Registered Report Stage 2: Full Article

Reexamining the role of intent in moral judgements of purity violations☆

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A R T I C L E   I N F O

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A B S T R A C T

Perceived intent is a pivotal factor in moral judgement: intentional moral violations are considered more morally wrong than accidental ones. However, a body of recent research argues that intent is less important for moral judgements of impure acts – that it, those acts that are condemned because they elicit disgust. But the literature supporting this claim is limited in multiple ways. We conducted a new test of the hypothesis that condemnation of purity violations operates independently from intent. In Study 1, participants judged the wrongness of moral violations that were either intentional or unintentional and were either harmful (e.g., stealing) or impure (e.g., public defecation). Results revealed a large effect of intent on moral wrongness ratings that did not vary across harmful and disgusting scenarios. In Study 2, a registered report, participants judged the wrongness of disgust-eliciting moral violations that were either mundane and dyadic (e.g., serving contaminated food) or abnormal and self-directed (e.g., consuming urine). Results revealed a large effect of intent on moral wrongness judgements that did not vary across mundane and abnormal scenarios. Findings challenge the claim that moral judgements about purity violations rely upon unique psychological mechanisms that are insensitive to information about the wrongdoer's mental state.

1. Introduction

Judgements of moral wrongness depend heavily on inferences about a wrongdoer's mental state, especially whether the wrongdoer acted intentionally (Alicke, 2000; Cushman, 2008; Malle, Guglielmo, & Monroe, 2014; Shaver, 1985). Across cultures, intentional acts are judged more wrong than accidental acts (Barrett et al., 2016; McNamara, Willard, Norenzayan, & Henrich, 2019; Ohtsubo, 2007),[1] and children as young as three believe that intentional wrongdoing deserves more blame than unintentional wrongdoing (Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Vaish, Carpenter, & Tomasello, 2010). Paralleling folk morality, legal codes also judge blame in proportion to *mens rea*, the requirement that a culpable agent acted intentionally or knowingly (Malle & Nelson, 2003).

Despite intent's pivotal role in moral judgement, recent research claims that judgements about one particular domain of wrongdoing are less sensitive to considerations of intent: those of impure (i.e., disgust-eliciting) acts, which are claimed to depend primarily on the nature of the act itself, rather than on inferences about the mental state of the agent (Barrett et al., 2016; Chakroff et al., 2015; Chakroff, Dungan, & Young, 2013; Chakroff, Russell, Piazza, & Young, 2017; Chakroff & Young, 2015; Russell & Giner-Sorolla, 2011; Sweetman & Newman, 2020a; Tsoi, Dungan, Chakroff, & Young, 2018; Young & Saxe, 2011; Young & Tsoi, 2013). For example, Young and Saxe (2011) found that participants judged accidental harms as much less morally wrong than they judged intentional harms (e.g., accidentally versus intentionally putting poison into a coworker's coffee), but they did not judge intentional purity violation as more wrong than an accidental ones (e.g., intentionally versus accidentally eating your dead dog). Russell and Giner-Sorolla (2011) similarly reported that moral disgust towards an act involving feeding cloned human meat to guests was not affected by the intent of the actor. More recently, Barrett et al. (2016) assessed the effect of intent on moral judgement across 8 small-scale and 2 Western societies. In all but one society, intentional harms, such as theft, were

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judged more wrong than accidental harms. In contrast, in all 10 societies, intentionally breaking a food taboo (e.g., eating dog meat for US participants) was judged no worse, or only slightly worse, than accidentally doing so. This finding was interpreted as offering cross-cultural support for less intent-based moral judgement in the domain of purity violations. Such findings buttress claims that moral judgements of purity violations rely upon psychological mechanisms that, compared to the mechanisms underlying condemnation of harmful acts, are insensitive to information about the wrongdoer's mental state (Cushman, 2015; Graham et al., 2013; Rottman, Kelemen, & Young, 2014; Russell & Giner-Sorolla, 2013).

Conclusions that intent does not influence judgements of purity violations deserve re-examination for two reasons. First, contra experimental psychology findings, the legal code - which may in part be shaped by folk moral intuitions (Cosmides & Tooby, 2006; Kahan, 1998; Sznycer & Patrick, 2020) - considers intent in punishing purity violations. Second, design features of the above-cited experimental psychology findings render conclusions ambiguous. We discuss both of these issues in turn.

1.1. The role of intent in laws punishing purity violations

Contamination of food by insect fragments, maggots, and rodent hairs is acknowledged as harmless but is outlawed because it is "offensive to the senses" according to the United States Food and Drug Administration (FDA, 2005). Intent is considered when assigning legal responsibility for food contamination and adulteration (Spink & Moyer, 2011). For example, following the 2013 UK horse-gate scandal, in which beef products were found to be adulterated with horse meat, one Dutch food supplier's defense - that he unintentionally supplied horse meat to food producers - was undermined when observers noticed his company, Draap, is the reverse spelling of "paard", the Dutch word for horse (Lawrence, 2013).

Public defecation laws also consider intent. In Hawaii, for example, the law stipulates that "A person commits the offense of urinating or defecating in public if the person *intentionally or knowingly* urinates or defecates in a public place or any area where such an act is likely to be observed by any member of the public" (Hawaii State Legislature, 2017; italics added). The law protects people from the mere sight of the disgust-eliciting act; defecation is still an offense on private land if it can be seen by the public. A clause explicitly exculpates those who unintentionally defecate in public: "This section shall not apply in cases where the person failed to use a restroom or other toilet facility because of a medical condition."

That experimental psychology evidence suggests that perceived intent is of little importance to judgements of disgust-eliciting norm violations (Barrett et al., 2016; Russell & Giner-Sorolla, 2011; Young & Saxe, 2011) is surprising given the tendency for legal reasoning to reflect everyday individual-level moral cognition (Cosmides & Tooby, 2006; Kahan, 1998). However, we suggest that the current evidence should be interpreted tentatively for several reasons.

1.2. Confounding content

In some studies, purity scenarios – but not harm scenarios – may have included confounding content. Purity scenarios have often contained more than one immoral act. For example, Young and Saxe (2011) used the following accidental impurity scenario: "Imagine that a car just killed your beloved dog. Your significant other has heard that dog meat is delicious and freezes the meat of your dog before it goes bad. Later, you decide to make yourself dinner. You see a package in the freezer. It is correctly labeled 'dog.' You end up eating your dog for dinner." In answering the question "How morally wrong was the action," participants might consider the agent's significant other's storage of the dog meat, the agent's potential endorsement of the significant other's actions, or the agent's decision to eat the dog. Only one of these

elements was changed in the unintentional version of the vignette – the fact that the agent thought that the dog meat was beef. Hence, when judging moral wrongness, participants may have considered the significant other's role in the scenario. In contrast, the harm scenarios were made fully unintentional. This design feature may account for the finding that intentional harm ($M = 6.68$) and intentional ingestion ($M = 6.29$) were judged to be similarly immoral, whereas accidental ingestion ($M = 5.28$) was judged much more immoral than accidental harm ($M = 2.05$).

1.3. Scenario content differences

Researchers have occasionally designed disgust-eliciting purity scenarios to have no second party victim, with the act done to oneself, often in private. Contrast "scratch someone on the arm" – a harm scenario used by Chakroff and Young (2015) – with a corresponding purity scenario of "pour urine on oneself". Studies are inconsistent on this point, with some suggesting that self-direction is a necessary feature of impure act content (Chakroff et al., 2013), and others testing hypotheses regarding judgements of purity using dyadic purity scenarios (e.g., Chakroff et al., 2017; Russell & Giner-Sorolla, 2011). Moreover, most perspectives on purity identify the elicitation of disgust or concerns about contamination as the defining characteristic of purity content, without mention of self- versus other-direction of the act (e.g., Graham et al., 2013; Haidt, 2012; Horberg, Oveis, Keltner, & Cohen, 2009). For example, Young and Saxe (2011) suggest that their findings show that it is "the key feeling of disgust that focuses participants' attention on the act itself, and therefore partly dampens their consideration of the intention".

To test the hypothesis that the disgust-eliciting content of the act renders intentionality unimportant, features of the scenarios other than the harmful versus disgusting content, such as whether the act is self- or other- directed, should be kept constant. Recent work suggests that when parallel scenarios such as these are used, intention may influence moral judgements of harmful and disgusting violations similarly (Parkinson & Byrne, 2017). In Study 1 we therefore compare moral judgements of dyadic purity violations with moral judgements of dyadic harm violations. Then, in Study 2, we compare moral judgements of dyadic purity violations with moral judgements of self-directed purity violations.

1.4. Measurement

One prominent study (Russell & Giner-Sorolla, 2011) concluded that moral disgust was no different for unintentional than intentional purity violations (feeding cloned human meat to dinner guests). However, moral disgust was measured using items (disgusted, repulsed, sickened, grossed-out) that also tap pathogen disgust (Kollareth & Russell, 2019; Nabi, 2002; Royzman, Atanasov, Landy, Parks, & Gepty, 2014). Hence, the null effect of intentionality might have reflected the fact that individuals experience pathogen disgust when imagining eating cloned meat regardless of the reason why that meat was consumed. This explanation is consistent with a modified interpretation of Russell and Giner-Sorolla's (2011) findings in which *pathogen* disgust is indeed insensitive to intentionality but moral judgements about the agents who cause this disgust are sensitive to intentionality. In the present research we will use terms that clearly distinguish physical disgust ("grossed out") from moral judgement ("morally wrong"), avoiding potentially imprecise terms such as disgust and moral disgust.

1.5. Sexual versus pathogenic impurity

Previous studies have not distinguished between sexual violations, such as incest, and pathogen-related violations, because both types of violation have typically been conflated under the rubric of impurity (Graham et al., 2013). Although sex and other bodily acts such as eating

both entail risks of pathogen exposure, and may elicit disgust for this reason, sexual acts may be judged immoral and elicit disgust for reasons other than physical impurity (Kurzban, Dukes, & Weeden, 2010; Lieberman & Smith, 2012; Tybur, Lieberman, Kurzban, & DeScioli, 2013). Therefore, in the current research we restrict our attention to violations involving cues to pathogens.

1.6. Abnormality

One critique of previous studies is that purity violations have been limited to acts that are abnormal or weird (Gray & Keeney, 2015), such as eating cloned human meat (Russell & Giner-Sorolla, 2011) or eating a pet dog (Young & Saxe, 2011). Performance of such acts may be particularly diagnostic of an individual's bad character (Uhlmann, Pizarro, & Diermeier, 2015), and might therefore influence moral judgement even if the act is unintentional. Many quotidian norm violations elicit disgust in observers, including soiling a public toilet, coughing in someone's face, eating noisily in a public area, spitting on the sidewalk, not cleaning up your dog's mess, and serving contaminated food. In the current research we will investigate judgements of mundane disgust-eliciting acts such as these, then in the second study we compare moral judgements of mundane acts with judgements of abnormal acts.

1.7. The current research

Our approach was to devise intentional and unintentional versions of scenarios describing disgusting acts, and to assess participant perceptions of the acts' moral wrongness. For comparison, we devised parallel harm scenarios in intentional and unintentional versions. Our primary hypothesis is that impure acts (those involving pathogen cues) are judged more severely when intentional than when unintentional. We therefore predicted that intentional disgust violations would be judged more morally wrong than unintentional disgust violations. The strongest version of this prediction is that the effect of intent on moral judgement does not differ between purity and harm scenarios (i.e. no interaction of intent with domain), whereas a less stringent version is that intent matters for purity violations, but not as much as for harm violations. The third possibility – that intentional and unintentional purity violations do not significantly differ in moral wrongness – is consistent with existing findings. All methods, hypotheses and predictions were pre-registered (see https://osf.io/t7d9z/ for data and pre-registrations and see supplemental material for study materials). We report all measures, manipulations, and exclusions. Sample size was determined before data were collected or analyzed.

2. Study 1

2.1. Method

2.1.1. Participants

252 participants (127 male; mean age = 31.9, SD = 10.8) were recruited from Amazon Mechanical Turk. They were allowed to participate if fluent in English and native to the U.S.

2.1.2. Scenarios

Quotidian bodily acts involving pathogen-cues were constructed. Scenarios had plausible victims – either a specific person in a dyad, or a more diffuse victim, such as a public facility or restaurant customers. Additional information manipulated the mental state of actors either describing them doing the act intentionally versus unintentionally. Purity scenarios were designed to elicit disgust while minimizing harm. Harm scenarios were also constructed in intentional and unintentional versions. As far as possible, the content of harm scenarios was similar to the disgust scenarios, except that they contained no content that would elicit pathogen disgust. An example scenario is given below in its four

conditions. All scenarios are shown in the supplementary materials.

2.1.2.1. Disgust intentional. Jason is preparing to host a birthday party for his wife. He is baking a birthday cake for the 10 people who will be at the party. When he measures out the flour for the cake, he sees that there are dozens of weevils (small grubby bugs) hidden in the flour. He decides to bake the cake anyway. The insects end up in the cake, and all of his guests end up eating them.

2.1.2.2. Disgust unintentional. Jason is preparing to host a birthday party for his wife. He is baking a birthday cake for the 10 people who will be at the party. When he measures out the flour for the cake, he doesn't see that there are dozens of weevils (small grubby bugs) hidden in the flour. The insects end up in the cake, and all of his guests end up eating them.

2.1.2.3. Harm intentional. Jason is preparing to host a birthday party for his wife. He is baking a birthday cake for the 10 people who will be at the party. When he measures out the flour for the cake, he sees that there are a few small bits of glass hidden in the flour. He decides to bake the cake anyway. The bits of glass end up in the cake, and all of his guests end up eating them.

2.1.2.4. Harm unintentional. Jason is preparing to host a birthday party for his wife. He is baking a birthday cake for the 10 people who will be at the party. When he measures out the flour for the cake, he doesn't see that there are a few small bits of glass hidden in the flour. The bits of glass end up in the cake, and all of his guests end up eating them.

2.1.3. Measures

2.1.3.1. Moral judgement. Following Young and Saxe (2011) participants were asked "How morally wrong was [target's] behavior?" on a scale from 0, "not at all wrong" to 6, "extremely wrong".

2.1.3.2. Intent. Participants responded to the item "Did [target] do it intentionally?" measured on a 7-point scale from 0, "definitely not intentional" to 6, "definitely intentional".

2.1.3.3. Anger. "How angry does [target's] behavior make you feel"?" on a 7-point scale from 0, "not at all angry", to 6, "extremely angry".

2.1.3.4. Disgust. "How grossed out does [target's] behavior make you feel?" on a 7-point scale from 0, "not at all grossed out", to 6, "extremely grossed out".

2.1.3.5. Harm. "How harmful was [target's] behavior?" on a 7-point scale from 0, "not at all harmful", to 6, "extremely harmful".

2.1.3.6. Attention check questions. The following attention check questions were embedded in the survey: "How many bunnies do you see above?" appeared below an image showing 2 bunnies and 2 kittens, and "What color is the sky on a clear day?" appeared alongside the options "red", "blue", "pink", "silver" and "green". Additionally, participants were asked "How seriously did you take participating in this survey? (Please be honest - your answer won't affect your payment or MTurk rating)" from "seriously", "somewhat seriously" and "not at all seriously".

2.1.3.7. Exclusion criteria. Data from participants who answered either of the attention check questions incorrectly, or reported taking the survey "not at all" seriously, were excluded from analysis.

2.1.3.8. Procedure. Participants were directed to a link taking them to a Qualtrics survey where they provided informed consent and were randomly assigned to one of the 4 versions (disgust intentional,

disgust unintentional, harm intentional, harm unintentional) of each of the 14 scenarios and responded to the items above after each one. They were then debriefed and thanked for their participation.

2.1.3.9. Analysis plan. To test our primary hypothesis, we regressed moral wrongness judgements on (1) moral violation intent (coded as -0.5 = non-intentional and 0.5 = intentional), (2) moral violation content (coded as -0.5 = harm and 0.5 = disgust), and (3) their interaction. We also modeled random intercepts for participants and scenarios and random slopes for main effects and interactions. Starting with the most complex random effects model, we iteratively simplified the model when the removal of random effects did not diminish model fit, as assessed via a likelihood ratio test (Matuschek, Kliegl, Vasishth, Baayen, & Bates, 2017). Fractional degrees of freedom were rounded to the nearest integer.

2.2. Results

Of the 252 participants who enrolled, 237 passed the pre-registered attention checks. Before testing our primary hypothesis, we checked whether harm and intentionality assessments – and anger and disgust responses to the scenarios – varied as a function of act content and intentionality. Rated intent indeed varied as a function of scenario intent, $F(1, 28) = 463.04$, $p < .001$, with intentional acts ($M = 5.22$, 95% CI: 5.04, 5.40) rated as more intentional than unintentional acts ($M = 1.27$, 95% CI: 0.95, 1.60), but did not vary between harm and disgust scenario content, $F(1,13) = 0.10$, $p = .76$. At the individual scenario level, all unintentional scenarios were rated as less intentional than intentional scenarios (see Table S1, supplementary materials).

Rated harm also varied as a function of scenario intent, $F(1,22) = 141.85$, $p < .001$, with intentional acts rated as more harmful ($M = 3.47$, 95% CI: 3.06, 3.88) than unintentional acts ($M = 2.14$, 95% CI: 1.68, 2.60), though harm did not vary across disgust-content and harm-content scenarios, $F(1, 14) = 0.80$, $p = .39$.

Like rated harmfulness, rated anger varied as a function of scenario intent, $F(1, 38) = 408.91$, $p < .001$, with anger higher for intentional scenarios ($M = 4.21$, 95% CI: 3.94, 4.48) than unintentional scenarios ($M = 1.80$, 95% CI: 1.48, 2.12), but did not vary across scenario content, $F(1, 14) = 0.12$, $p = .74$. In contrast, rated grossness did vary as a function of scenario content, $F(1,21) = 145.15$, $p < .001$, with disgust-content scenarios ($M = 4.02$; 95% CI: 3.67, 4.36) rated as more gross than harm-content scenarios ($M = 1.68$, 95% CI: 1.35, 2.02). Unexpectedly, rated grossness also varied as a function of scenario intent, $F(1, 239) = 278.59$, $p < .001$, with intentional scenarios rated as more gross ($M = 3.44$; 95% CI: 3.14, 3.74) than unintentional scenarios, ($M = 2.26$; 95% CI: 1.97, 2.55). The effect of intentionality on grossness ratings did not vary across disgust-based and harm-based scenarios, $F(1, 13) = 1.98$, $p = .18$. These preliminary analyses suggest that intentional versus unintentional scenarios differed in perceived intentionality and harm and rated anger and grossness, but that disgust-content versus harm-content scenarios differed only in rated grossness.

Next, we tested our primary hypothesis – that intentionality affects moral wrongness of both disgust-based and harm-based acts. Moral wrongness ratings were higher when acts were intentional, $F(1, 37) = 363.77$, $p < .001$, and this difference did not vary across scenarios with disgust-eliciting versus harmful content, $F(1, 13) = 3.63$, $p = .079$.

Harm scenarios with intent ($M = 4.58$, 95% CI: 4.23, 4.93) were rated as more morally wrong than were harm scenarios without intent ($M = 1.73$, 95% CI: 1.40, 2.06), $p < .001$, and disgust scenarios with intent ($M = 4.14$, 95% CI: 3.71, 4.58) were rated as more morally wrong than were disgust scenarios without intent ($M = 1.81$, 95% CI: 1.35, 2.27), $p < .001$. Fig. 1 shows moral wrongness ratings for each condition of each scenario.

2.3. Discussion

As with harmful acts, intentional disgust-eliciting acts were judged more morally wrong than unintentional disgust-eliciting acts. Moreover, the effect of intent on judgements of moral wrongness did not differ between harmful and disgusting scenarios. These results support the stronger version of our prediction: that the effect of intent on moral judgement would not differ between purity and harm scenarios. They also run contrary to previous findings that intent is unimportant to moral judgements of purity violations (e.g., Barrett et al., 2016; Young & Saxe, 2011).

Whereas past research has typically only used a small number of scenarios (e.g., Barrett et al., 2016; Russell & Giner-Sorolla, 2011), the current findings generalized across 14 different disgusting and harmful actions. These scenarios successfully manipulated the intended content: Harm scenarios were rated more harmful than gross, disgust scenarios were rated more gross than harmful, and intentional scenarios were rated more intentional than were unintentional scenarios.

Finding here might conflict with those reported in previous studies because our purity scenarios described mundane, dyadic, acts whereas those used in earlier work typically describe abnormal and self-directed impure actions, such as eating a pet dog (e.g., Young & Saxe, 2011), eating human meat (Russell & Giner-Sorolla, 2011), or pouring urine on oneself (Chakroff et al., 2013). To test whether the effect of intent extends to these types of violations, Study 2 included both the mundane scenarios used in Study 1 and scenarios describing abnormal, self-directed, purity violations. Further, to avoid potential contrast effects between scenarios Study 2 used a between-subjects design in which each participant responded to only one scenario.

3. Study 2 (registered study)

3.1. Methods

3.1.1. Participants

Participants were recruited from Prolific Academic, a platform similar to MTurk (Peer, Brandimarte, Samat, & Acquisti, 2017). They were allowed to participate if they were fluent in English and native to the UK. The power analysis described below recommended a sample size of 400 participants. Given that approximately 6% of participants failed the attention check in Study 1, we aimed to recruit 425 participants.

3.1.2. Exclusion criteria

As in Study 1, the following attention check questions were included: "How many bunnies do you see above?" will appear below an image showing 2 bunnies and 2 kittens, and "What color is the sky on a clear day?" will appear alongside the options "red", "blue", "pink", "silver" and "green". Participants will also be asked "How seriously did you take participating in this survey? (Please be honest - your answer won't affect your payment or Prolific rating)" from "seriously", "somewhat seriously" and "not at all seriously". Data from participants who answer either of the first two questions incorrectly, or report taking the survey "not at all" seriously, will be excluded from analysis. Due to errors in the survey programming, one scenario (Anne) only had one attention check question and the remaining scenarios had two attention check questions. Exclusions were made based on these questions.

3.1.3. Experimental procedures

Participants were directed to a link taking them to a Qualtrics survey, where they provided informed consent and then saw one of two versions (intentional versus unintentional) of 20 scenarios. All scenarios included disgust-eliciting content. Half of the scenarios were mundane (i.e., those used in Study 1), and half were similar to those used in the purity literature (i.e., abnormal). The mundane scenarios were the ten
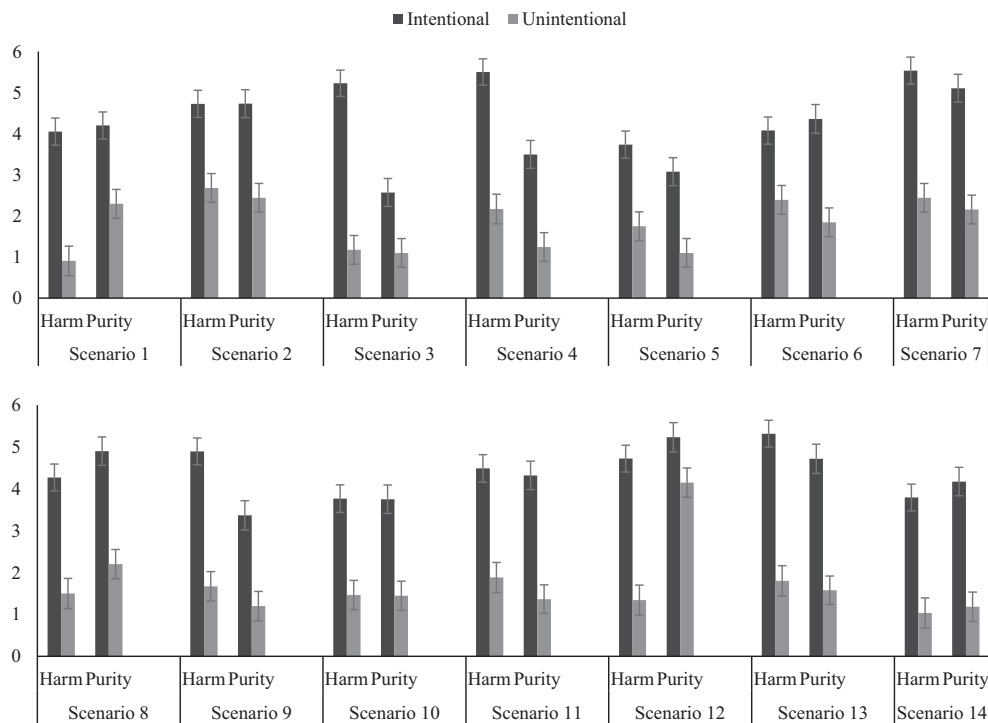
Fig. 1. Mean moral wrongness ratings by content and intent, Study 1. Error bars represent 95% confidence intervals.

scenarios used in Study 1 that received the highest grossness ratings (Scenarios 1, 2, 4, 5, 6, 7, 8, 9, 11 and 12). The ten abnormal scenarios (see Appendix B) were based on scenarios used in previous research on purity (Chakroff, Dungan, Koster-Hale, Brown, Saxe & Young, 2016; Chakroff et al., 2013; Chakroff et al., 2017; Chakroff & Young, 2015; Graham et al., 2013; Russell & Giner-Sorolla, 2011; Young & Saxe, 2011). The dependent variables were the same as in Study 1.

3.2. Power analysis

A power analysis with crossed random effects was conducted using the procedures developed by Judd, Westfall, and Kenny (2017). In Study 1, intentional and unintentional moral wrongness ratings differed by 2.33, scenario intercept variance was 0.57, variance in the effect of intent across scenarios was 0.34, and the residual variance was 2.71. Based on these parameter estimates, using 10 scenarios and 200 participants per purity type (mundane versus abnormal), yields over 99% power to detect an effect of intent. The effect size of intent might be lower for abnormal scenarios. Even so, a reduction in effect size of 35% (i.e., a mean difference of 1.48) would still yield 90% power to detect an effect of intent for the abnormal scenarios. We therefore used 20 scenarios and aimed for a sample size of 400 participants after exclusions.

3.3. Results

Of the 409 participants who provided data,[2] four answered the attention check incorrectly, and four reported taking the study "not at all" seriously. Removing these cases left a total of 401 participants (65% female, mean age = 34.6, SD = 12.5).

As registered, we first assessed whether acts in intentional scenarios were rated as more intentional than nonintentional scenarios. They were. Mean intentionality ratings were below 2 (on the 0 to 6 point

scale) for 19 of the 20 unintentional scenarios; they were above 4 for 19 of the 20 intentional scenarios. For none of the 20 scenarios were the intentionality ratings reversed.

We tested our primary hypothesis by regressing moral wrongness judgements on moral violation intent, moral violation content, and their interaction. We also modeled random intercepts for scenarios and random slopes for the effect of intentionality across scenarios. Results revealed that wrongness judgements varied as a function of intentionality, $F(1, 18) = 135.61$, $p < .001$. The effect of intentionality did not vary as a function of mundane versus abnormal scenario content, $F(1, 18) = 0.30$, $p = .589$. To illustrate, mundane purity violations were rated more wrong when intentional ($M = 4.51$, $SE = 0.25$) than unintentional ($M = 1.57$, $SE = 0.36$); abnormal purity violations were also rated more wrong when intentional ($M = 3.90$, $SE = 0.25$) than when unintentional ($M = 1.24$, $SE = 0.36$). Fig. 2 shows moral wrongness ratings for each condition of each scenario.

3.4. Discussion

Study 2 findings again showed that intent has a large effect on moral judgements of purity violations. Moreover, the effect of intent did not differ between abnormal and mundane purity violations. This suggests that intentional disgusting acts are judged more morally wrong whether those acts are self-directed and abnormal, such as drinking urine, or dyadic and mundane, such as urinating in public.

4. General discussion

Across two studies, we found that participants rated intentional disgusting acts more morally wrong than unintentional disgusting acts. Study 1 showed that intent had a large effect on moral judgement of mundane, dyadic impure acts, such as serving contaminated food, or urinating in public. Moreover, the effect of intent on moral judgement was not different for harm and purity violations. Study 2 showed that there was also a large effect of intent on moral judgement of abnormal, self-directed, purity violations, using scenarios similar to those frequently used in past research, such as eating a pet dog (e.g., Barrett
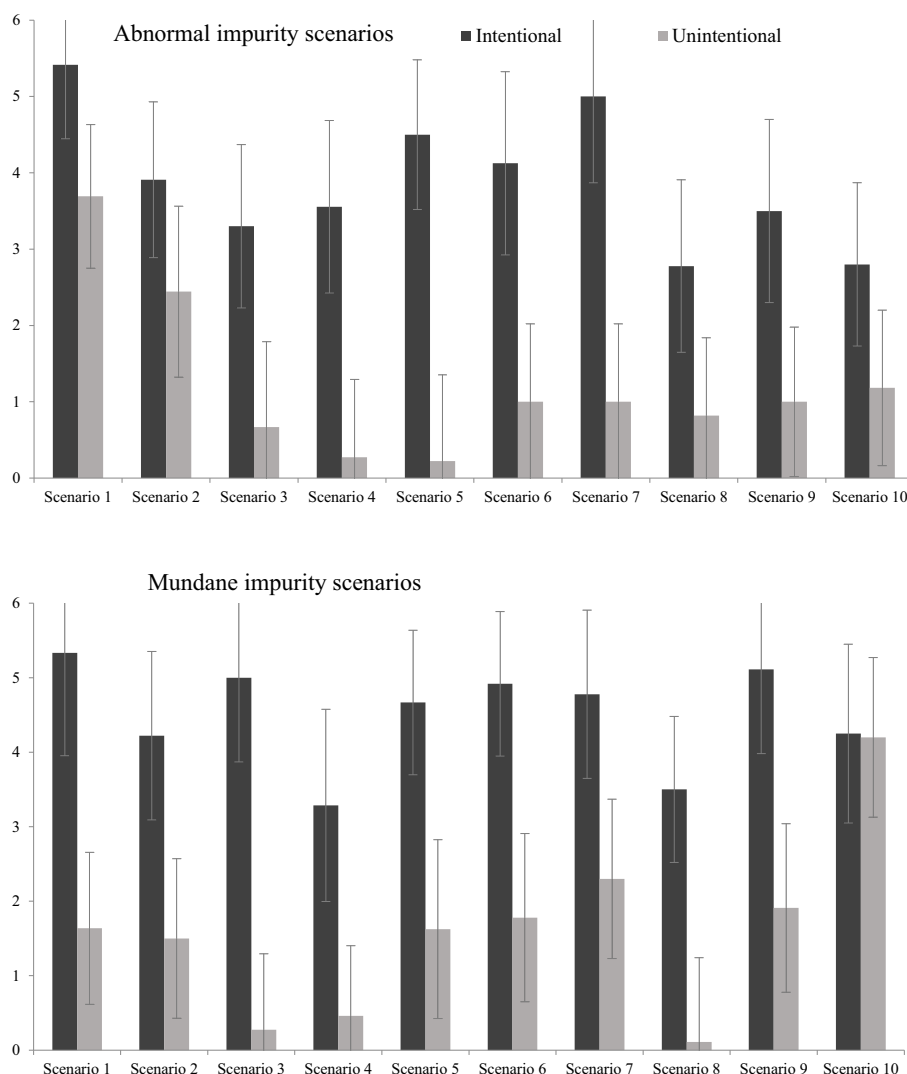
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[2] An error in the survey programming meant that scenarios were randomly but not evenly assigned and data for one scenario (Anne) were missing and were collected separately and merged with the main data set.

Fig. 2. Mean moral wrongness ratings by content and intent, Study 2. Error bars represent 95% confidence intervals.

et al., 2016), drinking urine (e.g., Young & Saxe, 2011), or eating cloned human meat (e.g., Russell & Giner-Sorolla, 2011). In Study 2 the effect of intent did not differ across abnormal, self-directed purity violations and mundane, dyadic purity violations. These results are inconsistent with previous findings purporting to show little or no effect of intent on moral judgements of impure acts (e.g., Barrett et al., 2016; Chakroff et al., 2015; Young & Saxe, 2011).

We suggest that the discrepancy between the current results and past findings is due to methodological limitations of past research, which did not always use stimuli that were similarly intentional and unintentional in harmful and impure scenarios. For example, purity violations used in earlier work contained more than one immoral action, and the manipulation of intentionality only concerned one of those actions (e.g., Young & Saxe, 2011). In the current research, we aimed to construct scenarios that were similarly intentional and unintentional in both the harmful and impure scenarios. Manipulation checks confirmed that these scenarios manipulated intent as intended, and that intent was manipulated similarly across harm and impure scenarios (Study 1).

Another limitation of past research is that conclusions were typically based on only a small number of scenarios describing purity violations (e.g., Barrett et al., 2016; Russell & Giner-Sorolla, 2011; Young & Saxe, 2011), raising the possibility that idiosyncratic features of those scenarios accounted for findings which might not generalize to other stimuli. The use of small numbers of stimuli has been found to

undermine findings in psychology (Clark, 1973; Judd, Westfall, & Kenny, 2012), including findings in moral psychology (McGuire, Langdon, Coltheart, & Mackenzie, 2009). In the present research, we used a stimulus sampling approach by constructing 24 different impure scenarios (Studies 1 and 2) and 14 different harm scenarios (Study 1). Both studies used linear-mixed modelling to account for variation attributable to differences between stimuli, permitting generalization to the population of stimuli from which ours were drawn. These attributes suggest that the current findings more accurately reflect the effect of intentionality on moral violations of purity than do earlier findings. Naturally, though, inferences are limited to the populations from which participants were drawn (i.e., the U.S. and UK) and the methods used (i.e., self-reports). Cross-cultural studies (Barrett et al., 2016) and fMRI studies (Chakroff et al., 2015) have also been taken as evidence that intentionality does not affect judgements of purity violations, and the current study cannot speak to those effects. However, these other studies have typically used the same or similar scenarios as earlier research, and therefore share the same methodological limitations.

Several mechanisms have been proposed to account for past findings of lack of effect of intent on moral judgements of impure acts. One proposal is that the weirdness or abnormality of impure acts diverts people's attention away from other contextual features such as information about the mental state of the actor (Gray & Keeney, 2015; Sweetman & Newman, 2020b). Another proposal is that the emotion

disgust focuses participants' attention on the impure act and away from accompanying mental state information (Russell & Giner-Sorolla, 2011; Young & Saxe, 2011). A third suggestion is that because purity violations are often self-directed, they are seen as victimless, so people don't take the actor's intention into account (Chakroff et al., 2013; Young & Tsoi, 2013). Results reported here suggest that people are just as able and disposed to use mental state information when making moral judgements about disgusting acts as when judging harmful acts (Study 1), and they are just as able and disposed to use mental state information when judging abnormal acts as when judging mundane acts, or other directed versus self-directed acts (Study 2).

We note that the current study employed purity scenarios describing violations involving pathogen cues (e.g., feces, vomit, urine) and not those describing sexual impurity. Purity violations have been most commonly defined as those that are physically contaminating (e.g., Graham et al., 2013; Haidt, 2012) or elicit disgust (Horberg et al., 2009; Young & Saxe, 2011). We therefore believe that the current findings adequately show that people use mental state information when judging purity violations, according to widely used definitions of purity. Nonetheless, future research should examine whether the current findings extend to sexual impurity, while also being careful to design parallel scenarios and using a range of stimuli.

These findings have important theoretical implications. The putative dissociation between the use of mental state information when judging harmful versus impure moral violations has been considered a key piece of evidence supporting moral foundations theory, which argues that different cognitive processes are used to make moral judgements depending on the content of the moral violation (e.g., Graham et al., 2013; Sweetman, Newman, 2020a; Young & Tsoi, 2013). The current findings suggest that the use of mental state information in moral cognition is less dependent on the content of moral violations than these perspectives suggest.

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Supplementary material

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