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Disgust: A predictor of social conservatism and prejudicial attitudes toward homosexuals

John A. Terrizzi Jr.^{a,*}, Natalie J. Shook^a, W. Larry Ventis^b

^a Virginia Commonwealth University, Department of Psychology, P.O. Box 842018, Richmond, VA 23284-2018, United States ^b The College of William and Mary, Department of Psychology, Williamsburg, VA 23187-8795, United States

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ABSTRACT

Disgust is a universal human emotion that evolved to protect individuals from ingesting harmful substances such as toxins and pathogens. Recent research suggests that disgust is a component of a "behavioral immune system" that encourages individuals to avoid people and situations that could potentially result in bodily contamination. The purpose of the current research was to explore the role of social conservatism in the link between disgust and prejudicial attitudes toward homosexuals. The results of a correlational study (Study 1) indicated that disgust sensitivity was positively correlated with socially conservative values. However, the relation was specific to conservative values regarding intergroup relations and potential contamination. In Study 2, disgust was experimentally manipulated. Inducing disgust resulted in increased prejudicial attitudes toward contact with homosexuals for conservative individuals and reduced prejudice for liberals. The results of these studies support the claim that disgust is part of a "behavioral immune system" that promotes socially conservative value systems and can lead to increased negative attitudes toward outgroups.

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1. Introduction

Disgust is a cross-culturally recognized emotion that invokes feelings of nausea and revulsion when individuals are exposed to repulsive stimuli (Ekman, 1970). In his book, *The Expression of the Emotions in Man and Animals*, Darwin (1872) referred to disgust as "something revolting, primarily in relation to the sense of taste, as actually perceived or vividly imagined" (p. 253). Essentially, disgust is thought to have evolved to protect individuals from ingesting harmful substances such as toxins and pathogens by inducing nausea and gag reflexes. However, the emotion of disgust may not be limited to oral contamination. Recent research suggests that disgust may also influence social behavior.

Schaller (2006) has suggested that disgust is a component of the "behavioral immune system" which motivates individuals to avoid situations that may lead to contamination. That is, disgust may be an "evolved disease avoidance mechanism" (Curtis & Biran, 2001; Faulkner, Schaller, Park, & Duncan, 2004; Navarrete & Fessler, 2006). According to this perspective, disgust serves a protective function by indicating that a specific situation, object, or person may be infectious or toxic and contact may result in bodily contamination. Thus, the experience of disgust signals avoidance of the target. Importantly, the disgust evoking stimulus is not limited

E-mail address: terrizzija@vcu.edu (J.A. Terrizzi Jr.).

to inanimate objects (e.g., food) or the sense of taste or smell. Rather, disgust may be induced through a number of different routes, such as visual appearance, and associated with people or situations. Consequently, disgust may lead to social behaviors such as social exclusion and outgroup avoidance. Along these lines, a number of recent studies have examined the relation between disgust and outgroup prejudice in the context of disease avoidance (e.g., Faulkner et al., 2004; Navarrete & Fessler, 2006; Park, Faulkner, & Schaller, 2003).

According to Schaller and Duncan (2007), the behavioral immune system should encourage individuals to prefer ingroup members over outgroup members. Ingroup members are more likely to have been exposed to the same diseases or pathogens and, therefore, have many of the same antibodies and immunity. Also, they share norms and customs, which may help limit transmission of disease. Outgroup members pose the threat of exposing individuals to foreign diseases or contamination. As a result, individuals are more vulnerable to the diseases of outgroup members and should have a stronger disgust reaction to outgroup members. Therefore, individuals with a strong behavioral immune system should exhibit more positive attitudes toward ingroup members.

In support of the disease avoidance model, researchers have demonstrated that perceived vulnerability to disease is related to negative attitudes toward outgroups, such as the disabled or foreigners (Faulkner et al., 2004; Navarrete & Fessler, 2006;

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Park et al., 2003). Disgust sensitivity has also been found to positively correlate with prejudice toward homosexuals (Inbar, Pizarro, Knobe, & Bloom, 2009; Olatunji, 2008). Moreover, manipulating disease salience has been demonstrated to increase negative attitudes toward outgroups and increase positive attitudes toward the ingroup (Faulkner et al., 2004; Navarrete & Fessler, 2006). Specifically, in a Canadian sample, Faulkner and colleagues (2004) manipulated disease salience and had participants make judgments about either Nigerian or Scottish immigrants. They found that inducing disease salience resulted in more positive attitudes toward the immigration of familiar others (e.g., Scots) but negative attitudes toward immigration of foreign others (e.g., Nigerians). Similarly, in an American sample, Navarrete and Fessler (2006) manipulated disgust and had participants rate ingroup and outgroup members. They found that inducing disgust resulted in more attraction to ingroup members (e.g., Americans) but a nonsignificant negativity toward outgroup members (e.g., foreigners). However, disgust sensitivity was associated with higher levels of negativity toward outgroups. These results suggest that the activation of the behavioral immune system encourages individuals to exhibit positivity toward ingroup members and negativity toward outgroup members.

From this work, it is apparent that the strength of the behavioral immune system varies on an individual basis and can be measured as a chronic personality trait with indices of disgust sensitivity and disease vulnerability. However, the behavioral immune system may have broader, more socially relevant correlates. That is, the behavioral immune system may relate to social value systems, which promote the inclusion or exclusion of others and set norms regarding intergroup relations. Given that the behavioral immune system functions as a mechanism that promotes avoidance of outgroup members, individuals with strong behavioral immune systems should be more likely to endorse socially conservative belief systems, such as authoritarianism, political conservatism, and religious fundamentalism, which encourage prejudice toward outgroups and fear of contamination (Altemeyer & Hunsberger, 1992; Duckitt, 2006; Sears & Henry, 2003). These value systems may serve to maintain and strengthen the behavioral immune system.

There is some evidence to demonstrate an association between social conservatism and the behavioral immune system. Disgust sensitivity and disease prevalence have been related to openness to experience and sociosexuality (Druschel & Sherman, 1999; Schaller & Murray, 2008). Disgust sensitivity has also been related to political conservatism (Inbar, Pizarro, & Bloom, 2009) and religious obsessions (Olatunji, Tolin, Huppert, & Lohr, 2005). If the behavioral immune system protects against possible contamination from outgroup members, strong behavioral immune systems should be related to a broad range of conservative value systems which encourage prejudice toward outgroups and fear of contamination.

The purpose of the current research was to examine the relation between the behavioral immune system, as indexed by disgust sensitivity, and socially conservative value systems in the context of intergroup relations. The first study was intended to demonstrate the basic associations among disgust sensitivity, conservative beliefs, and prejudice toward homosexuals. Of particular interest was the extent to which disgust sensitivity related to socially conservative beliefs, beyond political conservatism. If disgust functions as a disease avoidance mechanism, it should only be related to socially conservative attitudes that emphasize the avoidance of situations and outgroup members that could lead to bodily contamination. Thus, the first study investigated whether disgust sensitivity is related to right-wing authoritarianism and religious fundamentalism. Both of these measures have received little or no examination, respectively, with regard to their association with disgust sensitivity. Also, we examined whether the relation between disgust sensitivity and political conservatism is specific to political issues related to contamination. The first study was intended to provide evidence that the behavioral immune system is related to a broad range of socially conservative value systems.

In the second study, the role of social conservatism in the association between disgust and prejudice toward homosexual individuals was experimentally tested. The primary purpose of Study 2 was to examine whether inducing disgust would result in increased prejudicial attitudes toward homosexuals and whether the effect of disgust would be moderated by endorsement of conservative beliefs. As research has suggested that conservatives are more sensitive to disgust (Inbar et al., 2009) and perceive homosexuals as outgroup members, it was hypothesized that social conservatives would exhibit increased prejudice toward homosexuals, whereas less conservative individuals would exhibit decreased prejudice because they are more likely to include homosexuals in their ingroup.

2. Study 1

The purpose of the first study was to investigate the relation between the behavioral immune system and social conservatism. As disgust is hypothesized to function as a disease avoidance mechanism that promotes negative attitudes toward outgroup members (Faulkner et al., 2004; Navarrete & Fessler, 2006), it should be related to conservative belief systems that promote avoidance of outgroup members and fear of contamination. In particular, the study was designed to strengthen the argument for the relation between disease avoidance and conservatism by linking disgust sensitivity to a broad range of socially conservative value systems. Specifically, right-wing authoritarianism (RWA), religious fundamentalism, and conservative political opinions were chosen because of their relation to outgroup prejudice and fear of contamination.

RWA is a combination of submission to authority, aggression toward outgroups, and conventionalism, and it is strongly related to prejudice toward African Americans (Altemeyer, 1988) and homosexuals (Laythe, Finkel, & Kirkpatrick, 2001). With regard to religious conservatism, some of the core beliefs of Christianity involve purity, and many Christians engage in rituals such as baptisms and absolution to cleanse the body of sin and moral contamination. Also, religious fundamentalism has been found to correlate with prejudice toward homosexuals (Lavthe et al., 2001). Thus, a religious fundamentalism scale (Altemever & Hunsberger, 2004), which measures Christian orthodoxy and dogmatism, was incorporated. Consequently, it was expected that authoritarianism and religious fundamentalism would be positively associated with disgust sensitivity. With regard to political conservatism, some policies are relevant to intergroup relations and potential contamination (e.g., immigration, same sex marriage), whereas others are not relevant (e.g., minimum wage, separation of church and state). As the behavioral immune system encourages the avoidance of social situations that could potentially lead to contamination, it was expected that disgust sensitivity would only be associated with political policies regarding outgroups and contamination.

2.1. Method

2.1.1. Participants

One-hundred forty-six introductory psychology students (68% female; mean age = 18.84, *SD* = 2.46) from the College of William and Mary participated in the study for course credit.

Table 1

Means, standard deviations, alphas, and correlations for study 1 measures.

Measure	Μ	SD	α	r							
				1	2	3	4	5	6	7	8
1. Disgust sensitivity	2.51	0.48	0.89		0.49**	0.43**	0.33**	0.37**	0.34**	0.33**	0.37**
2. Right-wing authoritarianism	3.47	1.53	0.95			0.76	0.78	0.83**	0.73	0.84	0.66**
3. Religious fundamentalism	-1.14	2.17	0.95				0.60**	0.60**	0.46**	0.70	0.45**
4. Political conservatism	2.29	0.64	0.80					0.72	0.62**	0.74	0.59**
5. Attitudes toward Gay Men and Lesbians	2.05	0.80	0.97						0.95	0.94	0.81**
6. Contact subscale	1.86	0.83	0.95							0.81**	0.69**
7. Morality subscale	2.06	1.08	0.94								0.70**
8. Stereotypes subscale	2.39	0.67	0.79								

 $p^* < 0.05, p^{**} < 0.01.$

2.1.2. Measures and procedure

Participants completed a battery of questionnaires online in the following order. The tendency to experience disgust was measured using Haidt, McCauley, and Rozin's (1994) Disgust Sensitivity Scale¹. Prejudicial attitudes toward homosexuals were measured using LaMar and Kite's (1998) Attitudes toward Gay Men and Lesbians scale, which is composed of three subscales: contact, morality, and stereotypes. Social conservatism was assessed with the RWA scale (Altemeyer, 1988), a religious fundamentalism scale (Altemeyer & Hunsberger, 2004), and 14-items about various political issues (e.g., "Abortion should be illegal.") for which participants indicated their agreement on a scale from 1 (*absolutely false*) to 5 (*absolutely true*)².

2.2. Results and discussion

Means, standard deviations, and Cronbach's alphas for all measures, as well as the correlations between each of the measures are presented in Table 1. Correlations did not vary by gender. Thus, analyses are collapsed across gender.

Disgust sensitivity was positively correlated with RWA, religious fundamentalism, and political conservatism. Also, disgust sensitivity tended to correlate significantly with political issues that involved intergroup relations and/or bodily contamination (e.g., homosexual marriage, abortion) with correlations ranging from 0.20 to 0.34 (see Table 2). Disgust sensitivity did not correlate with issues such as healthcare and minimum wage (rs < 0.16). Additionally, disgust sensitivity was positively related to prejudicial attitudes toward homosexuals and each of the subscales: contact, morality, and stereotypes. Prejudicial attitudes toward homosexuals were also significantly correlated with political conservatism, RWA, and religious fundamentalism.

These results demonstrate that disgust sensitivity is related to socially conservative value systems. In particular, disgust sensitivity was found to be positively related to RWA, religious fundamentalism, and conservative political opinions that relate to contamination or intergroup relations (e.g., foreign policy, immigration) as opposed to issues such as taxes and minimum wage. These results provide evidence to support the relation between the behavioral immune system and social conservatism.

3. Study 2

The results of Study 1 demonstrated that the behavioral immune system, as measured by disgust sensitivity, was positively associated with social conservatism, and that disgust sensitivity and social conservatism were correlated with prejudice toward homosexuals. The purpose of Study 2 was to further explore the relations among these three variables, specifically focusing on the role of social conservatism in the effect of disgust on prejudicial attitude towards homosexuals. Previous research has demonstrated that inducing disgust or disease salience can increase negative attitudes toward outgroup members and increase positive attitudes toward ingroup members (Faulkner et al., 2004; Navarrete & Fessler, 2006). However, the effect of such manipulations may be dependent on levels of social conservatism. As social conservatism was related to disgust sensitivity and prejudice toward homosexuals, inducing disgust may activate the behavioral immune system and result in more negativity toward outgroup members for more conservative individuals. For less conservative individuals, the disgust induction may have the opposite effect. Liberals tend to be more flexible with regard to including others in the ingroup (Janoff-Bulman, 2009) and are less prejudiced toward homosexuals, so less conservative individuals may be more likely to include homosexuals in their ingroup. Therefore, inducing disgust may increase positivity toward homosexuals for less conservative individuals. Thus, it was expected that the disgust manipulation would increase prejudice toward homosexuals for conservatives whereas it would decrease prejudice toward homosexuals for liberals.

There was also a question as to whether the disgust manipulation would affect general attitudes toward homosexuals or be specific to the contact subscale of the Attitudes toward Gay Men and Lesbians Scale (LaMar & Kite, 1998). If disgust is an "evolved disease avoidance mechanism", the effect of a disgust induction should be particularly salient for attitudes toward contact with homosexuals, which are particularly relevant to fears of or potential for contamination. Indeed, Faulkner and colleagues (2004) found effects of their disease salience manipulation on items specifically about physical contact or social exclusion, not general attitude items. Thus, there was the potential that the disgust manipulation would affect items on the contact subscale but not items on the morality or stereotype subscales, so we also explored the specificity of the disgust manipulation.

3.1. Method

3.1.1. Participants

One-hundred two introductory psychology students (66% female) from the College of William and Mary participated in the study for course credit.

¹ The disgust sensitivity scale (Haidt, McCauley, & Rozin, 1994) has a sexual disgust subscale, which may exaggerate correlations between the disgust sensitivity scale and the prejudicial attitudes toward homosexuals scale. To ensure that this was not the case, a composite of the disgust sensitivity scale excluding the sexual disgust subscale was created. The correlations between disgust sensitivity and prejudicial attitudes were of similar significance when the items from the sexual disgust subscale were removed. Thus, the composite with the full disgust sensitivity scale is reported.

² Participants completed the balanced inventory for socially desirable responding (Paulhus, 1984). However, the measure did not significantly affect any of the results, so it is not included in the analyses.

Table 2

Study 1 cor	relations fo	or disgust	sensitivity	with	political (ppinions.
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Items	r
Homosexuals should not legally be allowed to marry.	0.32**
The government should restrict stem cell research.	0.30
Abortion should be illegal.	0.30
Terminal patients should not have the right to die.	0.29
Marijuana should not be legalized for medicinal use.	0.22
The current pre-emptive (strike them before they strike you)	0.21
foreign policy, is the most effective foreign policy.	
The government should adopt a stricter immigration policy.	0.15
Evolutionary theory should not be taught in public schools.	0.14
The death penalty should not be abolished.	0.08
There should not be a complete separation between church and state.	0.06
The minimum wage should not be raised.	0.00
6	
The government should not adopt a stricter policy to protect the environment.	0.00
The government should not adopt a policy to guarantee health care	-0.05
to all workers and their families.	

p < 0.05, *p* < 0.01.

3.1.2. Measures and procedure

The study was conducted online. Participants were informed that they would be participating in two unrelated studies. The first study would assess their emotional reactions to a scenario that they might see on television, and the second study would assess their attitudes toward various social and political issues. The participants were randomly assigned to either the control condition (scenario about consuming lettuce) or the experimental condition (scenario about eating maggots). Participants were asked to write an essay about the given scenario, describing the texture, taste, smell, and their stomach's reaction to consuming the stimuli.

Upon completion of their essays, the participants were prompted that they would now begin the second study. All of the participants completed three measures: the Attitudes toward Gay Men and Lesbians Scale (LaMar & Kite, 1998; M = 2.06, SD = 0.68, $\alpha = 0.96$), the political conservatism scale from Study 1 (M = 3.57, SD = 0.63, $\alpha = 0.79$), and the RWA scale (Altemeyer, 1988; M = 3.42, SD = 1.50, $\alpha = 0.95$). Finally, participants were asked how disgusted they were by the scenario that they read at the very beginning of the study on a scale from 1 (*not disgusting at all*) to 7 (*very disgusting*).

3.2. Results and discussion

3.2.1. Manipulation check

Participants rated the experimental condition (M = 5.39; SD = 1.78) as significantly more disgusting than the control condition (M = 2.37, SD = 1.41), $t_{100} = 9.49$, p < 0.01. The experimental manipulation did not affect RWA or political conservatism scores, ps > 0.12.

3.2.2. Analysis of the experimental manipulation

As in Study 1, there were no gender effects, so analyses are collapsed across gender. RWA and political conservatism were highly correlated (r = 0.71, p < 0.01), so for ease of presentation, an index of conservatism was created by standardizing each measure and computing their average.³ To test the effects of the disgust manipulation and social conservatism on general prejudice toward homosexuals (i.e., composite score of the three subscales), a hierarchical regression analysis was conducted. Condition (dummy coded) and

the centered social conservatism composite were entered in the first step, and their interaction term was entered in step two. There was no main effect for the experimental manipulation ($\beta = -0.09$, p > 0.15), but there was a main effect for social conservatism ($\beta = 0.72$, p < 0.01). More conservative participants reported more negative attitudes toward homosexuals. However, the main effect was qualified by an interaction between the disgust manipulation and social conservatism ($\beta = 0.17$, p < 0.05; R^2 change = 0.03, p < 0.05). Simple slopes analyses (Aiken & West, 1991) revealed that inducing disgust in less conservative participants (-1 SD) led to less prejudice toward homosexuals compared to the control ($\beta = -0.26$, p < 0.01), whereas inducing disgust in more conservative participants (+1 SD) did not significantly affect prejudicial attitudes ($\beta = 0.08$, p = 0.40).

To determine which components of the attitude measure were affected by the manipulation, regression analyses were conducted predicting each of the subscales separately. As previously noted the contact subscale was of particular interest as it relates most strongly to potential contamination and, thus, should be especially affected by the disgust manipulation. For the contact subscale, there was no main effect for the experimental manipulation (β = -0.00, p = 0.96). There was a main effect for social conservatism ($\beta = 0.58$, p < 0.01). Additionally, there was a disgust manipulation by conservatism interaction ($\beta = 0.26$, p < 0.01; R^2 change = 0.07, p < 0.070.01) (see Fig. 1). Again, inducing disgust in less conservative participants (-1 SD) resulted in less prejudice toward contact with homosexuals compared to the control condition ($\beta = -0.27$, p <0.05). However, unlike the general prejudice score, inducing disgust in more conservative participants (+1 SD) led to more prejudice compared to the control condition ($\beta = 0.26, p < 0.05$).

The morality subscale produced similar results to the general prejudice score. There was a main effect for conservatism ($\beta = 0.78, p < 0.01$). Interestingly, there was also a main effect of the disgust manipulation ($\beta = -0.15, p < 0.05$), indicating that those in the disgust condition reported less prejudicial attitudes than those in the control condition. However, these main effects were qualified by a significant interaction ($\beta = 0.11, p = 0.05$). Simple slope analyses revealed that the disgust manipulation resulted in less prejudice for less conservative individuals compared to the control condition ($\beta = -0.16, p = 0.05$) and had no effect on conservatives ($\beta = -0.03, p = 0.72$). For the stereotypes subscale, there was only a main effect of social conservatism ($\beta = 0.60, p < 0.01$).

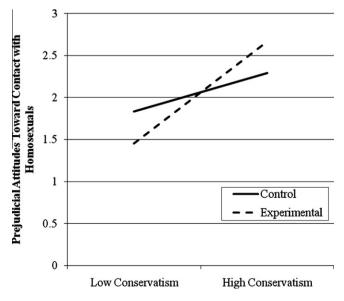


Fig. 1. Study 2 condition by conservatism interaction for prejudicial attitudes toward contact with homosexuals.

³ Separate regression analyses were conducted using RWA and political conservatism as predictors of prejudicial attitudes toward homosexuals. The patterns of results were very similar. Thus, only the results from the composite variable of conservatism are reported.

4. General discussion

The goal of the present research was to investigate the relation between the behavioral immune system, as measured by disgust sensitivity, and social conservatism. In particular, the first study examined the associations among disgust, RWA, religious fundamentalism, political conservatism, and prejudice toward homosexuals. As expected, the disgust sensitivity scale correlated with the various measures of conservatism. However, there was some specificity to the relation between the behavioral immune system and social conservatism. That is, disgust sensitivity was not predictive of conservative political positions across the board. Instead, it was predictive of socially conservative political beliefs such as immigration, abortion, euthanasia, stem cell research, medical marijuana, and homosexual marriage. Disgust sensitivity did not predict issues such as minimum wage and healthcare reform. These findings support Schaller and Duncan's (2007) conception of the behavioral immune system in that disgust sensitivity is only related to conservatism in regard to issues that involve intergroup relations and bodily contamination. Additionally, the results of Study 1 demonstrated that disgust sensitivity and conservatism are significant predictors of attitudes toward contact with homosexuals, moral judgments of homosexuals, and stereotypes of homosexuals. Thus, the first study demonstrated that the behavioral immune system is predictive of socially conservative value systems that promote outgroup exclusion.

In Study 2, the moderating role of social conservatism in the effect of a disgust manipulation on prejudice toward homosexuals was explored. For conservatives, inducing disgust resulted in increased prejudice toward contact with homosexuals, while for liberals the disgust induction resulted in a reduction in prejudice. The fact that the effect of disgust was only significant with the contact subscale for conservatives is accordant with what would be expected with a disease avoidance mechanism. The experience of disgust should promote distancing oneself from the potential source of contamination (Curtis & Biran, 2001; Schaller, 2006; Schaller & Duncan, 2007), and the contact subscale pertains specifically to distancing oneself and limiting interaction with homosexual individuals. Faulkner and colleagues (2004) found similar results with a disease salience manipulation such that the manipulation was most effective for questionnaire items regarding contact with outgroup members (i.e., immigration of foreigners) rather than general attitudes to outgroup members. The increased prejudice toward contact with homosexuals that was exhibited by conservatives suggests that the behavioral immune system may act through socially conservative value systems to promote outgroup exclusion. In other words, individuals with strong behavioral immune systems should be more likely to maintain socially conservative value systems that promote the exclusion of outgroup members especially when there is a perceived threat of contamination.

For less conservative individuals, inducing disgust led to lower levels of prejudice toward homosexuals. This finding is consistent with previous research (Faulkner et al., 2004; Navarrete & Fessler, 2006) for which disgust or disease salience inductions resulted in greater positivity toward ingroup members. Less conservative individuals are more flexible with respect to ingroup inclusion (Janoff-Bulman, 2009) and are more likely to perceive homosexuals as part of their ingroup, so engaging the behavioral immune system via a disgust induction should encourage more positive attitudes toward ingroup members such as homosexuals. The fact that less conservative individuals exhibited a general reduction in prejudice whereas conservatives evinced an increase in contact specific prejudice could suggest that disgust encourages a general bolstering of ingroup ties whereas it promotes more specific contact avoidant attitudes toward outgroups. Future research could explore the extent of these positive versus negative shifts.

In sum, the present research demonstrates that disgust sensitivity is related to socially conservative value systems (e.g., religious fundamentalism, political conservatism, RWA), which promote avoidance of situations that have the perceived potential for bodily contamination (e.g., contact with homosexuals). Moreover, the findings highlight the important role of social conservatism in understanding the behavioral immune system. Specifically, the behavioral immune system as indexed by disgust sensitivity seems to encourage socially conservative value systems that promote outgroup exclusion when individuals are confronted with a perceived threat of contamination.

4.1. Limitations

There are a couple of limitations to the current research. First, the studies were conducted using college students, potentially limiting generalizability. Second, the results from Study 2 could alternatively be explained as attitude polarization due to affective arousal rather than activation of the behavioral immune system. In other words, the disgust manipulation may have induced a state of affective arousal that caused participants to express stronger personal opinions (i.e., more negativity toward homosexuals for conservatives and more positivity toward homosexuals for less conservative individuals). However, given the specificity of the disgust effect for conservatives, this explanation seems less plausible. Still, future studies should rule out this explanation.

4.2. Conclusion

Disgust may have originally evolved to help protect individuals from ingesting harmful toxins. However, recent research suggests that it can also guide social behavior and in particular decisions that involve the potential for contamination (Schaller & Murray, 2008). The present findings support and extend the proposition that disgust is a component of the behavioral immune system. That is, disgust appears to serve as a disease avoidance mechanism that promotes the avoidance of outgroups via the adoption of socially conservative value systems that encourage social exclusion of potentially contaminated outgroup members.

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