Moral-Dilemma Judgments

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The current chapter provides an overview of research on responses in moral dilemmas where maximization of outcomes for the greater good (*utilitarianism*) conflicts with adherence to moral norms (*deontology*). Expanding on a description of the traditional paradigm to study moral-dilemma judgments (i.e., the trolley problem), the chapter reviews the most prominent dual-process account of moral-dilemma judgments, normative conclusions that have been derived from this account, and criticisms raised against this line of work. The following sections review advances in the development of alternative approaches that aim to address shortcomings of the traditional dilemma paradigm as well as the implications of this work for psychological theories of moral-dilemma judgments and philosophical inferences about the normative implications of moral-dilemma research. The chapter concludes with a review of research on the links between moral-dilemma judgments and social impressions.

Keywords: deontology; dual-process theory; moral dilemmas; moral judgment; trolley problem; utilitarianism

Introduction

Although moral dilemmas have been a prominent tool in psychological research since Kohlberg's (1971) work on moral development, modern research on moral-dilemma judgments has focused predominantly on a particular class of dilemmas in which choices maximizing the greater good (a.k.a. utilitarianism or outcome-based morality) conflict with choices adhering to moral norms (a.k.a. deontology or rule-based morality). Over the past two decades, a large body of research in various areas of psychology has investigated contextual conditions that influence preference for utilitarian versus deontological judgments, the psychological processes underlying utilitarian and deontological judgments, neural correlates of utilitarian and deontological judgments, and individual-difference factors that are associated with preference for utilitarian versus deontological judgments. The current chapter provides an overview of significant methodological, empirical, and theoretical contributions in this line of work.

Traditional Dilemma Paradigm

Research on moral-dilemma judgments has been strongly shaped by the trolley problem, in which a runaway trolley is said to approach a group of five people who would be killed by the trolley if it continues on its path. In a variant called the *switch dilemma*, participants are told that pulling a lever would redirect the trolley to a different track where it would kill only one person instead of five (Foot, 1967). In a variant called the *footbridge dilemma*, participants are told that the trolley could be stopped by pushing a man from a bridge in front of the trolley, which would kill the man but save the five

people on the track (Thomson, 1970). Judgments supporting these actions have been described as *characteristically utilitarian* in the sense that they maximize well-being for the larger number of people (i.e., kill one to save five; see Conway et al., 2018). In contrast, judgments opposing these actions have been described as *characteristically deontological* in the sense that they conform to a relevant moral norm (i.e., do not kill; see Conway et al., 2018). Although the trolley problem is by far the most frequently used scenario in this line of work, researchers have created a variety of structurally similar scenarios for empirical investigations of moral-dilemma judgments (e.g., Christensen et al., 2014).

The traditional dilemma paradigm has been used in many studies to investigate contextual influences, individual-difference correlates, and biological determinants of moral-dilemma judgments. Examples of contextual influences that have been investigated in moral-dilemma research include incidental mood states (e.g., Valdesolo & DeSteno, 2006), uncertainty about outcomes (e.g., Kortenkamp & Moore, 2014), and use of a foreign language (e.g., Geipel et al., 2015); examples of individual-difference variables that have been investigated in moral-dilemma research include the propensity to engage in cognitive reflection (e.g., Patil et al., 2021), antisocial traits (e.g., Bartels & Pizarro, 2011), and political orientations (e.g., Hannikainen et al., 2017); examples of biological determinants that have been investigated in moral-dilemma research include hormone levels (e.g., Carney & Mason, 2010), brain activity (e.g., Koenigs et al., 2007), and genetic factors (e.g., Bernhard et al., 2016). Much past research has assessed correlates of and influences on moral judgments (i.e., *is it acceptable to do X?*) and moral decisions (i.e.,

would you do X?), with extant work suggesting that different psychological processes may underlie these distinct forms of moral-dilemma responses (e.g., Pletti et al., 2013; Tassy et al., 2013). Some studies have used hypothetical judgments in the traditional dilemma paradigm to predict actual moral behavior, but available evidence in this line of work is rather mixed and inconclusive about associations between hypothetical moral-dilemma judgments and actual moral behavior (e.g., Bostyn et al., 2018; Capraro et al., 2018; Dickinson & Masclet, 2019).

Dual-Process Model

Among the theories that have been proposed to explain moral-dilemma judgments (e.g., Cohen & Ahn, 2016; Cushman, 2013; Greene, 2008, 2014; Holyoak & Powell, 2016), the most prominent account is Greene's (2008, 2014) dual-process model (DPM). According to the DPM, utilitarian and deontological judgments are rooted in distinct psychological processes. Whereas utilitarian judgments are assumed to be the product of controlled cognitive analyses of costs and benefits, deontological judgments are assumed to be rooted in automatic emotional reactions to the idea of causing harm. Consistent with these ideas, participants have been found to show a lower preference for utilitarian over deontological judgments in the footbridge dilemma than in the switch dilemma, presumably because direct physical contact with the target in the footbridge dilemma involves a stronger emotional reaction to the idea of causing harm (Greene, 2008). Moreover, some studies found that factors undermining cognitive reflection (e.g., time pressure, cognitive load) interfere with utilitarian judgments, presumably because utilitarian judgments require greater cognitive resources than deontological judgments (e.g., Greene et al., 2008; Suter & Hertwig, 2011). Another frequently cited finding is that utilitarian and deontological judgments seem to have distinct neural underpinnings, in that utilitarian judgments are associated with activation in brain areas claimed to signify central aspects of cognitive processing whereas deontological judgments are associated with activation in brain areas claimed to signify central components of emotional processing (e.g., Greene et al., 2001, 2004).

Expanding on the empirical work inspired by the DPM, Greene proposed the normative conclusion that utilitarian judgments are superior to deontological judgments (e.g., Greene, 2003, 2008, 2014). Greene based this claim on the argument that the emotional system supposedly underlying deontological judgments is less reliable than the cognitive system supposedly underlying utilitarian judgments, because judgments produced by the emotional system are affected by morally irrelevant factors (e.g., whether a focal action does or does not involve direct physical contact). For

example, in the switch and footbridge versions of the trolley problem, the number of lives lost and the number saved are identical across the two dilemmas (i.e., one vs. five). Yet, people are less inclined to endorse the utilitarian option in the footbridge dilemma than in the switch dilemma, presumably because direct physical contact with the target in the footbridge dilemma elicits a stronger emotional reaction, which in turn interferes with what might be called the "rational" choice. According to Greene, the cognitive system underlying utilitarian judgments is immune to such morally irrelevant influences, which makes utilitarian judgments normatively superior to deontological judgments.

Although the DPM is still the most prominent account of moral-dilemma judgments, the theory has also been the target of criticism. One critique is that the available evidence is much less consistent than suggested by selective citation patterns in the literature. For example, while some studies found that manipulations to disrupt cognitive reflection reduced utilitarian judgments (e.g., Suter & Hertwig, 2011), such manipulations did not influence moral-dilemma judgments in several other studies (e.g., Greene et al., 2008; Gürçay & Baron, 2017; Tinghög et al., 2016) and some studies even found the opposite effect (e.g., Hashimoto et al., 2022). The frequently cited evidence for distinct neural underpinnings seems similarly ambiguous. Aside from the issue that inferences of mental processes from neural activation involve the fallacy of reverse inference (Beer, 2015; Poldrack, 2006), the evidence itself is not as clean as it is commonly assumed, because utilitarian judgments in these studies were also associated with areas claimed to signify emotional processing and deontological judgments were also associated with areas claimed to signify cognitive processing (see Dale, 2020). These issues pose a challenge not only for the DPM; they also raise questions about Greene's (2003, 2008, 2014) normative arguments about the superiority of utilitarian judgments, because these arguments presuppose that the theoretical claims of the DPM are valid.

Methodological Problems

In addition to critiques of the DPM, concerns have been raised about several methodological problems of the trolley problem and the traditional dilemma paradigm more broadly. One critique is that the trolley problem and many other traditional dilemmas are highly unrealistic and that many of the scenarios cause amusement among participants rather than moral concern. The former issue seems problematic, because low plausibility has been found to influence moral-dilemma judgments in a manner that can produce empirical artifacts (Körner et al., 2019). The latter issue also seems problematic, because amusement is a rather unlikely response to moral situations, which raises

questions about the suitability of such scenarios for understanding moral judgments (Bauman et al., 2014).

Although these concerns can be addressed by using realistic dilemmas based on real-world events (Körner & Deutsch, 2023), the traditional dilemma paradigm has also been criticized for including two confounds that render empirical findings theoretically ambiguous. One confound involves the non-independent measurement of utilitarian and deontological judgments, in that endorsement of the utilitarian option necessarily requires rejection of the deontological option, and vice versa (Conway & Gawronski, 2013). Thus, for any given finding, it remains unclear whether it is driven by differences in the tendency to make a utilitarian judgment, differences in the tendency to make a deontological judgment, or differences in both. An illustrative example is the finding that participants who score high on measures of psychopathy show a greater preference for utilitarian over deontological judgments than participants who score low on measures of psychopathy (for a meta-analysis, see Marshall et al., 2018). Arguably, it seems rather implausible that individuals high in psychopathy are concerned about maximizing well-being for the greater good (Bartels & Pizarro, 2011; Kahane et al., 2015). Instead, it seems much more likely that individuals high in psychopathy do not object to causing harm (Conway et al., 2018). Yet, in the traditional dilemma paradigm, it is impossible to distinguish between the two alternatives.

A second confound present in the traditional dilemma paradigm is that the utilitarian option typically involves action, whereas the deontological option typically involves inaction (Crone & Laham, 2017). Thus, for any given finding, it remains unclear whether it reflects differences in moral preferences, differences in general action preferences, or differences in both. This issue becomes especially important considering research on the omission bias, which reflects the tendency to perceive harm caused via action as more severe than the same harm caused via inaction (e.g., killing a person is perceived as more severe than letting the person die; see Cushman et al., 2006; Spranca et al., 1991; for a meta-analysis, see Yeung et al., 2022). Such asymmetric perceptions of harm can lead to a general preference for inaction over action, in that someone may support inaction regardless of whether a proscriptive norm suggests inaction or a prescriptive norm suggests action (Janoff-Bulman et al., 2009) and regardless of whether overall well-being would be maximized by action or inaction.

Alternative Approaches

To resolve the non-independent measurement of utilitarian and deontological tendencies, Conway and Gawronski (2013) adopted a process-dissociation (PD) approach (see Jacoby, 1991) to independently quantify the strength of utilitarian and deontological tendencies in responses to moral dilemmas. To this end, Conway and Gawronski's (2013) PD model compares responses across two moral-dilemma versions. In one version, utilitarian and deontological judgments are pit against each other, such that utilitarianism supports action and deontology supports inaction (i.e., incongruent dilemmas). In the other version, the scenarios are designed such that utilitarianism and deontology both support inaction (i.e., congruent dilemmas). By applying PD analyses to judgments on congruent and incongruent dilemmas, one can independently quantify the strength of utilitarian and deontological tendencies in responses to moral dilemmas. Although some studies using this approach obtained results that are consistent with predictions of the DPM, others produced findings that are difficult to reconcile with the DPM. For example, consistent with predictions of the DPM, Conway and Gawronski (2013) found that (1) cognitive load reduced utilitarian tendencies without affecting deontological tendencies and (2) enhanced salience of harm increased deontological tendencies without affecting utilitarian tendencies. However, inconsistent with predictions of the DPM, other studies found that both utilitarian and deontological tendencies are positively associated with cognitive reflection (e.g., Byrd & Conway, 2019); yet other studies found that, among religious participants, time pressure reduced deontological tendencies without affecting utilitarian tendencies (McPhetres et al., 2018). The latter set of findings is difficult to reconcile with the DPM-hypotheses that utilitarian judgments are the product of controlled cognitive analyses of costs and benefits, whereas deontological judgments are rooted in automatic emotional reactions to the idea of causing harm.

Expanding on Conway and Gawronski's (2013) PD model, Gawronski et al. (2017) proposed an extended multinomial processing tree (MPT) model (see Hütter & Klauer, 2016) that additionally resolves the action-inaction confound in the traditional dilemma paradigm. To this end, the model compares responses across four types of moral dilemmas that differ in terms of whether (1) the focal action is proscribed by a proscriptive norm or prescribed by a prescriptive norm and (2) the benefits of the focal action for the greater good are either greater or smaller than the costs (see Gawronski & Beer, 2017). A model parameter labeled C captures sensitivity to consequences in responses to the four types of dilemmas, involving support for action when the benefits of action are greater than the costs and support for inaction when the benefits of action are smaller than the costs (see first row in Figure 1). A model parameter labeled N captures sensitivity to moral norms in responses to the four types of dilemmas, involving support for inaction when a proscriptive norm prohibits action and support for action when a prescriptive norm prescribes action (see second

row in Figure 1). Finally, a model parameter labeled *I* captures general preference for inaction versus action in responses to the four types of dilemmas, involving support for inaction (vs. action) regardless of cost-benefit ratios and moral norms (see third and fourth row in Figure 1). Based on the labels of the three parameters, the model is called the CNI model of moral-dilemma judgment.

The value of the CNI model in providing deeper insights into the determinants of moral-dilemma judgments can be illustrated with the abovementioned finding that participants who score high on measures of psychopathy show a greater preference for utilitarian over deontological judgments in the traditional dilemma paradigm as compared to those who score low on measures of psychopathy (for a meta-analysis, see Marshall et al., 2018). Research using the CNI model found that the relation between psychopathy and moral-dilemma judgments is much more complex, in that individuals high (vs. low) in psychopathy show (1) weaker sensitivity to consequences, (2) weaker sensitivity to moral norms, and (3) weaker general preference for inaction versus action (e.g., Gawronski et al., 2017; Körner et al., 2020; Luke & Gawronski, 2021a). Arguably, the most interesting aspect of these findings is the negative association between psychopathy and sensitivity to consequences, which suggests that individuals high in psychopathy are *less* utilitarian than individuals low in psychopathy. This finding stands in contrast to the conclusion suggested by research using the traditional dilemma paradigm that individuals high in psychopathy are *more* utilitarian than individuals low in psychopathy (see Bartels & Pizarro, 2011; Kahane et al., 2015; Marshall et al., 2018). Because it is not possible to disentangle the three determinants of moral-dilemma judgments in the traditional dilemma paradigm, it can lead to inaccurate conclusions, like the one about psychopathy being positively related to utilitarianism.

Research using the CNI model has provided nuanced insights for a wide range of questions in moral-dilemma research, including the effects of incidental emotional states (Gawronski et al., 2018), foreign-language use (Białek et al., 2019), uncertainty about outcomes (Ng et al., 2023), antisocial traits (Luke et al., 2022), political orientation (Luke & Gawronski, 2021b), and hormone levels (Brannon et al., 2019). There is also evidence suggesting that the parameters of the CNI model can be used to predict moral behavior (Ng et al., 2022). At the theoretical level, several findings obtained with the CNI model pose a challenge to the DPM and, by extension, Greene's (2008, 2014) normative arguments about the superiority of utilitarianism to deontology (Dale & Gawronski, 2023). For example, counter to the DPM-hypothesis that utilitarian judgments are the product of controlled cognitive analyses of costs and benefits, two studies by Gawronski et al. (2017) found that cognitive load increased general preference for inaction versus action without affecting sensitivity to consequences and sensitivity to moral norms. A potential interpretation of this finding is that people prefer inaction when they feel that they do not have the cognitive capacity to make a well-informed decision, because harm caused via inaction is perceived as less severe than harm caused via action (see Yeung et al., 2022). Although this interpretation accounts for the findings obtained with the CNI model, it is rather different from the hypothesis that cognitive analyses of costs and benefits require cognitive resources. If the latter hypothesis were correct, cognitive load should reduce sensitivity to consequences, which does not seem to be the case.

Another example pertains to the effect of personal involvement which, according to the DPM, should increase deontological judgments via enhanced automatic emotional reactions to the idea of causing harm. Yet, research using the CNI model suggests a more complex pattern of effects, in that personal involvement reduced sensitivity to moral norms on the model's *N* parameter and, at the same time, increased general preference for inaction versus action on the model's *I* parameter (Gawronski et al., 2017; Körner et al., 2020). Although the latter finding can be reconciled with the DPM by assuming that general preference for inaction can reflect general aversion to causing harm (Baron & Goodwin, 2020), the DPM is unable to explain why personal involvement should reduce sensitivity to moral norms, which arguably reflects a pattern of deontological responding. Together, these findings pose a challenge to the DPM and, by extension, the normative arguments that have been made based on the DPM. If the validity of the DPM as a theory of moral-dilemma judgments is in doubt, so are the normative conclusions derived from the DPM (Dale & Gawronski, 2023).

Social Impressions

Based on research indicating that morality is a central dimension of social impressions (Brambilla et al., 2021), a recent line of work has investigated how moral impressions of others are shaped by their responses in moral dilemmas. A well-replicated finding in this work is that people who make deontological judgments in the traditional dilemma paradigm are perceived as having stronger moral character than people who make utilitarian judgments (e.g., Everett et al., 2016; Rom et al., 2017). Drawing on the distinction between warmth and competence in social impressions (see Abele et al., 2021; Koch et al., 2021), some studies further suggest that people who make deontological judgments in the traditional dilemma paradigm are perceived as warmer than people who make utilitarian judgments, while people who make utilitarian judgments are perceived as

more competent than people who make deontological judgments (Rom et al., 2017).

Expanding on work relying on the traditional dilemma paradigm to study social impressions, research using the CNI model suggests that the link between deontological judgments and perceived morality is driven by sensitivity to moral norms, in that perceived morality is associated with greater presumed adherence to moral norms in the resolution of moral dilemmas (Gawronski, 2022). Associations with sensitivity to consequences and general action tendencies seem to be less reliable and driven by factors that tend to be confounded with perceived morality (e.g., perceived social influence). Together, the findings on social impressions suggest that people's naïve intuitions about morality do not align with Greene's (2003, 2008, 2014) normative arguments about the superiority of utilitarianism. Instead, people seem to regard those whose responses conform to deontological ideas when resolving moral dilemmas as morally superior, potentially because those who adhere to moral norms are perceived as more predictable (Turpin et al., 2021) and trustworthy (Sacco et al., 2017). Another interesting implication of the findings on moral perception is that people might use mental simulations of the presumed choices by moral paragons to guide their own decisions—a potential mechanism underlying moral-dilemma judgments that has hitherto been ignored (see Gawronski, 2022).

Outlook

Findings obtained with advanced approaches such as the CNI model (Gawronski et al., 2017) pose a challenge to the DPM (Greene, 2007) as the most influential account of moral-dilemma judgments. However, because these advanced approaches only quantify patterns of responses without specifying their underlying mental processes (Dale & Gawronski, 2023), a dismissal of the DPM raises the question of what mechanisms underlie moral-dilemma judgments. At this point, there is no straightforward answer to this question. Although some of the less influential theories might be able to fill this explanatory gap (e.g., Holyoak & Powell, 2016), there has been no attempt to systematically link these theories to the evidence obtained with advanced approaches (to gauge their explanatory power) and to derive novel predictions that could be tested with these approaches (to gauge their predictive power). We deem these endeavors as the most important tasks for the next phase of research on moral-dilemma judgments.

Another interesting direction for future research involves applications of PD and MPT modeling to other moral trade-offs. According to Moral Foundations Theory (Graham et al., 2013), moral-dilemma research is primarily concerned with trade-offs involving care and harm, providing little information about trade-offs in other domains of morality such as fairness, loyalty, authority, and purity. Although some researchers have rejected the idea of "harmless wrongs", arguing that harm is an essential aspect of morality (Schein & Gray, 2018), it would be possible to create trade-off scenarios involving other moral foundations and utilize advanced approaches such as PD and MPT modeling to quantify different factors underlying moral judgments in these scenarios. Yet, when pursuing ideas along these lines, researchers should be aware that consensus about moral norms tends to be much smaller in domains that do not involve care and harm (Graham et al., 2009), which makes it inherently difficult to develop construct-valid manipulations of moral norms for applications of PD and MPT modeling. Thus, while it would be interesting to extend the use of PD and MPT modeling to trade-offs involving moral foundations other than care and harm, such applications need to be thoroughly validated before interpreting findings involving contextual influences, individual-difference correlates, and biological determinants of moral judgments.

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Figure 1. CNI model of moral decision-making predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms, and consequences wherein the benefits of action are either greater or smaller than the costs of action. Reproduced from Gawronski et al. (2017). Reprinted with permission from the American Psychological Association.