


Disgusting Democrats and Repulsive Republicans: Members of Political Outgroups Are Considered Physically Gross

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Abstract

The status of disgust as a sociomoral emotion is debated. We conducted a stringent test of whether social stimuli (specifically, political outgroup members) can elicit physical disgust, as distinct from moral or metaphorical disgust. We employed stimuli (male faces) matched on baseline disgustingness, provided other ways for participants to express negativity toward outgroup members, and used concrete self-report measures of disgust, as well as a nonverbal measure (participants' facial expressions). Across three preregistered studies (total $N = 915$), we found that political outgroup members are judged to be “disgusting,” although this effect is generally weaker for concrete self-report measures and absent for the nonverbal measure. This suggests that social stimuli are capable of eliciting genuine physical disgust, although it is not always outwardly expressed, and the strength of this result depends on the measures employed. We discuss implications of these results for research on sociomoral emotions and American politics.

Keywords

disgust, morality, politics, outgroups, social judgment

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After *The New York Times* published an op-ed lambasting then-President Donald Trump as “amoral” and “erratic,” his son, Donald Trump, Jr., called the piece “disgusting” (Klein, 2018). Similarly, when it was reported that Trump had referred to U.S. war casualties as “losers,” then-candidate Joe Biden called the reported comments “disgusting” (Gregorian & Egan, 2020). It seems that—at least in the United States—the language of disgust is commonly used to describe political foes, on both the right and the left.

What should we conclude from this anecdotal observation? Does the use of the word “disgusting” indicate that people feel the same emotion in response to political outgroup members that they feel in response to gross, pathogenic content, such as blood, feces, and rats? In this article, we subject this possibility to an especially rigorous test. Specifically, we present participants with nonpathogenic photos of ordinary men aligned with either the Republican or Democratic party, which have been pretested and matched on baseline disgustingness. We use a variety of measures of disgust, including very concrete ones, and we give participants other, straightforward ways to express anger, disapproval, and general negativity. We find that people consistently report experiencing a disgusted emotional state

in response to political outgroup members, although the size of this effect varies in meaningful and predictable ways, depending on the measure that is employed.

Disgust: Physical, Moral, and Metaphorical

The meaning of the term “disgust” can be somewhat muddy, both in academic research and in common parlance. On one hand, it is used to refer to an emotional state characterized by nausea and oral inhibition, which is usually thought to be elicited by pathogen vectors, such as bodily fluids, rotting foods, corpses, and so on. This emotion is generally thought to be part of the “behavioral immune system” in that it

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motivates rejection of pathogenic, contaminating substances, thus preventing illness (see Curtis et al., 2004; Faulkner et al., 2004; Inbar & Pizarro, in press; Oaten et al., 2009; Schaller & Park, 2011; van Leeuwen & Petersen, 2018). Researchers sometimes call this emotion “core disgust” (Reicher et al., 2016; Rozin et al., 2016), “pathogen disgust” (Tybur et al., 2009), or “physical disgust” (Inbar & Pizarro, in press; Lee & Ellsworth, 2013). We adopt the latter term. We prefer it over the term “core disgust” because there is some disagreement about whether the pathogen-avoidance or social functions of disgust emerged first in human evolution (and thus, what is truly the “core” of the emotion; see Rottman et al., 2018), and we prefer it over the term “pathogen disgust” because this research is specifically about whether this emotional state can be elicited by social, rather than pathogenic, stimuli.

The definitional muddiness begins when we consider that the words “disgust” and “disgusting” are also used to describe moral offenses and disliked conspecifics in English and several other languages (Rozin et al., 2016). Some researchers argue that this reflects a unique emotion called *moral disgust*, which is a somewhat distinct emotional experience from the revulsion felt toward things such as feces and insects but is nonetheless a genuine form of disgust (Chapman & Anderson, 2013; Giner-Sorolla et al., 2018; Lee & Ellsworth, 2013; Rozin et al., 2016; Tybur et al., 2009). However, others maintain that this use of the word “disgust” is purely *metaphorical* and reflects an internal state of anger or outrage, rather than any kind of genuine disgust (Herz & Hinds, 2013; Nabi, 2002; Piazza et al., 2018; Roizman & Kurzban, 2011b; Roizman & Sabini, 2001). Moreover, in studies in which *only* “disgust” is measured, participants might use a “disgust” scale to express anger, disapproval, or general negativity, simply because it is the only means that the researchers have provided them to do so. Thus, there are several reasons to believe that—to borrow terminology from Cusimano and colleagues (2018)—“disgust-the-word” does not exclusively measure “disgust-the-feeling” (i.e., what we refer to as physical disgust).

In this research, we focus on physical disgust, as distinct from moral or metaphorical disgust. It is known that this emotion is experienced in response to gross, pathogenic stimuli, but it is not yet clear whether it can also be elicited by social stimuli. Thus, we investigate whether outgroup members can elicit it.

Prior Research

As of now, it remains controversial whether social stimuli such as outgroup members elicit physical, as opposed to moral or metaphorical, disgust. Previous research suggests that disgust—of some variety or another—can arise from unpleasant but non-contaminating stimuli (DeJesus et al., in press). Most notably, disgust can be elicited by people who are marginalized, stigmatized, or considered morally corrupt

(e.g., Doran, 2021; Giner-Sorolla & Chapman, 2017; Harris & Fiske, 2006; Petersen, 2017; Ritter & Preston, 2011). Theoretically, the idea here is that disgust toward outgroup members functions as an honest signal of moral commitments or group membership (Chapman & Anderson, 2013; Giner-Sorolla et al., 2018; Kupfer & Giner-Sorolla, 2017; Rottman et al., 2018; Rozin et al., 2016). However, many of these studies did not directly measure disgust reactions, or measure disgust as a reaction to *behaviors* rather than to *people*. Only a handful of studies have directly tested whether social outgroup members can evoke feelings of disgust by virtue of their identities (Cottrell & Neuberg, 2005; Jones & Fitness, 2008; Reicher et al., 2016; Ryan et al., 2012). Within this subset of studies, some findings are consistent with disgust being a response to physical cues of pathogen infection rather than to group membership per se (see Oaten et al., 2011; van Leeuwen & Petersen, 2018). Other results can plausibly be explained by imprecise self-report measures that allow for metaphorical use of the word “disgusting” (i.e., measures of metaphorical, rather than moral or physical, disgust).

Only one article that we are aware of has directly tested the idea that outgroup members qua outgroup members can elicit *physical* disgust. This article found that political leaders can elicit disgust, and these findings cannot easily be chalked up to infection cues, or to metaphorical responding (Bakker et al., 2020). However, given that this research tested responses to familiar individuals in positions of power, rather than generic members of outgroups, it does not straightforwardly speak to the possibility that physical disgust can be elicited by outgroup members more generally. Thus, despite academic and popular claims that some people are sources of disgust, no existing studies conclusively indicate that outgroup members can elicit *physical* disgust in the absence of clear infection cues.

This relative dearth of evidence is largely attributable to the fact that much of the research on disgust as a sociomoral emotion has relied upon one of two approaches: correlational studies that demonstrate an association between trait disgust sensitivity and negative evaluations of outgroup members (e.g., Aarøe et al., 2017; Crawford et al., 2014; Hodson & Costello, 2007; Terrizzi et al., 2010), and experimental studies that show an effect of manipulating disgust on social or moral evaluations (e.g., Adams et al., 2014; Buckels & Trapnell, 2013; Eskine et al., 2011; Inbar et al., 2009, 2012; Rottman & Kelemen, 2012; Schnall et al., 2008; Wheatley & Haidt, 2005; Wisneski & Skitka, 2017). The correlational approach is indirect and may detect spurious associations, given the likely relevance of confounding factors, such as openness to experience (Druschel & Sherman, 1999), conservatism (Inbar & Pizarro, 2016), or emotionality more generally (Landy & Piazza, 2019). Findings from the experimental approach appear to have been overstated; the actual effect of incidental disgust on sociomoral evaluations is likely negligible (Johnson et al., 2016; Landy & Goodwin, 2015).

The Present Research

Here, we rigorously test whether people can elicit physical disgust solely by virtue of being outgroup members. The domain of politics is particularly suited to studying this question because ingroups and outgroups are well-defined: In the United States, there is a clear division between Democrats (the liberal, left-leaning party) and Republicans (the conservative, right-leaning party). If disgust toward outgroups serves as a reliable signal of ingroup membership, we would expect that Democrats will perceive faces labeled as Republicans as more disgusting than Democrat faces, and vice versa.

Three methodological features of our studies are especially important to note. First, we employ a wide variety of measures of disgust, not just the word “disgusted,” which, as we have seen, is sometimes used to refer to emotional states other than physical disgust—moral disgust or anger or disapproval (i.e., metaphorical disgust). Previous research has employed several approaches to ensure that measures of “disgust” are specifically measuring *physical*, rather than moral or metaphorical, disgust; one is to use more concrete self-report measures of physical disgust. For example, researchers sometimes use the term “grossed out” to probe participants’ subjective emotional experiences as lay usage of this term more closely matches the theoretical meaning of physical disgust (Nabi, 2002). Researchers also sometimes employ concrete descriptions of the physiological experience of physical disgust (e.g., nausea, gagging, and loss of appetite; Royzman et al., 2008, 2014). Moreover, researchers sometimes ask participants whether their emotional state matches a facial expression displaying physical disgust (Royzman et al., 2014). Finally, researchers sometimes eschew self-report measures altogether, and analyze the facial expressions that participants spontaneously produce in response to stimuli, as a nonverbal measure of participants’ emotional experiences (Cannon et al., 2011; Chapman et al., 2009). We employ all of these approaches in this research. This multipronged approach allows us to triangulate on a set of appraisals and phenomenological responses that characterize physical disgust. Whereas some of the research reviewed above has used concrete self-report measures (Giner-Sorolla & Chapman, 2017) or nonverbal measures (Reicher et al., 2016; Ritter & Preston, 2011), no prior work that we are aware of has employed multiple different measures of disgust in the same study, and compared the results of the different measures, as we do here.

Second, we included additional evaluative judgments to minimize the possibility of participants using “disgust” measures to express negativity or disapproval due to having no other available outlet by which to do so. Third, we pretested our stimuli and matched them on baseline levels of disgustingness to ensure that any observed differences in physical disgust elicited by ingroup and outgroup members are attributable *solely* to group membership, rather than other features

of the stimuli. In addition, because the different stimuli do not contain clear indicators of sickness, and because it is unlikely that political outgroup members would be (implicitly or explicitly) expected to harbor dangerous pathogens (e.g., van Leeuwen & Petersen, 2018), this research provides a particularly strong test of the claim that physical disgust can be elicited by outgroup members in the absence of disease concerns.

Open Practices

All three studies were preregistered on the Open Science Framework (Study 1: <https://osf.io/2wxdu>; Study 2: <https://osf.io/3xkg5>; Study 3: <https://osf.io/w4juf>), and we report all measures, manipulations, data exclusions, and sample size determinations. All data and analysis scripts are publicly available on the Open Science Framework at <https://osf.io/rzfhw/>. Because our materials contain copyrighted images, we cannot make them available publicly, but they are available upon request.

Pretest and Stimulus Selection

We intended to use as stimuli 10 faces that are considered moderately disgusting in the absence of any information about their political views to form two sets of faces that were closely matched on baseline disgustingness. To select these stimuli, we conducted a pretest in which we presented 102 participants from Amazon Mechanical Turk with 50 color images of male faces displaying neutral expressions from an online database (3D.SK), with no further information about the person given. The 50 faces were presented in a randomized order for each participant. For each face, participants answered the question, “How disgusting does this person look?” on a 7-point Likert-type scale, ranging from *not at all disgusting* to *extremely disgusting*. Overall, the faces were rated as low on disgustingness ($M = 2.62$, median = 2.53, on a 1–7 scale); this is expected because the faces came from a standard face database and showed no clear signs of illness or disfigurement.

Given that most faces were rated as not disgusting, we retained the 10 most disgusting faces as our stimuli. On average, these 10 faces were rated below the scale midpoint on disgustingness ($M = 3.47$, median = 3.17, range = 2.84–4.36), but ratings were not so low as to introduce floor effects in the main studies. To be sure that the faces did not show any cues of pathogens, which could plausibly explain any disgust felt toward them, we ran several additional analyses on the healthiness ratings from Study 1, which were not preregistered. Specifically, we examined the mean healthiness ratings for each face. Four faces were rated as significantly less healthy than the scale midpoint, three were rated as significantly healthier than the scale midpoint, and three did not differ from the midpoint. In addition, we examined item-wise correlations between healthiness ratings in Study 1 and

the various disgust measures in Studies 1 to 3. With one exception, these analyses showed no significant correlations. Therefore, we are confident that the stimulus faces did not appear to be ill. Details of these analyses are presented in the supplemental materials.

Critically, the 10 faces all displayed neutral facial expressions. Therefore, the disgust felt toward them in the absence of additional information must be attributed to their physical appearance, rather than to their expression. Moreover, because no information was provided about the person and, because we asked specifically about the person's appearance, it is highly unlikely that this question tapped moral or metaphorical disgust, in this context.

Study 1

Study 1, was conducted in November 2018, shortly after the 2018 midterm elections, and provides an initial test of whether political outgroup members are considered to be more "gross" than ingroup members.

Method

Participants. We recruited 115 Republicans and 115 Democrats through Prolific. This sample size was generated by a power analysis indicating that we would need 198 participants to detect a small interaction effect ($\eta_p^2 = .01$) at 80% power in a 2×2 mixed analysis of variance (ANOVA). We expected to exclude approximately 15% of participants and therefore were oversampled by approximately 30 participants. In the end, we excluded 22 participants, 11 of whom admitted to not paying close attention, one of whom failed a simple attention check, and 10 of whom did not have a specific party affiliation associated with their Prolific account. We therefore retained a final sample of $N = 208$. The latter exclusion represents a deviation from our preregistration: We did not consider that participants could not have a party affiliation associated with their account, when we preregistered this study, because we deliberately recruited participants by their political affiliation, so it is not clear how this happened. Importantly, participants in Studies 1 and 2 had reported their political affiliations when signing up for Prolific and were invited to participate with no mention of the criteria on which they were selected.

Materials and procedure. After consenting to participate, participants responded to six blocks of 10 questions, with the blocks presented in a new randomized order for each participant. Each block presented the 10 male faces selected as stimuli on the basis of the pretest described above. Each of the 10 neutral-expression faces was paired with a description consisting of a stereotypically male name, filler information about the person's media and food preferences, family, and age, and information about the person's voting behavior (e.g., "This is Ryan. Ryan enjoys salads and sci-fi movies.

He has 4 siblings and is currently 41 years old. Ryan exclusively voted for Republican Party candidates in the recent midterm election.""). The faces were split into two sets of five that were matched on baseline disgustingness (Set 1: $M = 3.46$, $SD = 0.18$; Set 2: $M = 3.44$, $SD = 0.19$). One set of five faces was described as having voted for Republicans, and the other as having voted for Democrats, and which set was described as having which political affiliation was counterbalanced between subjects.

Below each face, participants responded to a question of the form "How [trait] is [target's name]?" on a 9-point Likert-type scale, ranging from *not at all* to *extremely*. The trait term depended on the following question block: "gross," "attractive," "healthy," "intelligent," "moral," or "trustworthy." Although our primary interest was in ratings of grossness, we included other evaluations because we were concerned that if we *only* probed grossness, participants might use the grossness scale to express their dislike of political outgroup members, simply because they had no other available way to do so. In other words, by allowing participants to rate outgroup members as immoral, unintelligent, and so on, we hoped to reduce theoretically uninteresting use of the grossness scale to express general negativity, as mentioned above. For exploratory purposes, participants filled out the Disgust Scale-Revised (DS-R, Olatunji et al., 2007) after they had responded to all six blocks, but individual differences in disgust sensitivity were not our focus, so we report all analyses of the DS-R in the supplemental materials. Following the DS-R, participants filled out a demographics survey and responded to two attention checks.

Results

All analyses were conducted in R, Version 4.0.3 (R Core Team, 2020) and R Studio, Version 1.3.1093 (RStudio team, 2020). Figure 1 presents box plots of the six trait evaluations (gross, attractive, healthy, intelligent, moral, and trustworthy). Following our preregistration, we conducted six 2 (participant's political affiliation) \times 2 (target's political affiliation) mixed ANOVAs with repeated measures on the second factor, collapsing ratings of the five Democrat faces and the five Republican faces. The most theoretically important analysis is of grossness ratings, so we focus on this analysis. We observed a significant interaction between participant's and target's political affiliation, such that Democrats rated Republican targets as more gross than Democratic targets ($M = 4.28$, $SD = 2.07$ vs. $M = 3.39$, $SD = 1.69$), and Republicans showed the opposite tendency ($M = 3.79$, $SD = 1.74$ vs. $M = 4.03$, $SD = 1.79$), $F(1, 206) = 34.69$, $p < .001$, $\eta_p^2 = .14$. Simple effects tests showed that this was primarily driven by Democratic participants, $t(216) = 6.59$, $p < .001$, with Republican participants showing a weaker, marginally significant, effect, $t(216) = 1.81$, $p = .072$. There was also a significant main effect of target's political affiliation, such that Republican faces were considered somewhat more gross

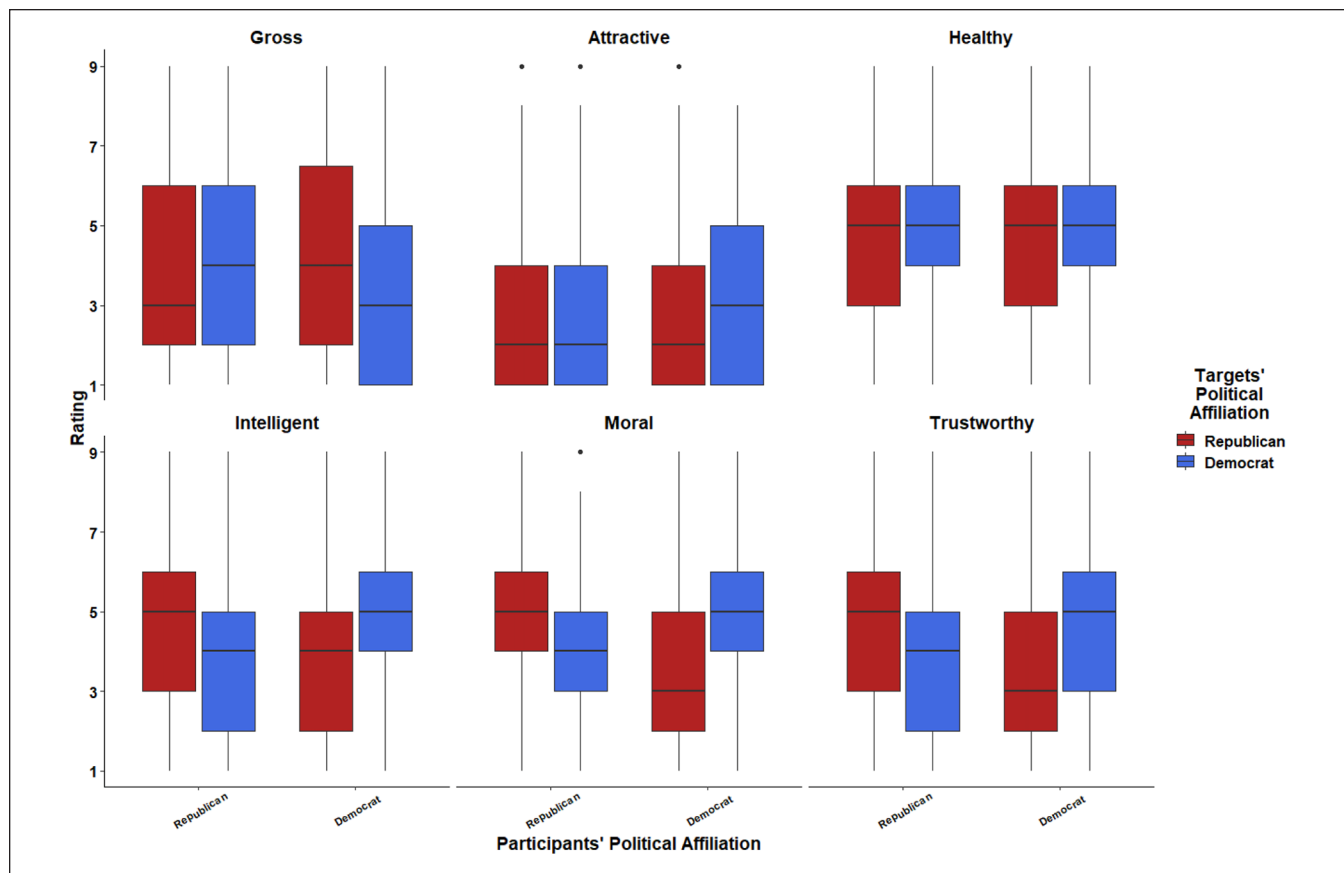


Figure 1. Box plots of trait evaluations, Study 1.

overall, $F(1, 206) = 10.84, p = .001, \eta_p^2 = .06$, and no significant main effect of participant's political affiliation, $F(1, 206) = 0.10, p = .750, \eta_p^2 = .00$. We also observed significant interactions for measures of attractiveness, intelligence, morality, and trustworthiness, although not for healthiness (see supplemental materials for details).

As a robustness check, we conducted a linear mixed-effects model predicting grossness ratings from target's political affiliation, participant's political affiliation, and their interaction, with random intercepts for participant and face, using the lme4 package for R (Bates et al., 2015). This analysis was not preregistered, but it is more appropriate to the design of this study as each participant rated all 10 faces. Importantly, we again observed a significant interaction between participant's and target's political affiliations, $b = -1.13, SE = 0.15, p < .001$, replicating the ANOVA results. Analogous models for the other evaluative measures are presented in the supplemental materials.

Discussion

In Study 1, participants rated political outgroup members as more gross than ingroup members, although photographs of these outgroup and ingroup members were matched on baseline disgustingness, and although participants were given

other ways to express general dislike or negativity. This result was primarily driven by Democrats. Perhaps Democrats' sociomoral emotions were particularly strong at the time of this study because they were the opposition party, and/or because then-President Trump and his base have garnered particularly strong negative reactions from Democrats. Importantly, our results probably do not simply reflect a negative halo effect (Thorndike, 1920) because we did not observe an interaction for ratings of healthiness; people do not simply judge outgroup members as negative in all respects. Rather, they specifically judge them to be unattractive, unintelligent, immoral, untrustworthy, and—most importantly—gross.

Study 2

Notably, “gross” is a more concrete term than “disgusting,” and closely matches the theoretical meaning of physical disgust (Nabi, 2002), suggesting that participants did experience physical disgust—not just moral or metaphorical disgust—toward outgroup members. In Study 2, we test this more comprehensively, using multiple measures of disgust. We also include comparable measures of anger. It is uncontroversial that anger is related to sociomoral evaluations, and laypeople consider it to be more associated with moral

disapprobation than disgust (Piazza & Landy, 2020). We therefore included several measures of anger to compare how strongly people experience these two emotions in response to political outgroup members.

Method

Participants. We recruited a total of 400 Democrats and 400 Republicans through Prolific. We determined this sample size using *simr*, an R package for conducting power analyses of linear mixed models (Green & MacLeod, 2016). Using the data from Study 1, a power curve indicated that we would approach 100% power to detect the interaction effect for grossness ratings with a sample of 100 participants. Our seven primary measures were manipulated between subjects (see the following), so we multiplied this estimate by 7, then added an additional 100 participants, to account for a likely exclusion rate of 10% to 15%, for a total of 800 participants. Unfortunately, we had to exclude 200 participants from our final sample: 14 for admitting to not paying attention, four for failing a simple attention check, and 182 for reporting political views in the demographics survey that did not match their Prolific profile, so we retained a final sample of $N = 600$. This final exclusion removed an unexpectedly large number of participants. To be sure that it did not meaningfully affect our results, we reran all of our analyses including these participants, classifying participants' political affiliations by the party affiliation associated with their Prolific account, rather than by self-report. The results of these analyses are substantively identical to the analyses reported below, except that a handful of theoretically irrelevant main effects change significance. Details of these analyses can be found in the supplemental materials.

Materials and procedure. After consenting to participate, participants responded to three blocks of 10 questions presented in a new randomized order for each participant. All three blocks presented the same 10 neutral expression faces and filler information used in Study 1. Five faces were described as having "voted exclusively for Democratic Party candidates in the past several elections," whereas the other five were described as having voted exclusively for Republican candidates. This study was conducted in July 2019, so we did not reference the 2018 midterm elections, unlike Study 1. Two of the three blocks asked participants how "moral" and "trustworthy" the target was to give participants a way to express general negativity or disapproval, as in Study 1. The other block presented one of seven emotion measures by random assignment.

Four of the emotion measures measured disgust: "How much does [target] make you feel disgusted?" "How much does [target] make you feel grossed out?" "How much does [target] make you feel nauseated, gag, and lose your appetite?" (based on Royzman et al.'s [2008] oral inhibition

index), and "How much does [target] make you feel like the facial expression shown below?" followed by a second face: a black-and-white image of a female exhibiting the "sick face" (Widen et al., 2013). Recent evidence suggests that the canonical "disgust face" (Ekman & Friesen, 1975) can be construed as an expression of anger (Pochedly et al., 2012; Yoder et al., 2016), so we employed the "sick face," which depicts a person gagging (Widen et al., 2013), as a less ambiguous measure of physical disgust (Yoder et al., 2016).

The remaining three questions measured anger: "How much does [target] make you feel angry?" "How much does [target] make you feel like the facial expression shown below?" followed by a second face: a black-and-white image of a female exhibiting an angry expression, drawn from the Compound Facial Expressions of Emotion Database (Du et al., 2014), and "How much does [target] make your blood pressure rise, your jaw clench, and your face flush?" We developed this last question as a measure of "physical anger" describing the physiological experience of anger, analogous to the oral inhibition measure describing the physiological experience of disgust. All measures were answered on 9-point Likert-type scales, ranging from *not at all* to *extremely*. Finally, participants responded to a brief demographics questionnaire and two attention checks.

Results

Figure 2 presents box plots of our seven emotion measures (approximately, 40–45 Republicans and 40–45 Democrats per measure) and the morality and trustworthiness measures (290 Republicans, 310 Democrats). Means and standard deviations for each measure are presented in Table 1. Following our preregistration, we analyzed participants' responses using linear mixed-effects models predicting each measure from target's political affiliation, participant's self-reported political affiliation, and their interaction, with random intercepts for participant and face.

Participants felt more disgust and more anger toward political outgroup members than ingroup members, regardless of how the emotions were measured (interaction $ps < .001$). However, although all interaction terms were statistically significant, it is clear that some of the effects were considerably larger than others (see Figure 3). The interaction terms for the anger measures were larger than the interaction terms for the disgust measures, consistent with prior research indicating that anger is more closely tied to moral disapproval than disgust (Piazza & Landy, 2020; Royzman et al., 2014). Moreover, two of the more concrete disgust measures (grossed out and oral inhibition, although not the sick face) showed substantially smaller effects than the "disgusted" measure, which is more likely to be used to express moral or metaphorical disgust. As in Study 1, participants rated ingroup members as more moral and more trustworthy than outgroup members (interaction $ps < .001$). For the sake of

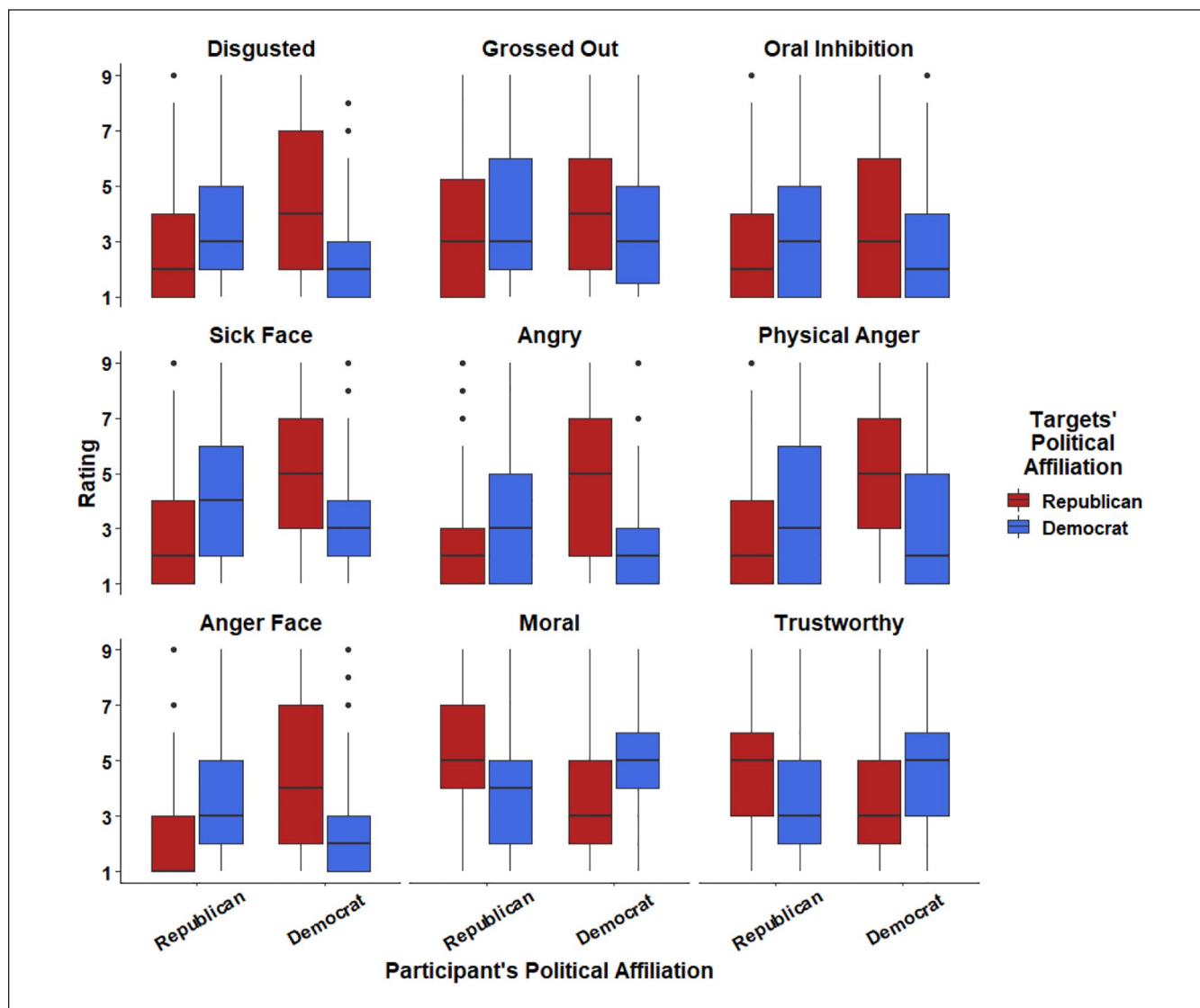


Figure 2. Box plots of emotion and morality measures, Study 2.

Table 1. *Ms (SDs)*, Study 2.

Measure	Democrat participants		Republican participants	
	Democrat targets	Republican targets	Democrat targets	Republican targets
Disgusted	2.45 (1.60)	4.42 (2.76)	3.72 (2.36)	3.02 (2.12)
Grossed out	3.35 (2.24)	4.30 (2.62)	4.06 (2.71)	3.65 (2.70)
Oral inhibition	2.93 (2.45)	3.75 (2.81)	3.55 (2.50)	2.97 (2.35)
Sick face	3.20 (2.09)	4.97 (2.37)	3.93 (2.38)	3.16 (2.21)
Angry	2.40 (1.91)	4.45 (2.50)	3.38 (2.36)	2.43 (2.00)
Physical anger	3.00 (2.26)	4.71 (2.47)	3.96 (2.83)	2.91 (2.24)
Anger face	2.46 (1.72)	4.32 (2.57)	3.73 (2.38)	2.24 (1.74)
Moral	5.12 (1.71)	3.33 (1.75)	3.81 (1.87)	5.04 (1.97)
Trustworthy	4.54 (1.79)	3.13 (1.77)	3.54 (1.87)	4.53 (2.11)

Note. All scales ranged from 1 (*not at all*) to 9 (*extremely*).

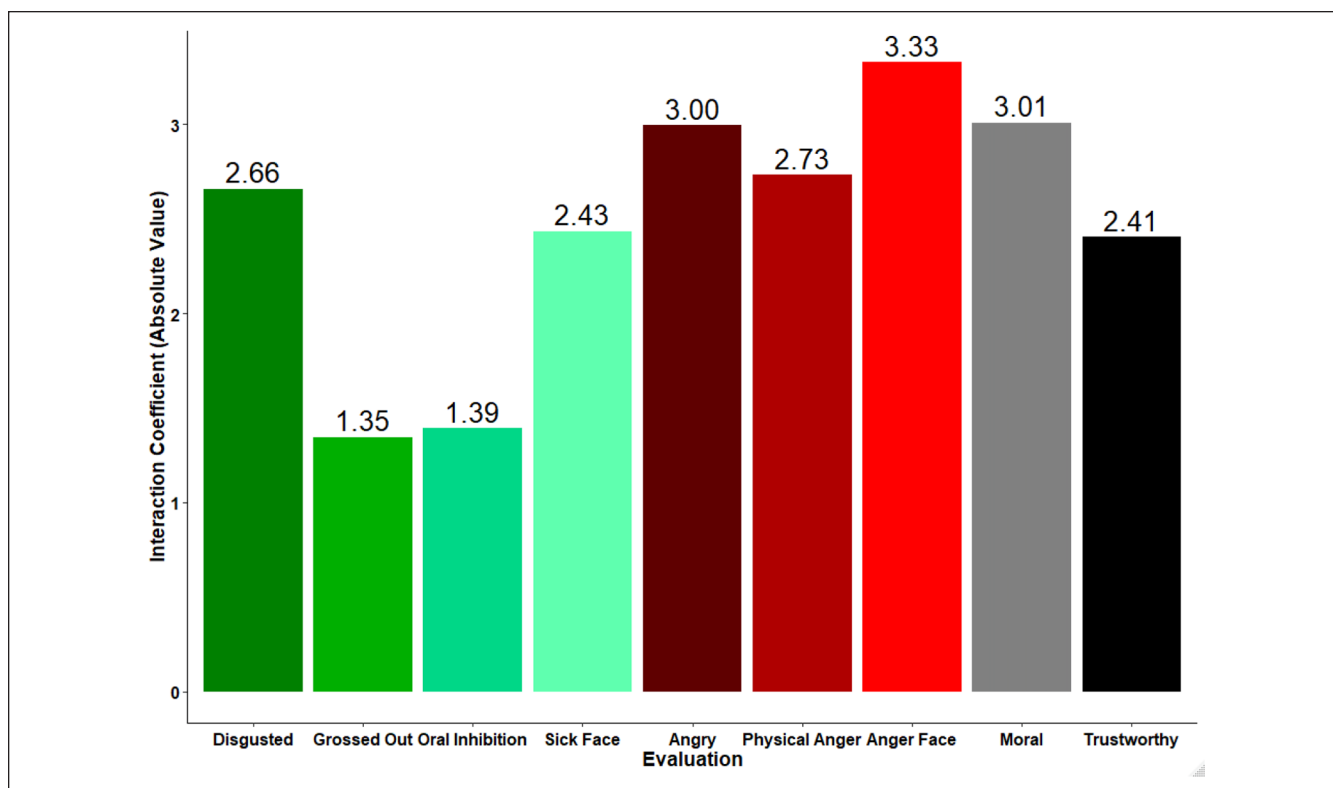


Figure 3. Interaction coefficients from linear mixed models, Study 2.

brevity, full models are presented in the supplemental materials.

Discussion

As in Study 1, participants in Study 2 expressed more disgust toward political outgroup members than ingroup members. This effect was observed using questions that measure physical disgust reactions in a concrete way. However, the effect was strongest when disgust was assessed using the word “disgusted.” This is the most straightforward, most common, and, arguably, most ambiguous method of measuring disgust because it is often unclear whether it is measuring physical, moral, or metaphorical disgust, or some combination thereof. However, the interaction term for the sick face measure was comparable in size to the “disgusted” measure, and the interactions for “grossed out” and oral inhibition, although smaller, were still statistically significant, strongly indicating that participants did experience physical disgust in response to outgroup members.

Study 3

Studies 1 and 2 relied on self-report measures, some more concrete than others. In Study 3, conducted in fall 2020, we move beyond self-report measures and analyze the intensity of disgust and anger expressions that participants spontaneously

produce in response to members of political ingroups and outgroups. We do so because facial activation has been used in prior studies as a nonverbal measure of sociomoral emotions (Cannon et al., 2011; Chapman et al., 2009).

Method

Participants. One hundred fifty-three undergraduate students recruited at a liberal arts college in the mid-Atlantic region and a private university in the southeastern United States participated in the study for course credit or monetary compensation. This study was run in fall 2020, during the COVID-19 pandemic. Because we were concerned that we might need to suspend or terminate in-person data collection unexpectedly, we did not preregister a specific sample size. Instead, we preregistered that we would run as many participants as possible prior to November 3, the day of the 2020 presidential election. Following our preregistration, we excluded 33 participants who did not identify as either Democrats or Republicans because there is no clear ingroup or outgroup for these participants. An additional 13 participants were excluded due to technical failures or because they did not follow the instruction to remove their face coverings during the study, leaving a final sample of $N = 107$ participants ($M_{\text{age}} = 19.79$, $SD_{\text{age}} = 1.55$, 90 female, one prefers not to say; 84 mid-Atlantic). We recognize that this is a fairly small sample, and that this study is likely underpowered. However,

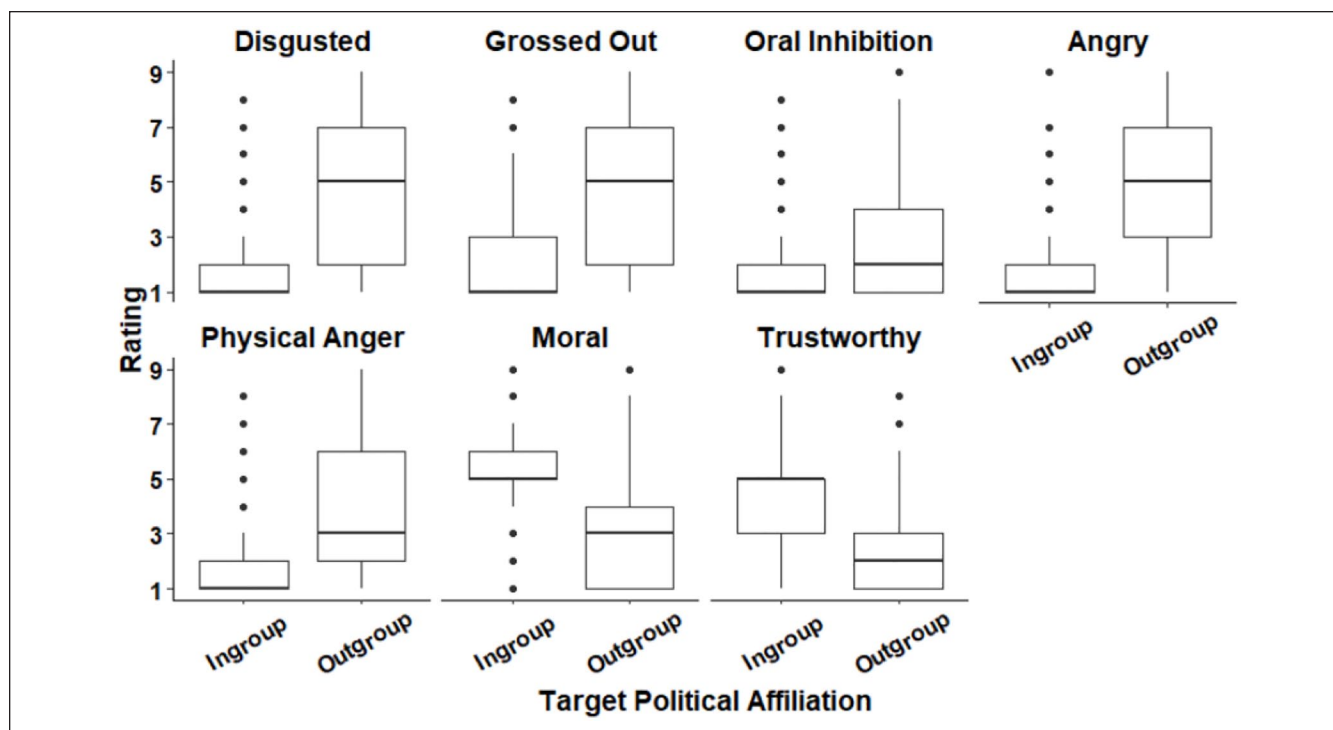


Figure 4. Box plots of self-report measures, Study 3.

given the logistical difficulties associated with in-person data collection during a pandemic, resources limited the possible size of our sample.

Method. Participants were greeted by a research assistant and informed that they would view pictures of different people and indicate their feelings about them. For safety reasons, the research assistant left the room during the study as participants could not wear a face covering during the study because their facial expressions were being recorded. Research assistants were blind to the hypothesis of the study.

Participants were presented with the same 10 neutral expression faces used in Studies 1 and 2. Instead of communicating targets' political affiliation with words, as in the previous studies, we manipulated the images so that each target appeared to be wearing a shirt that clearly expressed support for one political party (e.g., "Proud Democrat" or "Proud Republican"). As in the previous studies, which faces were presented as Democrats versus Republicans was counterbalanced between subjects.

On each trial, after a fixation period of 7 s, participants were presented with one target, and instructed to look at the target until instructions appeared telling them to look away. After 10 s, instructions appeared telling participants to respond to questions about the target in a pen-and-paper questionnaire. Participants responded to seven questions about each target, identical to questions in Study 2: three disgust questions (disgusted, grossed out, and oral inhibition), two anger questions (angry, physical anger), and two moral

disapproval questions (moral, trustworthy). The morality question was always presented first, the trustworthiness question was always presented fourth, and the order of presentation of the other questions varied by trial. After responding to all questions, participants pressed the space bar to begin the next trial. Participants' facial expressions were recorded during each trial. After completing all 10 trials, participants filled out a demographics questionnaire that included a measure of political affiliation.

Results

Participants who indicated that their political affiliation was "Strong Democrat" or "Lean Democrat" were categorized as Democrats ($n = 95$); participants who indicated that their political affiliation was "Strong Republican" or "Lean Republican" were categorized as Republicans ($n = 12$). Following our preregistration, we analyzed participants' responses using linear mixed-effects models predicting each measure from target's political affiliation (coded as "Same as participant" or "Opposite of participant"), with random intercepts for participant and face. In other words, instead of testing for an interaction, as in Studies 1 and 2, we collapsed across Democratic and Republican participants and tested whether outgroup members elicited different emotional responses than ingroup members, regardless of participants' political views. The results are substantively unchanged when examining interactions in models with fixed effects for participant political affiliation (Democrat vs. Republican)

Table 2. *M* (*SDs*) of All Measures, Study 3.

Self-report measures	Target political affiliation	
	Same as participant	Opposite of participant
Disgusted	1.96 (1.52)	4.75 (2.68)
Grossed out	2.21 (1.72)	4.62 (2.67)
Oral inhibition	1.63 (1.33)	3.04 (2.47)
Angry	1.79 (1.31)	5.04 (2.61)
Physical anger	1.75 (1.26)	4.04 (2.51)
Moral	5.21 (1.61)	2.84 (1.71)
Trustworthy	4.57 (1.68)	2.53 (1.48)
Facial expression measures	Target political affiliation	
	Same as participant	Opposite of participant
Disgust expression	0.059 (0.087)	0.69 (0.124)
Anger expression	0.127 (0.161)	0.148 (0.185)

and target political affiliation (Democrat vs. Republican), as in Studies 1 and 2. However, because the study was conducted on rather liberal college campuses, we preregistered that we would not focus on these models if our sample consisted of less than 25% Republicans, which it did. Details of these analyses are presented in the supplemental materials.

Self-report measures. Box plots of the self-report measures are presented in Figure 4. Descriptive statistics for self-report and facial expression measures are presented in Table 2. Participants reported feeling more disgusted ($b = 2.79$, $SE = 0.10$, $p < .001$), more grossed out ($b = 2.41$, $SE = 0.11$, $p < .001$), and more oral inhibition ($b = 1.41$, $SE = 0.09$, $p < .001$) in response to outgroup members than ingroup members. In addition, they reported being angrier at outgroup members ($b = 3.26$, $SE = 0.10$, $p < .001$) and experiencing more physical anger in response to outgroup members ($b = 2.30$, $SE = 0.10$, $p < .001$). Finally, outgroup members were rated as less moral ($b = -2.36$, $SE = 0.09$, $p < .001$) and less trustworthy ($b = -2.04$, $SE = 0.08$, $p < .001$) than ingroup members.

Facial expressions. The recordings of participants' facial expressions were analyzed using the Noldus FaceReader software. FaceReader classifies facial expressions by constantly monitoring activation of 20 key facial Action Units (AUs), which are muscle groups in the face that are implicated in facial expressions. Activity in these Action Units is then interpreted using the widely accepted Facial Action Coding System (FACS; Ekman & Friesen, 1978; Ekman & Rosenberg, 2005), which outlines Action Unit combinations necessary for the expression of specific emotions. FaceReader outputs an intensity score for each of seven emotional expressions—neutral, happy, sad, angry, surprised, scared, and disgusted—at 0.1 s intervals. Intensity scores range from 0 (*expression absent*) to 1 (*expression fully present*). For present purposes, we are interested in expressions of disgust

(AU9 [nose wrinkled], AU15 [lip corners depressed], and AU17 [chin raised]), and anger (AU4 [brow lowered], AU5 [upper lip raised], AU7 [lids tightened], and AU23 [lips tightened]), which do not share any common action units. Although disgust and anger are both negatively valenced emotions, the facial musculature involved in their expression is quite different.

Following our preregistration, we analyzed the maximum intensity of disgust and anger expressions on each trial.¹ Box plots of these measures are presented in Figure 5. Participants expressed more anger at outgroup members than ingroup members, $b = 0.021$, $SE = 0.010$, $p = .034$. Although participants expressed directionally more disgust at outgroup members than ingroup members, this effect was not statistically significant, $b = 0.010$, $SE = 0.006$, $p = .123$.

We also ran several additional analyses, which were not preregistered. First, although the effect of target political affiliation on anger expressions was statistically significant, and the effect on disgust expressions was not, these two effects were not significantly different from one another: In a linear mixed model, including fixed effects of target political affiliation, expression (anger vs. disgust), and their interaction, the interaction term was not significant, $b = 0.011$, $SE = 0.012$, $p = .380$. Second, we conducted analyses in which the dependent measure was the difference between maximum facial expression intensity during the trial and mean expression intensity during the 7 s fixation period to account for any emotion expressed before the target stimulus was presented. The results of these analyses were substantively identical to the focal analyses reported above. Finally, we examined whether "strong" partisans showed larger effects than "weak" partisans. They did, for the self-report measures, although weak partisans still showed clear differences in their feelings toward ingroup versus outgroup members. Strong and weak partisans did not differ in the effect of group membership on their emotional expressions. Details of these additional analyses are presented in the supplemental materials.

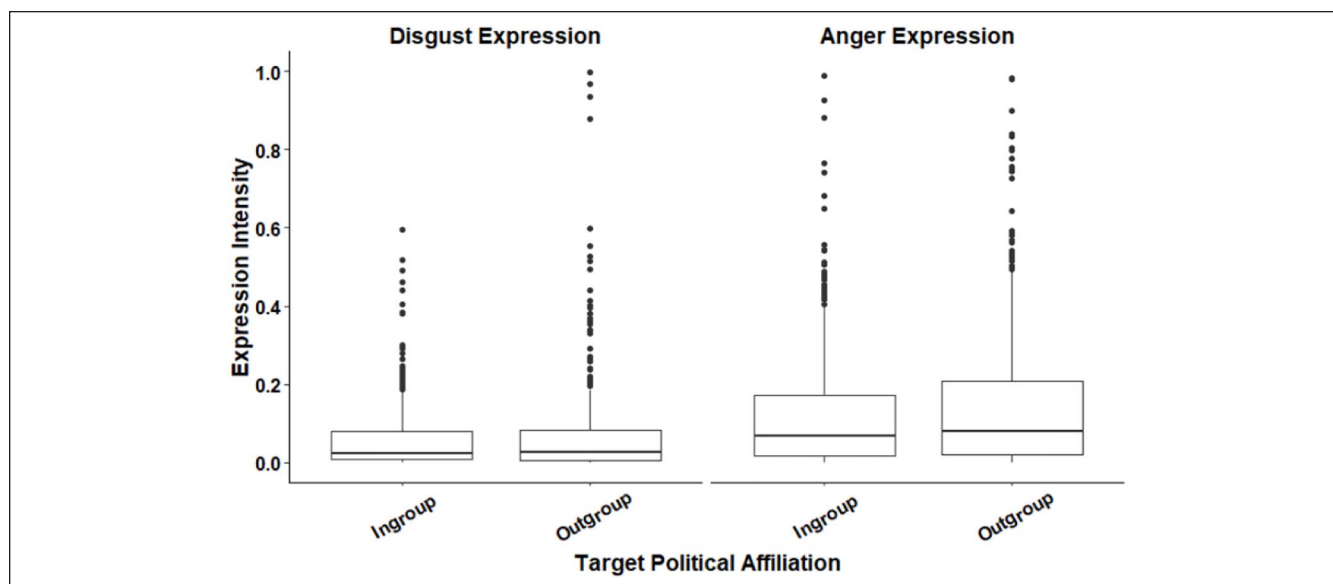


Figure 5. Box plots of maximum anger and disgust expression intensity, Study 3.

Discussion

Study 3 replicated the results of Study 2 in a sample from a different population (i.e., undergraduates vs. Prolific users). Political outgroup members were judged to be disgusting, even when concrete measures of feeling “grossed out” and oral inhibition were employed, although, as in Study 2, these effects were smaller than the effect for the term “disgusted.” However, a nonverbal measure of facial expression intensity showed no significant difference in expressed disgust in response to outgroup members versus ingroup members. Although we did find a significant effect for anger expressions, it was not large, nor was it significantly different from the effect found for disgust expressions. Overall, this study shows that methodological choices are highly consequential when measuring disgust as different measures will not necessarily yield convergent findings. We return to this point in the “General Discussion” section.

One notable drawback to Study 3 is that it was conducted during the COVID-19 pandemic. As noted above, this limited our capability to collect in-person data, resulting in a smaller sample than would be ideal. Moreover, it also introduced the possibility that political outgroup members may *actually* have presented different pathogen threats at the time of the study. This is unlikely to be true under typical circumstances, but the pandemic was originally localized to large, liberal cities, giving Republican participants reason to perceive a pathogen threat from Democrats, and liberal Americans have been more compliant with public health recommendations, such as mask wearing and social distancing (Brenan, 2020; Makridis & Rothwell, 2020; Nowlan & Zane, in press; Thompson, 2020), giving Democratic participants reason to perceive a pathogen threat from Republicans. In

other words, judgments of disgust in Study 3 might be bound up with real danger of infection (or, at least, the perception of such danger), in a way that they were not in Studies 1 and 2. We cannot rule out this possibility, but we are encouraged by the fact that the results of Studies 1 and 2, which were conducted well before the start of the pandemic, are largely consistent with those of Study 3.

General Discussion

The present research found that political outgroup members are judged to be more disgusting than ingroup members (Studies 1–3). Notably, although this effect was smaller when the term “grossed out” or a concrete description of the physiological experience of disgust was employed instead of the more ambiguous term “disgusting,” the effect still held for the concrete self-report measures (Studies 2–3), suggesting that participants did feel physical disgust, not just moral or metaphorical disgust, in response to outgroup members. However, we did not observe this effect when employing a nonverbal measure of participants’ facial expression intensity (Study 3). Participants in our studies seem to have *subjectively experienced* physical disgust in response to political outgroup members although they did not externally *express* this feeling in the privacy of a study cubicle.

This research makes two primary contributions. First, it demonstrates that political foes are considered physically disgusting. Second, the data pass a rigorous test of the idea that at least some social stimuli can elicit physical disgust as political outgroup members elicited disgust despite our use of stimuli matched on baseline disgustingness, concrete dependent variables, and provisions of additional, straightforward ways to express negativity toward outgroups. Thus,

we believe that we have produced the strongest evidence to date that outgroup members elicit genuine physical disgust, while also showing that the strength of this result is somewhat dependent on the measures employed.

Limitations and Remaining Questions

This research has several limitations. First, we relied primarily on self-report measures of participants' emotions, although we used the least ambiguous self-report measures of which we are aware. Although we did employ a nonverbal measure of facial expression intensity in Study 3, future research might attempt to replicate our findings using other nonreactive methods. Moreover, our stimuli were slightly disgusting, even in the absence of political information. We made this choice to avoid floor effects, but it is possible that very attractive people may not be considered as *physically* disgusting, even if they hold political views that one opposes. Our results do not speak to this possibility; they only show that faces that are capable of eliciting at least *some* disgust in the absence of information about group membership elicit *more* disgust when they belong to outgroup members. Moreover, there is some possibility of demand effects in our designs. Although we included filler information in Studies 1 and 2 (age, family, and food and media preferences), it would not be difficult to recognize that the only consistent difference between targets was their political affiliation, and no such filler information was included in Study 3. However, we think that our results are not easily explained by any such demand effects. In particular, if participants guessed that we expected emotional reactions to ingroups and outgroups to differ, this still would not explain the differences *between* emotions (e.g., larger effects for anger than disgust measures, differences between the sick face and other concrete measures). Thus, although participants may have had some idea that we were studying something related to politics and emotions, it seems unlikely that their responses were greatly impacted. Finally, our stimuli only depicted male faces, so future studies should examine whether our findings generalize to female targets.

Implications

This research illustrates the relative strengths and weaknesses of self-report and nonverbal measures of emotional experience. Our participants reported feeling "grossed out" and oral inhibition in response to outgroup members. This is not likely to reflect metaphorical disgust or moral disgust (due to the concrete, physical nature of the measures), nor to reflect a negative halo effect (because this was not observed for healthiness in Study 1), nor to be an artifact of participants using whatever measure is available to them to express general negativity (because the other measures we included straightforwardly allowed them to do so). Thus, we think that these self-reported emotional experiences are, *a priori*, veridical.

However, when using a nonverbal measure of disgust (facial expression intensity), the results were directionally consistent with the self-report measures, but not statistically significant. This may be because facial expressions are not direct, automatic outputs of mental states (Royzman & Kurzban, 2011a) but rather serve social and communicative functions (Crivelli & Fridlund, 2018). Thus, facial expressions of disgust are not always reliably associated with self-reported feelings of disgust (Stark et al., 2005) and are often muted in private settings (Gilbert et al., 1987; Jäncke & Kaufmann, 1994). Because participants in Study 3 were tested alone, they may not have strongly *expressed* disgust, even if they *experienced* it, subjectively. Other "objective" measures of emotion have similar drawbacks (see Rottman et al., 2019, for discussion). It is also possible, of course, that this null result was simply a Type II error. This seems plausible, given the small sample size in Study 3. Hence, we cannot say with certainty why the emotion expression measures did not fully agree with the self-report measures, but our results would seem to constitute preliminary evidence that group membership has more effect on subjectively experienced disgust than on outwardly expressed disgust. Future research should attempt to replicate and explain this result.

Overall, we think that a multimethod approach that uses multiple measures of emotional experience is the best way forward. Looking across all of our different measures, we clearly see disgust directed toward outgroup members, along with anger. More formally, in an internal meta-analysis aggregating across all of our disgust measures, we observe substantially more disgust toward outgroup members than ingroup members, $d_{RM} = 0.65$, $p < .001$, 95% CI = [0.41, 0.90].² Even when excluding the less concrete "disgusted" measures from Studies 2 and 3, the observed effect size is still substantial, $d_{RM} = 0.56$, $p < .001$, 95% CI = [0.32, 0.81]. Unsurprisingly, the effect size for anger is notably larger, $d_{RM} = 0.83$, $p < .001$, 95% CI = [0.47, 1.18]. Thus, across three studies and numerous measures, we found that political outgroup members elicit considerable anger and appreciable amounts of disgust.

In addition, American politics is highly polarized, with increasing division between Republicans and Democrats on policy issues, among both politicians and the electorate (Layman et al., 2006). There are surely many causes of people's unwillingness to seek common ground with political outgroup members, but sociomoral emotions such as anger and disgust may be one important contributor. Anger tends to promote aggression, confrontation, and punishment, and it could play an important role in generating political conflict; disgust, on the contrary, tends to promote withdrawal, rejection, and avoidance (Gutierrez & Giner-Sorolla, 2007; Molho et al., 2017), which could underlie unwillingness to engage with political outgroups. In other words, anger may drive conflict between partisans, and (physical) disgust may keep them apart, preventing resolution, and perpetuating disagreements and vilification on both sides.

Conclusion

We have shown that political outgroup members can elicit physical disgust, using methods that provided an especially strong test of this possibility. We consider these results to be compelling new evidence for a role of disgust in social and moral evaluation.

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. FaceReader was unable to detect participants' faces on some trials due to poor lighting or participants not looking at the screen as instructed. Whereas the self-report measures have nearly complete data for all participants (one participant did not respond to the questions on two trials; 107 participants \times 10 trials = 1,070 data points – 2 missing responses = 1,068 data points), the facial expression measures have only 901 data points.
2. The repeated measures Cohen's d , abbreviated d_{RM} , is calculated as the mean difference score across within-subjects conditions (in this case, ingroup vs. outgroup), divided by the standard deviation of difference scores (see Morris & DeShon, 2002). For simplicity, we averaged all ingroup trials and all outgroup trials, and collapsed across Democratic and Republican participants for this analysis. The random-effects meta-analysis was conducted using the metafor package for R (Viechtbauer, 2010).

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