What Disgust Does and Does Not Do for Moral Cognition

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1. Introduction

Disgust is typically characterized as a negative emotion associated with the rejection of distasteful or contaminating objects (Rozin and Fallon 1987). The physiological aspects of disgust involve nausea and loss of appetite, and the bodily expression of disgust includes behaviors (e.g., gagging, vomiting) designed to orally block or expel noxious substances (Ekman and Friesen 1971; Royzman, Leeman and Sabini 2008; Rozin, Haidt and McCauley 2008; Yoder, Widen and Russell 2016). The canonical elicitors of disgust are well documented: many people report feeling nauseous or sick at the sight or smell of oral contaminants (e.g., rotten food, bodily waste) and/or disease vectors (e.g., blood, skin maladies, sexual fluids, certain animals; Curtis, Aunger and Rabie, 2004; Haidt, McCauley and Rozin, 1994; Olatunji et al. 2007).

It is uncontroversial that disgust can also be evoked in the context of a moral offense. What remains controversial is disgust's role or relevance within a moral context. When Armin Meiwes, the Rotenburg Cannibal, was discovered to have eaten the severed penis of his voluntary victim, before killing him and consuming his flesh over the next ten months, the story of this crime undoubtedly aroused disgust (and horror) in many of us. The relevant question is not whether we felt disgust about this crime—for most of us, human penis is not on the menu, and the thought of Meiwes' preferred cuisine is deeply distasteful. Instead the question is whether our disgust and our judgment of Meiwes' behavior as immoral are related – and, if so, what the term "disgust" means in a moral context. To date, the literature on disgust and morality has not fully clarified the extent to which the same emotion that is evoked by the sight, smell, and thought of touching or ingesting offensive, pathogen-relevant material (e.g., bodily fluids, feces, blood, phlegm, rotten flesh) is the same emotion that some psychologists have posited to drive or enhance moral judgments, such as when an innocent person has been harmed, treated

unfairly, neglected or victimized, or when someone has violated a sacred value or principle (e.g., see Chapman et al. 2009; Giner-Sorolla and Chapman 2017; Hutcherson and Gross 2011; Kupfer and Giner-Sorolla in press; Prinz 2007; Rozin et al. 1999; Schein, Ritter and Gray 2016).

In the present chapter, we argue that robust evidence is lacking for a unique effect of disgust on moral judgment. We start by first outlining how methodological issues have complicated attempts to measure disgust in a moral context. We then address three broad questions regarding the purported connection between disgust and moral cognition: (1) Does experienced disgust predict moral condemnation? (2) Do typical features of immoral acts evoke the experience of disgust? (3) Is disgust in a moral context the same as disgust in other contexts? Finally, we end by proposing an alternate account of the role of disgust in moral cognition. We argue that "disgustingness" (i.e., whether an act may cause disgust in people, regardless of whether it evokes disgust in oneself), is one dimension along which we classify moral violations, separate from other relevant inputs, such as harm or injustice. This has consequences for how we respond to different kinds of violations, and aids in making sense of the vast complexity of what we classify as "wrongdoing."

2. How should disgust be measured?

Part of the confusion about disgust's role in moral judgment stems from the way it has been measured. While several researchers (e.g., Nabi 2002; Russell, Piazza and Giner-Sorolla 2013) have noted problems surrounding the use of the term "disgust" as a valid measure of disgust, and consequently have prescribed alternatives, many others have neglected these exhortations. Notably, Nabi (2002) found that "disgust" diverged from a seemingly identical term, "grossed out", in the content of offenses that were most accessible to memory retrieval. The word "disgust" and its close synonyms (e.g., "disgusted," "repulsed"), behaved much like

"anger" as a memory trigger for prototypical or non-pathogen moral offenses (e.g., unfairness, cheating, lying), while the term "grossed out" triggered stereotypically pathogenic content (e.g., blood, dead bodies, vomit, feces, inappropriate sexual acts). Likewise, Russell et al. (2013) found that the term "moral disgust" behaved much like "anger," "moral anger," "contempt," and "moral contempt," as a response to violations that did not involve pathogenic content (e.g., injustice and rights violations, disrespect towards authority), whereas "moral disgust" behaved more like "grossed out" as a response to violations containing such content (e.g., urinating in public, having sex with a dead chicken). Thus, the terms "disgust" and "moral disgust" both seem to be capable of communicating two theoretically distinct evaluative states, one closer to the classical definition of disgust (captured well by the lay term "grossed out") and the other elicited by the type of stimuli that typically arouse anger and moral disapprobation.

These findings complicate the interpretation of other work, given that researchers continue to use the term "disgust" and/or related synonyms (e.g., "disgusting," "revolting," "sickened") as their principal, if not exclusive, measure of disgust – for recent examples, see Giner-Sorolla and Chapman (2017), Kupfer and Giner-Sorolla (in press), Molho et al. (in press), and Schein et al. (2016). The complication arises from the fact that "disgust" is polysemous, from a participant's perspective. In the context of moral transgressions, participants appear to interpret and use the term "disgust" in a similar way to that of "anger" or "outrage", or even "moral disapproval" itself. In nonmoral contexts, the term "disgust" more often appears to convey an aversive response caused by exposure to or thoughts of encountering noxious, body-relevant substances—a meaning closer to that of "grossed out" and other terms connoting loss of appetite or oral inhibition (e.g., "nauseous," "queasy"; see Kayyal et al. 2015, for a similar argument).

Focusing on the oral aspects typically associated with pathogen-linked disgust (e.g., nausea, gagging) is one strategy that has been employed to investigate the correspondence of moral disgust with pathogen-triggered disgust in the moral domain. For example, Piazza, Russell and Sousa (2013) measured disgust with terms like "queasy" and "grossed out"—terms that are closer to the notion of oral inhibition—and found that disgust, when measured in this way, was largely irrelevant to the mitigating circumstances affecting participants' moral judgments, while feelings of anger were intimately tied to such judgments. Likewise, Royzman, Atanasov et al. (2014) used measures of the phenomenological oral inhibition associated with disgust (nausea, gagging, loss of appetite), and found that reports of these physiological responses were not reported in response to moral violations that did not contain pathogen-related content.

Similar arguments apply to the prototypical "disgust face." The prototypical disgust face was defined by Ekman and Friesen (1975) using the facial action coding system (FACS) as involving a minimum of two action units (AUs): a nose wrinkle (AU 9) and an upper lip raise (AU 10). However, several studies have found that this typical disgust face is often interpreted as connoting anger (Widen et al. 2013; Widen and Russell 2008), particularly when contextual cues suggest that a social offense has been committed (e.g., a raised fist; Aviezer et al. 2008). This led Widen et al. (2013) to revisit Darwin's (1965, 257) original speculation that "extreme disgust is expressed by movements round the mouth identical with those preparatory to the act of vomiting." Widen et al. speculated that the wrinkled-nose disgust face failed to effectively communicate notions central to disgust—namely, oral inhibition and gagging. The authors proposed a new disgust face built from four AUs: cheeks raised (AU 6), tight eyelids (AU 7), raised upper lip (AU 10), and dropped jaw (AU 26). They labeled this expression the "sick face," since it appears as a precursor to someone who might be gagging or vomiting. Widen et al. found

that the sick face is interpreted as connoting anger to a lesser extent than the standard, wrinkled-nose disgust face. More critically, Yoder et al. (2016) found that observers are much more likely to select the sick face, over the standard disgust face and sadness face, as the emotion one would express when confronted by bodily or pathogen-linked disgust elicitors (e.g., dead bodies, slimy animals, dirty toilets, spoiled milk, bodily fluids, cutting one's finger, someone masturbating). By contrast, observers were much more likely to select the standard disgust face as the emotional response to non-pathogen moral offenses (e.g., racial prejudice, bullying, stealing, unfairness). The selection rates for the sick face were close to floor for these moral offenses. When viewed in conjunction with linguistic approaches, these findings suggest that, when researchers are careful to define and measure disgust using methods that dissociate different meanings of the term, the link between what has traditionally been termed "core," "physical," or pathogen-related disgust and moral judgments appears weakened. Further, if moral disgust and anger overlap in their associated physiological responses, the unique nature and contribution of moral disgust become more difficult to assess.

It is worth discussing whether disgust has a reliable physiological signature at all. Here the literature is much less straightforward. As we discuss further below, some studies that use electromyography (EMG) have found increased levator labii activation (muscles responsible for the lip raise and nose wrinkle) when viewing pathogen or body-based disgust elicitors (e.g., mutilation and body hygiene violations; Stark et al. 2005; Vrana 1993), as well as when reacting to non-pathogen offenses such as an unfair offer within an economic game (Chapman et al. 2009). However, this approach has limitations, as we discuss below. Research into heart rate changes and electrodermal activity linked to disgust stimuli have produced mixed results (for a review, see Stark et al. 2005). We propose that research into disgust would be greatly clarified by

researchers focusing on physiological correlates characteristic of oral inhibition and precursors to vomiting (e.g., gagging) as originally theorized by Darwin. If observers of prototypical immoral actions, such as someone cheating or stealing, experience feelings of nausea and a physical urge to vomit in response to the action, and this could be shown through convergent, multi-modal methods, as opposed to relying solely on agreement with linguistic items, this would be strong evidence for a role of felt disgust in moral judgment. Yet we are unaware of any studies that have used such methods to convincingly link the phenomenal aspects of disgust (e.g., nausea, gagging) with judgments of immoral acts (though see Chan et al. 2014, for evidence that exposure to moral violations, such as incest and theft, can reduce consumption behaviors, arguably, as a consequence of oral inhibition).

We turn now to our three principal questions: Do experiences of disgust predict moral judgments? Do features of immoral acts evoke disgust? Is "moral disgust" the same as pathogen-related disgust? We then present our view of how conceptual knowledge of physical disgust elicitors, rather than the personal experience of disgust per se, might constitute a relevant input into moral cognition.

3. Does Felt Disgust Predict Moral Judgment?

Bearing in mind the measurement issues discussed above, we think that a critical review of the evidence provides, at most, weak and inconsistent support for a tight relationship between experienced disgust and moral judgments. We examine here three types of studies that bear on this question: first, studies that experimentally manipulate incidental disgust to test for a causal role of felt disgust in moral condemnation; second, studies of the correlational relationship between trait sensitivity to disgust and moral judgments; and, finally, studies of whether disgust affects what we classify as moral offenses in the first place.

(a) Isolating Causality: Studies of Incidental Disgust

A frequent claim in support of a disgust-morality link is that the experience of disgust can make condemnatory moral judgments more severe. Consistent with perspectives on affect-as-information (Schwarz and Clore 1988) and excitation transfer (Cantor, Zillman and Bryant 1975), disgust affect may be misattributed to the offense, and taken as diagnostic of how morally wrong it is. A variety of studies have found that manipulations intended to induce disgust with pathogenic stimuli (e.g., showing a film clip involving fecal matter) lead to more severe condemnation of moral offenses in a subsequent judgment task (e.g., Schnall et al. 2008; Wheatley and Haidt 2005; see Landy and Goodwin 2015a, for a complete list). These studies appear to constitute strong evidence for a causal role for pathogen-related disgust in moral condemnation, specifically that such disgust *amplifies* the severity of moral judgments (see Pizarro, Inbar and Helion 2011).

However, there have been several published failures to replicate this result (e.g., Case, Oaten and Stevenson 2012; Johnson, Cheung and Donnellan 2014), which call into question the robustness of the finding. A recent meta-analysis (Landy and Goodwin 2015a) found evidence for a very small effect of incidental disgust on condemnation (d = .11, based on k = 50 studies), which vanishes entirely when statistically accounting for publication bias (Duval and Tweedie's [2000] trim-and-fill procedure produced an adjusted effect size estimate of d = -.01). Since this meta-analysis was published, a high-powered replication study also found no effect of induced disgust on moral judgments (Johnson et al. 2016). Moreover, the manipulations used to induce disgust in these studies may also produce feelings of disapprobation among participants on account of the experimenter exposing them to such unpleasant stimuli in the absence of reasonable justification (Landy and Goodwin 2015a). This potential confound is extremely

prevalent, and may be inflating the effect sizes throughout this literature. In short, current evidence provides little to no support for a causal role of pathogen-related disgust in moral judgment, via extrinsic manipulations of disgust (for a rebuttal, see Schnall et al. 2015; for a reply, see Landy and Goodwin 2015b).

Moreover, even if these results are taken to be robust – if only for the sake of argument – most studies in this literature have not included appropriate control conditions. The disgust induction condition is typically compared to a neutral emotion condition, or to a condition in which sadness is induced. This cannot demonstrate that disgust is uniquely related to moral judgment. Comparisons to a neutral control condition leave open the possibility that other negatively-valenced emotional states could affect moral judgments, and comparisons of disgust (a high-arousal emotion) to a sadness control condition (low arousal) similarly leave open the possibility that other high-arousal emotions (e.g., anger, fear, stress) could show similar effects to disgust. In two studies testing this possibility, a disgust induction condition was compared with a neutral condition, as well as inductions of fear, grief, and excitement. All four emotion inductions produced more severe moral judgments than the neutral condition, but did not differ from one another (Cheng, Ottati and Price 2013). A follow-up study directly induced arousal by having participants listen to fast-tempo or slow-tempo music. Compared to the slow-tempo condition, the fast-tempo condition produced harsher moral judgments. One interpretation is that participants' moral judgments in these studies are driven by aspects of core affect (e.g., arousal) that cut across emotions. This is not to say that all affective states play functionally identical roles in moral cognition; it is conceivable that two different emotions could influence moral judgments via different pathways, while their effects manifest similarly as increases on the moral judgment scale. It also does not rule out a potential causal role for affective responses that are

elicited by aspects of the immoral acts themselves (researchers have yet to establish a reliable method for isolating endogenous emotions elicited by an act as causally *prior* to the judgment of the act; see Huebner, Dwyer and Hauser 2009). However, it does constitute a problem for the hypothesis that the affective experience of disgust (as compared to other emotions) has a *special* – i.e., unique – effect on moral judgments.

(b) Trait Disgust and Condemnation

A proponent of a disgust-morality link might argue that this relationship is real and important, but that effects of subtle disgust primes are small and difficult to observe reliably in the lab. A more promising method, perhaps, would be to examine *trait-level* propensities to experience disgust in response to non-moral stimuli, and examine whether they predict moral judgments. Some research suggests that people who are more prone to the experience of disgust are more condemning of moral offenses (Chapman and Anderson 2014; Horberg et al. 2009; Inbar, Pizarro and Bloom 2009; Jones and Fitness 2008; Tybur et al. 2010). However, recent work suggests that this relationship between disgust sensitivity and condemnation is part of a much more general phenomenon (Landy and Piazza 2017). Disgust-sensitive individuals tend to be more extremely negative in a wide variety of judgments, not only moral judgments. This includes, among others, judgments of other people's intelligence and aesthetic evaluations of paintings. Moreover, trait-level disgust is not the only emotion that is linked to harsher moral judgments. Sensitivities to many affective states, from anxiety to anger, also show a similar relationship with judgment extremity; for example, participants who tended to feel more alert produced more negative judgments (Landy and Piazza 2017). Similar to the conclusions of Cheng et al. (2013), discussed above, there appears not to be a unique connection between disgust sensitivity and moral condemnation. The relationship appears to be a corollary of the

broader relationship between affect and evaluation; thus, it should not be relied on as evidence for a moral form of disgust.

(c) Disgust and Delineation of the Moral

So far, we have found little evidence that state- or trait-level disgust, as triggered by pathogen-related stimuli, is uniquely associated with harsher moral judgments. However, there is a related and broader claim that is also worth exploring: disgust is a *moralizing* emotion (Pizarro et al. 2011), which leads non-moral actions to be seen as immoral. There is little experimental work testing this hypothesis, but what there is yields some weak support for it (d = .21, based on a meta-analysis of k = 13 studies; Landy and Goodwin 2015a). But this research is still susceptible to the confound mentioned above: exposing participants to disgusting stimuli may lead to anger toward or disapproval of the experimenter, which could “spill over” into subsequent moral judgments about the stimuli.

It has, however, been widely observed that some disgusting actions that cause little to no obvious harm are “moralized” by some people; that is, they are considered wrong, regardless of rules, consensus, or cultural beliefs, a property that is typically ascribed to classically harmful moral violations (e.g., Turiel 1983). These acts range from etiquette violations like spitting at the dinner table (Nichols 2002) to sexual offenses like consensual incest (Haidt and Hersh 2001; Haidt, Koller and Dias 1993; Royzman et al. 2008; Royzman, Landy et al. 2014). Findings like this have been taken as evidence for a critical role of emotion, and disgust in particular, in moral judgment; after all, what else could be prompting moralization of such acts, if not the disgust they evoke?

But recent research offers an alternative: the primary feature underlying moralization of disgusting stimuli may be *perceived harm* rather than the disgust itself. Although stimuli in these studies are designed to be largely free of "objective" interpersonal harm, this does not mean that participants do not subjectively consider them to be harmful or socially offensive (see Gray, Schein and Ward 2014; Royzman, Kim and Leeman 2015). Early research (Haidt and Hersh 2001) found that moralization of sexual offenses was better predicted by experienced negative affect than by beliefs about harm. However, this study used a very broad negative affect probe ("If you saw a photograph of this act happening, how would this make you feel?"), so it is not clear what, if anything, this result tells us about the role of disgust in particular. More recently, Royzman, Leeman and Baron (2009) found that moralization of spitting during dinner is much more strongly predicted by perceptions of harm or offense caused ("was anyone negatively affected?") than by felt disgust ("grossed out"). That is, the act was moralized to the extent that participants anticipated that others, i.e., third-party observers, were likely to identify the act as offensive. Similar results are found in response to moral dilemmas in which a character can commit an act of incest to prevent serious harm. Participants' rulings on the morally correct course of action in such scenarios are better predicted by beliefs about harm ("the overall costs for all concerned") than by felt disgust (Royzman, Goodwin and Leeman 2011). Lastly, individual differences in political conservatism and analytic thinking predict condemnation, moralization, and beliefs about the harmfulness of offensive sexual acts, yet these individual differences are much less predictive of felt disgust towards such acts (Landy 2016). In sum, the particular individual differences that predict moralization are those that track perceptions of harm, including psychological harm, and not feelings of disgust. We return to this point later

when we discuss how conceiving acts as disgusting to others might serve as an input into judging acts as socially inappropriate to perform.

Taken together, these findings cast doubt on a moralizing function of disgust as felt by the participant. Moreover, if disgust can, in and of itself, lead to moralization, it clearly does not always do so, as there are many acts that are considered disgusting, but not immoral (e.g., picking your nose and eating it in private; see Royzman et al. 2009). It may not do so even in contexts that force a strong link between disgust and an act: a recent experimental attempt to produce moralization of novel acts in children found no impact of induced disgust on moralization (Rottman, Young and Kelemen in press), though this same research did uncover a significant effect of disgust-based testimony as well as anger-based testimony on children's moralization. In other words, telling children that a novel act is disgusting or angering leads children to judge that act as more immoral. This finding is therefore in line with the hypothesis proposed above that children and adults judge acts to be immoral to the extent that they think others find them disgusting or otherwise offensive. To foreshadow our conclusion, it may be the concept of disgustingness (i.e., the recognition that a given act has the potential to evoke disgust states in people in general), rather than felt disgust, that has an impact on moral cognition. On this view, disgust has moral significance insofar as a person is aware that an act may be perceived and/or labeled as disgusting, and not due to any direct influence of disgust affect on people's judgments of wrongdoing. This explains why some disgusting actions (e.g., picking one's nose and eating it) constitute wrongdoing only when they are construed as impacting on others.

4. Do Inputs into Moral Judgment Modulate Disgust?

We turn now to the question of whether and when disgust is evoked in response to moral violations. Even if felt disgust does not play a role in *producing* moral judgments, it may still be a moral emotion in the sense that it is felt in response to (at least some) immoral acts. It may also track other features of acts that affect moral judgments. Examining the evidence for this idea leads to the conclusion that disgust is experienced in the presence of stereotypically gross content (feces, rotten food, bodily fluids, etc.), but not other factors that typically affect people's moral judgments.

(a) "Divinity" or "Purity" Violations

Some types of acts may preferentially elicit experiences of disgust. In particular, "purity" or "sanctity" violations, or violations of the "ethic of divinity" are often argued to be uniquely tied to disgust, and to evoke this emotional response in particular (e.g., Horberg et al. 2009; Rozin et al. 1999; Royzman, Leeman and Sabini 2008). This class of violations has been defined in various ways, but it is generally agreed to be about misuses of the body (e.g., food taboos, sexual offenses) or violations of spiritual beliefs (see, e.g., Graham, Haidt and Nosek 2009; Haidt 2012; Russell and Giner-Sorolla 2013; Shweder, Much and Mahapatra 1997). Disgust at these sorts of violations is said to protect the social order by promoting rejection of people who commit such offensive, debasing acts (Rozin, Haidt and McCauley 2008). However, these violations have typically been operationalized with stimuli that contain oral contaminants or pathogenic disgust elicitors (e.g., rotten meat [Rozin et al. 1999], bodily fluids and taboo sex acts [Haidt et al. 1993]). When these disgust elicitors are removed from the stimuli, these types of violations evoke anger, not disgust (see especially Kayyal et al. 2105; Royzman, Atanasov et al. 2014). Felt disgust seems to be tracking the presence of core disgust elicitors, rather than moral content relating to "purity" or "divinity", per se.

Notably, laypeople seem not to believe that disgust is necessarily tied to moral judgments of purity-related offenses. In two recent studies (Piazza and Landy 2017), participants read about a man – "Joe" in one study, "Jake" in the other – who observed two men in a romantic relationship, which some would categorize as a violation of sexual conventions. Upon seeing the two men, Joe/Jake was described in one study as either feeling very angry or very grossed out, and, in the other study, as expressing either anger or disgust ("Yuck!") verbally, and in his facial expression. Participants were then told that Joe/Jake believed that it was morally acceptable for two men to be romantically involved, and asked how plausible they found the scenario. In both studies, participants found the co-occurrence of felt or expressed anger and moral approval to be very implausible, but found the co-occurrence of disgust and moral approval to be quite plausible. Laypeople seem to attribute the disgust to something morally irrelevant (thinking about two men being involved sexually may be gross to some people), and acknowledge that it does not need to track moral judgments. Anger, on the other hand, is seen as inextricably tied to moral condemnation, to the point that the idea of anger occurring in the absence of condemnation borders on absurdity. However, it should be noted that participants were not asked to predict moral judgment on the basis of anger or disgust expressions, so it is unclear from this study whether individuals might at times infer moral condemnation from disgust expressed in the context of certain actions. In other words, there might be instances where individuals infer condemnation from disgust displays, even if participants are quite able to dissociate moral judgment from disgust much of the time.

(b) Prototypical Wrongdoing: Harm and Injustice

One provocative claim in the literature on disgust and morality is that people can feel disgust in response to prototypical moral offenses that have nothing to do with oral or pathogenic

disgust elements (e.g., phlegm, blood, puss, bodily waste, etc.), such as bullying or unfair actions (Chapman et al. 2009; Hutcherson and Gross 2011; Schein et al. 2016). Two studies have tested this hypothesis using facial electromyography (EMG). Chapman et al. (2009) observed increased levator labii activity (muscles responsible for raising the upper lip) when participants received unfair offers in the Ultimatum Game. Likewise, Cannon, Schnall and White (2011) found increased levator labii activity when reading vignettes describing transgressions involving both pathogen-related elements (e.g., "Someone eats in the same place she goes to the bathroom") and pathogen-free violations of fairness (e.g., "Someone cheated in a game of cards"). However, they also observed increased corrugator supercilii activity (muscles responsible for furrowing the brow, linked to anger) in response to both impure and harmful transgressions (e.g., "Someone pinched a baby's nose until it cried").

These studies have several limitations. First, they focus on a single aspect of disgust—facial expressions—and one component in particular, lip raising. However, as we have seen above, the standard lip raising or nose wrinkle, postulated by Ekman and Friesen (1975), may not be the most symptomatic expression of felt disgust (Widen et al. 2013). Furthermore, levator activity is not limited to expressions of disgust, and, in at least one of the aforementioned studies, responses to moral transgressions were not limited to levator activity, but involved other muscle groups (e.g., corrugator). Finally, as Royzman and Kurzban (2011a) point out, facial expressions are not fully automatic responses, and people may intentionally produce elements of the disgust expression, much like they do with "disgust" language, to signal disapproval. Aside from these EMG studies, the remaining evidence that disgust is elicited by prototypical wrongdoing comes from studies of trait disgust or disgust sensitivity (Chapman and Anderson 2014; Jones and Fitness 2009), and as we have seen above, there are issues with these studies that limit the

conclusions we can draw about a unique connection between disgust and morality (Landy and Piazza 2017).

Another provocative recent claim is that appraisals of harm mediate the relationship between disgust and moral judgment. Schein et al. (2016) found that participants reported feeling disgust towards pathogen-free religious claims (e.g., “God does not exist”), and the impact of disgust on moral condemnation of these claims was mediated by perceiving the claim to be threatening or dangerous. However, this study measured disgust with a single term, “disgust”, and found comparable results for the term “anger.” Given our previous discussion about measurement, we recommend against interpreting this result as support for a link between felt *pathogen-related* disgust and moral judgment. Nevertheless, this study highlights how the language of disgust and anger is often applied to express disapproval of pathogen-free offenses.

One final arena in which researchers have tested disgust’s connection to harm and injustice is in the context of sexual transgressions. Yet in this context, anger, not disgust, shows a preferential relationship with perceived harm. Giner-Sorolla et al. (2012) experimentally manipulated the extent to which a sexual transgression caused harm to someone (e.g., a hurtful infidelity), and the extent to which the sexual act deviated from traditional sexual mores (e.g., involved relations between members of the same sex). Disgust towards the acts was measured with linguistic items “disgusted, repulsed, sickened, grossed-out” and anger was measured with “angry, infuriated, outraged.” They found that feelings of anger increased with the level of harm caused and the belief that someone’s rights were violated, and this was true regardless of the nature of the sexual act. By contrast, feelings of disgust responded mostly to the type of sexual act (i.e., higher disgust ratings were observed for homosexual vs. heterosexual sex).

Russell and Piazza (2015) examined reactions of anger and disgust in the context of sexual transgressions where mutual consent was or was not expressed. They theorized that anger would largely be related to appraisals of injustice, which track whether or not consent was expressed, whereas disgust would respond mostly to counter-normative aspects of the sexual act and the desire to engage in such an act (e.g., a person having sex with a corpse or someone who had had gender reassignment surgery). Indeed, using a mediational approach, they found across four studies that feelings of anger (measured with terms "angry, mad, outraged, furious" and endorsement of the standard angry face) were largely aimed at the transgressor, when consent was absent, and were mediated by appraisals of injustice. By contrast, feelings of disgust ("sickened, grossed out, nauseous, queasy" and the standard disgust face) were aimed more at the consenter, when consent was present, and the consenter desired to engage in a counter-normative sexual act. Furthermore, appraisals of the abnormality of the act, and not the perceived injustice of the act, mediated the effects of the sexual acts on disgust.

Taken together, these studies highlight a systematic dissociation in the specific features correlated with each emotion: it is anger rather than disgust that tracks injustice, perceived harmfulness, and the absence of consent, whereas disgust is largely a product of the perceived abnormality of a sexual act, and a person's desire to perform it. Thus, unlike the emotion anger, disgust does not track the morally relevant aspects of sexual transgressions related to injustice or harm, though felt disgust does seem to relate to the abnormality or weirdness of the sexual act.

(c) Mental States: Intentionality

One of the most studied factors found to influence people's moral judgments is intentionality, or the extent to which an actor is thought to have planned their actions and was aware of what they were doing at the time (Cushman 2015). Research has shown, for example,

that intentional harms are judged as worse than accidental harms (Cushman 2008). Failed attempts to harm are even sometimes judged worse than accidental harms (Young and Saxe 2011). At the same time, intentionality may not be necessary for moral judgment, as some atypical acts (e.g., incest) may be judged quite wrong even in the absence of intentionality (see Young and Saxe 2011).

The current evidence suggests that this highly morally relevant feature does not affect felt disgust. Two studies in particular examined this question. Young and Saxe (2011, Study 3) presented participants with a scenario in which two individuals had sexual relations, and they either were aware or unaware of the fact that they were genetically related. While intentional incest was rated worse (more "wrong") than accidental incest, ratings of disgust (i.e., "how disgusting") were largely uninfluenced by the intentionality of the act. Similarly, Russell and Giner-Sorolla (2011a) systematically varied whether someone was described as intentionally feeding cultured human meat at a dinner party without telling her guests, or accidentally feeding her guests cultured human meat (an unfortunate accident in the life of a biochemist). The authors also independently manipulated whether the meat was from a taboo source (human vs. sheep) and whether she served the meat to others or to herself. Disgust was measured with the linguistic items "disgusted, repulsed, sickened, grossed-out" and endorsement of the standard disgust face. Anger was measured with items "angry, infuriated, outraged" and endorsement of the standard angry face. The authors found that while ratings of anger (controlling for disgust) were higher for acts that were perceived as intentional and harmful, ratings of disgust (controlling for anger) were not higher for intentional acts and were related to lower perceptions of harm. Feelings of disgust were affected only by the source of the meat—namely, whether it was from an atypical (human) source, consistent with the oral inhibition function of disgust.

In related work examining impurity, a functional neuroimaging study (Chakroff et al. 2016) found that a cortical region that supports the encoding and integration of intent information for moral judgment, the right temporoparietal junction (Young and Saxe 2008; Young et al. 2008; Young et al. 2010), distinguished intentional and accidental acts for harmful but not impure (sexual or pathogen-related) acts. As these impure acts are typically considered disgusting (and were rated as significantly more "gross" than the harmful acts; Wasserman et al. 2017), this result suggests that, on a neural level, the representation of intent information previously found to play such a key role in moral judgments of harmful acts may not be critical when forming judgments of disgusting acts.

Unlike anger, feelings of disgust are largely responsive to the presence (vs. absence) of core disgust objects (e.g., ingesting taboo foods, incestuous sexual relations), and largely unresponsive to the intentionality of the act in question.

(d) Mental States: Desires

Another component of representing intentionality in the context of moral judgments is the desire of the actor. If a person is perceived to have performed an action that they did not desire, then it makes little sense to claim that they intended the act (Malle and Knobe 1997). At the same time, a person can harbor a deviant desire that they never act upon. If a person never acts upon the deviant desire, then no offense has been committed and there is no action to hold the person culpable for. Yet we may still form a judgment of the person's character, since the kinds of desires a person has can inform us about the nature of the person (Reeder 2009).

Descriptions of disgusting desires may have the potential to elicit an experience of disgust in respondents by way of imagination. If knowledge of a given desire is enough to

conjure up thoughts in observers of an action that they would generally deem disgusting (e.g., imagining incestuous relations or a gory stabbing), then descriptions of that desire may be sufficient to induce disgust. Russell and Piazza (2015) manipulated whether or not a man was described as possessing a deviant sexual desire (wanting to have sex with his wife's dead body), and, separately, whether or not the man engaged in the deviant act itself. Participants rated how disgusted ("grossed out, nauseous, sickened, queasy" and standard disgust face) they felt about the person, and how angry ("mad, angry, outraged, furious" and angry face) the person made them feel. Ratings of anger were equally low across conditions, perhaps because the man did not cause pain to his wife or disrespect her (before dying, the wife requested the action be performed). At the same time, ratings of disgust were significantly higher than anger in each condition. Most critically, ratings of disgust were significantly lower when there was no deviant desire and no action, compared to the levels of disgust in the other three conditions (disgust was equally high in these three conditions). In other words, feelings of disgust towards the actor were elicited simply by virtue of his having a deviant sexual desire. Yet, ratings of disgust were equally high when the person acted on the request in the absence of any concurrent desire. Thus, disgust feelings were not *dependent* on there being a deviant desire; either desire or action was sufficient to elicit disgust, consistent with our suggestion that descriptions of deviant desires operate via imagining the disgusting properties of an action.

Russell and Piazza's results suggest that imagining a person's desire to perform a disgusting act is just as potent at eliciting disgust as representing the performed action. Thus, we cannot conclude from these findings that it was the agents' desires *per se* that elicited feelings of disgust. The disgusting element in the agent's deviant desire (e.g., sex with a corpse) conjured in the respondents' imagination may have been the cause. This is consistent with the idea that

feelings of disgust can be elicited by bizarre or unconventional uses of the body (Russell and Giner-Sorolla 2013), and it raises the possibility that awareness of bodily disgust elicitors may inform individuals of which sorts of actions may be inappropriate to perform or converse about when considering the emotional sensitivities of others.

(e) Character

Giner-Sorolla and Chapman (2017) have recently argued that "moral disgust" is the affective response we have to perceiving someone as having a bad or immoral character. This argument is different from the claim that impure acts are more likely to produce character-based attributions than are harmful acts (see Chakroff and Young 2015). Violent acts may be condemned and also lead to attributions of cruel or defunct character. By contrast, judgments of impure actions seem to be focused more on a person's character. In contrast with impure actions, the set of features that impacts judgments of harmful actions is broader; this includes information about the circumstances in which the act occurred (see section below on 'Mitigating Circumstances') and the outcome of the act (i.e., whether someone was harmed and to what extent). Indeed, research by Chakroff et al. (2017) found that both harmful and impure acts were perceived to be motivated by internal causes (e.g., an appetite for sex or violence), while harmful actions were more likely than impure acts to be understood as externally motivated (e.g., a reprisal to a previous insult).

However, this is a different matter from the question of whether disgust is an emotion triggered by the thoughts and actions of a person with bad character, as Giner-Sorolla and Chapman (2017) have argued. It is worth having a look at Giner-Sorolla and Chapman's materials and methods. In their first study, participants read a vignette about a man who "overwhelmed with rage beats up his girlfriend" or "his girlfriend's cat"—a scenario taken from

Tannenbaum, Uhlmann and Diermeier (2011). Among other measures, participants rated how angry ("anger, outrage, infuriated") and disgusted ("disgust, repulsed, sickened") they were by the man's actions. The authors found that compared to anger synonyms, there was a slightly stronger tendency for participants to apply disgust synonyms to the cat beater over the girlfriend beater, the former being rated as having worse character. Relatedly, their second study relies upon a single term ("How disgusted are you at [agent]?") to measure disgust towards actors within vignettes who desired and/or brought about harmful outcomes (materials adapted from Cushman 2008). The authors found that participants preferentially selected "disgusted" over "angry" as the emotion they felt towards the actors who had harmful desires yet failed to bring about the harmful outcomes (yet both terms were selected at levels above the scale mid-point, and in the other desire x outcome conditions there was either no difference in selection rates or "angry" was preferentially selected). The authors interpreted these results as evidence that disgust is evoked by bad character – but, once again, a polysemous account of disgust means that the disgust reported here by participants may not overlap with the disgust typically reported in response to pathogenic content. Participants' use of the term "disgusted" here may not reflect the subjective experience of disgust (i.e., nausea, oral inhibition), but may instead represent a rhetorical flourish to communicate their disapproval of the deviant desire. Thus, these findings represent, at best, weak evidence for the disgust-at-character account.

(f) Mitigating Circumstances

As we mentioned above, impure actions appear to be different from harmful actions insofar as it may be more difficult to envision plausible mitigating circumstances that might excuse them or reduce blame (Chakroff et al. 2017; Chakroff and Young 2015). Congruently, research suggests that the emotion of disgust is less susceptible to factors that might serve to

mitigate moral judgments, compared to anger. Russell and Giner-Sorolla (2011b) had participants consider harmful acts (e.g., kicking a dog, abuse of power in the workplace) and impure acts (e.g., eating a dead dog, sexual relationship between two individuals of very different ages), and rate their disgust and anger towards the actors (measures similar to Russell and Giner-Sorolla 2011a). Then they asked participants if there were anything that would change their opinion about the actor's actions, and to list up to five things. Participants then rated their disgust and anger towards the actions a second time, after supplying this additional information. The main finding was that the information participants supplied tended to reduce their feelings of anger about the acts, but failed to change their feelings of disgust.

Piazza et al. (2013) took this one step further. They presented participants with harmful and sexually impure offenses (e.g., "16 year old steals from 70 year old" vs. "16 year old romantically involved with 70 year old") and had participants rate their disgust ("sickened, grossed out, queasy, repulsed" and standard disgust face) and anger ("angry, mad, outraged, furious" and standard angry face) towards the offenses, and judge how wrong was the action. They also asked participants if they could think of circumstances in which it would be OK for someone to perform the act described, and if so to describe the circumstances. Interestingly, there were no differences in participants' ability to envision mitigating circumstances for harmful transgressions versus sexual transgressions (there were several, overlapping categories generated for each). However, ratings of anger tended to correlate strongly with judgments of wrongdoing across the transgressions, whereas disgust feelings did not. Furthermore, feelings of anger, but not disgust, predicted the ability to envision mitigating circumstances for wrongdoing (i.e., participants experiencing low levels of anger had the easiest time doing this, compared to participants experiencing higher levels).

Together, these studies suggest that disgust is often incidental to the factors that serve to reduce culpability and transform judgments of wrongdoing, whereas feelings of anger are more responsive to real or imagined extenuating circumstances. If felt disgust truly plays a role in moral judgments, it does not do so by interacting with features that typically modulate the moral judgments themselves.

(g) Causality

Establishing that a person is causally responsible for a harmful outcome is essential for judgments of blame (see, e.g., Cushman 2008, 2015; Malle, Guglielmo and Monroe 2014). While people with deviant desires may be avoided for fear that they will act upon their desires, unless a person has acted and is causally responsible for a transgression there is nothing to blame them for. Indeed, studies show that causation promotes blame and a desire to punish even in the absence of intentionality (Cushman et al. 2009). Actors who harm others by accident (e.g., accidentally shooting and killing someone) are seen as deserving punishment more than those who fail to accomplish their harmful intentions (e.g., failing to hit someone you are trying to kill). Given the importance of causality for judgments of blame, it is reasonable to ask whether candidate moral emotions track the degree of causal responsibility ascribed an actor for an immoral outcome. Recent research by Piazza and Landy (2017) suggests that disgust, unlike anger, does not do so.

In their study, Piazza and Landy manipulated whether an actor (“Tom”) was causally to blame for a negative outcome that he desired (Tom’s neighbor’s patio furniture was ruined). In the scenario, participants read that the neighbor’s dog, or Tom’s dog, had either torn up or pooped on the new furniture, and viewed an accompanying image depicting the ruined furniture—thus, half of the scenarios contained a core disgust elicitor (feces). Independent of

this, Tom was described as either having trained his dog to destroy the furniture (causally responsible), or as having had nothing to do with it (the neighbor's own dog damaged the furniture). Participants judged how blameworthy Tom was for the event, and rated how "grossed out" and "angry" they felt about the sequence of events. They reported being significantly angrier when Tom was causally responsible than when he was not the cause, and this was true regardless of whether the neighbor's furniture was torn up or defecated on. However, ratings of disgust ("grossed out") behaved quite differently. Feelings of disgust responded predominantly to the presence or absence of feces within the scenario; participants reported significantly higher levels of disgust when feces was involved than when the furniture was torn apart, regardless of whether Tom was causally responsible. Furthermore, when ratings of anger and disgust were treated as simultaneous mediators of the effect of causality on judgments of blame, anger emerged as the only significant mediator. Ratings of disgust did not track the manipulation of causality and did not explain its influence on judgments of blame. These findings are consistent with the view that disgust, when measured to minimize equivocation with anger (e.g., "grossed out"), is orthogonal to other features (e.g., causality, intentionality, etc.) that directly impact on our moral judgments.

In sum, the evidence points to the conclusion that felt disgust is surprisingly resistant to the presence of other factors that have consistently been found to impact moral judgments. In a moral context, disgust appears to be elicited by atypical uses of the body or the incidental presence of pathogenic content. At the same time, the evidence reviewed here does not rule out the possibility that moral judgments of impure acts rely on different features than harmful acts, such as intentionality (Chakroff et al. 2016) and mitigating circumstances (Chakroff et al. 2017; Chakroff and Young 2015). More broadly, the evidence regarding felt disgust does not bear on

another potential role for disgust in moral cognition, one that involves the use of conceptual knowledge related to disgust to *designate* a subclass of proscribed acts – an account to which we will return at the end of this chapter.

5. Does Moral Disgust Overlap with Core Disgust?

(a) The Definition of Moral Disgust

The existence of moral disgust is a topic of considerable debate. Tybur, Lieberman and Griskevicius (2009) argue that there is a distinct domain of disgust with different triggers and action tendencies than pathogen and body-based disgust. In their studies, factor analyses of disgust ratings of a wide range of stimuli showed three distinct domains of disgust: pathogen, sexual, and moral, each with unique eliciting stimuli. Similarly, Lee and Ellsworth (2013) found that reported disgust triggered by moral violations was characterized by approach action tendencies and a desire to retaliate, whereas disgust triggered by pathogen vectors was characterized by avoidance action tendencies and a sense of helplessness. Hutcherson and Gross (2011) have found that people endorse "moral disgust" as their strongest emotional response to a wide range of moral transgressions, much stronger than feeling "grossed out" and even somewhat more than "anger" (cf. Russell et al. 2013, who found in their extended replication study that "anger" was endorsed more strongly and widely than "moral disgust" in most non-pathogenic contexts). However, as we discussed earlier, there are issues with using the term "moral disgust" as a measure of disgust, given its semantic overlap with anger (Nabi 2002; Russell et al. 2013). Lastly, Cameron, Lindquist and Gray (2015) argued from a constructionist perspective that there is great correspondence in the moral content thought to evoke disgust and anger, though it remains to be seen whether this correspondence is largely due to particularities of the way disgust has been operationalized and measured. Anger and disgust certainly share

similar valence and arousal, yet Cameron et al.'s review revealed only a few studies that have included measures of valence and arousal alongside measures of anger and disgust, while testing differences in anger and disgust. Cameron et al. (2015) argue that regression and ANCOVA strategies, like those employed by Russell and Giner-Sorolla (2011a) and Russell and Piazza (2015), which statistically "control" for overlap between anger and disgust, are inferior to methods that include measures of core affect. Nonetheless, regression/ANCOVA strategies are not without merit, and researchers such as Russell and colleagues who use regression/ANCOVA strategies have consistently found clear and reliable mean differences in the relationship anger and disgust measures bear with moral content. The results of these studies (e.g., Giner-Sorolla et al. 2012; Russell and Piazza, 2015) suggest a tight conceptual fit between anger and injustice, and not disgust and injustice, and, likewise, a tight fit between disgust and abnormal uses of the body, but not anger and abnormality.

(b) Two Meanings of Disgust

When emotion researchers use the term "disgust," they are typically referring to a sense of nausea at the sight or smell of a noxious object (e.g., Curtis et al. 2004). What, if anything, does moral disgust share with this particular definition of disgust? As mentioned above, levator muscle activity is not unique to disgust: it also manifests during experiences of anger. People may use the term "disgust" (and disgust synonyms, and facial expressions) to signal the strength of their disapprobation about pathogen-free offenses (Royzman and Kurzban 2011b). Indeed, findings by Kupfer and Giner-Sorolla (in press) suggest that the term "anger" communicates not only that a moral offense has occurred, but one that personally affects the respondent. By contrast, the term "disgust", in a moral context, seems to more strongly communicate that a social affront has occurred. This may partly explain why "disgust" is sometimes selected by

third-party observers as a means of expressing their moral disapproval (Hutcherson and Gross 2011).

These findings converge to indicate that people hold two distinct concepts, both conveyed with the language of disgust – so-called moral disgust (which resembles the concept of anger) and canonical pathogen-related disgust (quite distinct from anger) – that are dissociated in terms of their physiological and behavioral signature, response to different kinds of content, and situational usage. We might thus be tempted to seek a correspondence between moral disgust and impurity, a concept specific to moral contexts and semantically related to disgust. But there are caveats to such an approach. First, we should not conflate the concept of impurity with the experienced emotion of disgust. Studies that have found substantial correlations between disgust and elements related to impurity (e.g., "weirdness," "unnatural") have used the word "disgust" or "disgusting" within their methodologies (see e.g., Chakroff, Dungan and Young 2013). Thus, it is possible that these studies may specifically be tracking the relationship between impurity and the recognition that impure acts are socially proscribed, rather than any affective experience of individual participants. Second, perceptions of impurity and feelings of disgust may share common elicitors (e.g., body-directed actions), which could obscure their independence. Take for example sexual actions directed at the self. Such actions are perceived by many as impure (see Chakroff et al. 2013). Indeed, even harmful actions directed at the self (e.g., suicide, self-cutting) appear to be seen as impure (see Rottman, Kelemen and Young 2014). Yet self-directed impure actions often involve body-based disgust elicitors (but see Rottman et al. 2014, discussed below); thus, we would expect to see canonical disgust responses in these contexts.

6. Restoring a Role for Disgust: Disgustingness as an Organizing Property of Wrongdoing

The evidence presented so far suggests that the emotional experience of disgust may not play a unique role in enhancing or determining the immorality of an action. Yet we are left with an indisputable observation: There is a class of actions (sometimes labeled "impure" actions) that are consistently described as both disgusting and wrong to perform. This folk usage may indeed be merely metaphorical, but we think the specific choice of metaphor is revealing in itself. While the role of felt disgust in moral cognition may not be as unique or central as previously hypothesized, this curious, frequent usage of the "disgust" label in the context of socially proscribed behavior must be explained.

To tackle this question, we take a step back to consider the entire spread of social actions a person might encounter. If we conceive of these acts as points in a multidimensional space, whose dimensions consist of different features, it becomes clear that the mind must solve a dimensionality reduction problem in order to recognize, label, and organize acts into useful concepts (Feldman 2003; Rogers and McClelland 2004). "Moral violation" is itself such a concept, and in order to conceive it, our minds make use of features that aid classification while placing relatively less weight on others. Crucially, *any* feature that contributes to effective classification is fair game; if it were the case that only purple poodles ever committed crimes, for example, our minds would certainly take advantage of purple-poodleness for the conceptualization of criminal acts, even if the link between purple poodles and criminality were merely due to statistical chance.

We propose that *disgustingness* (again, the awareness that certain actions could be found disgusting to some people) is a conceivable feature of acts that may contribute in just this way to the conceptual organization of some proscribed actions. In recently collected data, Wasserman et al. (2017) found support for disgustingness as a key organizing feature within a space of

wrongful actions, taken from previous literature, pre-structured into Harm and Purity domains, with Psychological Harm, Physical Harm, Incest Impurity, and Pathogen Impurity subdomains. Disgust was measured using the question, "How gross?", forestalling some of the methodological problems mentioned earlier in this chapter. When principal components analysis was applied to mean ratings of the violations along twelve morally relevant dimensions, disgust emerged as a key axis setting Purity violations apart from Harm violations, and Pathogen violations apart from all other violations. Notably, the Purity subdomains were highly separable with K-means clustering, while the Harm subdomains were not (i.e., harmful actions were treated more homogeneously than impure actions).

Taken together, these results suggest that the mind may use disgustingness to meaningfully separate and classify moral violations, and this organizing principle appears to operate separately from judgments of the acts' level of wrongdoing, which emerged as an organizing dimension separate from disgustingness in the study. This study seems to have uncovered a role for disgust in moral cognition that eludes the criteria applied earlier: (a) lack of covariance between felt disgust and wrongness judgments, and (b) the failure of felt disgust to respond to morally relevant features, such as intentionality. This highlights that a conceptual dimension (disgustingness) need not covary with other features (e.g., whether an act is intentional or accidental), nor directly track judgments of wrongness, to be considered relevant to moral cognition. Nor need it be driven by felt affect: one may understand that an act is generally considered gross, and use that information to judge and act, regardless of whether one personally feels grossed out.

Although the above data hint that disgust may contribute to the classification of "purity" violations, we are not claiming that disgustingness and impurity are identical. As discussed

earlier, impure acts need not be disgusting, and many disgusting acts (e.g., picking one's nose) are seen as neither impure specifically nor immoral more generally. The category of "impure acts" is most likely constructed via a combination of disgust with other relevant features – such as the perceived victim of an impure action. In the above experiment, perceived self-harm formed a similar organizational axis to disgust in principal component space, and other features, such as the perceived weirdness of the act, also played a role in separating impure from harmful acts. In another series of experiments (Dungan, Chakroff and Young 2017), impure acts were consistently perceived as worse than harmful acts when the victim was oneself, whereas the pattern was reversed when the victims were others. Crucially, disgust and also impurity ratings enhanced the degree to which a self-targeted act was seen as wrong, versus an other-targeted act. And consistent with this pattern, in a study assessing moral judgments of suicides versus homicides, both state and trait disgust predicted moral condemnation of suicides only (including for liberal, non-religious participants) – even though at an explicit level participants reported *feeling* more disgusted by a homicide than a suicide overall (Rottman et al. 2014). Finally, it is important to note that the experimental stimuli, the suicide and homicide obituaries, did not contain any pathogen-related or disgust-eliciting features; they were stories about individuals' lives and simply stated that the individuals had died either due to suicide or homicide. The relationship between the concept of impurity and disgust judgments is therefore complex. Nevertheless, we argue from these data that the central role of disgustingness, as a conceptual dimension, in constructing this moral subcategory should be recognized by researchers.

It is worth asking why such acts, which are often harmless and victimless, fall in the space of moral violations at all? What is the functional value of using disgustingness to construct a conceptual subclass, such as impurity, within that space? We submit that the conceptual

dimension of disgustingness may be useful for determining what sort of behavioral response is socially warranted by acts within in this subclass of proscribed actions. While a mind may collapse the differences across many acts to categorize them all as 'moral violations', when it comes time to act, it may need to recognize that different behaviors require different kinds of response, for example, when to punish (Martin and Cushman 2015) and when to simply avoid someone (Chakroff et al. 2017). Classifying an act as disgusting, at a conceptual level, may signal to perceivers that the actor deserves social censure, avoidance, or continued surveillance, rather than immediate punishment, given that such acts bespeak a potential disregard for the emotional sensitivities of others (Dungan and Young 2015). This perceived disregard for others may account for why impure actions are judged to be especially wrong when carried out by members of one's ingroup (see Dungan, Chakroff and Young 2017; Dungan and Young 2017), and why people who perform such impure acts are predicted to violate other norms including harm norms (e.g., be violent) in the future (Chakroff et al. 2017).

To reiterate, acts classed together in this way (i.e., as impure) need not always evoke felt disgust in the perceiver. Rather, the conceptual awareness of disgust-relevant content may contribute to, but not constitute, this categorical distinction. Such an adaptive categorization account also addresses the broader question of why disgusting acts are moralized at all. If individuals have an adaptive interest in ensuring that their neighbors (and they themselves) follow certain standards of behavior (Fehr and Fischbacher 2004), they may find it useful to construct a conceptual category containing all the acts that violate such norms of propriety, even if the acts vary wildly along other features, in order to efficiently represent and reason about the class of "things we do not do."

7. Concluding Remarks

As of now, we conclude that there is little evidence for a unique predictive effect of physical, pathogen-based disgust experiences on moral judgments people form about the actions of others. When care is taken to distinguish between different meanings of the term, it appears that felt disgust is experienced specifically in response to body- or pathogen-related content within scenarios of moral violations, and tends not to track other features of acts (e.g., perceptions of injustice, mitigating circumstances, intentionality, causality) that reliably modulate people's moral judgments. On the other hand, moral disgust may constitute a different construct, but the extent to which this construct is distinct from anger remains open to debate. New research may yet reveal a role for pathogenic disgust in moral cognition, and, in particular, in moral judgments of people's character, rather than their acts. Yet we find only limited evidence to support the moralizing or judgment-modulating functions of canonical disgust that have been the topic of so much debate in the literature (Pizarro et al. 2011).

Nevertheless, we are not prepared to discard the idea that disgust may be relevant in some manner to morality. Taking a functionalist perspective, we suspect that the recognition of an act's potential to cause disgust in others serves an important social function, by demarcating what kinds of actions should be avoided regardless of their perceived level of harm, injustice, or wrongness. In order to be able to recognize and respond to different types of proscribed acts, the mind may take advantage of disgustingness as an informative feature of the acts themselves – even in cases where feelings of disgust are not experienced to any strong degree by the respondent. In admitting that disgust may be a more complex concept than the 'core' disgust so often studied, and renewing our focus on both cognitive processes and social context, we come closer to an understanding of how – and crucially, *why* – disgust may bear on moral cognition.

References

Aviezer, Hillel, Ran R. Hassin, Jennifer Ryan, Cheryl Grady, Josh Susskind, Adam Anderson, Morris Moscovitch, and Shlomo Bentin. 2008. "Angry, Disgusted, or Afraid? Studies on the Malleability of Emotion Perception." *Psychological Science* 19: 724-732.

Cameron, C. Daryl, Kristen A. Lindquist, and Kurt Gray. 2015. "A Constructionist Review of Morality and Emotions: No Evidence for Specific Links Between Moral Content and Discrete Emotions." *Personality and Social Psychology Review* 19: 371-394.

Cannon, Peter Robert, Simone Schnall, and Mathew White. 2011. "Transgressions and Expressions Affective Facial Muscle Activity Predicts Moral Judgments." *Social Psychological and Personality Science* 2: 325-331.

Cantor, Joanne R., Dolf Zillmann, and Jennings Bryant. 1975. "Enhancement of Experienced Sexual Arousal in Response to Erotic Stimuli Through Misattribution of Unrelated Residual Excitation." *Journal of Personality and Social Psychology* 32: 69-75.

Case, Trevor I., Megan J. Oaten, and Richard J. Stevenson. 2012. "Disgust and Moral Judgment." In *Emotions, Imagination, and Moral Reasoning,* edited by Robyn Langdon and Catriona Mackenzie, 195-218. New York: Psychology Press.

Chakroff, Alek, James Dungan, Jorie Koster-Hale, Amelia Brown, Rebecca Saxe, and Liane Young. 2016. "When Minds Matter for Moral Judgment: Intent Information is Neurally Encoded for Harmful but Not Impure Acts." *Social Cognitive and Affective Neuroscience* 11: 476-484.

Chakroff, Alek, James Dungan, and Liane Young. 2013. “Harming Ourselves and Defiling Others: What Determines a Moral Domain?” *PloS One* 8: e74434.

Chakroff, Alek, Pascale Sophie Russell, Jared Piazza, and Liane Young. 2017. “From Impure to Harmful: Asymmetric Expectations About Immoral Agents.” *Journal of Experimental Social Psychology* 69: 201-209.

Chakroff, Alek, and Liane Young. 2015. “Harmful Situations, Impure People: An Attribution Asymmetry Across Moral Domains.” *Cognition* 136: 30-37.

Chapman, Hanah A., and Adam K. Anderson. 2014. “Trait Physical Disgust is Related to Moral Judgments Outside of the Purity Domain.” *Emotion* 14: 341.

Chapman, Hanah A., David A. Kim, Joshua M. Susskind, and Adam K. Anderson. 2009. “In Bad Taste: Evidence for the Oral Origins of Moral Disgust.” *Science* 323: 1222-1226.

Chan, Cindy, Leaf Van Boven, Eduardo B. Andrade, and Dan Ariely. 2014. “Moral Violations Reduce Oral Consumption.” *Journal of Consumer Psychology: the Official Journal of the Society for Consumer Psychology* 24: 381-386.

Cheng, Justin S., Victor C. Ottati, and Erika D. Price. 2013. “The Arousal Model of Moral Condemnation.” *Journal of Experimental Social Psychology* 49: 1012-1018.

Curtis, Val, Robert Aunger, and Tamer Rabie. “Evidence that Disgust Evolved to Protect From Risk of Disease.” 2004. *Proceedings of the Royal Society of London B: Biological Sciences* 271: S131-S133.

Cushman, Fiery. 2008. “Crime and Punishment: Distinguishing the Roles of Causal and Intentional Analyses in Moral Judgment.” *Cognition* 108: 353-380.

Cushman, Fiery. 2015 "Deconstructing Intent to Reconstruct Morality." *Current Opinion in Psychology* 6: 97-103.

Cushman, Fiery, Anna Dreber, Ying Wang, and Jay Costa. 2009. "Accidental Outcomes Guide Punishment in a 'Trembling Hand' Game." *PloS One* 4: e6699.

Darwin, Charles. 1872. *The Expression of the Emotions in Man and Animals.* London: John Murray (reprinted Chicago: University of Chicago Press, 1965).

Dungan, James A., Alek Chakroff, and Liane Young. 2017. "The Relevance of Moral Norms in Distinct Relational Contexts: Purity Versus Harm Norms Regulate Self-Directed Actions." *PLoS One* 12: e0173405.

Dungan, James, and Liane Young. 2015. "Understanding the Adaptive Functions of Morality From a Cognitive Psychological Perspective." In *Emerging Trends in the Social and Behavioral Sciences: An Interdisciplinary, Searchable, and Linkable Resource*, edited by Robert A. Scott and Stephen M. Kosslyn. John Wiley & Sons: Wiley Online Library.

Dungan, James and Liane Young. 2017. "The Impact of Social Distance on Moral Judgments of Harm versus Purity Violations." Boston College.

Duval, Sue. 2006. "The Trim and Fill Method." In *Publication Bias in Meta-Analysis: Prevention, Assessment, and Adjustments,* edited by Hannah R. Rothstein, Alexander J. Sutton, and Michael Borenstein, 127–146. West Sussex: Jon Wiley & Sons.

Ekman, Paul, and Wallace V. Friesen. 1975. "Constants Across Cultures in the Face and Emotion." *Journal of Personality and Social Psychology* 17: 124-129.

Ekman, Paul, and Wallace V. Friesen. 1975. *Unmasking the Face: A Guide to Recognizing Emotions From Facial Cues.* Englewood Cliffs: Prentice-Hall.

Fehr, Ernst, and Urs Fischbacher. 2004. “Social Norms and Human Cooperation.” *Trends in Cognitive Sciences* 8: 185-190.

Feldman, Jacob. 2003. “The Simplicity Principle in Human Concept Learning.” *Current Directions in Psychological Science* 12: 227-232.

Giner-Sorolla, Roger, Jennifer K. Bosson, T. Andrew Caswell, and Vanessa E. Hettinger. 2012. “Emotions in Sexual Morality: Testing the Separate Elicitors of Anger and Disgust.” *Cognition & Emotion* 26: 1208-1222.

Giner-Sorolla, Roger, and Hanah A. Chapman. 2017. “Beyond Purity: Moral Disgust Toward Bad Character.” *Psychological Science* 28: 80-91.

Graham, Jesse, Jonathan Haidt, and Brian A. Nosek. 2009. “Liberals and Conservatives Rely on Different Sets of Moral Foundations.” *Journal of Personality and Social Psychology* 96: 1029-1046.

Gray, Kurt, Chelsea Schein, and Adrian F. Ward. 2014. “The Myth of Harmless Wrongs in Moral Cognition: Automatic Dyadic Completion From Sin to Suffering.” *Journal of Experimental Psychology: General* 143: 1600-1615.

Haidt, Jonathan, and Matthew A. Hersh. 2001. “Sexual Morality: The Cultures and Emotions of Conservatives and Liberals.” *Journal of Applied Social Psychology* 31: 191-221.

Haidt, Jonathan. 2012. *The Righteous Mind.* New York: Vintage Books.

Haidt, Jonathan, and Matthew A. Hersh. 2001. "Sexual Morality: The Cultures and Emotions of Conservatives and Liberals." *Journal of Applied Social Psychology* 31: 191-221.

Haidt, Jonathan, Silvia H. Koller, and Maria G. Dias. 1993. "Affect, Culture, and Morality, or Is It Wrong to Eat Your Dog?" *Journal of Personality and Social Psychology* 65: 613-628.

Haidt, Jonathan, Clark McCauley, and Paul Rozin. 1994. "Individual Differences in Sensitivity to Disgust: A Scale Sampling of Seven Domains of Disgust Elicitors." *Personality and Individual Differences* 16: 701-713.

Huebner, Bryce, Susan Dwyer, and Marc Hauser. 2009. "The Role of Emotion in Moral Psychology." *Trends in Cognitive Sciences* 13: 1-6.

Horberg, Elizabeth J., Christopher Oveis, Dacher Keltner, and Adam B. Cohen. 2009. "Disgust and the Moralization of Purity." *Journal of Personality and Social Psychology* 97: 963-976.

Hutcherson, Cendri A., and James J. Gross. 2011. "The Moral Emotions: A Social-Functionalist Account of Anger, Disgust, and Contempt." *Journal of Personality and Social Psychology* 100: 719-737.

Inbar, Yoel, David Pizarro, and Paul Bloom. 2008. "Conservatives are More Easily Disgusted Than Liberals." *Cognition and Emotion* 23: 714-725.

Johnson, David J., Felix Cheung, and M. Brent Donnellan. 2014. "Does Cleanliness Influence Moral Judgments? A Direct Replication of Schnall, Benton, and Harvey (2008)." *Social Psychology* 45: 209-215.

Johnson, David J., Jessica Wortman, Felix Cheung, Megan Hein, Richard E. Lucas, M. Brent Donnellan, Charles R. Ebersole, and Rachel K. Narr. 2016. “The Effects of Disgust on Moral Judgments: Testing Moderators.” *Social Psychological and Personality Science* 8: 640-647.

Jones, Andrew, and Julie Fitness. 2008. “Moral Hypervigilance: The Influence of Disgust Sensitivity in the Moral Domain.” *Emotion* 8: 613-627.

Kupfer, Tom R., and Roger Giner-Sorolla. In press. “Communicating Moral Motives: The Social Signaling Function of Disgust.” *Psychological Science*.

Landy, Justin F. 2016. “Representations of Moral Violations: Category Members and Associated Features.” *Judgment and Decision Making* 11: 496-508.

Landy, Justin F., and Geoffery P. Goodwin. 2015a. “Does Incidental Disgust Amplify Moral Judgment? A Meta-Analytic Review of Experimental Evidence.” *Perspectives on Psychological Science,* 10: 518-536.

Landy, Justin F., and Geoffery P. Goodwin. 2015b. “Our Conclusions Were Tentative, but Appropriate: a Reply to Schnall et al. (2015).” *Perspectives on Psychological Science,* 10: 539-540.

Landy, Justin F., and Jared Piazza. 2017. “Re-evaluating Moral Disgust: Disgust and Other Negative Emotions Predict Negativity in Many Evaluative Judgments.” University of Chicago.

Lee, Spike W. S., and Phoebe C. Ellsworth. 2013. “Maggots and Morals: Physical Disgust is to Fear as Moral Disgust is to Anger.” In *Components of Emotional Meaning: A*

Sourcebook, edited by Johnny J. R. Fontaine, Klaus R. Scherer, and Christina Soriano, 271-280. Oxford: Oxford University Press.

Malle, Bertram F., Steve Guglielmo, and Andrew E. Monroe. 2014. "A Theory of Blame." *Psychological Inquiry* 25: 147-186.

Malle, Bertram F., and Joshua Knobe. 1997. "The Folk Concept of Intentionality." *Journal of Experimental Social Psychology* 33: 101-121.

Martin, Justin, and Fiery Cushman. 2015. "To Punish or to Leave: Distinct Cognitive Processes Underlie Partner Control and Partner Choice Behaviors." *PLoS One* 10: e0125193.

Molho, Catherine, Joshua M. Tybur, Ezgi Güler, Daniel Balliet, and Wilhelm Hofmann. "Disgust and Anger Relate to Different Aggressive Responses to Moral Violations." *Psychological Science* 28: 609-619.

Nabi, Robin L. 2002. "The Theoretical versus the Lay Meaning of Disgust: Implications for Emotion Research." *Cognition and Emotion* 16: 695-703.

Nichols, Shaun. 2002. "Norms with Feeling: Towards a Psychological Account of Moral Judgment." *Cognition* 84: 221-236.

Oaten, Megan, Richard J. Stevenson, and Trevor I. Case. 2009. "Disgust as a Disease-Avoidance Mechanism." *Psychological Bulletin* 135: 303-321.

Olatunji, Bunmi O., Nathan L. Williams, David F. Tolin, Jonathan S. Abramowitz, Craig N. Sawchuk, Jeffrey M. Lohr, and Lisa S. Elwood. 2007. "The Disgust Scale: Item Analysis, Factor Structure, and Suggestions for Refinement." *Psychological Assessment* 19: 281-297.

Piazza, Jared and Justin F. Landy. 2017. “Anger, but Not Disgust, is Seen as Inextricably Linked to Moral Condemnation.” Lancaster University.

Piazza, Jared, Pascale S. Russell, and Paulo Sousa. 2013. “Moral Emotions and the Envisioning of Mitigating Circumstances for Wrongdoing.” *Cognition and Emotion* 27: 707-722.

Pizarro, David, Yoel Inbar, and Chelsea Helion. 2011. “On Disgust and Moral Judgment.” *Emotion Review* 3: 267-268.

Prinz, Jesse J. 2007. *The Emotional Construction of Morals.* Oxford: Oxford University Press.

Reeder, Glenn D. 2009. “Mindreading: Judgments About Intentionality and Motives in Dispositional Inference.” *Psychological Inquiry* 20: 1-18.

Rogers, Timothy T, and James L. McClelland. 2004. *Semantic Cognition: A Parallel Distributed Processing Approach*. Cambridge: MIT Press.

Rottman, Joshua, Deborah Kelemen, and Liane Young. 2014. “Tainting the Soul: Purity Concerns Predict Moral Judgments of Suicide.” *Cognition* 130: 217-226.

Rottman, Joshua, Liane Young, and Deborah Kelemen. In press. “The Impact of Testimony on Children’s Moralization of Novel Actions.” *Emotion*.

Rosch, Eleanor, and Carolyn B. Mervis. 1975. “Family Resemblances: Studies in the Internal Structure of Categories.” *Cognitive Psychology* 7: 573-605.

Royzman, Edward B., Pavel Atanasov, Justin F. Landy, Amanda Parks, and Andrew Gepty. 2014. “CAD or MAD? Anger (Not Disgust) as the Predominant Response to Pathogen-Free Violations of the Divinity Code.” *Emotion* 14: 892-907.

Royzman, Edward B., Geoffrey P. Goodwin, and Robert F. Leeman. 2011. "When Sentimental Rules Collide: 'Norms with Feelings' in the Dilemmatic Context." *Cognition* 121: 101-114.

Royzman, Edward B., Kwanwoo Kim, and Robert F. Leeman. 2015. "The Curious Tale of Julie and Mark: Unraveling the Moral Dumbfounding Effect." *Judgment and Decision Making* 10: 296-313.

Royzman, Edward B., and Robert Kurzban. 2011a. "Facial Movements Are Not Goosebumps: A Response to Chapman and Anderson." *Emotion Review* 3: 274-275.

Royzman, Edward B., and Robert Kurzban. 2011b. "Minding the Metaphor: The Elusive Character of Moral Disgust." *Emotion Review* 3: 269-271.

Royzman, Edward B., Justin F. Landy, and Geoffrey P. Goodwin. 2014. "Are Good Reasoners More Incest-Friendly? Trait Cognitive Reflection Predicts Selective Moralization in a Sample of American Adults." *Judgment and Decision Making* 9: 176-190.

Royzman, Edward B., Robert F. Leeman, and Jonathan Baron. 2009. "Unsentimental Ethics: Towards a Content-Specific Account of the Moral-Conventional Distinction." *Cognition* 112: 159-174.

Royzman, Edward B., Robert F. Leeman, and John Sabini. 2008. "'You make me sick': Moral Dyspepsia as a Reaction to Third-Party Sibling Incest." *Motivation and Emotion* 32: 100-108.

Rozin, Paul, and April E. Fallon. 1987. "A Perspective on Disgust." *Psychological Review* 94: 23-41.

Rozin, Paul, Jonathan Haidt, and Clark R. McCauley. 2008. "Disgust." In *Handbook of Emotions, 3rd Edition*, edited by Michael Lewis, Jeanette Haviland, and Lisa Feldman Barrett, 757-776. New York: Guilford Press.

Rozin, Paul, Laura Lowery, Sumio Imada, and Jonathan Haidt. 1999. "The CAD Triad Hypothesis: A Mapping Between Three Moral Emotions (Contempt, Anger, Disgust) and Three Moral Codes (Community, Autonomy, Divinity)." *Journal of Personality and Social Psychology* 76: 574-586.

Russell, Pascale S., and Roger Giner-Sorolla. 2011a. "Moral Anger, but Not Moral Disgust, Responds to Intentionality." *Emotion* 11: 233-240.

Russell, Pascale S., and Roger Giner-Sorolla. 2011b. "Moral Anger Is More Flexible Than Moral Disgust." *Social Psychological and Personality Science* 2: 360-364.

Russell, Pascale S., and Roger Giner-Sorolla. 2013. "Bodily Moral Disgust: What It Is, How It Is Different from Anger, and Why It Is an Unreasoned Emotion." *Psychological Bulletin* 139: 328-351.

Russell, Pascale S., and Jared Piazza. 2015. "Consenting to Counter-Normative Sexual Acts: Differential Effects of Consent on Anger and Disgust as a Function of Transgressor or Consenter." *Cognition and Emotion* 29: 634-653.

Russell, Pascale S., Jared Piazza, and Roger Giner-Sorolla. 2013. "CAD Revisited: Effects of the Word "Moral" on the Moral Relevance of Disgust (and Other Emotions)." *Social Psychological and Personality Science* 4: 63-69.

Schein, Chelsea, Ryan S. Ritter, and Kurt Gray. 2016. “Harm Mediates the Disgust-Immorality Link.” *Emotion* 16: 862-876.

Schnall, Simon, Jonathan Haidt, Gerald L. Clore, and Alexander H. Jordan. 2008. “Disgust as Embodied Moral Judgment.” *Personality and Social Psychology Bulletin* 34: 1096-1109.

Schnall, Simon, Jonathan Haidt, Gerald L. Clore, and Alexander H. Jordan. 2015. “Landy and Goodwin (2015) Confirmed Most of Our Findings, Then Drew the Wrong Conclusions.” *Perspectives on Psychological Science* 10: 537-538.

Schwarz, Norbert, and Gerald L. Clore. 1988. “How Do I Feel about It? The Informative Function of Affective States.” In *Affect, Cognition and Social Behavior,* edited by Klaus Fiedler and Joseph Forgas, 44-62. Toronto: Hogrefe.

Shweder, Richard A., Nancy C. Much, Manamohan Mahapatra, and Lawrence Park. 1997. “The ‘Big Three’ of Morality (Autonomy, Community, and Divinity), and the ‘Big Three’ Explanations of Suffering.” In *Morality and Health,* edited by Allan M. Brandt and Paul Rozin, 119-169. New York: Routledge.

Tannenbaum, David, Eric Luis Uhlmann, and Daniel Diermeier. 2011. “Moral Signals, Public Outrage, and Immaterial Harms.” *Journal of Experimental Social Psychology* 47: 1249-1254.

Turiel, Elliot. 1983. *The Development of Social Knowledge: Morality and Convention.* Cambridge: Cambridge University Press.

Tybur, Joshua M., Debra Lieberman, and Vladas Griskevicius. 2009. “Microbes, Mating, and Morality: Individual Differences in Three Functional Domains of Disgust.” *Journal of Personality and Social Psychology* 97: 103-122.

Tybur, Joshua M., Leslie A. Merriman, Ann E. Caldwell Hooper, Melissa M. McDonald, and Carlos David Navarette. 2010. “Extending the Behavioral Immune System to Political Psychology: Are Political Conservatism and Disgust Sensitivity Really Related?” *Evolutionary Psychology* 8: 599-616.

Wasserman, Emily A., Alek Chakroff, Rebecca Saxe, and Liane Young. 2017. “Illuminating Conceptual Structure in the Space of Moral Violations with Representational Similarity Analysis.” Boston College.

Wheatley, Thalia, and Jonathan Haidt. 2005. “Hypnotic Disgust Makes Moral Judgments More Severe.” *Psychological Science* 16: 780-784.

Widen, Sherri C., Joseph T. Pochedly, Kerrie Pieloch, and James A. Russell. 2013. “Introducing the Sick Face.” *Motivation and Emotion* 37: 550-557.

Widen, Sherri C., and James A. Russell. 2008. “Children's and Adults’ Understanding of the ‘Disgust Face’.” *Cognition and Emotion* 22: 1513-1541.

Yoder, Anne M., Sherri C. Widen, and James A. Russell. 2016. “The Word Disgust May Refer to More Than One Emotion.” *Emotion* 16: 301-308.

Young, Liane, Joan A. Camprodon, Marc Hauser, Alvaro Pascual-Leone, and Rebecca Saxe. 2010. “Disruption of the Right Temporoparietal Junction with Transcranial Magnetic

Stimulation Reduces the Role of Beliefs in Moral Judgments." *Proceedings of the National Academy of Sciences* 107: 6753-6758.

Young, Liane, Fiery Cushman, Marc Hauser, and Rebecca Saxe. 2007. "The Neural Basis of the Interaction Between Theory of Mind and Moral Judgment." *Proceedings of the National Academy of Sciences* 104: 8235-8240.

Young, Liane, and Rebecca Saxe. 2008. "The Neural Basis of Belief Encoding and Integration in Moral Judgment." *NeuroImage* 40: 1912-1920.

Young, Liane, and Rebecca Saxe. 2011. "When Ignorance Is No Excuse: Different Roles for Intent across Moral Domains." *Cognition* 120: 202-214.