.

*Harm self:* The scientist does not develop a taste for human flesh, and she is never tempted to harm people. Her curiosity is satisfied and she goes on with her research. However, she develops deep regrets about what she has done and worries about whether it was worth doing in the name of science.

*Harm others:* Their friends did not develop a taste for human flesh, and she is never tempted to harm people. Her curiosity is satisfied and she goes on with her research. She has no regrets or worries about what she has done, as it was all in the name of science. Her friends all enjoyed the dinner, but when they find out afterwards what it was, they become quite upset and the scientist has to apologize to them.

## Appendix B: Scenarios Used in Experiment 2

*Non-Taboo-Violating Versions*

A scientist studying recent advances in human memory is investigating a new drug that may increase the capabilities of human memory. When she finally completes the process, she is curious about the effects of the drug, so she mixes the drug with water.

*No harm:* She drinks it with her dinner to test it on herself.

*No harm to others:* She gives it to her friends at a dinner without their knowledge to test it on them. She has no reason to believe that the drug has negative effects on humans.

The scientist does not test the drug again, and she was careful with the use of the drug. Her curiosity is satisfied and she goes on with her research.

*No harm:* She has no regrets or worries about what she has done, as it was all in the name of science.

*Taboo-Violating Versions*

A scientist studying recent advances in cell cloning technology takes a group of muscle cells from her arm and clones them in a vat. The cells grow into a strip of human muscle tissue about the size of a steak. When the process is finished, she is curious about the meat's taste, so she takes the strip of tissue and grills it.

*No harm:* She eats it alone for dinner.

*No harm to others:* She serves it to her friends for dinner without their knowledge. She knows it is free of any communicable diseases.

The scientist does not develop a taste for human flesh, and she is never tempted to harm people. Her curiosity is satisfied and she goes on with her research.

*No harm:* She has no regrets or worries about what she has done, as it was all in the name of science.

## Footnotes

**1** Because of this lower correlation, it was not necessary to include one emotion as a covariate in analyzing the other emotion. In fact, for Studies 2 and 3, analyses covarying out disgust from anger and anger from disgust gave results similar to the results reported without covariates.

These experiments were partially sponsored by a grant from Mexico's National Council of Science and Technology to Roberto Gutierrez. We thank Jessica Salvatore for assistance in creating materials for Experiment 1 and Ana Guinote and Jonathan Haidt for comments on a draft of the manuscript.