Understanding the adaptive functions of morality from a cognitive psychological perspective

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Abstract

What are the possible functions of moral cognition? Addressing this question has proven difficult, leading to disagreement among moral psychologists. Researchers claiming that morality is composed of many distinct domains have posited multiple functions, whereas researchers focusing on the features that are unique to and common across all moral judgments have suggested a unified evolutionary function. In this review, we suggest that the limitations of these accounts can be overcome by systematically investigating the cognitive mechanisms that support moral judgments across descriptively distinct domains. As a case study, we focus on the contrast between harm and purity morals, and we argue for a novel functional difference on the basis of differences in the underlying psychological processes. Understanding the psychology behind distinct morals will pave the way for understanding the distinct functions of moral cognition.

Keywords

morality; function; harm; purity; cognitive processes

Disciplines

Moral/Social Psychology; Cognitive Neuroscience; Evolutionary Biology; Philosophy

Introduction

Is it not reasonable to anticipate that our understanding of the human mind would be greatly aided by knowing the purpose for which it was designed?

- George C. Williams (1966, p. 16)

What is the purpose of moral cognition? Moral psychologists have become increasingly interested in exploring the function of moral cognition (that is, how we think about moral right and wrong) using the tools of evolutionary and developmental psychology. Given the complexity of moral cognition, this has proven to be a difficult task. On the one hand, "morality" could mean many things at once – an umbrella term referring to diverse judgments of diverse behaviors, from assault to incest. Accordingly, researchers supporting this view have posited multiple distinct functions for distinct "domains" of morality. On the other hand, morality may be unified and defined by features that are unique to morality (versus other domains of cognition) or at least features that are common across descriptively different kinds of moral norms. Researchers proposing such a unified account of morality also typically propose a unified adaptive function for morality.

In this review, we discuss the strengths and limitations of these two accounts. We then highlight new research on the cognitive mechanisms supporting moral judgment and how this research constrains and informs inferences about the adaptive functions of morality. Using the contrast between harm and purity morals as a case study, we illustrate how understanding the cognitive mechanisms for moral judgments allows researchers to build novel functional accounts that capture real psychological differences.

Foundational Research

Morality is many things

Historically, morality has been thought to be a unified ethic of justice and fairness (Kohlberg, 1969, 1981; cf. Baumard, Andre, & Sperber, in press) or a related ethic of concern for people's welfare and happiness (Harris, 2010). However, views of morality as a single ethic or value have attracted many critics. These critics have argued that our moral concerns are many – providing care and prohibiting harm (Gilligan, 1982), showing respect and loyalty (Shweder, Much, Mahapatra, & Park, 1997), preserving one's purity (Appiah, 2006; Haidt & Joseph, 2007), to name a few. In order to account for these diverse descriptions of common moral concerns, Moral Foundations Theory (MFT) has posited that morality is composed of five distinct moral domains (Harm, Fairness, Loyalty, Authority, and Purity), each of which evolved in response to a specific adaptive need (Graham et al., 2013; Graham et al., 2011; Graham, Haidt, & Nosek, 2009). On this view, each moral domain is a functionally specialized mechanism, or module (Graham et al., 2013; Haidt & Joseph, 2007). For example, the Harm domain addresses the challenge of caring for vulnerable offspring, the Authority domain helps people navigate social dominance hierarchies, and the Purity domain prevents exposure to pathogens and parasites.

While MFT has broadened the scope of research in moral psychology and uncovered meaningful differences in the moral concerns endorsed within and across cultures (e.g., liberals/conservatives; Graham, Haidt, & Nosek, 2009), MFT may be limited in its empirical focus on the descriptive content of moral norms. The ways in which moral content can be carved up into different categories are numerous and possibly arbitrary. Indeed, MFT originally featured four domains, such that loyalty was covered by a combination of reciprocity and hierarchy (Haidt & Joseph, 2004). MFT in its present form accommodates five domains, featuring loyalty

as its own distinct domain (Haidt, & Joseph, 2007; Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011). More recently, theorists have tentatively proposed six domains, splitting Fairness into two separate domains: Equality and Liberty/Oppression (Graham et al., 2013). Given the sheer breadth of possible moral concerns, the number of domains could be ratcheted up to include domains concerning industriousness, modesty, and wastefulness (Graham et al., 2013; Suhler & Churchland, 2011). The number of moral domains that researchers could potentially identify seems limitless: morality may in fact be composed of hundreds or even thousands of distinct functional modules, each addressing a unique adaptive problem (Cosmides & Tooby, 1994).

The concern here is not one of parsimony – an acceptable taxonomy of morality should strive for explanatory adequacy without limiting itself for the sake of neatness. Instead, the concern is with the general approach of carving up moral cognition based on descriptive differences, that is, differences in the content of moral actions, rather than differences in the psychological mechanisms that support the processing of different actions. This concern deserves more consideration as more domains are identified. Notably, the addition of Liberty as a sixth domain was motivated by the observation of moral attitudes among Libertarians that were not easily described by the current moral domains (Iyer, Koleva, Graham, Ditto, & Haidt, 2012), rather than by novel evolutionary theorizing or novel observations of cognitive mechanism. If moral domains represent functionally distinct modules, then judgments associated with distinct domains might be expected to behave differently – they might follow different cognitive rules due to the contribution of different cognitive processes. To the extent that evidence for such differences is lacking among the five domains posited by MFT (see Key Issues for Future Research), amendments to current moral taxonomies may be needed.

Morality is one thing

Despite its diverse content, morality may nonetheless be unified by features that are unique to moral judgments and also common to moral judgments across all domains (cf. Young & Dungan, 2012). Developmental psychologists made an early attempt at distinguishing moral norms from norms of social convention (Turiel, 1983). Work on the moral-conventional distinction was aimed at identifying the features that separate conventional judgments (e.g., wearing pajamas to class is wrong) from uniquely moral judgments (e.g., murder is wrong). For instance, whereas conventional judgments are culture-specific, moral judgments might apply universally across all cultures as well as across time (e.g., murder is always wrong, no matter the place or time).

While the moral-conventional distinction has faced criticism (Kelly, Stich, Haley, Eng, & Fessler, 2007), researchers have proposed other features that may be unique to, and common across, moral judgments (DeScioli, Asao, & Kurzban, 2012; DeScioli & Kurzban, 2009; Gray, Young, & Waytz, 2012). For example, moral violations evoke stronger emotional and behavioral reactions than conventional violations (Rozin, 1997, 1999). Furthermore, when previously non-moral norms become moralized (as in the case of an omnivore who converts to vegetarianism for moral reasons), these newly moralized norms elicit a common suite of reactions such as prohibition, internalization, over-justification, and increased parent-to-child transmission (Rozin, Markwith, & Stoess, 1997).

More importantly, whereas descriptive theories of diverse moral domains offer few specific predictions about the psychological mechanisms underlying distinct domains, researchers focusing on morality as a unified concept suggest common cognitive components that cut across all moral judgments – in spite of their apparent differences. On one such account,

"moral cognition has an "insert here" parameter, processing diverse moral rules with the same computational architecture" (DeScioli & Kurzban, 2009, p. 3). Researchers have proposed a number of candidate components of uniquely moral cognition, such as the perception of an agent who inflicts harm on a patient (Gray, Young, & Waytz, 2012), or the integration of causal and intentional attributions (Mikhail, 2007).

If cognitive mechanisms operate similarly across descriptively different moral domains, and if these domains share a common cognitive structure that is distinct from non-moral judgments, then morality may be better understood as serving a single purpose. One possibility is that morality functions to limit selfishness and foster cooperation (Tomasello & Vaish, 2013). Similarly, morality could function as a means of navigating social alliances (Atran & Henrich, 2010; Graham, Haidt, & Nosek, 2009; Sosis & Bressler, 2003). In competitive terms, morality could function as a dynamic coordination strategy for choosing sides in interpersonal and intergroup conflict (DeScioli & Kurzban, 2009; Descioli & Kurzban, 2013). In all cases, the functional explanations are not tied down to the specific content of moral actions and instead focus on a broader adaptive problem that might be unique to morality and common across all kinds of moral judgments.

The strength of these unified accounts is their attention to the psychological mechanisms supporting moral judgment. However, unified accounts run the risk of overgeneralization (Parkinson et al., 2011). By focusing on common features across moral domains, researchers may fail to detect meaningful differences in the psychological mechanisms underlying different moral judgments.

A new approach for defining morality

We have reviewed the strengths and limitations of current taxonomies of morality. How then should moral psychologists approach the task of carving up (or not carving up) moral cognition? We suggest that moral psychologists might first identify cognitive rules that apply to moral judgment in one context and then test whether those rules apply equivalently across descriptively distinct domains. In the next section, we use the well-studied domains of harm and purity to illustrate how the cognitive processes underlying different norms dictate where psychologically meaningful boundaries exist within moral cognition.

Cutting-Edge Research

The case of harm and purity

Descriptive accounts of morality provide clear evidence that people moralize not simply concerns of harm (e.g., murder is wrong) but also concerns of purity – e.g., avoiding impure objects or acts that could lead to defilement or contamination (Shweder, Much, Mahapatra, & Park, 1997). Purity morals are typically characterized as part of an adaptive disease-avoidance mechanism that has been co-opted to signal socially and morally offense behavior as well (e.g., drug abuse, sexual deviance; Chapman, Kim, Susskind, & Anderson, 2009). Purity norms may thus function to protect the body from desecration or defilement. By contrast, moral norms against harm are thought to address the evolutionary need to care for vulnerable offspring, leading us to express compassion and empathy for the suffering (Haidt & Joseph, 2007).

While this functional distinction may be intuitively appealing, empirical evidence for distinct psychological signatures of harm and purity morals has been mixed. On the one hand, researchers supporting the view that "morality is many things" suggest that harm and purity are associated with distinct emotions: typically, harm violations elicit anger, whereas purity

violations elicit disgust (Rozin, Lowery, Imada, & Haidt, 1999; Russell & Giner-Sorolla, 2013). However, researchers supporting the view that "morality is one thing" point out that feelings of anger and disgust are highly correlated and frequently co-occur (Gray, Young, & Waytz, 2012). Furthermore, observations of whether specific emotions are linked to specific moral judgments have been variable across studies. Disgust, for instance, has been shown to increase the severity of purity-related judgments specifically (Seidel & Prinz, 2013), moral judgment more generally (Zhong & Liljenquist, 2006), and even judgments of non-moral actions (e.g., giving a class presentation; Wheatley & Haidt, 2005).

Some researchers have argued that purity violations do not belong to a separate domain; instead, they can be construed as a form of harm (Gray, Young, & Waytz, 2012). If harm and purity morals do not form distinct domains, then we might expect similar psychological processing underlying harm and purity morals. Yet, new studies reveal important differences. For example, while anger, elicited by harmful actions, is modulated by contextual factors, including whether or not the violation was committed intentionally or accidentally, disgust, elicited by purity violations, is insensitive to factors such as intent – disgust is elicited simply if purity rules have been broken, regardless of the circumstances (Russell & Giner-Sorolla, 2011; Russell & Giner-Sorolla, 2010). Furthermore, participants perceive a greater moral difference between intentional and accidental harms, compared to the difference between intentional and accidental purity violations (Young & Saxe, 2011).

The behavioral difference in people's moral judgments of harm and purity violations is supported by recent neural evidence. Brain regions involved in reasoning about mental states (e.g., beliefs, intentions) are more active when participants judge harmful compared to impure actions (Young, Chakroff, Dungan, Koster-Hale, & Saxe, in prep). Additionally, information

about intent is encoded in the spatial pattern of neural activity in brain regions for mental state reasoning when participants consider harm violations but not purity violations. The evidence thus reveals important differences in the cognitive mechanisms for harm and purity judgments.

Distinct functions for self versus other

How can the pattern of cognitive differences observed above inform our functional accounts of harm versus purity norms? One explanation is that harm norms function to limit our negative impact on others. Harm norms appear to operate primarily in interpersonal contexts, where one person's harmful actions affect another. Recent work suggests that the presence of at least two parties – a violator who acts on a victim – is necessary to establish an act as harmful in the first place (DeScioli & Kurzban, 2009; Gray & Wegner, 2011). If harm norms dictate how we ought (and ought not) to treat each other, information about intent would be expected to play a significant role: we need to know what others are thinking to evaluate their actions and to understand their intentions towards us.

Conversely, purity norms may function to limit our negative impact on ourselves. We may pay particular attention to preserving the purity of our own bodies (Russell & Giner-Sorolla, 2013). Indeed, we may be concerned with the impurities of other people only to the extent that they are perceived as a possible threat to our own purity (Rozin et al., 2000). Impure actions are therefore prohibited even when no one, except for possibly one's own self, is rendered a "victim" (Haidt, Koller, & Dias, 1993). If purity norms function to protect our own selves from possible contamination, we may care less about our own intent, i.e., whether we acted accidentally or intentionally in defiling ourselves. As Appiah (2006) states in an account of Akran society in Ghana: "With taboo breaking… it doesn't matter what you meant to do. You're polluted. You

need to get clean" (p. 51). In other words, since purity violations affect the self, we care mostly about avoiding the outcome or else making sure we "get clean" afterwards.

Thus, our key prediction is that purity norms function to protect one's self, whereas harm norms function to protect others. Two recent lines of investigation in our lab support this prediction. First, regardless of whether the content of actions was harmful or impure, participants judged self-directed actions (e.g. cutting or splashing urine on yourself) as impure and other-directed actions (e.g. cutting or splashing urine on someone else) as harmful. Importantly, the perceived moral difference between intentional versus accidental violations was also smaller for self-directed actions, compared to other-directed actions, consistent with the differential role of intent across moral domains (Chakroff, Dungan, & Young, submitted).

Second, although moral judgments of negative actions directed at others versus one's self show the cognitive signatures of moral judgments of harm versus purity violations, respectively, an outstanding question is whether participants are especially averse to impure outcomes that affect themselves and harmful outcomes that affect others. Consistent with this prediction, participants judged harmful actions as morally worse (and less preferred) than impure actions when directed at others; however, the opposite pattern emerged when participants judged actions directed at themselves - impure actions were judged as morally worse (and less preferred; Dungan, Chakroff, & Young, submitted). Thus, purity norms are tied specifically to concerns about defiling one's self, whereas harm norms are tied to concerns about harming others.

Beyond self versus other

A potential limitation of the proposed functional distinction between norms governing how we treat our selves and norms governing how we treat others is that we have focused only

on judgments of interactions between individuals when much of morality occurs at the level of groups. Purity morals may not only govern how people treat their own bodies but also more generally define proper behavior within a group, as well as boundaries between groups (cf. Atran & Henrich, 2010; Sosis & Bressler, 2003). As such, close adherence to purity norms may be a strong signal of group membership. We argue though that purity morals operating at the group level may nonetheless function to protect the self for two reasons: 1) purity violations undermine the cohesion of the social group, making each individual potentially vulnerable to threat, and 2) purity violations committed by other group members may contaminate one's self either by association with the group, or directly through physical contagion (cf. van Leeuwen, Park, Koenig, & Graham, 2012).

A unique prediction follows from this account. While studies in social psychology routinely demonstrate a robust ingroup bias whereby people judge their own group's violations as less wrong than the same violations committed by an outgroup member (Valdesolo & DeSteno, 2007), this account predicts that people should be harsher on purity violations occurring within versus outside of their own group – again, because of the potential threat of impurity for the self. To test this prediction, we presented participants with vignettes (adapted from Leidner & Castano, 2012) depicting ingroup and outgroup members committing harm and purity violations (Dungan, Chakroff, & Young, submitted). Consistent with our prediction, participants displayed the typical ingroup bias for harm violations, judging outgroup harms as worse than ingroup harms; however, the opposite pattern emerged for purity violations – purity violations committed by ingroup members were judged as morally worse than the same purity violations committed by outgroup members. In an extension of our previous findings, these

results suggest that some morals function for protecting the group and the self, whereas other morals may be focused more on how our actions affect others, across group boundaries.

Key Issues for Future Research

A new taxonomy for all moral judgment

While we have focused on the distinction between harm and purity, a primary question for future research is whether the functional distinction between morals that protect the self and morals that protect others applies to other moral norms described by MFT and other theories, including loyalty, hierarchy, and fairness. Although empirical work on the cognitive components of loyalty, hierarchy, and fairness judgments is sparse, several studies indicate a possible cognitive boundary between "individualizing" norms such as harm and fairness, and "binding norms" such as purity, loyalty, and hierarchy (Graham, Haidt, & Nosek, 2009). For example, while harmful omissions are generally judged less harshly than harmful commissions (e.g., it is worse to kill than to fail to rescue), this omission bias is reduced when the violator and victim are bound by a close relationship, necessitating loyalty, or a hierarchical relationship (e.g., the violator and victim are boss and employee; Haidt & Baron, 1996). Similarly, omission bias is enhanced for individualizing violations compared to purity violations (DeScioli, Asao, & Kurzban, 2012; DeScioli, Christner, & Kurzban, 2011). These findings fit nicely with the observations above on the differential role of intent – revealing an overall emphasis on outcomes when considering binding norms compared to individualizing norms.

Other research on the cognitive and neural processes supporting different moral judgments corroborates the difference between individualizing and binding norms. Judgments of individualizing and binding norms are differentially affected by abstract versus concrete thinking

(Napier & Luguri, 2013) as well as cognitive load (Wright & Baril, 2011). Endorsement of these norms is also associated with volumetric differences in specific brain regions (Lewis et al., 2012). Finally, while psychopathy is marked by a willingness to violate individualizing norms of harm and fairness, endorsement of binding norms is relatively preserved (Glenn, Iyer, Graham, Koleva, & Haidt, 2009). Notably, these findings do not reveal differences among all five domains of morality – suggesting that a two-factor model may better capture psychological differences in moral cognition (Dungan & Young, 2012; cf. the exploratory factor analysis in Graham et al., 2011). These lines of research reveal empirical approaches for testing whether descriptively different moral domains are psychologically distinct and important avenues for building taxonomies of moral psychology.

Motivation and behavior

Uncovering the functional differences within moral cognition might also illuminate the situational factors that influence judgments across domains. In a recent example, we described two people – one loyal person and one fair person – and asked participants which person they would rather befriend and which person they deemed more moral (Dungan, Waytz, & Young, in prep). Overall, participants reported a preference for loyal (versus fair) friends but endorsed fairness (over loyalty) as an abstract moral virtue. Future research should investigate how different motivations, such as the need for social inclusion versus the need to feel moral (moral self-concept), influence judgments across moral domains.

Another key aim for moral psychologists will be to connect theories describing the adaptive functions of morality to actual behavior, both within and beyond the laboratory. For instance, if some moral norms function to protect the self, while other moral norms function to

protect others, we might expect a tension between competing moral demands (cf. Cohen, Montoya, & Insko, 2006). This tension has behavioral implications, as in the case of whistleblowing. One hypothesis is that the valuation of fairness over loyalty predicts decisions to report unethical deeds; emphasizing one value over another may consequently shift attitudes toward whistleblowing (Waytz, Dungan, & Young, submitted).

Normative implications

Understanding moral norms from a cognitive psychological perspective may even, in some sense, constrain claims as to what morality is or ought to be. If moral norms ought to apply equally to everyone, regardless of culture or standing in society, then moral norms, such as purity, which govern self-interest or ingroup-interest, may be less legitimately moral than norms governing interpersonal interactions across group boundaries, such as harm (Bloom, 2011). Furthermore, if moral judgments of an agent should be based at least in part on the agent's mental states (e.g., whether the agent intended to do wrong or not), then our reactions to purity violations might be less legitimately moral, to the extent that they are largely insensitive to intent information and driven instead by the inflexible emotion of disgust, (Russell & Giner-Sorolla, 2013). Illuminating the cognitive mechanisms underlying different moral norms may indeed constrain key normative and meta-ethical claims.

Conclusion

Morality is complex. Researchers have disagreed over the function or functions of morality. Moving forward, moral psychologists would do well to focus their empirical efforts on the underlying cognitive processes for moral judgment to identify which descriptive differences

are psychologically meaningful. Understanding these psychological differences will pave the way for understanding the key functions of moral cognition.

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Biographies

James Dungan received his undergraduate degree in Brain and Cognitive Sciences from the Massachusetts Institute of Technology and is now a graduate student in the Boston College Psychology Department. He is a member of the Morality Lab, under the direction of Liane Young. His research investigates the cognitive and neural processes underlying moral judgment using methods from social psychology and cognitive neuroscience. He is supported by the National Science Foundation Graduate Research Fellowship.

Liane Young is an assistant professor in the Department of Psychology at Boston College, where she directs the Morality Lab. Her research focuses on the cognitive and neural bases of human moral judgment, including the roles of mental state reasoning and emotional processing. Her research relies on the tools of social psychology and cognitive neuroscience, including functional magnetic resonance imaging, transcranial magnetic stimulation, and the study of patients with cognitive and neural deficits. Young received her BA in philosophy (2004) and her PhD in cognitive psychology (2008) from Harvard University, after which she did post-doctoral work in Cognitive Neuroscience at MIT's Brain and Cognitive Sciences Department.

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