

## BRIEF REPORT

## Disgusting Smells Cause Decreased Liking of Gay Men

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An induction of disgust can lead to more negative attitudes toward an entire social group: Participants who were exposed to a noxious ambient odor reported less warmth toward gay men. This effect of disgust was equally strong for political liberals and conservatives, and was specific to attitudes toward gay men—there was only a weak effect of disgust on people’s warmth toward lesbians, and no consistent effect on attitudes toward African Americans, the elderly, or a range of political issues.

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The emotion of disgust is evoked by substances such as urine, vomit, blood, and feces, but it also plays a significant role in human social and moral judgment (Bloom, 2004; Rozin, Haidt, & McCauley, 2000). A growing body of work demonstrates that making participants feel disgusted while they evaluate the moral actions of others can lead them to make harsher judgments, both of the acts and of the individuals committing them. For example, participants who were given a posthypnotic suggestion to feel disgust while reading about moral violations judged them as more severe (Wheatley & Haidt, 2005). Likewise, participants exposed to disgusting film clips, foul odors, dirty surroundings, and even disgusting tastes were harsher moral judges (Eskine, Kacinek, & Prinz, 2011; Horberg, Oveis, Keltner, & Cohen, 2009; Schnall, Haidt, Clore, & Jordan, 2008).

But how does disgust influence attitudes toward groups? Throughout history the rhetoric of disgust has been used against marginalized groups. As Nussbaum (2001) puts it, “certain disgust properties—sliminess, bad smell, stickiness, decay, foulness—have repeatedly and monotonously been associated with . . . Jews, women, homosexuals, untouchables, lower-class people—all of these are imagined as tainted by the dirt of the body.” Yet there is little research exploring whether disgust can actually shift individuals’ attitudes toward entire social groups. The evidence thus far

comes from correlational studies which show that individuals who are more prone to experiencing disgust are more likely to hold negative attitudes toward certain social groups. For instance, they are more likely to have negative explicit (Tapias, Glaser, Vasquez, Keltner, & Wickens, 2007) and implicit (Inbar, Pizarro, Knobe, & Bloom, 2009) attitudes toward gay men. Similarly, Hodson and Costello (2007) found that a tendency to experience interpersonal disgust was predictive of xenophobia and negative attitudes toward stigmatized outgroups.

Although these results are consistent with the claim that experiencing disgust during the evaluation of an outgroup might shape an individual’s social judgment of that group, they cannot demonstrate that disgust plays a causal role. It could be, for example, that the highly disgust-sensitive share some other characteristic that leads them to judge outgroups more harshly.

More convincing evidence for causation would involve showing that *inducing* disgust experimentally can give rise to negative evaluations of an entire social group. Initial evidence along these lines was reported by Dasgupta and colleagues (Dasgupta, DeSteno, Williams, & Hunsinger, 2009), who demonstrated that specific emotions (i.e., disgust and anger) have differential effects on implicit attitudes toward specific social groups. Using a common measure of implicit attitudes [the Implicit Association Task (IAT)], the authors demonstrated that inducing disgust in participants (by means of disgusting images and autobiographical writing) led to more negative implicit attitudes toward homosexuality as measured by the gay/straight version of the IAT (whereas inducing anger led to more negative implicit attitudes toward Arabs).

What about explicit attitudes? As their goal was to investigate the effect of specific emotions on implicit attitudes, Dasgupta et al. did not assess explicit attitudes toward these groups. It is these explicit attitudes, however, that are argued to be affected by appeals to disgust outside of the laboratory (Nussbaum, 2001,

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2010). Furthermore, the relationship between implicit attitudes and explicit attitudes is quite variable—in many cases implicit attitudes are poor predictors of explicit judgments (Nosek, 2005, 2007). In the specific case of judgments of outgroups, this may be because a commitment to egalitarian values can motivate individuals to “correct” even for strong negative implicit attitudes (Fazio, Jackson, Dunton, & Williams, 1995). It is therefore unclear whether disgust can affect explicit attitudes toward stigmatized outgroups.

In the current study we sought to investigate this possibility by focusing specifically on the effects of disgust on attitudes toward a particular stigmatized outgroup—gay men. Homosexual men have been one of the most frequent targets of the rhetoric of disgust (Nussbaum, 2001, 2010), and individuals who report negative attitudes toward gay men often report feeling disgusted (Herek, 1993). Accordingly, we hypothesized that participants who were disgusted by exposure to an ambient noxious odor would report less liking for gay men. In order to explore the scope of the effects of this disgust manipulation—whether it was limited to gay men or extended more broadly—we also assessed attitudes toward a number of other social groups, as well as on a range of participants’ political and moral views.

Our sample consisted primarily of socially liberal university undergraduates. Although political liberals are less likely to view disgust as a morally relevant emotion (Graham, Haidt, & Nosek, 2009) and are more committed to egalitarian values (Jost, Glaser, Kruglanski, & Sulloway, 2003), we nonetheless hypothesized that because disgust is strongly implicated in moral judgments in general and attitudes toward gay men in particular, our subtle disgust induction would increase negativity toward gay men even in this population.

## Method

Participants were 61 heterosexual undergraduates (50 female) at a large Northeastern university who were randomly assigned to a *no smell* condition ( $n = 23$ ) or to a *smell* condition ( $n = 38$ ). In the smell condition, a research assistant applied a disgusting odorant (a commercially available novelty stink spray) to a trashcan in the corner of the 600-square-foot lab room immediately before the participant entered.

Participants were told that the study concerned people’s social and political attitudes. We first asked participants to complete a “feeling thermometer” task in which they indicated their feelings toward a variety of social groups. For each group, participants were provided with an example scale, which was a line anchored by *Cold* (0) and *Warm* (100), with the midpoint labeled *Neutral* (50), and were asked to enter a number between 0 and 100. Using this scale, participants indicated their feelings toward gay men, lesbians, heterosexual men, and heterosexual women, as well as toward 15 other social groups (e.g., “European Americans,” “The elderly,” “College students,” and “African Americans,” “Midwesterners,” “Athletes,” “Southerners”). These additional social groups were included both to obscure the purpose of the study and to allow us to investigate the specificity of the disgust manipulation. All 19 group names were presented in random order on a computer, and participants indicated their ratings for each group before moving on to the next.

Participants were next asked to indicate their attitudes on a set of political issues (also presented in random order) including gay

marriage, abortion, and the Iraq war on a scale from 1 (*Completely Disagree*) to 7 (*Completely agree*). Counterbalanced with the first two measures, which always appeared in the order described, participants completed an implicit measure of attitudes toward homosexuality (a gay-heterosexual IAT; Nosek, Banaji, & Greenwald, 2006) that showed no effect by condition.<sup>1</sup> We will not discuss this measure further in the results but will return to it in the General Discussion.

Participants next completed two tasks unrelated to the current research, followed by a series of demographic questions including political orientation (on a seven-point scale anchored by “Extremely Liberal” and “Extremely Conservative”). Finally, participants responded to a series of questions designed to assess the effectiveness of the smell manipulation by indicating their current level of disgust on a scale from 1 (*Not at all disgusted*) to 7 (*Very disgusted*), how pleasant the room smelled from 1 (*Extremely unpleasant*) to 7 (*Extremely pleasant*), and how much they had been bothered by any odor from 1 (*Didn’t bother me at all*) to 7 (*Completely nauseated me*). Participants were then probed for suspicion, debriefed, thanked, and dismissed.

## Results and Discussion

We excluded two participants (one who guessed our hypothesis during debriefing, and one who gave a response of “900” on the feeling thermometer rating for gay men), leaving us with 59 participants. Responses to the three manipulation check items (*disgusted*, *odor pleasant*, and *odor bothered me*) were standardized and averaged into a composite score ( $\alpha = .74$ ). As expected, participants in the smell condition scored higher on this composite ( $M = .11$ ) than those in the control condition ( $M = -.12$ ),  $t(57) = 2.58$ ,  $p = .01$ , and this effect was not moderated by gender,  $F(1, 55) = .11$ ,  $ns$ . The smell manipulation did not affect political orientation,  $t(57) = .92$ ,  $p = .36$ , which was therefore used as a covariate in the following analyses.

Because women are generally more disgust-sensitive (Druschel & Sherman, 1999; Haidt, McCauley, & Rozin, 1994) and more accepting of gay people (Kite & Whitely, 1996), we included gender and the interaction between gender and condition in our analyses.

Our primary focus was on the effect of disgust on participants’ attitudes toward specific social groups as measured by their ratings of these groups on the feeling thermometer scales. In order to control for individual differences in scale use, feeling thermometer ratings of groups are typically analyzed by creating difference scores between a target group and a comparison group (e.g., Sears & Henry, 2003; Uhlmann et al., 2002; see also Wilcox, Sigelman, & Cook, 1989). Accordingly, we created composite attitude scores by subtracting feeling thermometer ratings for heterosexual men from those for gay men and ratings for heterosexual women from those for lesbians. Higher numbers therefore indicate more favorable attitudes toward gay men and lesbian women.

### Gay Men

Participants in the smell condition showed less warmth toward gay men relative to heterosexual men,  $M_{smell} = -12.93$ ,  $M_{control} =$

<sup>1</sup> Order did not affect any results.

4.92,  $\beta = -.36$ ,  $t(54) = -2.24$ ,  $p = .03$  (to correct for unequal cell sizes, we report estimated marginal means). Conducting this analysis using repeated-measures ANOVA—that is, by treating ratings of gay men and heterosexual men as a repeated measure rather than creating difference scores—showed a significant interaction between target group and smell condition,  $F(1, 54) = 5.01$ ,  $p = .03$ . Follow-up tests showed that in the smell condition, gay men were evaluated more negatively than heterosexual men, paired  $t(35) = -2.25$ ,  $p = .03$ , whereas in the control condition the two groups were evaluated equally positively, paired  $t(22) = -.51$ ,  $p = .62$  (see Figure 1).

There was no main effect of gender on relative warmth toward gay men,  $\beta = -.074$ ,  $t(54) = -.57$ , *ns*, and no interaction between gender and smell,  $\beta = -.28$ ,  $t(54) = -1.74$ ,  $p = .09$ . As Figure 2 shows, the effect of smell was not moderated by political orientation, interaction  $F(1, 53) = 1.67$ , *ns*. Rather, greater political conservatism independently predicted less warmth toward gay men,  $\beta = -.49$ ,  $t(53) = -3.53$ ,  $p = .0009$ .

**Lesbians**

There was no main effect of the smell manipulation on attitudes toward lesbians relative to heterosexual women,  $M_{smell} = -2.10$ ,  $M_{control} = 9.67$ ,  $\beta = -.19$ ,  $t(54) = -1.15$ ,  $p = .25$  (to correct for unequal cell sizes, we report estimated marginal means). Conducting this analysis using repeated-measures ANOVA likewise did not show a significant interaction between target group and smell condition,  $F(1, 54) = 1.33$ ,  $p = .25$ . There was, however, a significant interaction between smell condition and gender,  $\beta = -.34$ ,  $t(54) = -2.11$ ,  $p = .04$ . Follow-up tests showed that for women, there was no effect of smell on relative warmth toward lesbians,  $M_{smell} = -5.26$ ,  $M_{control} = -14.82$ , planned contrast  $F(1, 54) = 1.24$ , *ns*. For men, there was a marginally significant effect,  $M_{smell} = -1.07$ ,  $M_{control} = 34.16$ , planned contrast  $F(1, 54) = 3.23$ ,  $p = .08$ . However, the low number of men in the sample, combined with the marginally significant follow-up test,

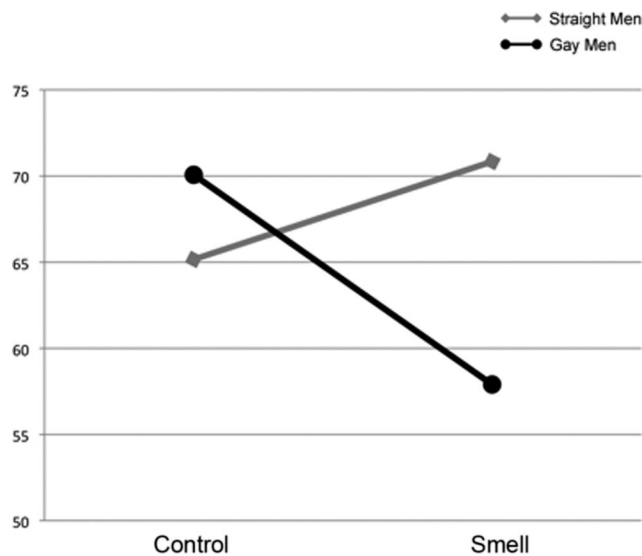


Figure 1. Feeling thermometer ratings of gay and heterosexual men by condition. Values are estimated marginal means.

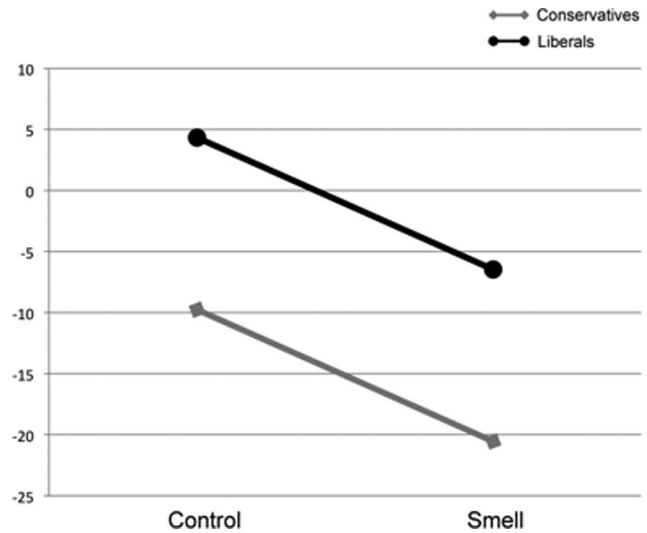


Figure 2. Warmth toward gay men (relative to heterosexual men) by condition for political conservatives and liberals. Values are predicted at  $\pm 1$  SD of political orientation (Aiken & West, 1991).

suggests that this result should be interpreted cautiously. We will return to this issue in the general discussion.

**Other Outgroups**

In order to further examine the specificity of the manipulation we examined whether smell affected attitudes toward two other clear outgroups: African Americans and the elderly. As before, we created composite attitude scores by subtracting feeling thermometer ratings for African Americans from those for European Americans (such that higher numbers indicate more favorable attitudes toward African Americans). The smell manipulation had no effect on these ratings,  $M_{Smell} = -.65$ ,  $M_{control} = 5.71$ ,  $t(53) = -1.07$ , *ns*.<sup>2</sup> We next examined attitudes toward the elderly (subtracted from attitudes toward “college students”) and again found no effect of smell,  $M_{Smell} = -10.00$ ,  $M_{control} = -11.26$ ,  $t(57) = .16$ , *ns*. Thus, it appears that exposure to a noxious odor affected attitudes toward gay men specifically, rather than of outgroups in general. Likewise, an analysis of participants’ ratings on the items assessing political attitudes revealed no significant effect of smell on any item. (For a full list of items by condition please see Table S1, available online as supplemental material.)

**General Discussion**

We found that inducing disgust by manipulating the odor in a room caused participants to evaluate gay men more negatively. This effect did not appear to be attributable to a general “negativity” effect of disgust across judgment: although there was some evidence that the smell manipulation had an effect on ratings of lesbian women, we found no effect on participants’ evaluations of

<sup>2</sup> This analysis excludes four participants who identified themselves as “African American” or “Black.” Results are nearly identical with these participants included.

African Americans or the elderly or on participants' attitudes toward specific political issues.

This result adds to the growing literature documenting the crucial role of disgust in moral and social judgment, particularly with regard to homosexuality (Inbar et al., 2009). The finding that disgust exerted a stronger effect on attitudes toward gay men than toward lesbians is consistent with the observation that male homosexuality is particularly targeted by rhetorical appeals to disgust (Nussbaum, 2001, 2010). We should note, however, that in a replication study that used the same paradigm described here (but only assessed attitudes toward gay men, heterosexual men, heterosexual women, and lesbians), we found that a noxious smell significantly decreased warmth toward both gay men relative to heterosexual men,  $t(73) = 2.55, p < .02$  and lesbians relative to heterosexual women,  $t(73) = 2.96, p < .01$ . Furthermore (consistent with the current results), the smell manipulation in the replication study affected the attitudes of male participants toward both groups more strongly [*gay men* gender  $\times$  condition interaction  $F(1, 73) = 3.96, p = .05$ ; *lesbians* gender  $\times$  condition interaction  $F(1, 73) = 4.75, p = .03$ ]. Thus, there is some evidence that disgust may affect attitudes toward lesbians as well as gay men in male respondents. Further investigation of the specificity of disgust's effect on moral and intergroup attitudes is an important area for future research.

Another important topic for future research is the divergent effect of disgust on implicit and explicit intergroup attitudes. Both in the current study and in the replication mentioned above, we found no effect of smell on participants' *implicit* evaluations of gay men and lesbians as measured by a gay-straight IAT (for a full description of the IAT methods and results, please see the online supplemental material). How do we reconcile this with the finding of Dasgupta et al. (2009) who showed that disgusting images (coupled with an autobiographical writing manipulation) caused more implicit negativity toward these groups? We believe that the differences between Dasgupta et al.'s induction of disgust and ours may explain the divergence in our results. Our fairly subtle disgust induction may not have been powerful enough to shift the patterns of associations underlying people's implicit attitudes (see Gawronski & Bodenhausen, 2006). However, this very subtlety may have made it difficult for participants to "correct" for the influence of disgust on their explicit judgments. Similar to effects documented in the misattribution literature, which have shown that the influence arousal on judgment is moderated by the salience of the arousal source (Cantor, Zillmann & Bryant, 1975), variations in the salience of a disgust manipulation may lead to different effects on participants' implicit and explicit judgments.

It is also possible that a more salient disgust induction would affect attitudes on political issues such as gay marriage, abortion, and cloning—a finding that did not emerge in the current study but that would be consistent with our previous research documenting a relationship between dispositional proneness to disgust and political attitudes (Inbar et al., 2009). However, we suspect that there may be something of a Catch-22 here: Any induction powerful enough to affect these sorts of attitudes may also be salient enough to participants to lead them to correct their judgments for its influence, particularly in a sample of participants who are likely motivated to explicitly endorse more liberal attitudes in these domains. Consistent with this possibility, across a number of attempts we have never observed changes in explicit political

attitudes on these issues after manipulations of disgust in which the source of the manipulation is highly salient (such as by presenting disgusting film clips or images), although other researchers have shown that such methods can successfully influence judgments in other domains (e.g., Lerner, Small, & Loewenstein, 2004).

One limitation of the current results is that we did not include a measure of general negative affect, and it is possible that in addition to making participants disgusted, our manipulation may have put our participants in a more negative mood in general. However, although negative affect has been shown to affect a wide range of judgments, it is unlikely that it would account for the fact that our manipulation only affected judgments of gay men.

Finally, our results highlight the power of disgust to affect attitudes even among political liberals, who are more likely than political conservatives to believe that one should not rely on feelings of disgust when making moral judgments (Graham, Haidt, & Nosek, 2009). The current results show that these differences may not run as deep as previously assumed—though liberals say that one *should not* rely on disgust in one's moral judgments, exposure to an actual disgust elicitor affected the judgments of liberals just as much as those of conservatives. Although this inconsistency may seem disheartening, awareness of these subtle effects may encourage individuals to reflect on the emotional influences that shape their moral and political beliefs, and perhaps even to correct for these influence when they conflict with their explicit ideals.

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