**Investigating the Conservatism-Disgust Paradox in Reactions to the COVID-19 Pandemic:
A Critical Reexamination of the Interrelations Between Political Ideology, Disgust
Sensitivity, and Pandemic Response**

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Abstract

Research has documented robust associations between greater disgust sensitivity and (1) concern about disease, and (2) political conservatism. However, the COVID-19 disease pandemic raised challenging questions about these associations. In particular, why have conservatives—despite their greater disgust sensitivity—exhibited *less* concern about the pandemic? Here, we aim to resolve this “conservatism-disgust paradox” and address several outstanding theoretical questions regarding the interrelations between disgust sensitivity, ideology, and pandemic response. In four studies ($N=1,764$), we identify several methodological and conceptual factors—in particular, an overreliance on self-report measures—that likely inflated, or even wholly created, the apparent associations between these constructs. Using non-self-report measures, we find that disgust sensitivity is a far less potent predictor of disease avoidance than is typically believed, and that ideological differences in disgust sensitivity may be limited to self-report measures. These findings help resolve this paradox, while providing important insight into the nature of these associations.

Keywords: political ideology, disgust sensitivity, disease avoidance, COVID-19

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The emotion of disgust is believed to have evolved to facilitate disease prevention, motivating behavioral avoidance of situations and stimuli that hold the potential for pathogen transmission (Schaller, 2011). Consistent with this view, disgust in modern humans is triggered by many cues of potential contagion, such as bodily fluids (e.g., blood, vomit), certain insects and animals (e.g., cockroaches, rats), and humans exhibiting signs of illness (e.g., coughing, spasms, skin lesions; Oaten, Stevenson, & Case, 2009).

Disgust constitutes an integral part of the “behavioral immune system” (BIS), a suite of affective (the emotion of disgust), cognitive (disease-relevant thoughts), and behavioral (avoidance of disgusting stimuli) responses that collectively operate to limit the transmission of disease. The BIS operates in complement to the biological immune system. While the biological immune system eliminates pathogens inside the body, the purpose of the BIS is to prevent these pathogens from entering the body in the first place (Schaller, 2011).

Despite the universality of the BIS and the emotion of disgust, however, people nonetheless exhibit substantial variability in their propensity to experience disgust, with some individuals generally showing greater sensitivity than others to disgusting situations and stimuli (Haidt, McCauley, & Rozin, 1994). Consistent with the theorized evolutionary function of disgust, individuals who are higher in disgust sensitivity tend to exhibit greater concern about potentially contracting illnesses, greater sensitivity to cues or signals of disease, and greater behavioral avoidance of situations with the potential for pathogen transmission (e.g., contact with sick people; Crandall & Moriarty, 1995; Park, Faulkner, & Schaller, 2003).

Disgust Sensitivity and Political Ideology

Individual differences in sensitivity to disgust have also been shown to relate to political ideology. A large body of research has demonstrated that individuals who are dispositionally

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more disgust-sensitive tend to be more politically conservative (e.g., Terrizi, Shook, & McDaniel, 2013). Similarly, situational manipulations of disgust (e.g., bad smells, disgusting images) can also lead people to adopt more politically conservative positions on certain issues (e.g., same-sex marriage; Inbar, Pizarro, & Bloom, 2012).

The association between disgust sensitivity and ideology has been explained via several psychological mechanisms. In particular, leading theoretical perspectives contend that this relation is explained by the associations between dispositional disgust sensitivity and greater traditionalism and sexual restrictiveness (Tybur, Inbar, Güler, & Molho, 2015; Tybur et al., 2016) and greater intergroup bias (i.e., favoritism toward social ingroups and derogation of social outgroups; Aarøe, Petersen, & Arceneaux, 2017; Terrizi et al., 2013). According to these theoretical perspectives, individuals who are higher in disgust sensitivity tend to adopt more politically conservative ideologies because conservatism better aligns with these positions and principles (e.g., by promoting traditional sexuality and providing greater ingroup protection).

Despite the large body of research on the association between disgust and conservatism, however, recent events have raised intriguing questions regarding the nature, extent, and importance of ideological differences in sensitivity to disgust. In particular, the COVID-19 disease pandemic—and ideological differences in responses to it—has revealed a pattern of effects that seems to challenge the idea that conservatives broadly exhibit greater sensitivity to disgusting situations and stimuli.

The COVID-19 Pandemic

The COVID-19 disease pandemic that began in late 2019 claimed hundreds of thousands of lives and has exacted yet-untold economic and societal repercussions. Despite the profound and wide-ranging consequences of the pandemic, however, people vary greatly in their concern

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about the virus. While some individuals express substantial worry about the virus and exhibit strict behavioral compliance with efforts to combat it, other individuals have downplayed the importance of the pandemic and have fought against social distancing guidelines and other anti-virus measures (Pew Research Center, 2020a-c).

Consistent with the theoretical framework outlined above, one predictor of responses to the pandemic are individual differences in disgust sensitivity. Several lines of research suggest that disgust sensitivity and broader BIS activation predict responses to the pandemic (e.g., De Coninck, d'Haenens, & Matthijs, 2020; Makhanova & Shepherd, 2020; Shook, Sevi, Lee, Oosterhoff, & Fitzgerald, 2020). More disgust-sensitive individuals express greater attitudinal concern about the virus and self-report engaging in greater social distancing and other anti-virus behaviors (e.g., handwashing, mask-wearing; *ibid.*).

Reactions to the pandemic have also exhibited a stark ideological divide, with liberals and conservatives differing greatly in their responses to the virus. These ideological differences have been documented in polling with nationally representative samples (Pew Research Center, 2020a-c), as well as social psychological research (e.g., Rothgerber et al., 2020).

Given conservatives' well-established greater sensitivity to disgust, the existence of ideological differences in responses to the pandemic should come as no surprise. After all, the research and theory outlined above clearly suggest that conservatives should exhibit greater concern about the pandemic—and, indeed, about any large-scale disease threat. However, the direction of these ideological differences is actually in direct opposition to these predictions: Political conservatives—despite their greater sensitivity to disgust—do not exhibit greater concern about the virus, and, in fact, actually exhibit *less* concern than do liberals (Pew Research Center, 2020a-c).

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Critically, these associations are not small or tenuous. Indeed, disgust sensitivity/BIS activation is argued to be among the most powerful predictors of responses to the virus (Shook et al., 2020). The ideological gap in pandemic response is also quite substantial—for example, with more than double the number of right-leaning (68%) versus left-leaning (30%) individuals expressing the belief that the danger of the pandemic has generally been exaggerated (Pew Research Center, 2020a). The large size of these effects makes this conflicting pattern of results all the more difficult to explain.

Reconciling the Conservatism-Disgust Paradox in Pandemic Response

In sum, then, disgust sensitivity, ideology, and pandemic response exhibit an intriguing—and seemingly somewhat paradoxical—pattern of interrelations: disgust sensitivity is reliably associated with political conservatism, and disgust sensitivity appears to be one of the most powerful predictors of concern about the virus. And yet, rather than being more concerned about the virus, conservatives are actually substantially less so.

How can we reconcile this pattern of effects? Why is it that disgust sensitivity is such a powerful predictor of responses to COVID-19, while the well-established *ideological differences* in disgust sensitivity appeared to have little impact in shaping conservatives' and liberals' responses to the pandemic? To our knowledge, no research has attempted to reconcile this intriguing pattern of results. To fill this gap, in this research we provide an in-depth examination of the interrelations between disgust sensitivity, ideology, and pandemic response, and we test several possible explanations for this pattern of associations.

In reviewing past research, we identified several factors that—independently or collectively—may help to explain the conservatism-disgust paradox in pandemic response. In particular, we identified three core conceptual and methodological issues that may have

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artificially amplified—or, in some cases, perhaps even wholly created—the apparent relations between these three factors (e.g., between disgust sensitivity and pandemic response; between disgust sensitivity and ideology). If so, this may have contributed to this apparently paradoxical pattern of results. For example, if disgust sensitivity is in fact only a relatively weak predictor of pandemic response—or if ideological differences in disgust sensitivity are smaller than is typically believed—then it is less surprising that conservatives have exhibited so little concern about the virus, as these factors would have been more easily subsumed by other concerns and motivations, such as political partisanship.

Below, we briefly discuss each of these possible explanations, and we present the specific hypotheses that we will test to assess each. These hypotheses, collectively, constitute a critical reexamination of the interrelations between disgust sensitivity, ideology, and pandemic response (see Figure 1), providing novel insights into the nature of each “branch” of this triangular pattern of associations (each of which has independently been the subject of much research) as well as helping to resolve the overarching question of what explains the conservatism-disgust paradox in pandemic response.

Figure 1. Model of the theorized interrelations between our three target variables, with hypotheses positioned according to the specific relations that they test. Solid blue arrows indicate positive associations and dashed red arrows indicate negative associations.

Use of Self-Report Measures of Pandemic Response: One possible contributing factor is that past research has predominately used relatively subjective self-report measures of pandemic response, such as attitude measures and self-reported behavior (e.g., social distancing, mask-wearing; Makhanova & Shepherd, 2020; Olivera-La Rosa, Chuquichambi, & Ingram, 2020; Samore, Fessler, Sparks, & Holbrook, 2020). Such self-report measures are more susceptible to social-desirability motivations, self-presentational concerns, and other reporting biases (Balcetis, 2008; Fisher, 1993; Leary & Kowalski, 1990), especially given the strong normative—and in some cases legal—pressure to engage in social distancing and other anti-virus behaviors (Byrnes, 2020; Hagger, Smith, Keech, Moyers, & Hamilton, 2020). This may have amplified the apparent

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strength of the relations between pandemic response and both disgust sensitivity and ideology (e.g., because of social desirability or ideological-identity-related concerns). If true, then:

H1a. The relation between disgust sensitivity and pandemic response should be attenuated for behavioral (versus self-report) measures of pandemic response.

H1b. The relation between ideology and pandemic response should be attenuated for behavioral (versus self-report) measures of pandemic response.

Content Overlap Between Disgust Sensitivity and Pandemic Response Measures: The self-report measures of disgust sensitivity/BIS activation that have been used in past research also suffer from a critical weakness in the current context: possible conceptual/content overlap with measures of pandemic response. For example, most past research on responses to COVID-19 (e.g., De Coninck et al., 2020; Makhanova & Shepherd, 2020; Olivera-La Rosa et al., 2020; Shook et al., 2020) has used the Perceived Vulnerability to Disease scale (Duncan, Schaller, & Park, 2009) as an index of BIS activation. This measure focuses largely on situations with clear and immediate relevance for disease transmission (e.g., being in close contact or proximity to sick individuals), and thus seems likely to capture behaviors that are intended to prevent the spread of COVID-19 specifically. For example, the items “I prefer to wash my hands pretty soon after shaking someone’s hand” and “It really bothers me when people sneeze without covering their mouths” could themselves be considered indicators of concern about COVID-19.

The Disgust Scale-Revised (DS-R; Haidt et al., 1994; Olatunji et al., 2007), which has been most widely used in past research on ideological differences (Terrizi et al., 2013), may suffer a similar weakness. This measure assesses self-reported disgust and participants’ self-beliefs regarding how they would behave in a variety of hypothetical disgusting situations—at least some of which appear to directly relate to disease prevention/avoidance (e.g., “I probably

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would not go to my favorite restaurant if I found out that the cook had a cold”; “You take a sip of soda, and then realize that you drank from the glass that an acquaintance of yours had been drinking from”).

This conceptual overlap between IV and DV may have further inflated the apparent predictive power of disgust sensitivity for pandemic response. If this is true, then we should see asymmetries in the predictive power of disgust sensitivity measures that rely on self-reports/self-beliefs versus less reflective measures of disgust sensitivity—such as measures that rely on more immediate affective or “experiential” responses to disgusting stimuli (e.g., affective reactions to disgusting images). Specifically:

H2a. Self-report measures of pandemic response should be more strongly associated with self-report (versus experiential) measures of disgust sensitivity.

Accordingly, however, if this conceptual overlap is eliminated or reduced—such as via the use of experiential measures of disgust sensitivity and behavioral measures of pandemic response—then we may see that:

H2b. Experiential (versus self-report) measures of disgust sensitivity may relate more strongly to behavioral (versus self-report) measures of pandemic response.

Exaggeration of Ideological Differences in Sensitivity to Disgust: Finally, another, perhaps more controversial, possibility is that ideological differences in disgust sensitivity may be exaggerated—or even completely illusory. That is, although the disgust-conservatism association is supported by a large body of research, in recent years some commentators have argued against the idea that liberals and conservatives differ widely in their psychological traits and motivations (e.g., Bakker, Schumacher, Gothreau, & Arceneaux, 2019; Choma, Hanoach, Gummerum, & Hodson, 2013; Crawford, 2017). These perspectives contend that methodological limitations of

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past research—especially the near-exclusive reliance on self-report measures of psychological motivations—has amplified the appearance of ideological differences (Taber and Young, 2013; Van Hiel, Onraet, Crowson, & Roets, 2016). Such self-report measures of psychological motivations are argued to be more susceptible to factors such as self-presentational differences between liberals and conservatives, and conceptual overlap between measures of ideology and measures of psychological traits. Collectively, these confounding factors may have led past research to substantially overestimate the degree of ideological differences in traits such as sensitivity to disgust.

These concerns are further underscored by recent failures to replicate some well-established ideological differences, including liberal-conservative differences in sensitivity to disgust. For example, in multiple well-powered studies, Bakker and colleagues (2020) recently failed to find any evidence of ideological differences on non-self-report, experiential (in this case, physiological) measures of sensitivity to disgusting stimuli. Similarly, Elad-Strenger, Proch, and Kessler (2020) found that ideological differences in disgust sensitivity emerged on some self-report measures (e.g., the DS-R) but not others (e.g., a measure assessing self-beliefs about one's frequency of experiencing disgust in everyday life, rather than reactions to specific disgusting stimuli as in the DS-R). These results dovetail with other recent findings suggesting that people may have limited introspective ability into their own degree of sensitivity to disgust. Indeed, some research has found that self-reports of disgust sensitivity correlate only moderately—and sometimes not at all—with other, more indirect measures of responses to disgusting stimuli (e.g., more experiential measures such as image ratings; behavioral tasks; e.g., Aarøe et al., 2017; Smith, Oxley, Hibbing, Alford, & Hibbing, 2011; Stark, Walter, Schienle, & Vaitl, 2005).

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For these reasons, we also wished to examine whether ideological differences in disgust sensitivity might be exaggerated by the self-report measures that are typically used in research. To test this question, we compared the relation of ideology with both self-reported disgust sensitivity, as well as to the more experiential measure of disgust sensitivity discussed above. If ideological differences in disgust sensitivity are indeed exaggerated by self-report measures, then:

H3. Measures of disgust sensitivity that rely on more immediate experiential responses (versus self-reports of one's sensitivity to disgust such as the DS-R) will show attenuated relations with ideology.

If this final hypothesis is correct, then the paradoxical pattern of results discussed above may simply stem from the fact that liberals and conservatives do not truly differ in their sensitivity to disgust—or at least not to the degree suggested by past research. That is, if ideological differences in disgust sensitivity are in fact relatively small (or nonexistent), then it is less surprising that they can be overridden by competing motivations (e.g., identification with one's political ingroup).

The Present Research

In this research, we provide an examination of the interrelations between disgust sensitivity, ideology, and pandemic response, testing these five hypotheses and answering the questions outlined above. To do so, we conducted a series of four studies (Total $N = 1,764$), using a range of measures and approaches, as well as reexamining data from a large-scale survey on the predictors of pandemic response.

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In Study 1, we provide an initial examination of the interrelations between ideology, disgust sensitivity, and pandemic response. In this study, we used the DS-R as our measure of disgust sensitivity, allowing us to test the nature and strength of these relations using the measure of disgust sensitivity that has been most widely used in research on ideological differences.

In Study 2, we provided a more in-depth and nuanced examination of these relations. To do so, we re-examined data from a large-scale, multi-wave correlational study that we conducted to understand the predictors of responses to the pandemic (Citation blinded). Using these data, we examined whether and how this pattern of associations differs when using self-report (e.g., attitudes) measures of pandemic response, compared to more behavioral measures (interactive virtual social-distancing scenarios). In doing so, we test H1a and H1b—that the relations between pandemic response and both ideology and disgust sensitivity will be attenuated when behavioral measures are used.

In Study 3, we used a more experiential, non-self-belief-based measure of disgust sensitivity to determine whether this measure would also predict responses to the pandemic. In doing so, we provide a preliminary investigation of whether methodological issues such as conceptual overlap between self-report measures of disgust sensitivity and pandemic response may have inflated the apparent relations between these factors.

In Study 4, we assessed both self-reported disgust sensitivity (the DS-R) and the experiential disgust sensitivity measure from Study 3, allowing us to compare the predictive power of each measure for different dimensions of pandemic response (i.e., self-reports vs. behavior; H2a and H2b). We also test the relation of each disgust sensitivity measure with ideology to gain insight into whether and to what degree ideological differences in disgust sensitivity may have been exaggerated in past research (H3).

Studies 1 and 2

In our first two studies, we provided an examination of the interrelations between ideology, disgust sensitivity, and pandemic response, using the measure of disgust sensitivity that has been most widely used in past research on ideological differences, the DS-R. In Study 1, we conducted a (preregistered) initial test of these associations. In Study 2, we provided a more in-depth examination of different dimensions of pandemic response, using a multi-faceted measure that included items assessing both attitudes and self-reported behavior. Critically, to overcome the limitations of these self-report measures, this study also employed an innovative behaviorally oriented measure of social distancing: virtual graphical scenarios in which participants interactively “distanced” themselves from others. These measures presented participants with several real-world scenarios and allowed them to position themselves relative to other people in the scene. This included situations such as distancing oneself from an oncoming walker, separating individuals waiting in line for the bus, and choosing a spot on a crowded beach. (Demo measures can be viewed at <http://psychvault.org/social-distancing-measures/>.)

Although these virtual measures, arguably, are not “true” behavioral measures of pandemic response, they present realistic representations of real-world scenarios and require concrete, “in-the-moment” (virtual) behavioral responses. Thus, if it is true that the use of self-report measures of pandemic response has in fact inflated these relations (e.g., the association between disgust sensitivity and pandemic response), we should see that these associations emerge less strongly for these virtual behavioral measures. If true, this would be particularly consequential given that these same behavioral measures have been shown to predict whether or not an individual contracts COVID-19—and even to be a more powerful predictor of contracting the virus than are self-report measures of social distancing (Citation blinded).

Method

Participants

We recruited participants from Amazon's Mechanical Turk (MTurk; see Buhrmester, Kwang, & Gosling, 2011). Although not a nationally representative sample, participants from MTurk are substantially more demographically, geographically, and—most important for the present purposes—ideologically diverse than the college student samples typically used in psychological research (Berinsky, Huber, & Lenz, 2012; Paolacci & Chandler, 2014). They also perform similarly to non-MTurk samples across many tasks and measures, including measures of politically relevant beliefs and attitudes (Berinsky et al., 2012; Clifford, Jewell, & Waggoner, 2015).

In Study 1, we recruited 300 participants. Consistent with our preregistered analysis plan (see OSF page), one participant was excluded from analyses for failing the included attention check, leaving a sample of 299 participants (134 female, 164 male, 1 nonbinary; $M_{\text{age}} = 37.66$; $SD_{\text{age}} = 11.44$).

In Study 2, we recruited a large sample to ensure we had sufficient power to probe higher-order interactions and provide more stable and accurate effect size estimates (Schönbrodt & Perugini, 2013). This study employed a planned-missing design (Graham, Taylor, Olchowski, & Cumsille, 2006) in which different subsets of participants were randomly assigned to complete different sets of measures. Two thousand and one people participated in the first wave of the study (May 7, 2020) and 1,508 participated in the second wave (June 9, 2020). (Study wave did not moderate our effects, so we simply combined both waves into a single dataset). Of these 3,509 participants, 1,010 were assigned to complete our target measures. Of these, 109

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participants (10.8%) failed the included attention check, leaving an analyzable sample of 901 participants (404 female, 492 male, nonbinary; $M_{\text{age}} = 38.77$; $SD_{\text{age}} = 12.41$).

Procedure

The basic procedure of these two studies was similar. In Study 1, participants completed the 25-item DS-R ($\alpha = .88$) and completed a 4-item measure of self-reported pandemic response ($\alpha = .80$) that included two questions assessing attitudes towards the pandemic (e.g., “Generally speaking, how worried are you that you personally will contract COVID-19 / the coronavirus?”) and two questions assessing self-reported behavior (e.g., “Generally speaking, how strictly have you personally been following the ‘social distancing’ recommendations of the government and CDC to maintain a distance of six feet or more from others?”). Participants then indicated their political ideology ($M = 3.31$, $SD = 1.77$) using a 7-point scale ranging from “Extremely Liberal” to “Extremely Conservative”, with the midpoint labeled “Neither/Moderate” (e.g., Graham, Haidt, & Nosek, 2009) and then reported their age and gender.

In Study 2, participants first completed our multi-faceted measure of pandemic response, which included six items assessing attitudes towards the virus (e.g., belief that the threat is exaggerated; $\alpha = .72$; See Supplemental Materials (SM) for all measures), four items assessing self-reported behavior (e.g., mask-wearing, handwashing; $\alpha = .70$), and ten virtual behavioral distancing scenarios, as described above ($\alpha = .81$). Participants then completed a shortened version of the DS-R (the 5-item contamination subscale; $\alpha = .70$). They then responded to some other measures (see SM for all measures)¹, provided demographic information, and indicated their ideology using the same scale from Study 1 ($M = 3.60$; $SD = 1.81$).

¹ Participants also completed the 15-item perceived vulnerability to disease scale. As anticipated, this measure showed similar effects to the DS-R, and for brevity we therefore do not discuss it here.

Results

Study 1 confirmed the paradoxical pattern of results that was anticipated based on past research. We found that greater disgust sensitivity (as assessed by the DS-R) was associated with greater political conservatism ($\beta = .17$, $t(297) = 2.99$, $p = .003$, 95% CI[.06,.28]), and we also found that disgust sensitivity predicted greater concern about the pandemic ($\beta = .20$, $t(297) = 3.59$, $p < .001$, 95% CI[.09,.32]). (Notably, however, both of these associations were relatively modest in size.) Consistent with past research, we also found that more conservative (versus liberal) participants exhibited substantially less concern about the virus ($\beta = -.32$, $t(297) = 5.81$, $p < .001$, 95% CI[-.43,-.21]).

Study 2 replicated this general pattern of results, while extending these findings in several important ways. To assess the overall pattern of associations between these variables, we first created a composite measure of overall pandemic response by combining the attitudes, self-reported behavior, and behavioral distancing dimensions ($\alpha = .80$). Using this measure, we replicated the results of Study 1: disgust sensitivity (as assessed by the DS-R) was positively associated with conservatism ($\beta = .18$, $t(896) = 5.38$, $p < .001$, 95% CI[.11,.24]) and with pandemic response ($\beta = .24$, $t(898) = 7.44$, $p < .001$, 95% CI[.18,.30])—although both of these associations were again relatively modest in size. As in Study 1, ideology was negatively associated with pandemic response ($\beta = -.33$, $t(897) = 10.43$, $p < .001$, 95% CI[-.39,-.27]), such that conservatives expressed considerably less concern about the virus. Notably, the effect sizes for all of these relations were remarkably similar to those observed in Study 1, with β s/ r s deviating only by .01, .04, and .01, respectively.

We next tested our first set of hypotheses by comparing self-reported pandemic response (attitudes and self-reported behavior) to our behavioral measure (the virtual social-distancing

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scenarios).² Supporting H1a, we found that the strength of the relation between disgust sensitivity and pandemic response differed as a function of measure type ($F(1,898) = 23.96, p < .001$), with disgust sensitivity showing a stronger relation to self-reported pandemic response ($\beta = .26, t(898) = 7.99, p < .001, 95\% \text{ CI} [.19, .32]$), but only a weak association with the behavioral measures of pandemic response ($\beta = .13, t(898) = 3.91, p < .001, 95\% \text{ CI} [.06, .19]$).

Similarly, supporting H1b, we also found that the strength of the association between ideology and pandemic response significantly differed as a function of measure type ($F(1,897) = 22.59, p < .001$), with political ideology showing a stronger association with self-reports of pandemic response ($\beta = -.33, t(897) = 10.58, p < .001, 95\% \text{ CI} [-.40, -.27]$) than with behavioral responses ($\beta = -.22, t(897) = 6.69, p < .001, 95\% \text{ CI} [-.28, -.15]$).

Discussion

The results of Studies 1 and 2 provided clear support for our predictions. First, we replicated the seemingly paradoxical pattern of interrelations that we anticipated based on past work: Disgust sensitivity positively predicted both conservatism and concern about COVID-19, and yet, conservatives—despite their greater sensitivity to disgust—nonetheless exhibited substantially less concern about the virus.

Importantly, however, these results also provided novel insights into the nature and extent of these relations. First, we found that the effect sizes using the DS-R measure of disgust sensitivity—which has been favored in research on ideological differences, but which has been rarely (if at all) used in research on COVID-19—were relatively small. This was true both of the

² As anticipated, the relation between attitudes and self-reported behavior ($r = .66, p < .001$) was significantly stronger than the relation of either factor to behavioral distancing (attitudes and behavioral distancing: $r = .5, p < .001$; difference: $F(1,899) = 95.32, p < .001$; self-reported behavior and behavioral distancing: $r = .54, p < .001$; difference: $F(1,899) = 37.39, p < .001$), providing empirical support for the importance of the conceptual distinction between self-report and non-self-report measures.

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relation between disgust sensitivity and pandemic response, as well as the relation between disgust sensitivity and ideology, both of which exhibited associations of approximately $r/\beta = .2$.

Second, we also identified a factor that is likely to have inflated the strength of the relations between these variables in past research: the exclusive use of self-report measures of pandemic response. Using an innovative virtual behavioral measure of social distancing, we observed attenuated relations between ideology and concern about the pandemic, such that conservatives and liberals differed substantially less in their behavior in pandemic-relevant situations than they did in their attitudes and self-reported behavior regarding the pandemic (H1b).

Similarly, these behavioral measures of pandemic response also exhibited an attenuated relation to disgust sensitivity, compared with self-report pandemic response measures (H1a). This pattern is consistent with the possibility of IV-DV content/conceptual overlap in past research, which may have inflated the apparent relation between disgust sensitivity/BIS activation and pandemic response.

In sum, then, the paradoxical pattern of relations between ideology, disgust sensitivity, and pandemic response emerged in these studies as well, although our findings suggest that the extent/strength of the interrelations between these variables is likely to have been amplified by methodological characteristics and, hence, limitations of past research. These findings therefore take us one step closer to resolving the conservatism-disgust paradox in pandemic response: Given that these relations appear to be somewhat smaller than has been suggested by past research, it is less surprising that conservatives' higher sensitivity to disgust may not have led them to exhibit greater concern about COVID-19.

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Importantly, however, even using this modified set of measures (e.g., the DS-R to assess disgust sensitivity; self-report measures of pandemic response), this paradoxical pattern did nonetheless continue to emerge. This suggests that these factors alone are unlikely to wholly account for the conservatism-disgust paradox. In Studies 3 and 4, we therefore continued to examine other factors that may have contributed to this pattern of results.

Study 3

In Study 3, we wished to examine whether a more experientially-based measure of sensitivity to disgust—ratings of disgusting images—would also be associated with pandemic response. To create this experiential measure of disgust sensitivity, we created a visual analogue to the DS-R scale – one that relies less on participants’ self-reports and self-beliefs about their own sensitivity to disgust, and more on their immediate experiential reactions to disgusting stimuli. For this measure, we chose images that visually represented four vignettes from the DS-R scale. Specifically, the item “You see maggots on a piece of meat in an outdoor garbage pail” was represented by an image of maggots on a piece of meat; “It would not upset me at all to watch a person with a glass eye take the eye out of the socket” (reverse-scored) was represented by an image of a person taking a glass eye out of the socket; “It would bother me to be in a science class, and to see a human hand preserved in a jar” was represented by an image of a human hand preserved in a jar; and “You see someone put ketchup on vanilla ice cream, and eat it” was represented by an image of a person putting ketchup on vanilla ice cream. Participants were asked to rate the degree of disgust that they experienced upon viewing these four images.³

³ Descriptive statistics revealed that although these images did, as anticipated, generally elicit substantial levels of disgust, there was nonetheless considerable individual variability in the degree of disgust that participants experienced.

Method

Participants

We recruited 300 participants from Mechanical Turk. (No demographic information was collected.)

Procedure

Participants first completed our experiential measure of disgust sensitivity, which consisted of the four images described above. They rated each image on an 11-point scale from 0 “Not disgusting at all” to 10 “Extremely disgusting” (mean ratings of the disgusting images = 7.90, $SD = 1.85$). For exploratory purposes, they also rated one milder, more ambiguously disgusting image (a birthday cake in the shape of a cockroach), and as control variables/covariates, they rated one positive image (a puppy), and one neutral image (a stapler).

Participants then indicated their concern about the pandemic. For this measure, we chose the item that showed the highest item-total correlation (.58) in Study 2, which assesses general worry about the pandemic: “Generally speaking, how worried are you that you personally will contract COVID-19 / the coronavirus?” (Because our predictions for this study did not involve political ideology, we did not assess ideology in this study.)⁴

Results

As predicted, we found that this more experiential measure of disgust sensitivity was positively associated with the pandemic response measure, i.e., worry about contracting COVID-19 ($\beta = .13$, $t(295) = 2.22$, $p = .03$, 95% CI [.02, .24]). Ratings of the ambiguously disgusting

⁴ Additionally, we randomly assigned participants to read either that the survey was about (1) everyday life, or (2) the COVID-19 pandemic, in case this affected the nature of the relations between disgust sensitivity and pandemic response. However, this manipulation had no effect on participants’ responses ($ps > .29$), and it is therefore not discussed further.

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image were also significantly related to pandemic response ($\beta = .19$, $t(295) = 3.28$, $p = .001$, 95% CI[.08,.30]). The relation between our experiential disgust measure and pandemic response also remained significant when adjusting for ratings of the control images ($\beta = .11$, $t(294) = 2.05$, $p = .04$, 95% CI[.004,.22]).

Discussion

These results conceptually replicate those of past work and our previous studies, showing that sensitivity to disgust—in this case, assessed by a more experiential and less self-report-based measure—is significantly associated with responses to the pandemic. These results suggest that although methodological issues relating to the use of self-report disgust sensitivity measures (e.g., IV-DV conceptual overlap) may have amplified the relation between these variables, this association also emerges on conceptually analogous experiential measures of sensitivity to disgusting situations and stimuli. In Study 4, we directly contrast the predictive power of self-report and experiential disgust sensitivity measures.

Study 4

In this study, we had two primary aims. First, we directly compared the pattern of relations using our experiential measure of disgust sensitivity to self-reported disgust sensitivity, the DS-R. Given possible conceptual overlap between self-report measures of disgust sensitivity and self-report measures of pandemic response, we predicted that the DS-R would relate more strongly to self-report pandemic response measures (H2a). Critically, however, we predicted that the more experiential measure of disgust sensitivity would relate more strongly to behavioral measures of pandemic response (H2b).

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Second, we also wished to test whether the apparent extent of ideological differences in disgust sensitivity may be exaggerated by the use of self-report measures. If so, then our experiential measure of disgust sensitivity (compared with the DS-R) should show attenuated relations with conservatism (H3). If this is true, this may suggest an additional possible reason why conservatives' previously documented higher sensitivity to disgust did not translate into greater concern about the COVID-19 pandemic: the degree of these ideological differences has been overestimated.

Method

Participants

One hundred and fifty four participants completed this survey.⁵ Two participants did not complete our pandemic response measure or indicate their political ideology and could therefore not be included in analyses, leaving a sample of 152 (65 female, 86 male, 1 nonbinary; $M_{\text{age}} = 37.78$; $SD_{\text{age}} = 11.18$).

Procedure

Participants first completed some measures unrelated to the present hypotheses (see OSF page for all measures). They then completed the full DS-R and a shortened version of our multifaceted pandemic response measure, which included three items assessing attitudes (worry about contracting the virus, perceived likelihood of contracting the virus, and belief that the government should prioritize controlling the virus), two assessing self-reported behavior (number of people with whom they had close contact, self-reported social distancing), and two

⁵ These participants were also surveyed previously, in November 2019, as part of a larger sample of 251 participants. Save for our experiential disgust and COVID-19-related measures, this survey was identical to the one described here.

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virtual behavioral scenarios (grocery shopping and walking with a friend).⁶ They then completed the experiential measure of disgust sensitivity from Study 3, consisting of the same four images derived from the DS-R vignettes. As in Study 3, for exploratory purposes participants also rated four milder disgusting images *not* drawn from the DS-R (e.g., a birthday cake in the shape of a raw chicken). As control variables/covariates, they also rated four positive images. Finally, they reported their political ideology on a 9-point scale ($M = 4.31$, $SD = 2.52$), provided demographic information, and answered a few additional questions unrelated to the present hypotheses (see OSF page).

Results

As in our previous studies, we first examined the pattern of relations using the composite measure of pandemic response. Replicating our previous results, we found a significant association between self-reported disgust sensitivity (i.e., DS-R scores) and political conservatism ($\beta = .17$, $t(150) = 2.14$, $p = .03$, 95% CI[.01,.33]), a marginally significant association between self-reported disgust sensitivity and pandemic response ($\beta = .16$, $t(150) = 1.95$, $p = .053$, 95% CI[-.002,.32]), and a negative association between conservatism and pandemic response ($\beta = -.22$, $t(150) = 2.75$, $p = .007$, 95% CI[-.38,-.06]).

We next turned to our experiential measure of disgust sensitivity. We first examined the strength of the association with self-reported disgust sensitivity/DS-R scores. Although the self-report and experiential measures were positively correlated, the association was nonetheless relatively modest in size ($r = .36$, $p < .001$). Even more strikingly, the same modest correlation was true even when comparing experiential disgust scores to ratings of the four specific DS-R

⁶ Given that this study included a more limited range of dependent measures, and because we were underpowered to detect higher-order interaction effects, we did not retest H1a and H1b. However, the pattern of effects was similar to Study 2.

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vignettes on which the experiential disgust images were based ($r = .28, p < .001$). These results appear consistent with past work showing that self-reported disgust sensitivity often correlates only moderately with other, more indirect or behavioral measures of sensitivity to disgust (e.g., Aarøe et al., 2017; Stark et al., 2005).

We next compared the overall predictive power of these two disgust sensitivity measures for our composite measure of pandemic response. Interestingly, we found that the relation between our experiential disgust sensitivity measure and responses to the pandemic ($\beta = .26, t(150) = 3.30, p = .001, 95\% \text{ CI} [.10, .42]$) was significantly stronger than the association between self-reported disgust sensitivity and pandemic response ($\beta = .16$; difference: $F(1,150) = 6.35, p = .01$). Even more surprisingly, we found that when both measures were included in the model, *only experiential disgust significantly predicted responses to the pandemic* ($\beta = .23, t(149) = 2.76, p = .007$); self-reported disgust sensitivity was not significant ($\beta = .07, t(149) = 0.85, p = .40$).

To provide an even more stringent test of the predictive power of experiential versus self-reported disgust sensitivity, we also conducted a separate set of analyses in which we compared our experiential disgust sensitivity measure to participants' ratings of the four specific DS-R vignettes on which the experiential disgust images were based. In effect, this allowed us to test the relative predictive power of ratings of *the same stimuli*, varying only the way in which they were presented/rated: experiential responses to images versus self-reported responses to the vignettes. Notably, the pattern of results using these measures was nearly identical to that described above. With both measures in the model, only experiential disgust was a significant predictor of responses to the pandemic ($\beta = .24, t(149) = 2.90, p = .004$), while self-reported disgust was not significant ($\beta = .08, t(149) = 0.91, p = .37$).

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To better understand these associations, we next tested H2a and H2b by comparing the pattern of effects with our experiential and self-report disgust sensitivity measures with different dimensions of pandemic response—both self-report and behavioral measures. Here we found that experiential disgust sensitivity was a better predictor of both behavioral *and* self-reported pandemic response. With both disgust measures in the model, only *experiential* disgust sensitivity predicted *behavioral* pandemic response ($\beta = .23$, $t(149) = 2.74$, $p = .007$), while self-reported disgust sensitivity was non-significant ($\beta = .03$, $t(149) = 0.40$, $p = .69$; supporting H2b). Similarly, with both disgust measures in the model, *self-reported* pandemic response exhibited a stronger relation to *experiential* disgust sensitivity ($\beta = .16$, $t(149) = 1.81$, $p = .07$) than it did to self-reported disgust sensitivity ($\beta = .08$, $t(149) = 0.90$, $p = .37$), opposing H2a.⁷

Finally, we examined H3, that political ideology would show an attenuated relation to experiential (versus self-reported—i.e., the DS-R) disgust sensitivity. Supporting this hypothesis, we found a significant interaction between ideology and measure type ($F(1,150) = 5.72$, $p = .02$). As noted above, there was a significant association between DS-R scores and political conservatism ($\beta = .17$, $t(150) = 2.14$, $p = .03$), consistent with much previous research (Terrizi et al., 2013). However, with the experiential measure of disgust sensitivity, this relation was not only attenuated, but we actually found *no association with conservatism whatsoever* (and the relation was in fact descriptively in the opposite direction, $\beta = -.10$, $t(150) = 1.24$, $p = .22$, 95% CI[-.26,.06]; Fig. 2). Thus, on the experiential disgust sensitivity measure—which was also the better predictor of pandemic response—there were no meaningful ideological differences.

⁷ In exploratory analyses, we separately examined attitudes and self-reported behavior. Providing some tentative support for H2a, we found that self-reported disgust sensitivity was a stronger predictor of attitudes towards the pandemic ($\beta = .21$, $p = .02$) than was experiential disgust ($\beta = -.08$, $p = .37$). However, experiential disgust was a stronger predictor of self-reported behavior ($\beta = .29$, $p = .001$) than was self-reported disgust ($\beta = -.07$, $p = .41$).

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Figure 2. Scatterplot illustrating the relations between political ideology and the two disgust sensitivity measures from Study 4. Experiential disgust sensitivity scores are plotted as red circles, and self-reported disgust sensitivity scores are plotted as green triangles. Shaded areas represent the 95% confidence intervals of the regression lines.

Importantly, the absence of a relation between ideology and experiential disgust sensitivity was not due to the specific vignettes that we selected to represent visually for our

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experiential measure: the same divergence was clear even when comparing participants' ratings of the four specific target DSR vignettes to their ratings of the four images representing the same content ($F(1,150) = 4.17, p = .04$).

To further assess the generalizability of this (lack of an) effect, we also examined the relation between ideology and ratings of the milder disgusting images. For these images, too, we found no relation whatsoever between ideology and experienced disgust ($\beta = -.02, t(150) = 0.19, p = .85, 95\% \text{ CI}[-.18, .15]$). These findings suggest that the absence of ideological differences on more experiential measures of disgust sensitivity extend beyond the specific images that we selected from the DSR, and may apply to disgust experienced in response to visual imagery more generally.

Discussion

Our fourth and final study provided important novel insights into the conservatism-disgust paradox, as well as into the interrelations between each of these factors. The pattern of results with our experiential and self-report disgust sensitivity measures were particularly intriguing. We found that experiential disgust sensitivity was a stronger predictor of pandemic response than was self-reported disgust sensitivity (H2a and H2b)—and that when both measures were in the model, only experiential disgust significantly predicted responses to the pandemic. Thus, even in spite of factors such as possible conceptual overlap between self-report disgust sensitivity and pandemic response measures, it was nonetheless experiential disgust sensitivity that proved to be the more powerful predictor of responses to the pandemic. These results provide strong reason to be skeptical of self-report measures of disgust sensitivity, at least in the current context.

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Further, we found support for the prediction (H3) that ideological differences in disgust sensitivity would be attenuated on an experiential measure of disgust sensitivity, compared with self-reports. These results appear consistent with recent critiques arguing that overreliance on self-report measures of psychological traits may have amplified the appearance of ideological differences in traits such as sensitivity to disgust. Indeed, using this more experiential measure we found no evidence whatsoever that conservatives are more sensitive to disgust.

Considered together, these results suggest an additional, and relatively straightforward reason why previously-observed ideological differences in disgust sensitivity may have failed to translate into commensurate responses to the COVID-19 pandemic: the extent of these differences may simply be overestimated. At the very least, these results seem to suggest that the form of disgust sensitivity in which liberals and conservatives differ is less relevant for pandemic response. On a more experientially based assessment of sensitivity to disgust—the kind that mattered most for pandemic response—we observed no ideological differences.

#	Hypothesis	Study	Supported
H1a	The disgust-pandemic response relation will be weaker for behavioral (vs. self-report) measures of pandemic response.	S2	Yes
H1b	The ideology-pandemic response relation will be weaker for behavioral (vs. self-report) measures of pandemic response.	S2	Yes
H2a	Self-report (vs. experiential) measures of disgust sensitivity will relate more strongly to self-report measures of pandemic response.	S4	Mixed
H2b	Experiential (vs. self-report) measures of disgust sensitivity will relate more strongly to behavioral measures of pandemic response.	S4	Yes
H3	Experiential (versus self-report) measures of disgust sensitivity will show an attenuated relation with ideology.	S4	Yes

Table 1. List of hypotheses, the study in which each hypothesis was tested, and whether or not each hypothesis was supported.

General Discussion

This research provides important insight into the conservatism-disgust paradox in responses to the pandemic, as well as the relations between each of these target constructs—disgust sensitivity, ideology, and pandemic response. These studies identify multiple factors that influence the (apparent) relations between these variables, thereby pinpointing several factors that are likely to have contributed to this seemingly contradictory pattern of results.

One contributing factor appears to be the predominant use of self-report measures of pandemic response in past research. Indeed, using a behavioral measure of virtual social distancing, we found that the relations between pandemic response and both ideology and disgust sensitivity were significantly attenuated, compared with self-report pandemic response measures. These findings are consistent with the possibility that these self-report measures may suffer from IV-DV conceptual overlap, while also being more susceptible to social desirability and other reporting biases (Balcetis, 2008; Fisher, 1993; Leary & Kowalski, 1990). Particularly given that this same virtual behavioral measure has been shown to out-predict self-reports in predicting who contracts the COVID-19 virus (Citation blinded), these results suggest that behavioral measures of pandemic response may provide a more accurate estimate of the extent of ideological differences in responses to the COVID-19 pandemic, as well as of the predictive power of disgust sensitivity for pandemic response.

We found a similar divergence between self-report and non-self-report measures in the domain of disgust sensitivity. In this case, however, it was our experiential measure of disgust

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sensitivity that was the more powerful predictor of pandemic response. These findings identify important additional caveats and considerations for research examining the impact of disgust sensitivity on real-world outcomes, suggesting, in line with some past research, that self-reports of disgust sensitivity may correlate only modestly with other, more experiential or indirect indices of sensitivity to disgust—and that these measures/operationalizations may have different predictive power for attitudes and behavior.

Perhaps the most intriguing findings, however, concern the relation of political ideology to self-report and experiential measures of disgust sensitivity. Using the DS-R, we replicated the well-documented ideological differences in self-reported disgust sensitivity. However, using our more experiential measure of disgust sensitivity—which presented participants with visual stimuli that closely corresponded to those described in the DS-R vignettes—we found no evidence of liberal-conservative differences in sensitivity to disgust.

Taken together, the findings discussed above suggest that methodological inconsistencies and limitations of past research—particularly the reliance on self-report measures of disgust sensitivity and pandemic response—may have artificially inflated the relations between these three variables, and, thus, contributed to this seemingly contradictory pattern of results. In identifying the influence of these methodological factors, this research helps resolve the conservatism-disgust paradox, suggesting that the true pattern of interrelations between these variables is not as paradoxical as past work would suggest. That is, if, as these findings suggest, (1) the true relation between disgust sensitivity and pandemic response is smaller than previously suggested, and (2) ideological differences in disgust sensitivity are overestimated, then it is less surprising that conservatives exhibit less concern about the virus—particularly given that (3) ideological differences in responses to the pandemic may not be as dramatic as has been

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suggested by past research. The relatively small size of these effects makes it more likely that they would be subsumed by other concerns and motivations (e.g., political partisanship).

More generally, these findings also pose some difficult challenges for past research and theory—particularly work suggesting a relation between disgust sensitivity and political ideology. At the very least, these findings seem to suggest that liberals and conservatives do not differ in the form of disgust sensitivity that is most relevant to pandemic response. A more pessimistic interpretation, however, is that ideological differences in disgust sensitivity may be exaggerated, if not completely illusory. That is, consistent with some recent critiques, it may be that self-report measures such as the DS-R overestimate the degree of ideological differences in disgust sensitivity, at least compared with measures that rely less on self-reports and self-beliefs about one's own sensitivity to disgust.

Of course, these findings stand in contrast to a large body of research that suggests a connection between ideology and disgust, and, clearly, liberals and conservatives *do* reliably differ on some measures of disgust sensitivity (in particular, the DS-R and similar vignette-based measures). However, our findings align with other recent failures to replicate ideological differences in sensitivity to disgust using more indirect or experiential measures (e.g., Bakker et al., 2019). Particularly in light of other research suggesting that people may have limited introspective ability into their own level of disgust sensitivity (e.g., work showing that self-reports do not significantly correlate with more indirect measures of disgust sensitivity; e.g., Smith et al., 2011) a closer examination of the nature and extent of ideological differences in disgust sensitivity seems warranted.

Critical to note, however, is that although our research is to some degree empirically consistent with past work that has failed to find ideological differences on some measures of

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disgust sensitivity, our findings nonetheless challenge the theoretical accounts that have been posited to account for the mixed findings of past research—i.e., why ideological differences in disgust sensitivity emerge on some measures and not others. In particular, Elad-Strenger and colleagues (2020) posited that ideological differences in disgust sensitivity are “elicitor specific,” being limited to certain kinds of disgusting stimuli. For example, they suggest that while conservatives may exhibit greater disgust in response to elicitors such as those described in the DS-R (e.g., rotting meat, severed hands, ketchup on ice cream), liberals exhibit greater disgust in response to other stimuli. However, our findings decisively contradict this “elicitor-specific” account, showing that *identical disgust elicitors* (e.g., rotting meat, severed hands, ketchup on ice cream) can elicit ideological differences—or not—depending on how they are presented and evaluated: via self-reports in response to written vignettes versus experiential responses to visual stimuli.

These findings therefore reveal a critical theoretical gap in our understanding of the relation between ideology and disgust sensitivity: Why is it that ideological differences reliably emerge on some measures of disgust sensitivity (e.g., the DS-R) but not others—even, as we demonstrate, measures that assess responses to closely related, or even identical, situations and stimuli? One possibility is that the ideological differences on the DS-R and similar vignette-based measures of sensitivity to disgust can be attributed to factors other than disgust sensitivity *per se*. For example, liberals and conservatives may differ in their mental representations or construal of the stimuli described in written vignettes. If, for example, conservatives tend to imagine relatively more extreme versions of these stimuli than do liberals, this may explain why conservatives tend to rate them as more disgusting.

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Less interestingly, it may be that the well-established ideological differences in personality traits such as conscientiousness (e.g., Gerber, Huber, Doherty, Dowling, & Ha, 2010) lead conservatives to complete survey measures more thoughtfully, perhaps reading more carefully or engaging more deeply with the material. This, too, could explain why conservatives report experiencing greater disgust in response to these vignettes—which require a degree of cognitive effort to process and mentally represent—but do not experience greater disgust to these same stimuli when presented visually. Future research may wish to assess these possibilities to deepen our understanding of the nature of the relation between ideology and sensitivity to disgust.

More generally, these findings urge caution in the development and use of measures to assess these constructs—disgust sensitivity, ideology, and pandemic response—and, especially, their interrelations. Given the close connections between these factors, coupled with potential confounds such as self-presentational concerns that are likely to be at play for such impactful and politicized issues as the COVID-19 pandemic, the use of self-report measures, in particular, should be subject to close scrutiny.

Concluding Remarks

In this research, we provided a critical reexamination of the interrelations between disgust sensitivity, political ideology, and pandemic response. These results present an intriguing portrait, confirming some past findings, challenging others, and suggesting important caveats for yet others. Although many questions remain, we believe that this work sheds important light on several areas of research, including the relation between disgust sensitivity and ideology, and between disgust/BIS activation and disease avoidance. Taken together, this work also helps to

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reconcile and make sense of the conservatism-disgust paradox—the intriguing and seemingly contradictory pattern of relations that spurred our interest in these questions. We hope that these ideas will prove generative for future research, both that which seeks to understand responses to the current pandemic, as well as that which aims to deepen our understanding of the nature of, and relations between, these constructs.

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