Corrigendum

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Corrigendum: Beyond Purity: Moral Disgust Toward Bad Character

Original article: Giner-Sorolla, R., & Chapman, H. A. (2017). Beyond purity: Moral disgust toward bad character. *Psychological Science, 28*, 80–91. doi:10.1177/0956797616673193

In this article, some effect sizes in the Results section for Study 1 were reported incorrectly and are now being corrected.

In the section titled Manipulation Checks: Act and Character Ratings, we reported a d value of 0.32 for the one-sample t test comparing participants' act ratings with the midpoint of the scale; the correct value is 0.30. The sentence should read as follows:

> Follow-up one-sample t tests using the midpoint of the scale as a test value (because participants compared John with Robert) indicated that the cat beater's actions were judged to be less wrong than the woman beater's actions, $t(86) = -2.82$, $p = .006$, $d = 0.30$.

In the section titled Emotion Ratings, we reported a d value of 0.42 for the paired-samples t test comparing relative ratings of facial disgust and facial anger; the correct value is 0.34. In addition, the effect-size statistic is d_z rather than d. The sentence should read as follows:

> As predicted, a paired-samples t test indicated that relative facial-disgust ratings ($M = 4.36$, $SE = 0.21$) were significantly different from relative facial-anger ratings ($M = 3.63$, $SE = 0.20$), $t(86) = -3.12$, $p = .002$, $d_z = 0.34$; this indicates that the cat-beater and woman-beater scenarios differentially evoked disgust and anger.

Later in that section, we reported a d value of 0.21 for the one-sample t test comparing ratings of facial disgust with the midpoint of the scale; the correct value is 0.20. In the same sentence, we reported a d value of 0.21 for the one-sample t test comparing ratings of facial anger with the midpoint of the scale; the correct value is 0.19. The sentence should read as follows:

> Follow-up one-sample t tests against the midpoint of the scale showed trends in the predicted directions, with higher disgust for the cat beater compared with the woman beater, $t(86) = 1.7$, $p = .088$, $d = 0.20$, and higher anger for the woman beater compared with the cat beater, $t(86) = -1.82$, $p = .072$, $d = 0.19$ (see Fig. 1).

These errors do not affect the significance of the results or the overall conclusions for Study 1.

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Beyond Purity: Moral Disgust Toward Bad Character

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Abstract

Previous studies support a link between moral disgust and impurity, whereas anger is linked to harm. We challenged these strict correspondences by showing that disgust is activated in response to information about moral character, even for harm violations. By contrast, anger is activated in response to information about actions, including their moral wrongness and consequences. Study 1 examined disgust and anger in response to an action that suggests bad moral character (animal cruelty) versus an action that is seen as inherently more wrong (domestic abuse). Animal cruelty was associated with more disgust than domestic abuse was, whereas domestic abuse was associated with more anger. Studies 2 and 3 manipulated character by varying the agent's desire to cause harm and also varied the action's harmful consequences. Desire to harm predicted only disgust (controlling for anger), whereas consequences were more closely related to anger (controlling for disgust). Taken together, these results indicate that disgust arises in response to evidence of bad moral character, not just to impurity.

Keywords

anger, disgust, morality, character, harm, purity, open materials, preregistered

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Hostile emotions such as disgust and anger play a controversial part in psychological and philosophical questions of moral judgment. Emotionalist accounts (e.g., Haidt, 2001; Kass, 2005) posit that hostile feelings do, and sometimes should, inform moral decisions. But other prescriptive views draw distinctions between emotions; disgust, in particular, is said to have an undesirable effect on judgment because of its irrational nature (e.g., Nussbaum, 2006). Which hostile emotions are felt toward moral violations, and why, have thus become questions of interest.

Research so far has mostly distinguished disgust from anger on the basis of the moral rule violated. In the community/contempt—autonomy/anger—divinity/disgust (CAD) hypothesis (Rozin, Lowery, Imada, & Haidt, 1999), anger arises in response to rights or "autonomy" violations, such as harm or unfairness, whereas disgust arises in response to "divinity" or "purity" violations, such as taboo sexual acts, that contaminate the body or soul (Horberg, Oveis, Keltner, & Cohen, 2009; Russell & Giner-Sorolla, 2013). If people say they are "disgusted" at harm or unfairness, it has been argued, this is only semantic confusion with anger (e.g., Nabi, 2002). The idea that different moral rules are associated with different emotions is significant for broader theories of moral judgment, since it supports the notion that there are different kinds or domains of morality (e.g., Haidt, 2001). This contrasts with domain-general accounts, in which the same cognitive processes support all moral judgments (e.g., Cameron, Lindquist, & Gray, 2015).

However, some findings of moral disgust at nonpurity offenses are not easily explained away. Lab studies have shown physiological and verbal disgust responses to unfairness, independent from anger responses (Cannon, Schnall, & White, 2011; Chapman, Kim, Susskind, & Anderson, 2009; Moretti & di Pellegrino, 2010). Also, the relationship between endorsement of faces and words relevant to disgust was shown to be significant in scenarios involving rights violations, even when anger endorsement was statistically controlled (Gutierrez, Giner-Sorolla, & Vasiljevic,

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2012). "Disgust" toward rights violations, then, is not entirely explicable as a verbal synonym for "anger." In addition to its importance for theories of morality, disgust toward nonpurity offenses would also represent a striking example of *exaptation*, an evolutionary process whereby a preexisting structure assumes a new functional role (Rozin, Haidt, & McCauley, 2008). Disgust is believed to have originated as a defense against poison and disease (Rozin et al., 2008), so disgust toward nonpurity offenses would constitute a dramatic change in its function.

If moral disgust is not restricted to purity violations, nor just a synonym for anger, what then is its role in morality? Some researchers have speculated that disgust may arise when a person is seen as having a fundamentally bad character (Haidt, 2003; Hutcherson & Gross, 2011; Miller, 1997; Rozin et al., 2008), regardless of what moral norm they have broken. Although this idea has not been tested directly, individuals do predominantly feel shame when others express disgust toward them (Giner-Sorolla & Espinosa, 2011), and appraisals of one's own bad character are linked to shame (Lewis, 2010). Functionally, the avoidance action tendencies and indelible taint of disgust (Rozin et al., 2008) fit well with the enduring and permanent stigma of bad character.

In contrast to disgust, anger may be more sensitive to factors that influence whether a particular act is viewed as right or wrong, such as the act's consequences. For example, manipulations of whether or not an action causes harm influence anger more than disgust (Giner-Sorolla, Bosson, Caswell, & Hettinger, 2012; Gutierrez & Giner-Sorolla, 2007; Russell & Giner-Sorolla, 2011). As well, individuals primarily feel guilt when others express anger toward them (Giner-Sorolla & Espinosa, 2011), and self-appraisals of one's own bad actions (rather than one's character) are linked to guilt (Lewis, 2010). Functionally, because of its approach action tendencies (Carver & Harmon-Jones, 2009), anger is more suited to correcting a mistaken or negligent harm committed by someone of basically good character (Fischer & Roseman, 2007). For these reasons, the moral wrongness of an act and its harmful consequences may influence anger to a greater degree than disgust.

To test these predictions, we conducted three studies in which we independently manipulated act- and character-related variables in descriptions of harmful moral violations. In Study 1, we built on previous findings that some acts that are relatively less immoral yield stronger inferences of bad character than others that are more immoral (Tannenbaum, Uhlmann, & Diermeier, 2011). In Studies 2 and 3, we manipulated the relative salience of moral character and act judgments by varying the desire to harm others (Aristotle, trans. 1890; Reeder, Kumar, Hesson-McInnis, & Trafimow, 2002), as well as whether or not the action had harmful consequences. We predicted that information leading to inferences of bad moral character would primarily affect disgust, with a lesser influence on anger. By contrast, information about the moral badness of the act, namely its wrongness and consequences, should primarily affect anger, with a weaker influence on disgust.

Study 1

One situation in which act and character evaluations can be dissociated is when acts that are relatively less immoral nonetheless provide strong signals of poor character (Tannenbaum et al., 2011; Uhlmann, Zhu, & Diermeier, 2014). For example, Tannenbaum and colleagues (2011) measured act and character judgments in two scenarios: one in which an individual reacts to his girlfriend's infidelity by beating her and another in which an individual reacts to the same situation by beating his girlfriend's cat. Participants judged that the cat beater had worse moral character than the woman beater, even though the act of beating a woman was judged to be more immoral. These findings demonstrate that act and character evaluations can vary independently, but the associated emotions were not examined. In Study 1, we therefore carried out a preregistered replication and extension of Tannenbaum et al. (2011, Study 1a; registration at osf.io/ynvhz/[1]). We presented the original scenarios in which a cat or a woman was beaten, measuring character judgments, wrongness judgments (as an index of act evaluations), anger, and disgust. If character judgments are primarily related to disgust, then we expected the cat beater (who has worse character) to evoke more disgust than the woman beater. Conversely, if act judgments are primarily related to anger, then we expected the woman beater (whose act is more immoral) to evoke more anger than the cat beater. As well, character judgments should be more strongly correlated with disgust than with anger, whereas act judgments should be more strongly correlated with anger than disgust.

In this article, we report all measures in each of our studies, all manipulations, any data exclusions, and the rule for determining sample size. In no study was additional data collected after looking at the results.

Method

Participants. One hundred U.S. residents were recruited via Amazon Mechanical Turk, of whom 3 did not complete the study. This sample size was determined a priori using a power analysis, which allowed extra recruitment with possible exclusions in mind; 90 cases would achieve 80% power to detect a small effect size ($d = 0.3$) for the critical one-sample t test comparing responses to the cat and woman beater. Of the participants who completed the study, we excluded 7 who indicated that the study seemed familiar and 3 who completed the study in less than half of

the median completion time. The final sample size was 87 (34 female, 52 male, 1 other gender identity; mean age = 33.2 years, range = 21–62).

Procedure. Participants were asked to read and evaluate two scenarios (taken from Tannenbaum et al., 2011). In the woman-beater scenario, participants read about John, who "learns that his girlfriend of 8 years has been sleeping around with another man. Upon hearing this, John becomes overwhelmed with rage and beats up his girlfriend." In the cat beater scenario, participants read about Robert; the text was the same as in the woman-beater scenario, except that Robert "beats up his girlfriend's cat" instead of his girlfriend.

After being introduced to the scenarios, participants were asked to evaluate John's and Robert's actions and moral character, as well as to report on their emotional reactions to the scenarios both verbally and by endorsing emotional expressions. Act, character, verbal-emotion, and expression-endorsement ratings were presented in separate blocks, in random order. To measure participants' act evaluations, we asked them to indicate whose actions were more immoral, which action should be punished more severely, and which action deserves more blame, on scales from 1 (*John beating up his girlfriend*) to 7 (*Robert beating up his girlfriend's cat*). To measure participants' character evaluations, we asked them to rate each of the following items on scales from 1 (*definitely John*) to 7 (*definitely Robert*): who is more sick and twisted, who is more likely to be sadistic, who is more screwed up, who is more likely to enjoy other peoples' suffering, who is more likely to have normal human feelings, who is more likely to feel sorry for a homeless person, who is more likely to help the homeless, and who is more likely to feel empathy for a stranger who is suffering (the last four items were reverse-scored; Tannenbaum et al., 2011).

Participants also rated their relative feelings of disgust and anger toward the scenarios, both verbally and by endorsing photographs of emotional facial expressions (Gutierrez et al., 2012). Verbal and expression-endorsement measures were presented in separate blocks. In the expression-endorsement measure, participants saw two sets of photographs taken from the Montreal Set of Facial Displays of Emotion (MSFDE; Beaupré, Cheung, & Hess, 2000). Each set showed three female posers expressing anger or disgust. Participants were asked to rate whether the emotion they felt toward John or Robert was similar to the emotions expressed in the photos, using a scale from 1 (*definitely feel more of this emotion toward John*) to 7 (*definitely feel more of this emotion toward Robert*). The verbal measures asked, in separate items, which agent participants felt more anger, outrage, and disgust toward, as well as whom they were more infuriated, repulsed, and sickened toward; ratings were made on a scale from 1 (*definitely more toward John*) to 7 (*definitely more toward Robert*; cf. Gutierrez & Giner-Sorolla, 2007). Two four-item scales were created, one for anger (verbal ratings for anger, outrage, and being infuriated, along with endorsement of angry facial expressions) and one for disgust (verbal ratings for disgust, being repulsed, and being sickened, along with endorsement of angry facial expressions).

Finally, participants indicated their age, education, gender, race, and ethnicity. They also rated their political orientation with the item "when it comes to politics, I am generally . . .", which they answered on a 7-point scale from *very liberal* to *very conservative*.

Results

Manipulation checks: act and character ratings. The eight character ratings formed a reliable scale (α = .91) and were averaged together, as were the three act ratings (α = .93). Replicating Tannenbaum and colleagues' (2011) results, a paired-samples t test indicated that character ratings (M = 4.31, SD = 1.24) were significantly different from act ratings (M = 3.43, SD = 1.89), $t(86) = -5.37$, $p < .001$, d = 0.57. Follow-up one-sample t tests using the midpoint of the scale as a test value (because participants compared John with Robert) indicated that the cat beater's actions were judged to be less wrong than the woman beater's actions, $t(86) = -2.82$, $p = .006$, $d = 0.30$. By contrast, the moral character of the cat beater was judged to be worse than that of the woman beater, $t(86) = 2.36$, $p = .021$, $d = 0.25$.

Emotion ratings. The four facial-expression and verbal items for disgust formed a reliable scale (α = .93), as did the four facial-expression and verbal items for anger (α = .93). However, these two scales correlated with each other at a very high level (r = .80); this was driven by a very high correlation between the verbal disgust and verbal anger ratings (r = .95). By contrast, the facial-expression items were less correlated than the verbal items, which made anger and disgust more easily distinguishable (r = .36). Therefore, we used the original single-item facial-expression measures in these analyses.

As predicted, a paired-samples t test indicated that relative facial-disgust ratings (M = 4.36, SE = 0.21) were significantly different from relative facial-anger ratings (M = 3.63, SE = 0.20), $t(86) = -3.12$, $p = .002$, $d_z = 0.34$; this indicates that the cat-beater and woman-beater scenarios differentially evoked disgust and anger. Follow-up one-sample t tests against the midpoint of the scale showed trends in the predicted directions, with higher disgust for the cat beater compared with the woman beater, $t(86) = 1.7$, $p = .088$, $d = 0.20$, and higher anger for the woman beater compared with the cat beater, $t(86) = -1.82$, $p = .072$, $d = 0.19$ (see Fig. 1).

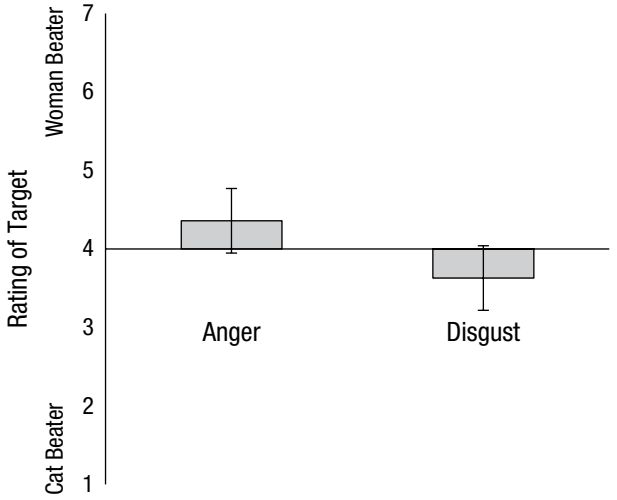

Fig. 1. Results from Study 1: mean anger and disgust toward the two men in the vignette. On the *y*-axis, higher ratings indicate more emotion toward the man who beat his girlfriend (a worse action), and lower ratings indicate more emotion toward the man who beat his girlfriend's cat (a worse character). Error bars show 95% confidence intervals.

Regression analyses. The relationship between emotion and character ratings was analyzed using a multiple regression with disgust and anger ratings as independent variables and character ratings as the dependent variable. Consistent with our hypotheses, results showed that higher disgust was associated with more-negative character evaluations ($\beta = 0.38$, $p < .001$), whereas anger was not ($\beta = 0.088$, $p = .135$). A *t* test of the difference between dependent betas indicated that the difference in slopes was significant, $t(84) = 3.07$, $p = .0029$.

To examine the relationship between emotion and act ratings, we repeated this analysis with act ratings as the dependent variable. Although we predicted that anger ratings should be more highly associated than disgust ratings with negative act evaluations, we found that both anger ($\beta = 0.46$, $p < .001$) and disgust ($\beta = 0.45$, $p < .001$) were significantly related to act evaluations. A comparison of the difference between dependent betas indicated that the difference in slopes was not significant, $t(84) = 0.040$, $p = .97$.

Study 2

Overall, the results of Study 1 support the hypothesis that disgust is related to judgments of bad moral character, and more equivocally, the idea that anger is related to judgments about the act itself. At the same time, Study 1 did not provide a clean separation of act and character: Both the cat beater and the woman beater were bad people, and both of their actions were bad. In Study 2, we used a method that more cleanly separated act and character: a paradigm used to study the contribution of harmful desire, consequences, and belief to moral judgments in situations of potential harm (Cushman, 2008). Information about the agent's moral character was varied by describing that he or she had either a desire to harm or no desire to harm the other person. Desire to harm should primarily influence judgments of moral character and wrongness (Cushman, 2008; Pizarro & Tannenbaum, 2011); we additionally predicted that it would affect moral disgust more than anger. Information about the act was varied by manipulating its consequences, describing that the other person either was harmed by the act or was not. We predicted that this manipulation would influence anger more than disgust. Additionally, following Cushman's procedure, we varied whether or not the agent believed (or foresaw) that the act would cause harm. This manipulation was not clearly related to moral character (e.g., a good person may not foresee that a particular act will be harmful) nor to the consequences of the act. There was therefore no clear ground for a prediction about how belief would be related to disgust and anger.

Method

Participants. One hundred thirty-nine undergraduate students (108 female, 31 male; mean age = 20.01 years, range = 17–38) from a university in southeast England took part in the study. All participants who completed the online questionnaire from the launch of the survey to the end of the university term were included. This sample size yielded high power (99.8%) to detect differences between two repeated measures means, if one assumes a correlation of .3 and a medium effect size (*f*) of .25; for comparison, the effects of these manipulations on judgments in Cushman (2008) had a conventionally large size, with η_p^2s at .5 and above.

Materials and procedure. Materials were 64 moral scenarios taken verbatim from Cushman's (2008) Study 1, which manipulated (in a 2 × 2 × 2 design) whether or not the agents in the scenarios believed their action would be harmful, whether the agents desired harm, and whether the consequences of their action were harmful. These eight factor combinations were counterbalanced with eight scenario settings (e.g., construction site, railway carriage). Each participant was randomly assigned to respond to one of eight questionnaires, each of which described 8 scenarios from the set of 64. These were balanced such that each participant saw all eight unique combinations of factors and all 8 scenario settings. However, no combination of factors and setting was presented more than once across all questionnaires. The order of scenario presentation was also randomized.

After each scenario, participants expressed their feelings toward the agent by making a forced choice between

two picture sets, one showing disgust expressions and one showing anger expressions; each illustration was of three full-intensity black-and-white facial expressions from the MSFDE. They were then asked "How angry are you at [agent]?" and "How disgusted are you at [agent]?" followed by the questions "How wrong was [agent's] behavior?" "How much blame does [agent] deserve?" and "How much should [agent] be punished?" all of which they rated on 7-point scales from 1, *none/not at all*, to 7, *very much*. Finally, two questions about moral character were asked: "Do you think that [agent] is mainly a good person or a bad person?" (rated on a 9-point scale from *mainly a bad person* to *mainly a good person*) and "Do you think [agent] has good moral standards?" (rated on a 9-point scale from *not at all* to *completely*).

Results

We entered data for each scenario as a separate case and used the MIXED procedure in IBM SPSS Statistics software (Version 23) to carry out a multilevel analysis predicting each outcome variable from coded independent variables, each representing one of the manipulated traits of the scenarios: harmful desire, belief, and consequences (−1 = *not present*, 1 = *present*) and their two-way and three-way interactions. We treated the identity of the participant as a random variable, effectively creating a within-participants random-intercept analysis; results of all analyses were substantively similar in significance level and magnitude when full random-slopes models were used.

Our analyses focused on the effects of the manipulations on anger, disgust, and moral-character judgments. (The Supplemental Material available online includes additional analyses that generally replicated the effects of our manipulations on the dependent variables of wrongness, blame, and punishment from Cushman, 2008, and means for the character variable.)

Manipulation check: judgments of moral character. The two items related to the agents' moral character were correlated at .91, so they were averaged into one index, then reverse-scored so that high numbers indicated bad character. As expected, the agents' desire to harm increased participants' judgments of bad character most strongly, $F(1, 966) = 495.85$, $p < .001$, $\gamma = 3.13$, and there were smaller main effects of harmful belief, $F(1, 966) = 95.22$, $p < .001$, $\gamma = 1.55$, and harmful consequences, $F(1, 975.16) = 22.67$, $p < .001$, $\gamma = 0.88$. The effect of desire to harm was moderated further by a significant interaction with belief, $F(1, 966) = 7.48$, $p = .008$, $\gamma = -1.13$, and by a three-way interaction, $F(1, 966) = 6.10$, $p = .014$, $\gamma = 1.08$.

Effects on forced choice of anger versus disgust expressions. The forced-choice item was coded 0 for anger and 1 for disgust. Figure 2 gives the pattern of choices according to whether agents had a desire to harm and whether the consequences of their action were harmful. (The additional effect of belief, although not theoretically focal, is depicted in Fig. S1 in the Supplemental Material.)

Whether the agent desired harm was the strongest predictor of emotion choice, $F(1, 966) = 65.79$, $\gamma = 0.31$, $p < .001$; harmful desire led to disgust being chosen more often than anger. Whether agents believed their actions were harmful also predicted greater choice of disgust over anger, though less strongly, $F(1, 966) = 12.84$, $\gamma = 0.12$, $p = .001$. Harmful consequences, however, did not

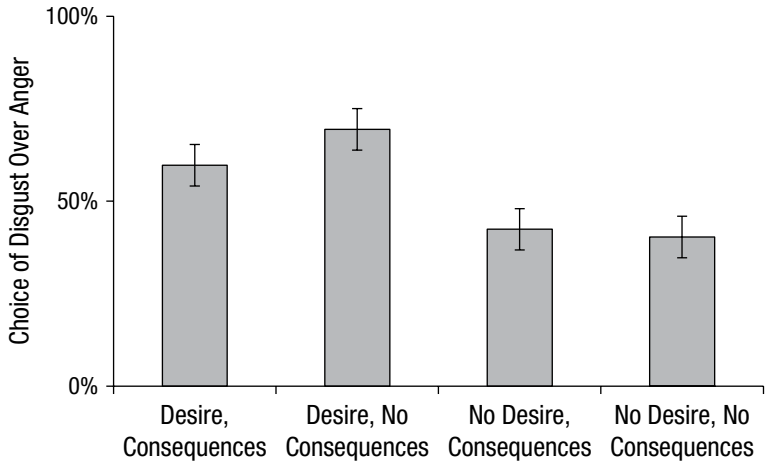

Fig. 2. Results from Study 2: percentage of participants who chose disgust over anger as a function of whether agents desired harm and whether the consequences of their actions were harmful. Error bars show 95% confidence intervals.

predict emotion choice overall, $F(1, 966) = 1.74$, $\gamma = 0.04$, $p = .19$. There was also a Desire × Consequences interaction, $F(1, 966) = 4.31$, $\gamma = -0.16$, $p = .038$. When there was desire to harm, disgust was chosen more often than anger when there were no consequences than when there were, simple-effects $F(1, 966) = 5.71$, $p = .02$. When there was no desire to harm, consequences had no effect on emotion choice, simple-effects $F(1, 966) = 0.28$, $p = .60$.

Anger, controlling for disgust. Since there was considerable shared variance between ratings of anger and disgust ($r = .74$), we analyzed the effects of harmful desire, belief, and consequences on anger, with disgust as a covariate. Results for desire and consequences are shown in Figure 3 (see Fig. S2 in the Supplemental Material for the effect of belief; unadjusted results for all three effects are shown in Fig. S3 in the Supplemental Material). This analysis revealed significant main effects on anger from belief, $F(1, 1008.92) = 27.21$, $\gamma = 0.58$, $p < .001$, and consequences, $F(1, 972.82) = 57.89$, $\gamma = 0.52$, $p < .001$, but not desire, $F(1, 1045.55) = 1.59$, $\gamma = 0.36$, $p = .207$.[2] Also, the Belief × Desire interaction was significant, $F(1, 961.38) = 12.07$, $\gamma = -0.31$, $p < .001$; desire to harm did not increase anger when the agent believed the act to be harmful (means adjusted for disgust; no desire: $M = 4.52$, desire: $M = 4.37$) but did increase anger when the agent did not believe the act to be harmful (means adjusted for disgust; no desire: $M = 3.85$, desire: $M = 4.21$). No other interactions were significant.

Disgust, controlling for anger. Reversing the role of the two emotions from the anger analysis, so that disgust was the dependent variable and anger the covariate, we found a different pattern of effects (Fig. 3; see Fig. S2 for effects of belief and Fig. S3 for unadjusted results). Harmful desire was the strongest predictor of disgust, $F(1, 1025.79) = 209.29$, $\gamma = 1.51$, $p < .001$, and harmful belief was a significant but weaker predictor, $F(1, 1019.78) = 52.21$, $\gamma = 0.70$, $p < .001$. Harmful consequences did not predict disgust, $F(1, 1001.30) = 0.71$, $\gamma = 0.28$, $p = .401$. The Desire × Consequences interaction was weak but significant, $F(1, 963.30) = 4.39$, $\gamma = -0.50$, $p = .036$. When there were harmful consequences, the effect of desire in increasing disgust was slightly weaker (means adjusted for anger; no desire: $M = 3.91$, desire: $M = 4.96$) than when there were no harmful consequences (means adjusted for anger; no desire: $M = 3.68$, desire: $M = 5.06$).

Overall, the adjusted means of anger and disgust reflected these main effects of desire increasing disgust (more than anger) and of consequences increasing anger (more than disgust). Disgust predominated over anger when there was desire to harm, and most strongly so when there were no consequences; anger predominated over disgust when there were harmful consequences but no desire to harm.

Mediation of the desire-disgust link by character judgment. We tested the ability of character judgment to account for the effect of our manipulation of harmful desires on disgust, treating moral character (not reverse-scored) as a mediator, the desire manipulation as the predictor, and verbal disgust ratings as the outcome, with verbal anger ratings as a covariate. We performed multilevel mediation analyses (see Preacher, Zyphur, & Zhang, 2010), estimating the indirect path using a bootstrap procedure with 5,000 resamples. This showed moral

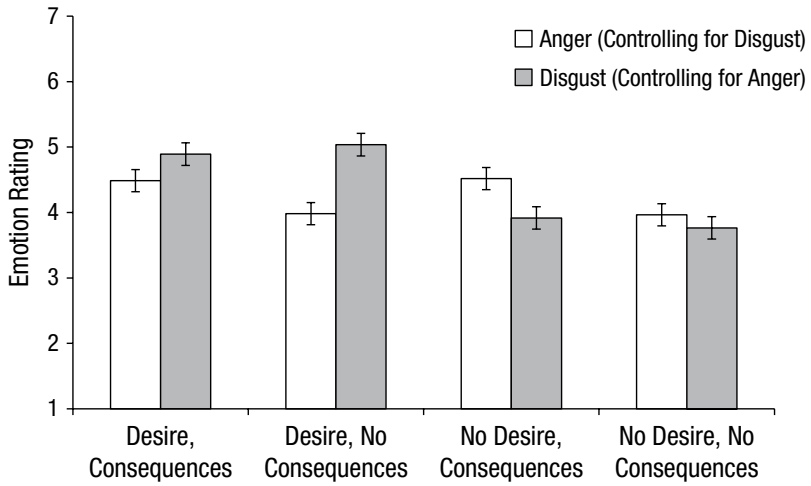

Fig. 3. Results from Study 2: adjusted mean verbal ratings of anger (controlling for disgust) and disgust (controlling for anger) as a function of whether agents desired harm and whether the consequences of their actions were harmful. Error bars show 95% confidence intervals.

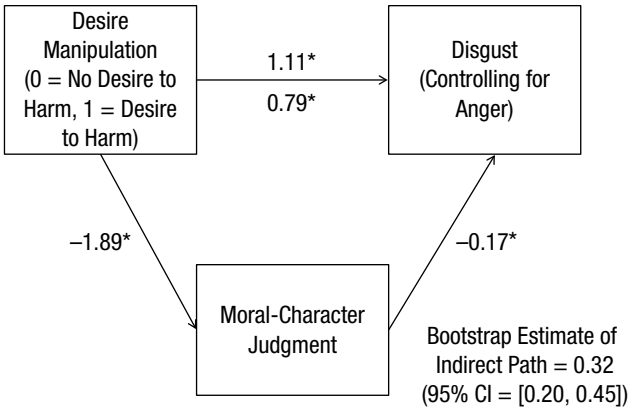

Fig. 4. Results of the mediation analysis from Study 2: effect of the desire manipulation on disgust (controlling for anger), as mediated by judgments of the agent's moral character. On the path from desire to disgust, the total effect is shown above the arrow, and the direct effect is shown below the arrow. Unstandardized coefficients are given, and significant paths are indicated with an asterisk ($p < .001$). CI = confidence interval.

character to be a significant partial mediator between desire and disgust; when moral character was accounted for, the direct path between desire and disgust remained significant (Fig. 4).

A "reversed" mediation with moral character as the outcome variable and disgust as the mediator gave an indirect effect of 0.36 (95% CI = [0.24, 0.47]), which, however, did not completely account for the direct effect of the desire manipulation on character, direct effect = 1.54 (95% CI = [1.30, 1.77]), total effect = 1.89. The relative strength of these paths, however, should be interpreted cautiously, because factors such as relative reliability can interfere with their comparison; in general, a mediation model can only be suggestive about the causal ordering of variables that could influence each other and that were measured at approximately the same time (Lemmer & Gollwitzer, 2016; Thoemmes, 2015). The safest interpretation is that there is a mutual influence of disgust and character that helps to explain the effect of the manipulation of desire on both variables.

Study 3

A limitation of the first two studies was a within-participants design, which may have allowed participants to explicitly compare scenarios. In Study 3, we therefore used a between-participants design. The results of Study 2 also suggested a number of simplifications.

We wanted to focus this design on the most distinctive factors separating anger and disgust. First, we removed the manipulation of belief, giving information only about harmful desire and harmful consequences. Belief seemed to relate to both anger and disgust in about equal measure, unlike harmful consequences, which exclusively predicted anger and desire, which exclusively predicted disgust. Also, we further simplified the design by including only the desire/no-consequences and no-desire/consequences conditions, the two conditions that produced the clearest differences between anger and disgust ratings in Study 2.

With these reductions, we could accommodate a new manipulation based on an observation about our measures in Studies 1 and 2: The emotion items had been targeted on the person committing the act. To see whether this context of person focus was necessary to strengthen the effects of desire and character on differentiating disgust from anger, we asked emotion questions in Study 3 either about the person or about the act. Because desire and disgust showed a connection to person-based judgments of moral character in Studies 1 and 2, we thought that the evaluation of the person would show a stronger influence of disgust than of anger, whereas the evaluation of the act was conceptually related more to its consequences and so would show a stronger influence of anger than of disgust.

Method

Participants. One hundred sixty U.S. residents recruited via Amazon Mechanical Turk took part in the study. This number was determined a priori and gave 88% power to detect a medium effect size ($f = .25$) between two groups, if one takes into account the medium to large key effects in Study 2. Participants who did not begin the questionnaire after signing up were excluded and new ones recruited until the target number (160) was reached. Two participants were further excluded for failing to answer the check questions (see Materials and Procedure) correctly, which left a total of 158 (110 male, 48 female), with a mean age of 31.02 years (range = 19–72).

Materials and procedure. The scenarios used were identical to those in Study 2, except that the information about the agents' beliefs was removed, so that we manipulated only whether the agents desired harm and whether the consequences of their action were harmful, and only the consequences/no-desire (henceforth *consequences*) and desire/no-consequences (henceforth *desire*) versions of the stories were used. The study had a 2 (condition: consequences vs. desire) × 2 (emotion focus: person vs. act) between-participants design.

Each participant was randomly assigned to read one of the scenarios in either the consequences or the desire version. After reading the scenario, they completed emotion measures. In the act conditions, these measures were aimed at the actions of the agent (e.g., "How ANGRY are you at the actions of Amy?"), whereas in the person conditions, these measures were aimed at anger or

disgust at the agent (e.g., "How ANGRY are you at Amy?"). As in Study 2, participants made a dichotomous choice between disgust and anger expressions and also rated how much they felt each emotion themselves (from 1, *not at all*, to 7, *very*). Participants also completed additional verbal measures of emotions as in Study 1 (cf. Gutierrez & Giner-Sorolla, 2007); the items measuring anger were "outraged," "furious," and "angry," whereas the ones measuring disgust were "disgusted," "revolted," and "sickened" (rated from 1, *not at all*, to 7, *very*). Three additional words measuring compassion, kindness, and hatred were also rated but are not relevant to the present hypotheses.

After the emotion questions, further judgments were assessed in a randomly presented order, without varying the wording according to the act and person conditions, which were intended to apply only to the emotion measures. Participants completed the same character-related judgments as in Study 2 ("Do you think that [agent] is mainly a good person or a bad person?" and "Do you think [agent] has good moral standards?"; rated on 9-point scales that were transformed before analysis) as well as two more character-related items ("How moral is [agent]?" and "How trustworthy is [agent]"?; rated on 7-point scales). Participants also completed a number of items regarding the act's wrongness, the responsibility of the agent, whether he or she should be punished, and the appropriateness of various legal actions toward him or her. These items are not relevant to the current hypotheses (the full item descriptions and results are given in the Supplemental Material). Finally, two checks on attention were included: one asking whether a character named Tim appeared in the scenario (he never did) and another asking whether anyone was harmed in the vignette (the correct answer varied according to condition).

Results

We analyzed emotion choices using a 2 (condition: consequences vs. desire) × 2 (emotion focus: act vs. person) between-participants analysis of variance (ANOVA) and analyzed emotion ratings using a 2 (condition) × 2 (emotion focus) × 2 (reaction: anger vs. disgust) within-participants ANOVA. All other scores were entered in a one-factor (condition) between-subjects analysis.

Manipulation check: judgments of moral character. We rescaled the two 9-point items measuring moral character, multiplying each by 7/9 to correspond to the 7-point items. Low scores indicated worse moral character. The four items formed a reliable scale at $\alpha = .95$. Participants in the desire condition attributed worse moral character to the agent ($M = 1.91$, $SD = 1.00$) than those in the consequences condition did ($M = 4.22$, $SD = 1.40$), $F(1, 156) = 140.44$, $p < .001$, $\eta_p^2 = .47$.

Fig. 5. Results from Study 3: percentage of participants who chose disgust over anger as a function of emotion focus and condition. Error bars show 95% confidence intervals.

Effects on forced choice of anger versus disgust expressions. The dichotomous choice was coded 0 for anger and 1 for disgust, so that the means represented the percentage of participants who chose disgust (Fig. 5). A significant effect of condition showed that more participants chose disgust in the desire condition ($M = 71\%$, $SD = 46\%$) than in the consequences condition ($M = 45\%$, $SD = 50\%$), $F(1, 154) = 11.02$, $p = .001$, $\eta_p^2 = .07$. There was no significant main effect of emotion focus, $F < 1$, or interaction of emotion focus and condition, $F(1, 154) = 2.69$, $p = .104$, $\eta_p^2 = .02$. However, the simple effect of condition on participants' reaction was significant when participants focused on the person, $F(1, 154) = 12.44$, $p = .001$, $\eta_p^2 = .08$ (desire: $M = 74\%$, $SD = 44\%$; consequence: $M = 37\%$, $SD = 49\%$, $p = .001$) but not when they focused on the act, $F(1, 154) = 1.40$, $p = .239$, $\eta_p^2 = .01$ (desire: $M = 67\%$, $SD = 48\%$; consequence: $M = 54\%$, $SD = 51\%$, $p = .239$).

Scaled ratings of emotion. The scaled item for angry facial expressions and the three additional verbal-anger items formed a scale with excellent reliability ($\alpha = .95$), and likewise the four disgust-related items formed a scale with excellent reliability ($\alpha = .95$). These four-item scales correlated with each other at a very high level ($r = .80$), which was likely driven by the high correlation between the verbal disgust and anger ratings ($r = .81$). However, the facial-endorsement items allowed us to more easily distinguish between anger and disgust, although there was still a good deal of overlap ($r = .66$). Therefore, we used the two single-item face-endorsement measures in these analyses, reporting the three-item verbal-scale analyses separately only when they differed in level of significance from the single-item analyses. (Fig. S5 in the Supplemental Material gives unadjusted means for expression endorsement by condition.)

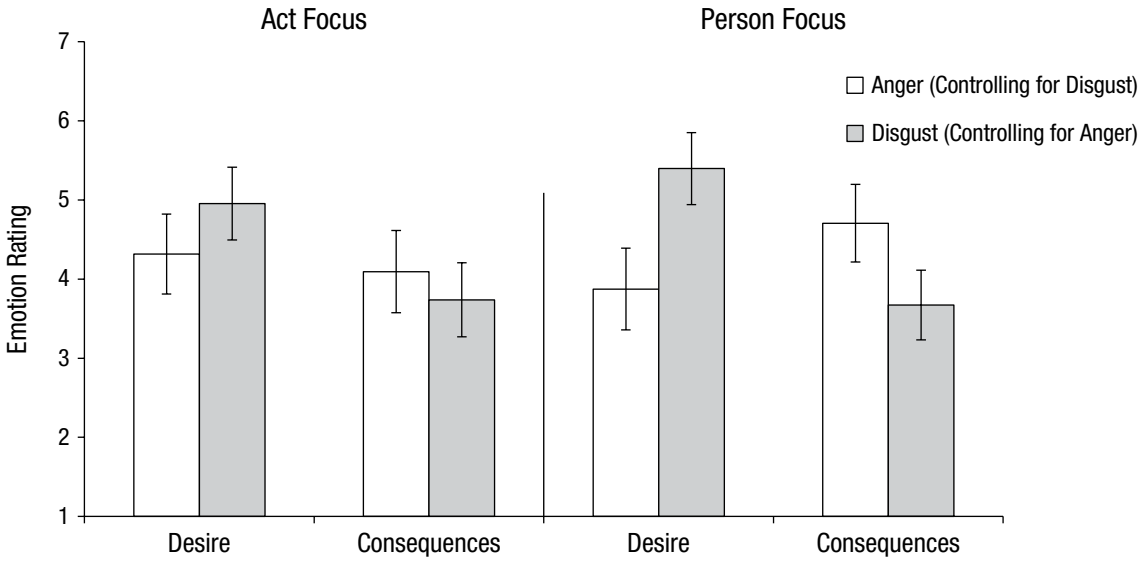

Fig. 6. Results from Study 3: mean endorsement of facial expressions of anger (controlling for disgust) and disgust (controlling for anger) as a function of whether agents desired harm and whether the consequences of their actions were harmful, separately for each emotion focus (act vs. person). Error bars show 95% confidence intervals.

The predicted interaction between reaction and condition was significant, $F(1, 154) = 14.14$, $p < .001$, $\eta_p^2 = .08$, and was in turn qualified by a marginal three-way interaction also involving emotion focus, $F(1, 154) = 3.62$, $p = .06$, $\eta_p^2 = .02$; on the verbal measures, the three-way interaction was significant, $F(1, 154) = 5.48$, $p = .02$, $\eta_p^2 = .03$. To further interpret the pattern of these interactions, we used covariance analyses as in Study 2, applying the Condition × Emotion Focus model to disgust with anger as a covariate and to anger with disgust as a covariate (Fig. 6).

For facial disgust as a dependent variable, the main effect of condition was the only significant factor, $F(1, 153) = 38.48$, $p < .001$, $\eta_p^2 = .20$, with no interaction involving emotion focus, $F(1, 153) = 1.22$, $p = .271$, $\eta_p^2 = .008$. Simple effects showed that disgust (controlling for anger) was higher in the desire condition compared with the consequences condition, both for participants with an act focus, $F(1, 153) = 12.88$, $p < .001$, $\eta_p^2 = .08$, and a person focus, $F(1, 153) = 28.82$, $p < .001$, $\eta_p^2 = .16$. Using verbal instead of facial disgust, we found that the interaction with emotion focus became significant, $F(1, 153) = 5.66$, $p = .019$, $\eta_p^2 = .04$. The disgust gap between the desire and consequences conditions was larger in the person condition, $F(1, 153) = 49.39$, $p < .001$, $\eta_p^2 = .23$, than in the act condition, $F(1, 153) = 11.06$, $p = .001$, $\eta_p^2 = .07$. Overall, disgust was higher when the agent desired negative consequences but none occurred, compared with when negative consequences occurred but the agent did not desire them. For the verbal ratings, this effect was stronger when emotions were focused on the person rather than the act, which supports the interpretation that disgust at mere desire to harm indicates a judgment of personal character.

For facial anger as a dependent variable, although the main effects of condition and emotion focus were not significant ($p > .25$), their interaction was, $F(1, 153) = 4.57$, $p = .034$, $\eta_p^2 = .03$. The simple effect of condition was significant within the person condition, $F(1, 153) = 4.97$, $p = .027$, $\eta_p^2 = .03$, but not within the act condition, $F < 1$. For person judgments, anger (controlling for disgust) was higher in the consequences condition (adjusted $M = 4.71$, $SE = 0.25$) than in the desire condition (adjusted $M = 3.87$, $SE = 0.26$). For act judgments, the means went in the other direction (consequence: adjusted $M = 4.09$, $SE = 0.26$; desire: adjusted $M = 4.32$, $SE = 0.26$). Using verbal ratings instead, the only change in significance patterns was that the main effect of condition was now significant, if only by a slim margin, $F(1, 153) = 4.12$, $p = .044$, $\eta_p^2 = .03$; anger (controlling for disgust) was higher in the consequences condition ($M = 4.20$, $SE = 0.14$) than in the desire condition ($M = 3.75$, $SE = 0.15$). These results indicate that anger was higher when negative consequences occurred, even though the agent did not desire them, but contrary to our hypotheses, only when emotions were focused on the person rather than the act.

Mediation of the desire-disgust link by character judgment. As in Study 2, a mediation analysis was carried out to establish the link between character and disgust in the context of the manipulation of desire versus consequences. The analysis collapsed across person and act conditions, with character as a mediator between the manipulation and the scaled facial-expression measure of

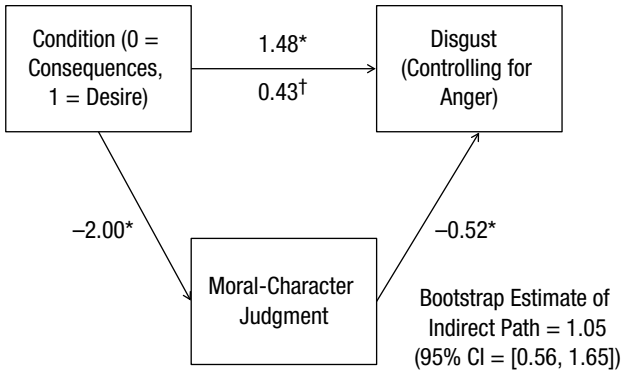

Fig. 7. Results of the mediation analysis from Study 3: effect of the desire manipulation on disgust (controlling for anger), as mediated by judgments of the agent's moral character. On the path from desire to disgust, the total effect is shown above the arrow, and the direct effect is shown below the arrow. Unstandardized coefficients are given. Significant and marginally significant paths are indicated with an asterisk ($p < .001$) and a dagger ($p = .14$), respectively. CI = confidence interval.

disgust (controlling for anger). The indirect path was significant, but this time, the direct path was not, which indicated full mediation of effects on disgust by character (Fig. 7). For verbal measures of disgust, controlling for verbal measures of anger, mediation was also significant (95% CI = [0.34, 1.04]) but only partial, as a significant direct path from the manipulation to disgust remained ($b = 0.61$, $p = .006$). When anger controlling for disgust was the dependent variable, however, there was no significant mediation by character.

A "reversed" mediation as in Study 2 with character as the outcome and disgust as the mediator yielded an indirect effect of 0.47 (95% CI = [0.22, 0.81]) that, unlike the disgust-outcome mediation, did not completely account for the direct effect of condition on character, direct effect = 1.35 (95% CI = [0.96, 1.73]). Again, bearing in mind that the experimental design did not allow clear distinction of the relative causal role of disgust and character, the best interpretation of these analyses is that character and disgust were involved with each other's effects under the manipulation of consequences and desire.

Discussion

The results of three studies supported our hypotheses that disgust would be activated, more so than anger, in response to information about character. In each study, even immoral acts not related to impurity elicited disgust more than anger if taken as evidence for the agent's evil character. These results are not just due to semantic confusion of the word *disgust* with feelings of anger, because they were obtained with measures giving both emotions as options, and statistically controlling for the other emotion.

We found more limited support for the proposal that anger more so than disgust would respond to act-related variables, including moral wrongness and harmful consequences. In particular, Study 3 revealed that anger was more sensitive to consequences than to character only when emotions were focused on the person rather than the act. For emotions felt directly toward unintended harmful acts, anger and disgust were chosen with approximately equal frequency and rated at approximately equal intensity. Thus, the distinction between anger and disgust appears clearer when persons are the target of the emotion.

Overall, our results suggest that disgust and anger are sensitive to different moral variables, at least under certain conditions. These findings are only relative: Each study showed strong coactivation of disgust and anger. However, coactivation of disgust and anger does not mean that they are the same thing. Further work might explore the different social functions of these two reactions, and in particular the tendency of disgust to encourage withdrawal behavior with a relatively low cost, appropriate to someone who is seen as having irredeemably bad character, compared with the potentially costly approach motivation linked to anger (Carver & Harmon-Jones, 2009). Indeed, allowing participants the opportunity to act on their feelings could amplify differences between disgust and anger, much as the opportunity to act increases anger-related cortical asymmetries (Carver & Harmon-Jones, 2009). For now, our results have shown how it is possible that any kind of immoral behavior—acting unfairly, betraying one's group, and so on—might lead an observer to feel more disgust than anger, if the act is attributed to a "rotten" moral character.

Action Editor

Jamin Halberstadt served as action editor for this article.

Author Contributions

R. Giner-Sorolla developed the concept and design for all three studies, together with H. A. Chapman on Study 1. Data were collected by H. A. Chapman alone for Study 1 and under the supervision of R. Giner-Sorolla for Studies 2 and 3. Data were analyzed by R. Giner-Sorolla and H. A. Chapman. Both authors wrote the manuscript and approved the final version of the manuscript for submission.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Supplemental Material

Additional supporting information can be found at http://pss.sagepub.com/content/by/supplemental-data

Open Practices

The hypotheses, method, and analysis plan for Study 1 were preregistered at the Open Science Framework and can be accessed at https://osf.io/ynvhz/. All materials have been made publicly available via the Open Science Framework and can be accessed at https://osf.io/ynvhz/ (Study 1) and https://osf.io/x7bfj/ (Studies 2 and 3). Because of unforeseen issues with the wording of our experiments' consent forms, data from these studies could not be made openly available, but are still available in anonymous form on request. The complete Open Practices Disclosure for this article can be found at http://pss.sagepub.com/content/by/supplemental-data. This article has received badges for Open Materials and Preregistration. More information about the Open Practices badges can be found at https://osf.io/tvyxz/wiki/1.%20View%20the%20Badges/ and http://pss.sagepub.com/content/25/1/3.full.

Notes

1. The preregistered analysis plan contains one analysis that is not reported here for technical reasons. This analysis (Analysis 2c) involved an unusual use of residualization, which we believed might allow us to better separate disgust from anger. However, we later realized that this analysis was not statistically meaningful (by definition, residuals average to zero, so it is not informative to compare the average of two residuals).
2. Noninteger degrees of freedom are a consequence of the SPSS MIXED procedure using Satterthwaite approximations to the *F* distribution when a covariate is included (SPSS, 2005).

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