CHAPTER

The effect of analytic and experiential modes of thought on moral judgment

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Abstract

According to dual-process theories, moral judgments are the result of two competing processes: a fast, automatic, affect-driven process and a slow, deliberative, reason-based process. Accordingly, these models make clear and testable predictions about the influence of each system. Although a small number of studies have attempted to examine each process independently in the context of moral judgment, no study has yet tried to experimentally manipulate both processes within a single study. In this chapter, a well-established "mode-of-thought" priming technique was used to place participants in either an experiential/emotional or analytic mode while completing a task in which participants provide judgments about a series of moral dilemmas. We predicted that individuals primed analytically would make more utilitarian responses than control participants, while emotional priming would lead to less utilitarian responses. Support was found for both of these predictions. Implications of these findings for dual-process theories of moral judgment will be discussed.

Keywords

moral judgment, dual-process, moral psychology, mode of thought, utilitarianism

1 INTRODUCTION

Since at least the time of the ancient Greeks, philosophers have contemplated the psychological mechanisms that underlie everyday moral judgment. However, it was not until the twentieth century that psychologists began to empirically study the moral faculties of humans (Kohlberg, 1981; Piaget, 1932). Contemporary psychological research has focused heavily on how individuals reason and make judgments about complex moral dilemmas, that is, cases or situations in which two moral concerns are brought into tension with each other, such that any action taken will lead to at least one of the concerns being violated. For example, is it morally permitted to kill one person in order to save five? These dilemmas have been used in philosophy to pit

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utilitarian and deontological concerns against each other (e.g., Thomson, 1976). In broad terms, utilitarian judgments are those that maximize the overall benefits and minimize the overall costs in a given situation (it is permissible to kill one to save five), while deontological judgments favor individual rights and duties even if the consequences are worse (killing one is not morally permitted, despite the loss of five).

In recent years, dual-process models, which argue that moral judgments are the result of two competing neural systems, have become the focus of considerable research. Although dual-process models have been prominent in social psychology for quite some time (Chaiken and Trope, 1999), they were first proposed as a model of moral judgment by Greene and colleagues (2001, 2004). According to the dual-process model, certain moral dilemmas provoke responses from two separable, though competing, psychological processes often referred to simply as *System 1* and *System 2* (Stanovich, 1999). System 1 is associated with fast, automatic, affect-laden processing, with System 2 characterized by more conscious, deliberate, and controlled reasoning.

Within the context of moral judgment, the dual-process account posits that, when faced with certain moral dilemmas, two competing responses are generated: an affective response from System 1 (in our example, an aversive reaction to the prospect of taking a life), in addition to a deliberative cost-benefit response from System 2 (weighing the calculus of the lives lost and saved).[1] This theory proposes that nonutilitarian responses are generated when an aversive System 1 response overwhelms cognitive mechanisms that allow for utilitarian-consistent reasoning. In contrast, dilemmas low in emotional salience are likely to provoke utilitarian judgments.

Initial support for the dual-process model came from fMRI studies (Greene et al., 2001, 2004). Since then, a small number of behavioral studies have been used to support the model. Valdesolo and Desteno (2006) found that inducing positive mood with a humorous video clip led to increased rates of utilitarianism in moral dilemmas. This is argued as support for the dual-process model on the grounds that the positive mood induction counteracted the aversive emotional response of System 1 and created less conflict with the utilitarian System 2 response. In another study, Greene et al. (2008) found that individuals took longer to make utilitarian, but not nonutilitarian, judgments while under cognitive load, suggesting that the cognitive processes under load were causally relevant to utilitarian judgments in particular, as predicted by dual-process theory.

Additional evidence for the dual-process model comes from a study examining moral judgment in patients with lesions in ventromedial prefrontal cortex (VMPFC) (Koenigs et al., 2007). Damage to this area is thought to lead to deficits in emotional processing (Damasio, 1994), and the researchers found that the VMPFC patients

[1]Although the dual-process model proposed by Greene and colleagues suggests competition between a single affective response and a single cost-benefit response, this need not necessarily be the case. For instance, in our example of considering the loss of one life as opposed to the loss of five lives, separate affective and deliberative responses may be generated for each of these possibilities. See Moll et al. (2008) for a detailed treatment of this important issue.

were significantly more likely to make utilitarian moral judgments than controls. Dual-process proponents have argued that this finding supports the model, as dampened emotion processing should lead to less conflict between the two systems, thus resulting in increased utilitarian judgments (Greene, 2007).

However, recent research on gender differences in moral judgment complicates the dual-process model. Fumagalli and colleagues (2010) found that men made significantly more utilitarian judgments than women, even after controlling for several cultural and environmental factors. Additionally, Harenski et al. (2008) showed that, while female moral judgments were predicted by activity in brain regions thought to be particularly important for emotional processing, male moral judgments were predicted by activation in regions previously noted for involvement in recruiting cognitive resources for difficult moral decisions (Greene et al., 2004).

These gender differences overlap considerably with the fMRI results of Greene et al. (2001, 2004) and suggest that System 1 and System 2 may operate differently in men and women. Men may rely relatively more on System 2, whereas System 1 may be more prominent in women. This would explain the finding that males make significantly more utilitarian judgments.

In this study, we address some still unanswered questions surrounding dual-process theory and moral decision making. In particular, while support for the role of System 1 has been relatively strong, evidence for System 2 processes has been less obvious. Greene et al. (2008) found reaction time differences consistent with the dual-process theory but were unable to show that manipulation of System 2 processes actually altered the judgments themselves. Here, we primed participants toward either an experiential (System 1) or analytic (System 2) mode of thought using a method developed by Hsee and Rottenstreich (2004). We therefore predicted that, overall, participants primed analytically would show increased rates of utilitarian judgments relative to controls, while experientially primed individuals would show decreased rates of utilitarianism. Additionally, and importantly, we further predicted that men primed experientially would make significantly fewer utilitarian judgments than controls but would not be affected by analytic priming, while women would make significantly more utilitarian judgments when primed analytically but would not be affected by experiential priming.

2 METHODS

2.1 Participants and procedure

One hundred and seventy-five participants (70% female, mean age = 18.9, SD = 1.16) were recruited from the University of Arizona subject pool. All participants were undergraduates and received course credit for participating. Participants were excluded if their average reaction time during either of two critical phases of the experiment was greater than 2.5 standard deviations from the mean. This left a final sample of 166 participants (70% female, mean age = 18.84, SD = 1.17), used for all

reported analyses. The experiment was presented to participants using E-Prime, a computerized experimental design software package.

The experiment used a 3×3 mixed design, in which mode of thought was a between-subject variable and dilemma type was a within-subject variable. Participants were randomly assigned to one of three conditions: analytic mode of thought, experiential mode of thought, or a control condition in which participants received no priming. All participants responded to a set of 30 dilemmas, comprising 10 personal, 10 impersonal, and 10 nonmoral dilemmas. Greene et al. (2001) proposed that moral dilemmas can be usefully categorized as either personal or impersonal. Personal dilemmas are those involving (a) serious bodily harm, (b) to one or more particular individuals, where (c) this harm is not the result of deflecting an existing threat. Dilemmas were categorized as impersonal if they did not meet these criteria. Personal dilemmas then are those in which physical harm is brought to an individual as a means of preventing some other harm, while impersonal dilemmas are those in which the harm arises as an unintended consequence of an action. For example, an individual choosing to push a stranger in the line of gunfire in order to save his daughter would be an example of a personal dilemma, while choosing to pull one's daughter out of the way of a bullet, inadvertently leading to the bullet hitting a stranger standing behind her would be an example of an impersonal dilemma (see Greene and Haidt, 2002 for a discussion of the personal/impersonal distinction in moral judgment).

2.2 Mode of thought manipulation

To induce an analytic mode of thought, participants were asked to answer a short math problem prior to the presentation of each dilemma (e.g., "*If an object travels at five feet per minute, then by your calculations how many feet will it travel in 360 seconds?*"). For experiential priming, participants were shown a word before each trial and asked to simply write down the feeling they most associate with this word prior to the presentation of each dilemma (e.g., "*When you hear the word crying what do you feel? Please use one word to describe your predominant feeling*"). All priming questions were presented to participants via computer and they responded in writing on an answer sheet (Hsee and Rottenstreich, 2004). Participants in the control condition were presented with a screen showing a fixation cross for 10 s, in place of any priming task.

2.3 Moral dilemma task

Thirty moral dilemmas were selected from a larger set of dilemmas used in several previous studies (Greene et al., 2001, 2004; Koenigs et al., 2007). Participants were presented with 10 personal, 10 impersonal, and 10 nonmoral dilemmas. In each scenario, participants were faced with competing utilitarian and nonutilitarian interests (though they were not labeled as such) and asked to make a judgment about what they would do in each case. These judgments always came in the form of a binary yes/no judgment, where a "yes" response corresponded to making a utilitarian judgment and

a "no" response corresponded to a nonutilitarian judgment, a convention adopted to be consistent with previous research (Greene et al., 2008; Koenigs et al., 2007) (see Fig. 1).

2.4 Analysis

Analyses were run using a 3 (prime type: analytic, experiential, control) × 3 (dilemma type: personal, impersonal, nonmoral) mixed-factor analysis of covariance (ANCOVA), with average reaction time to make a moral judgment included as a covariate. Reaction times were treated as a covariate because it has been suggested in the literature that increased deliberation when making a moral judgment is likely to be correlated with increased utilitarian judgments (Bartels, 2008). Rate of utilitarian judgments was the primary dependent variable. Rates were computed by dividing the total number of utilitarian judgments within a dilemma type by the total number of dilemmas within that type.

Planned contrasts were conducted for both prime type and dilemma type. Two contrasts were planned for prime type such that both experimental groups (analytic and experiential) were independently compared to the control group. Two contrasts

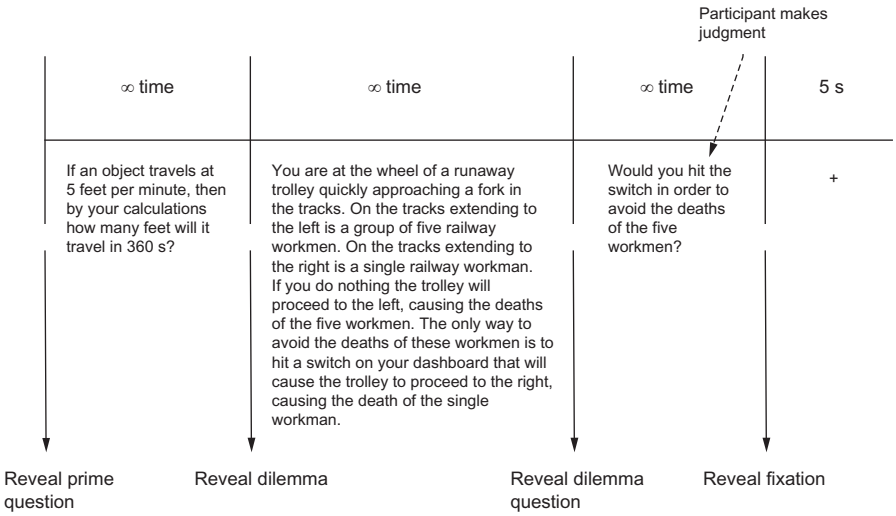

FIGURE 1

Timeline for a single trial in the analytic mode-of-thought condition. Each trial began with the presentation of a prime question, which the participant responded to on an accompanying paper answer sheet. After answering the prime question, the participant was presented with a moral dilemma. Next the participant was presented with a question about the dilemma and made a judgment about what they would do in the dilemma. The participant made her judgment by pressing either "Q" for yes or "P" for no on the keyboard. After making a judgment, a fixation point was presented for 5 s. The complete task consisted of 30 trials, with order for both prime question and dilemma randomized across participants.

were also run for each dilemma type. The first contrast combined both personal and impersonal moral dilemmas and compared them to nonmoral dilemmas. The second contrast tested for differences between personal and impersonal moral dilemmas. All analyses were conducted using SPSS (version 17) statistical software.

3 RESULTS

The analysis revealed a significant main effect of mode of thought ($F(2, 160) = 3.227$, $p = 0.042$) as well as the predicted effect of the reaction time covariate ($F(1160) = 4.479$, $p = 0.036$, see Fig. 2). Planned contrasts revealed significantly increased rates of utilitarianism in the analytic group ($M = 0.63$, SE = 0.014) compared to the control group ($M = 0.58$, SE = 0.014), $p = 0.048$. No significant difference was found between the experiential ($M = 0.58$, SE = 0.015) and control groups. The analysis also revealed a significant main effect of dilemma type ($F(2, 320) = 4.129$, $p = 0.017$). Planned contrasts revealed a significant difference between moral ($M = 0.556$, SE = 0.013) and nonmoral dilemmas ($M = 0.688$, SE = 0.007), $p = 0.015$. No significant difference was found between personal and impersonal dilemmas. No significant interaction between prime type and dilemma type was found.

Additional analyses were conducted to examine gender differences on the effect of mode of thought on moral judgment. First, we examined whether males and females in the control condition were significantly different from each other in their judgments. A 2 (gender: male, female) × 3 (dilemma type: personal, impersonal, nonmoral) ANCOVA with average reaction time to make moral judgments included as a covariate was used to test for gender differences. This analysis revealed a significant gender difference ($F(1, 56) = 4.456$, $p = 0.039$) with males ($M = 0.637$, SE = 0.028) demonstrating higher rates of utilitarianism than females ($M = 0.0.568$, SE = 0.016). No interaction between gender and dilemma type was found.

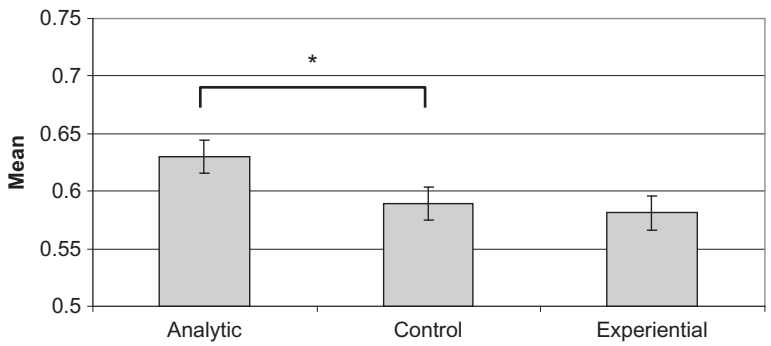

FIGURE 2

Mean rates of utilitarianism by mode-of-thought condition across all dilemma types. Error bars represent standard error of the mean.

To explore this gender difference further, we ran two additional 3(prime type) × x 3(dilemma type) ANCOVA analyses, one restricted to male participants and one restricted to female participants, again including average reaction time to respond to dilemmas as a covariate. Among male participants, there was a significant effect of mode of thought ($F(2, 48) = 3.787$, $p = 0.03$) and the reaction time covariate was significant ($F(1, 48) = 7.766$, $p < 0.008$). Simple contrasts revealed that the experiential group ($M = 0.558$, SE = 0.026) gave significantly less utilitarian responses than the control group ($M = 0.634$, SE = 0.027), $p = 0.045$. No significant effect was found between analytic ($M = 0.654$, SE = 0.025) and control groups. No interaction effect was found between prime type and dilemma type (see Fig. 3).

Among female participants, there was no significant effect of priming. However, planned simple contrasts revealed a trend toward significance ($p = 0.054$) between analytic ($M = 0.614$, SE = 0.017) and control ($M = 0.569$, SE = 0.016) groups, with analytic participants providing higher rates of utilitarian judgments than controls. No such trend was observed between the experiential ($M = 0.589$, SE = 0.017) and control groups (see Fig. 3).

4 DISCUSSION

Priming individuals toward an analytic mode of thought had a significant effect upon moral judgments. More specifically, individuals in an analytic mode were significantly more likely to make utilitarian judgments than individuals who were not primed. This finding is particularly important because it is the first time, to our

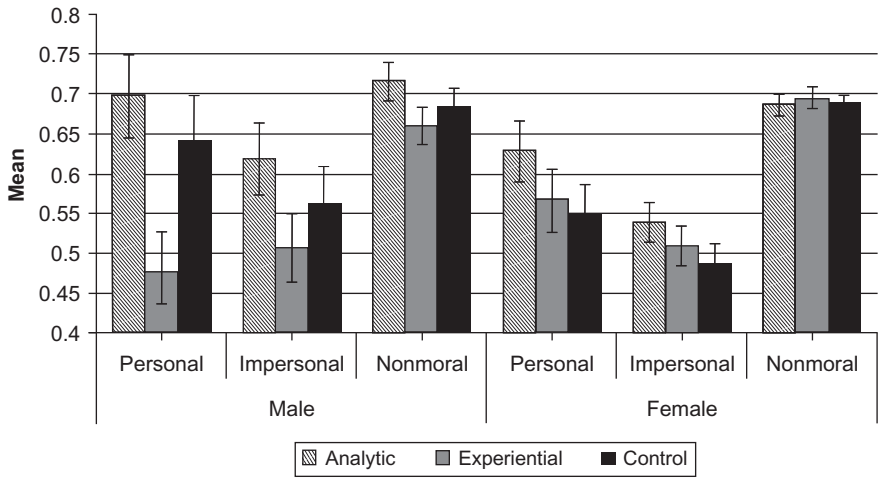

FIGURE 3

Rates of utilitarianism for males and females by mode-of-thought and dilemma-type conditions. Error bars represent standard error of the mean.

knowledge, that a behavioral manipulation of System 2 processes has resulted in a significant change in the rate of utilitarian judgments made in a moral dilemma task. Previous research aimed at manipulating System 2 (Greene et al., 2008) found reaction time differences consistent with the dual-process model but failed to show an effect in the actual judgments made.

Our findings are also consistent with those of Koenigs et al. (2007), who found that VMPFC lesion patients showed increased rates of utilitarian judgments. In that study, the increased rates of utilitarianism were explained in terms of decreased input from System 1, thought to be underlain in part by activity in VMPFC, which allowed System 2 processes to be more heavily weighted in the patients' moral judgments. This study provides an important counterpoint to these results by showing that rates of utilitarian judgment can also be increased by priming System 2 and additionally that these effects can be demonstrated in healthy participants.

As noted previously, Harenski et al. (2008) provide support for the notion that, while females rely more on emotional processing when making moral judgments, males make preferential use of deliberative processes. One possible interpretation of the gender differences seen in our data is that males may already be at, or at least near, ceiling for any effects that can be induced via a subtle analytic prime such as the one used here. This could explain why experiential, but not analytic, priming is effective in males. Similarly, females may be near ceiling for any effects likely to result from the experiential primes used in this study. This interpretation fits the dual-process model but suggests that moral judgment in females depends more on System 1 processes, while moral judgment in males is more influenced by System 2 processing. This interpretation also fits with the finding that males in general tended to be more utilitarian than females in the control condition. This is, of course, just one interpretation of the results and can be seen as potentially reinforcing negative gender stereotypes. Because of this, these results should be considered with care. Further studies are needed to clarify the precise role of gender differences within a dual-process framework.

A caveat worth mentioning in these findings is that we did not observe an interaction between mode of thought and dilemma type, as would be predicted by previous work (Greene et al., 2001, 2004). Although moral dilemmas, particularly personal moral dilemmas, showed greater differences between mode-of-thought groups than nonmoral dilemmas, these differences did not result in a statistically significant interaction. This lack of an interaction is perhaps not as surprising, given that the priming manipulation used demonstrates effects in a wide variety of decision-making domains. It does, however, raise the noteworthy question as to the extent to which the processes underlying moral judgment are domain general or domain specific. Further research aimed at investigating this question would provide important new directions for the study of moral judgment.

In conclusion, this study provides the first evidence that manipulation of System 2 processes actually alter moral judgments, as predicted by the dual-process theory of moral judgment. Participants who were primed to be in an analytic mode of thought made significantly more utilitarian judgments than control participants. This is an

important piece of new evidence in understanding moral decision making. Although much support has been shown for the role of emotions in moral judgment (Valdesolo and Desteno, 2006), and much of this support has been interpreted as consistent with a dual-process system of moral judgment, there has been a surprising lack of evidence for the deliberative System 2. Without data such as that presented here, it is difficult, if not impossible, to distinguish between the dual-process model and alternative models such as Haidt's Social Intuitionism model of moral judgment (Haidt, 2001). It is only through conclusive evidence that manipulation of both System 1 and System 2 alters moral judgment as predicted that the dual-process model can be considered as a plausible account of the psychology of moral judgment.

Additionally, our data suggest that gender plays an important role in moral judgment. This idea has a long history in moral psychology (Gilligan, 1977) but has received relatively little attention in contemporary research (Fumagalli et al., 2010, Harenski et al., 2008). Our data suggest that investigating gender differences in moral judgment within the context of dual-process theory is an exciting and promising direction for future research, although one that should be approached carefully so as not to reinforce unwarranted gender stereotypes.

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