

**Dissecting Cognitive Deliberation:
Distinct Effects of Accountability and Processing Time on Moral-Dilemma Judgments**

Bryanna K. Boone, Nyx L. Ng, & Bertram Gawronski

The University of Texas at Austin

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Correspondence concerning this article should be sent to:

Bertram Gawronski
Department of Psychology
University of Texas at Austin
108 E Dean Keeton A8000
Austin, TX 78723
USA
Phone: +1-512-471-7520
Email: gawronski@utexas.edu

Abstract

Prior research obtained conflicting evidence on whether cognitive deliberation increases support for actions that maximize welfare in a utilitarian sense yet violate moral norms in a deontological sense, as suggested by prominent theories of moral-dilemma judgment. The current research aimed to provide more nuanced insights into this question by (a) distinguishing between effects of accountability and processing time, and (b) using a computational modeling approach to disentangle effects on welfare maximization, norm adherence, and general action tendencies. While the results of two individual experiments were mixed, an integrative analysis of the combined data ($N = 798$) suggests that (a) processing time selectively increases welfare maximization whereas (b) accountability selectively increases norm adherence without affecting processing time. The findings provide more nuanced insights into how different aspects of cognitive deliberation influence moral-dilemma judgments, posing an explanatory challenge to prominent theories of moral judgment and decision-making.

Keywords: accountability; CNI model; cognitive deliberation; moral judgment; processing time

In March of 2020, a surge of COVID-19 cases hit Italian hospitals, leaving the healthcare system overwhelmed with insufficient ICU beds and ventilators (Vergano et al., 2020). Due to this shortage, medical professionals had to decide which patients should receive medical care. To illustrate the significance of these decisions, imagine a patient who is admitted to the ICU before a surge in COVID-19 cases. The patient needs 24 hours of uninterrupted ventilator support to survive. Three other patients are subsequently admitted to the ICU, and each of them needs only 8 hours of ventilator support within the next 24 hours to survive. With no additional ventilators available, should the original patient be removed from the ventilator, so that the three newly admitted patients can get the support they need to survive? Many medical professionals faced similar dilemmas during the COVID-19 pandemic. Some argued that, in cases like these, the original patient should be removed from the ventilator, as it will save the lives of three other patients. Yet, others argued that removing the original patient from the ventilator is morally wrong, because it violates the Hippocratic Oath commanding that medical professionals *do no harm* (Robert et al., 2020; Vecchio & Colombo, 2025).

Competing principles can guide decisions in moral dilemmas like the one described above. If a medical professional chooses to provide the three new patients with ventilator support, they save three lives as opposed to one. Such a decision is characteristic of the utilitarian school of thought, which purports that the morally right decision is the one bringing about the greatest good for the greatest number of people (Mill, 1861/1998). On the other hand, one can decide to keep the original patient on the ventilator, thereby not causing said patient harm. Such a decision is in line with the deontological school of thought, according to which moral norms apply unconditionally regardless of the circumstances (Kant, 1785/1959). In the described

scenario, removing the original patient from the ventilator violates the moral norm *do no harm*, and thus is deemed morally wrong from a deontological view.

A large body of research in moral psychology has investigated how people make judgments about actions that maximize welfare in a utilitarian sense while concurrently violating moral norms in a deontological sense (for a review, see Gawronski et al., 2025). A central question in this work is how cognitive deliberation affects moral-dilemma judgments. The main goal of the current work is to provide more nuanced insights into the effects of cognitive deliberation on moral-dilemma judgments by (a) distinguishing between effects of accountability and processing time, and (b) using a computational modeling approach to disentangle effects on welfare maximization, norm adherence, and general action tendencies.

Cognitive Deliberation

An influential theory of moral-dilemma judgments is the moral Dual-Process Model (mDPM; Greene, 2008). The mDPM posits that characteristically deontological judgments are rooted in automatic emotional reactions to the idea of causing harm, while characteristically utilitarian judgments result from controlled cognitive analyses of costs and benefits. According to the mDPM, controlled cognitive processes favoring utilitarian judgments must override automatic emotional processes favoring deontological judgments, leading to different moral judgments depending on which processes are dominant. To test these assumptions, several studies have investigated the effect of cognitive deliberation on moral judgments of actions that maximize welfare in a utilitarian sense yet violate moral norms in a deontological sense. Results from this work have revealed mixed support for the mDPM. Consistent with the presumed role of cognitive deliberation in utilitarian decisions, Greene et al. (2008) found that cognitive load increased reaction times for characteristically utilitarian but not for characteristically

deontological decisions. Similarly, Patil (2021) found that individual differences in cognitive deliberation were positively associated with a preference for utilitarian over deontological judgments, regardless of trait-level emotional responses to harm. A study by Paxton et al. (2011) provides further evidence for the mDPM, showing that (a) inducing cognitive deliberation increased preference for utilitarian over deontological judgments, and (b) trait-level deliberation tendencies were positively associated with preference for utilitarian over deontological judgments.

Yet, other studies have failed to support the hypothesized effect of cognitive deliberation on moral-dilemma judgments. In a study by Tinghög et al. (2016), for example, neither time pressure nor cognitive load influenced preference for utilitarian over deontological judgments. McPhetres et al. (2018) found that time pressure increased (rather than decreased) preference for utilitarian over deontological judgments among religious participants. Similarly, in a study by Körner and Volk (2014), impaired processing capacity increased (rather than decreased) preference for utilitarian over deontological judgments under conditions of abstract (vs. concrete) thinking. Integrating the mixed body of evidence, a meta-analysis by Rehren (2024) found no evidence for the hypothesis that cognitive deliberation increases preference for utilitarian over deontological judgments. A meta-analysis by Fahrenwaldt et al. (2025) found a significant effect of deliberation instructions, but no significant effects of time pressure and cognitive load. One potential conclusion from these findings is that cognitive deliberation has no reliable effect on moral-dilemma judgments. However, another potential conclusion is that cognitive deliberation may affect moral-dilemma judgments in multiple ways that can counteract each other (see Byrd & Conway, 2019). The latter possibility resonates with the idea underlying computational

modeling approaches that disentangle multiple distinct factors confounded in the traditional moral-dilemma paradigm.

The CNI Model

A prominent example of such computational approaches is the CNI model of moral-dilemma responses (Gawronski et al., 2017; Gawronski & Ng, 2025). The CNI model has been developed to disentangle three factors that are confounded in the traditional moral-dilemma paradigm. To illustrate these confounds, consider the well-known trolley problem in which a runaway trolley is said to be moving down a track where it would kill five people unless it is redirected to a different track where it would kill only one person (Foot, 1967; Thomson, 1985). In this scenario, redirecting the trolley has been interpreted as a characteristically utilitarian choice, because it maximizes overall welfare (i.e., killing one saves five; see Conway et al., 2018). Conversely, not redirecting the trolley has been interpreted as a characteristically deontological choice, because it conforms to a relevant moral norm (i.e., do not kill; see Conway et al., 2018). However, a closer analysis reveals that responses in the trolley problem involve three conceptually distinct components. Specifically, redirecting the trolley involves (a) an action that (b) maximizes overall welfare and (c) violates a moral norm. Conversely, not redirecting the trolley involves (a) an inaction that (b) minimizes overall welfare and (c) conforms to a moral norm. Thus, any effect on moral-dilemma judgments could be driven by (a) differences in general action tendencies, (b) differences in welfare-maximization tendencies, or (c) differences in norm-adherence tendencies (see Conway & Gawronski, 2013; Crone & Laham, 2017).

The CNI model is a multinomial processing tree model (see Hütter & Klauer, 2016) that addresses this limitation by separating three factors underlying moral-dilemma judgments: sensitivity to consequences (*C*), sensitivity to moral norms (*N*), and general preference for

inaction versus action (*I*). The three factors are quantified via maximum-likelihood statistics using responses to a series of moral dilemmas based on real-world scenarios. Each scenario comprises four variants that differ in terms of whether (a) the benefits of action are either greater or smaller than its costs and (b) the focal action is either prohibited or prescribed by a moral norm (for an example, see Table 1). The CNI model's *C* parameter captures the extent to which a participant favors action when the benefits of action are greater than its costs and favors inaction when the benefits of action are smaller than its costs (i.e., sensitivity to consequences; see first row in Figure 1). The CNI model's *N* parameter captures the extent to which a participant favors action when action is prescribed by a moral norm and favors inaction when action is prohibited by a moral norm (i.e., sensitivity to moral norms; see second row in Figure 1). Finally, the CNI model's *I* parameter captures the extent to which a participant favors inaction (vs. action) regardless of whether the benefits of action are greater or smaller than the costs and regardless of whether a moral norm prescribes or prohibits action (i.e., general preference for inaction versus action; see third and fourth row in Figure 1).

A meta-analytic synthesis of studies with the CNI model suggests that cognitive deliberation has multiple effects on moral-dilemma judgments that compensate each other in the traditional moral-dilemma paradigm (Gawronski & Ng, 2025). Across several published studies that used the CNI model to investigate effects of cognitive deliberation, greater cognitive deliberation was associated with (a) a stronger sensitivity to consequences and (b) a stronger sensitivity to moral norms. In other words, cognitive deliberation enhanced both utilitarian welfare-maximization and deontological norm-adherence (for related findings, see Byrd & Conway, 2019). Because these effects compensate each other in traditional dilemmas that pit utilitarian welfare-maximization against deontological norm-adherence (e.g., trolley problem),

the overall result in the traditional dilemma paradigm is a null effect, consistent with the null effects found in meta-analyses (Fahrenwaldt et al., 2025; Rehren, 2024).

Dissecting Deliberation

While Gawronski and Ng's (2025) meta-analytic findings provide more nuanced insights into the effects of cognitive deliberation, a notable limitation of their analysis is that it conflates a rather broad range of variables presumed to capture differences in cognitive deliberation. For experimental studies, these variables include manipulations of cognitive load (Gawronski et al., 2017), time pressure (Kroneisen & Steghaus, 2021), deliberation instructions (Kroneisen & Steghaus, 2021), and instructions to think about reasons for one's choices (Ng et al., 2025). For correlational studies, the relevant variables include individual differences in the need for cognition (Körner et al., 2020) and cognitive reflection (Paruzel-Czachura et al., 2023). Although these variables are commonly assumed to reflect differences in cognitive deliberation, it is possible that their effects are functionally distinct, in that some variables may affect one facet of moral-dilemma judgments (e.g., sensitivity to consequences) while others affect a different facet (e.g., sensitivity to moral norms). In this case, conflating them in a meta-analytic synthesis may lead to the mistaken conclusion that cognitive deliberation has two simultaneous effects that compensate each other, although different variables may have distinct effects on moral-dilemma judgments.

In the current work, we explored this possibility by delineating effects of accountability and processing time. Following Lerner and Tetlock (1999), accountability can be defined as the "expectation that one may be called on to justify one's beliefs, feelings, and actions to others" (p. 255). Although accountability may increase processing time, effects of accountability and processing time have been claimed to be distinct, in that accountability shapes judgments

through enhanced reasoning about what judgments can be justified to gain others' approval (Lerner & Tetlock, 1999), whereas processing time merely shapes the amount of cognitive resources devoted to or available for a focal task (Moors & De Houwer, 2006). Nevertheless, both factors are central to cognitive deliberation, in that cognitive deliberation has been argued to involve response justification (De Neys, 2025) and cognitive resources (Evans & Stanovich, 2013).

This distinction may be critical for understanding differential effects of accountability and processing time on moral-dilemma judgments. Prior research has found that participants rated actors who made a characteristically deontological decision in the trolley problem as more trustworthy and moral than actors who made a characteristically utilitarian decision (for a review, see Crockett et al., 2021). Follow-up research using the CNI model suggests that this effect is driven by a positive association between an actor's perceived moral character and their presumed sensitivity to moral norms, rather than by associations involving sensitivity to consequences or general action preferences (Gawronski, 2022; Ng & Gawronski, 2026). Relatedly, Rom and Conway (2018) found that participants accurately guessed others' perceptions of themselves on traits such as warmth and morality based on their moral-dilemma judgments, and participants publicly shifted their judgments based on what traits were situationally favorable. Together, these findings suggest that accountability may affect moral-dilemma judgments by increasing sensitivity to moral norms, because greater sensitivity to moral norms may convey stronger moral character to others.

In line with this idea, Ng et al. (2025) found that instructions to think about reasons for one's moral-dilemma judgments—a central component of accountability—increased sensitivity to moral norms without reliably affecting sensitivity to consequences and general action

preferences. Importantly, instructions to think about reasons did not affect the time participants took to make their judgments, indicating that thinking about reasons affected moral-dilemma judgments independent of processing time (see Lerner & Tetlock, 1999). Yet, processing time may still affect moral-dilemma judgments in other ways, such as by affecting utilitarian cost-benefit analyses, as suggested by the mDPM (see Kroneisen & Steghaus, 2021). Based on these considerations, the current studies tested the idea that accountability and processing time have distinct effects on moral-dilemma judgments, in that processing time affects moral-dilemma judgments via sensitivity to consequences whereas accountability affects moral-dilemma judgments via sensitivity to moral norms. In doing so, the current studies expand on Ng et al.'s (2025) work by (a) experimentally manipulating the presence versus absence of social accountability (instead of manipulating instructions to think about reasons) and (b) experimentally manipulating processing time (instead of merely measuring it). This fully crossed experimental design allows us to test the complementary hypotheses that (a) sensitivity to consequences is weaker under conditions of time pressure (vs. unlimited time) and (b) sensitivity to moral norms is stronger under conditions of accountability (vs. no accountability).

The Current Research

We conducted two preregistered experiments to test these hypotheses. In both experiments, participants responded to 44 moral dilemmas for research using the CNI model (Körner et al., 2020). The dilemmas varied in terms of whether (a) the benefits of a focal action are either greater or smaller than its costs and (b) the focal action is either prohibited or prescribed by a moral norm (i.e., 11 basic dilemmas in four variants). Participants indicated whether they found the focal action acceptable or unacceptable. To manipulate accountability, half of the participants were told prior to the moral-dilemma task that they will subsequently

have to justify their choices, and that their responses may be shown to other participants (accountability condition). The remaining half were told that they do not have to justify their choices and that their responses will be strictly confidential (no accountability condition). Orthogonal to the accountability manipulation, half of the participants were given unlimited time to read and respond to each dilemma (unlimited-time condition), while the other half were instructed to read and respond to each dilemma within 30 seconds (time-pressure condition). Responses to the moral dilemmas were analyzed using the CNI model to disentangle effects on sensitivity to consequences, sensitivity to moral norms, and general preference for inaction versus action.

For each experiment, we report how we determined our sample size, all data exclusions, all manipulations, and all measures. All data, analysis codes, and materials are available at <https://osf.io/8z5y9/>. Experiment 1 was formally preregistered at <https://osf.io/34mnp/>. Experiment 2 was formally preregistered at <https://osf.io/37cs4/>.

Experiment 1

Methods

Participants and design. The experiment used a 2 (Accountability: yes vs. no) $\times$ 2 (Processing Time: unlimited vs. time pressure) design with both factors varying between subjects. We preregistered that we would recruit 400 participants from the undergraduate subject pool at the University of Texas at Austin. A sensitivity analysis using G*Power 3.1 (Faul et al., 2007) indicates that a sample of 400 provides 80% power to detect a small main effect of $f = 0.14$ (equivalent to a small between-group difference of $d = 0.28$) in a 2×2 ANOVA with an alpha-level of .05 (two-tailed). A total of 400 students enrolled in an introductory psychology class completed the study online for research credit. Following our preregistered exclusion criteria,

two participants who showed the same response on all 44 moral dilemmas were excluded from analyses, leaving a final sample of 398. Demographics of the final sample were as follows: 286 female, 108 male, 2 other, 2 prefer not to answer; $M_{\text{age}} = 19.11$ years, $SD_{\text{age}} = 1.79$ years; 234 White, 21 Black/African American, 1 American Indian and Alaska Native, 102 Asian, 0 Native Hawaiian or Pacific Islander, 19 multiracial, 19 other, 2 did not answer.

Materials. The stimuli included a battery of 44 moral dilemmas validated for research using the CNI model (Körner et al., 2020). The battery includes 11 basic dilemmas based on real-world events (i.e., transplant dilemma, torture dilemma, assisted suicide dilemma, immune deficiency dilemma, vaccine dilemma, dialysis dilemma, investor dilemma, tyrant killing dilemma, Rwanda dilemma, mercy killing dilemma, Nazi occupation dilemma), each with four variants.¹ The four variants of each basic dilemma include the same scenario with slight modifications, such that the four variants differ in terms of whether (a) the benefits of the focal action are either greater or smaller than its costs and (b) the focal action is either prohibited or prescribed by a moral norm. A sample dilemma is presented in Table 1. The full set of dilemmas is available at: <https://osf.io/8z5y9/>. The 44 dilemmas were presented in a fixed randomized order.

Procedure. Participants were randomly assigned to one of four experimental conditions. Participants in the accountability condition were asked to take a moment to think about reasons that would justify their choice and respond accordingly. They were additionally told that they will be asked to explain their reasoning at the end of the task and that their justifications may be shown to other participants. Participants in the no-accountability condition were asked to think

¹ Körner et al.'s (2020) original battery of moral dilemmas for research using the CNI model includes 12 basic dilemmas in four variants (i.e., 48 total). However, one of the 12 basic dilemmas (i.e., abduction dilemma) has been found to have low construct validity for the manipulation of moral norms (see Gawronski et al., 2020). The four variants of this basic dilemma were not included in the current study.

carefully about their responses. They were additionally told that they will not have to explain their reasoning and that their responses will remain confidential. In addition to the instructions for the manipulation of accountability, participants in the time-pressure condition were told that they will have 30 seconds to read each dilemma and make a choice. To enhance the feeling of time pressure, a timer began counting down from 30 seconds upon the onset of each dilemma (see Kroneisen & Steghaus, 2021). After 30 seconds, a message appeared asking participants to respond and move on to the next question. Participants in the unlimited-time condition were told that they will have unlimited time to read each dilemma and make a choice. The processing-time manipulation was adapted from Kroneisen and Steghaus (2021), the only differences being that (a) we reduced the time window in the time-pressure condition from 35 seconds in Kroneisen and Steghaus's study to 30 seconds in the current study and (b) participants in both conditions were required to respond to each dilemma in order to move on to the next question. The shorter time window was based on informal analyses of response times in prior studies from our lab in which participants read and responded to the same set of 44 dilemmas without time restrictions.² The requirement to respond to all dilemmas in both conditions was included to avoid missing data and potential confounds between processing time and proportions of incomplete data. Table 2 includes the complete instructions in the four experimental conditions.

Across all four conditions, participants responded to the 44 moral dilemmas by indicating whether they find the focal action described in the dilemma acceptable (*yes* vs. *no*). To maintain the credibility of the accountability manipulation, participants in the accountability condition responded to an open-ended item that instructed them to justify their responses to one of the

² Average response times in the reanalyzed studies ranged between 30 and 39 seconds; median response times ranged between 29 and 31 seconds; the 75th percentile ranged between 35 and 46 seconds. We aimed to keep the response window sufficiently short to reduce cognitive deliberation, yet long enough to ensure that participants have sufficient time to read the complete text of each scenario.

dilemmas at the end of the moral-dilemma battery. Following this, they were shown a justification written by a participant from an earlier study. Participants in this condition were then asked if they agree or disagree with the provided justification.

Data Aggregation. For each of the four dilemma variants, we calculated the total number of times participants judged the focal action as acceptable to obtain four indices of action responses. To obtain indices of inaction responses, we subtracted the indices of action responses from 11 (i.e., the number of dilemmas per variant). Both the action and inaction response indices can range from 0 to 11. In total, there were eight indices per individual: the sum of action and the sum of inaction responses for the four variants of dilemmas. Using the action and inaction indices, we used the CNI model to estimate indices reflecting sensitivity to consequences (*C*), sensitivity to moral norms (*N*), and general preference for inaction versus action (*I*) in moral-dilemma judgments (see Gawronski et al., 2017). To this end, we fitted the CNI model to the aggregated action and inaction indices for each participant, resulting in estimates of unique CNI parameters for each participant (see Körner et al., 2020). The parameter estimation was conducted using multiTree (Moshagen, 2010). Following the procedures recommended by Gawronski et al. (2017), the modeling analyses used a fixed estimation algorithm with random start values, two replications, and a maximum of 90,000 iterations.

Data Analysis. We preregistered that we would submit each of the three CNI model parameters to a 2 (Accountability) $\times$ 2 (Processing Time) ANOVA. Our first hypothesis would be confirmed by a significant main effect of Processing Time on the *C* parameter, indicating that sensitivity to consequences is stronger in the unlimited-time condition than in the time-pressure condition. Our second hypothesis would be confirmed by a significant main effect of

Accountability on the N parameter, indicating that sensitivity to moral norms is stronger in the accountability condition than in the no-accountability condition.

Results

Manipulation check. To determine if the processing-time manipulation was effective, we calculated the total time participants took to read and respond to the 44 moral dilemmas and submitted the resulting score to a non-preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA. Mean response times across the four experimental conditions are presented in Table 3. As expected, there was a significant main effect of Processing Time, indicating that participants in the unlimited-time condition took longer to read and respond to the moral dilemmas than participants in the time-pressure condition, $F(1, 394) = 40.84, p < .001, \eta_p^2 = .090$. There was no significant effect of Accountability, $F(1, 394) = 0.77, p = .379, \eta_p^2 = .002$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 394) = 0.01, p = .929, \eta_p^2 < .001$. Information on the distribution of participant-level median response times and response times at the item-level are provided in the Supplement to Experiment 1 at <https://osf.io/8z5y9/>.

Sensitivity to consequences. Mean C parameter scores across the four experimental conditions are presented in Table 3. Contrary to our first hypothesis, the preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the C parameter did not reveal a significant main effect of Processing Time, $F(1, 394) = 0.18, p = .674, \eta_p^2 < .001$. There was also no significant main effect of Accountability, $F(1, 394) = 2.93, p = .088, \eta_p^2 = .007$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 394) = 0.02, p = .894, \eta_p^2 < .001$.

Sensitivity to moral norms. Mean N parameter scores across the four experimental conditions are presented in Table 3. Consistent with our second hypothesis, the preregistered 2

(Accountability) $\times$ 2 (Processing Time) ANOVA on the N parameter revealed a significant main effect of Accountability, $F(1, 394) = 11.09, p < .001, \eta_p^2 = .030$, indicating that sensitivity to moral norms was stronger in the accountability condition than the no-accountability condition. There was no significant main effect of Processing Time, $F(1, 394) = 2.64, p = .105, \eta_p^2 = .007$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 394) = 0.03, p = .860, \eta_p^2 < .001$.

General preference for inaction versus action. Mean I parameter scores across the four experimental conditions are presented in Table 3. The preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the I parameter revealed no significant main effect of Processing Time, $F(1, 394) = 0.31, p = .579, \eta_p^2 < .001$, no significant main effect of Accountability, $F(1, 394) = 0.12, p = .727, \eta_p^2 < .001$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 394) = 0.31, p = .577, \eta_p^2 < .001$.

Discussion

The results of Experiment 1 support the hypothesis that accountability increases sensitivity to moral norms. However, we found no support for the hypothesis that processing time influences sensitivity to consequences—even though the processing-time manipulation showed the to-be-expected effect on the overall time participants took to read and respond to the moral dilemmas. Interestingly, while accountability showed the predicted effect on moral-dilemma judgments, it did not affect the overall time participants took to read and respond to the moral dilemmas. These results are consistent with the idea that accountability influences judgments and choices independent of processing time (Lerner & Tetlock, 1999). To gain greater confidence in the reliability of these findings, we conducted a second experiment with the same materials to replicate the findings of Experiment 1.

Experiment 2

Methods

Experiment 2 used the same 2 (Accountability) $\times$ 2 (Processing Time) design used in Experiment 1. As in Experiment 1, we preregistered that we would recruit 400 participants from the undergraduate subject pool at the University of Texas at Austin. A sensitivity analysis using G*Power 3.1 (Faul et al., 2007) indicates that a sample of 400 provides 80% power to detect a small main effect of $f = 0.14$ (equivalent to a small between-group difference of $d = 0.28$) in a 2×2 ANOVA with an alpha-level of .05 (two-tailed). A total of 401 students completed the study online, but only 400 requested research credit. Following our preregistered exclusion criteria, one participant who showed the same response on all 44 moral dilemmas was excluded from analyses, leaving a final sample of 400. Demographics of the final sample were as follows: 264 female, 133 male, 1 other, 2 prefer not to answer; $M_{\text{age}} = 19.58$ years; 210 White, 24 Black/African American, 3 American Indian and Alaska Native, 123 Asian, 1 Native Hawaiian or Pacific Islander, 25 multiracial, 14 other. The study materials and procedure, as well as the preregistered data-aggregation and data-analysis plans were identical to Experiment 1.

Results

Manipulation check. To determine if the processing-time manipulation was effective, we again calculated the total time participants took to read and respond to the 44 moral dilemmas and submitted the resulting score to a non-preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA. Mean response times across the four experimental conditions are presented in Table 3. As expected, there was a significant main effect of Processing Time, indicating that participants in the unlimited-time condition took longer to read and respond to the moral dilemmas than participants in the time-pressure condition, $F(1, 396) = 40.47, p < .001, \eta_p^2 =$

.090. There was no significant main effect of Accountability, $F(1, 396) = 0.15, p = .698, \eta_p^2 < .001$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 396) = 0.17, p = .678, \eta_p^2 < .001$. Information on the distribution of participant-level median response times and response times at the item-level are provided in the Supplement to Experiment 2 at <https://osf.io/8z5y9/>.

Sensitivity to consequences. Mean C parameter scores across the four experimental conditions are presented in Table 3. Inconsistent with Experiment 1 but supporting our first hypothesis, the preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the C parameter revealed a significant main effect of Processing Time, $F(1, 396) = 9.17, p = .003, \eta_p^2 = .020$, indicating that sensitivity to consequences was stronger in the unlimited-time condition than in the time-pressure condition. There was no significant main effect of Accountability, $F(1, 396) = 1.11, p = .292, \eta_p^2 = .003$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 396) = 0.99, p = .321, \eta_p^2 = .002$.

Sensitivity to moral norms. Mean N parameter scores across the four experimental conditions are presented in Table 3. Contrary to our second hypothesis, the preregistered 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the N parameter did not reveal a significant main effect of Accountability, $F(1, 396) = 0.07, p = .793, \eta_p^2 < .001$. Unexpectedly, there was a significant main effect of Processing Time, $F(1, 396) = 4.70, p = .031, \eta_p^2 = .010$, indicating that sensitivity to moral norms was stronger in the unlimited-time condition than in the time-pressure condition. The two-way interaction of Processing Time and Accountability was not significant, $F(1, 396) = 0.16, p = .688, \eta_p^2 < .001$.

General preference for inaction versus action. Mean I parameter scores across the four experimental conditions are presented in Table 3. Unexpectedly, the preregistered 2

(Accountability) $\times$ 2 (Processing Time) ANOVA on the I parameter revealed a significant main effect of Accountability, $F(1, 396) = 5.55, p = .019, \eta_p^2 = .010$, indicating that participants in the accountability condition showed a weaker general preference for inaction than participants in the no-accountability condition. There was no significant main effect of Processing Time, $F(1, 396) = 0.65, p = .421, \eta_p^2 = .001$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 396) = 0.19, p = .660, \eta_p^2 < .001$.

Discussion

The results of Experiment 2 support the hypothesis that processing time influences moral-dilemma judgments by increasing sensitivity to consequences. However, we found no support for the hypothesis that accountability increases sensitivity to moral norms. Instead, accountability unexpectedly reduced participants' general preference for inaction versus action. These findings are remarkably different from the ones of Experiment 1, which revealed a significant effect of accountability on sensitivity to moral norms but no significant effect of processing time on sensitivity to consequences. Experiment 1 also revealed no significant effect of processing time on sensitivity to moral norms and no significant effect of accountability on general action tendencies, as found in Experiment 2.

Integrative Data Analysis and Robustness Check

While the two experiments were reasonably well-powered, a potential concern is that the discrepant findings may be due to insufficiently large samples, which can increase the likelihood of both false positives (Button et al., 2013) and false negatives (Maxwell et al., 2015). To address this concern, we conducted an integrative data analysis (IDA; Curran & Hussong, 2009) of the combined data from both studies. The larger sample size in the IDA should be better suited to separate “signal” from “noise” in the two individual experiments, permitting stronger

conclusions about which outcomes of the two individual studies are real, which significant effects are false positives, and which null effects are false negatives.

We also checked the robustness of our findings against model specifications. A notable limitation of the CNI model concerns the hierarchical structure of the three parameters in the processing tree (see Figure 1). This structure can be criticized as being arbitrary in that all six combinatorially possible processing trees with the three parameters show identical goodness-of-fit (Gawronski et al., 2017). Yet, effects on the three parameters can differ in non-trivial ways across model specifications (Gawronski et al., 2020, 2026). While there are compelling conceptual reasons to include the *I* parameter at the lowest position of the hierarchy (Gawronski et al., 2017),³ the concern is still relevant for the respective positions of the *C* and *N* parameters in the processing tree, in that effects on the two parameters obtained with the original CNI model can differ in a modified variant where the hierarchical position of the two parameters is reversed (i.e., NCI instead of CNI). Thus, to check the robustness of the obtained results against model specifications, we also analyzed the combined data from the two studies with a model in which the hierarchical positions of the *C* and *N* parameters are reversed (see Gawronski et al., 2017, 2020).

Table 3 shows the means and 95% confidence intervals of the three model parameters in the IDA using the CNI model and the NCI model, respectively. Consistent with our first hypothesis, a 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the *C* parameter revealed a significant main effect of Processing Time in both the CNI model, $F(1, 794) = 5.84, p = .016, \eta_p^2$

³ Including the *I* parameter at the lowest hierarchical position of the processing tree permits estimates along a bipolar continuum reflecting general preference for inaction on one end (i.e., scores > 0.5) and general preference for action on the other end (i.e., scores < 0.5). Yet, when the *I* parameter is included at a higher position of the hierarchy, its scores reflect gradual differences along a single unipolar dimension of general preference for inaction, with a score of 0 reflecting the mere absence of such a preference.

= .007, and the NCI model, $F(1, 794) = 16.96, p < .001, \eta_p^2 = .020$, indicating that sensitivity to consequences was stronger in the unlimited-time condition than in the time-pressure condition. There was no significant main effect of Accountability on the C parameter in the CNI model, $F(1, 794) = 0.25, p = .621, \eta_p^2 < .001$, and the NCI model, $F(1, 794) = 1.97, p = .161, \eta_p^2 = .002$. There was also no significant two-way interaction of Processing Time and Accountability in the CNI model, $F(1, 794) = 0.37, p = .541, \eta_p^2 < .001$, and the NCI model, $F(1, 794) = 0.01, p = .941, \eta_p^2 < .001$.

Consistent with our second hypothesis, a 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the N parameter revealed a significant main effect of Accountability in both the CNI model, $F(1, 794) = 6.30, p = .012, \eta_p^2 = .008$, and the NCI model, $F(1, 794) = 7.01, p = .008, \eta_p^2 = .008$, indicating that sensitivity to moral norms was stronger in the accountability condition than in the no-accountability condition. While the main effect of Processing Time was statistically significant in the CNI model, $F(1, 794) = 7.17, p = .008, \eta_p^2 = .009$, this effect was not statistically significant in the NCI model, $F(1, 794) = 1.67, p = .196, \eta_p^2 = .002$. The two-way interaction of Processing Time and Accountability on the N parameter was not statistically significant in the CNI model, $F(1, 794) = 0.02, p = .876, \eta_p^2 < .001$, and the NCI model, $F(1, 794) = 0.01, p = .934, \eta_p^2 < .001$.

A 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the I parameter revealed no significant main effect of Processing Time in the CNI model, $F(1, 794) = 0.87, p = .352, \eta_p^2 = .001$, and the NCI model, $F(1, 794) = 0.83, p = .363, \eta_p^2 = .001$, and no significant main effect of Accountability in the CNI model, $F(1, 794) = 2.36, p = .125, \eta_p^2 = .003$, and the NCI model, $F(1, 794) = 2.57, p = .109, \eta_p^2 = .003$. There was also no significant interaction between the two

factors in the CNI model, $F(1, 794) = 0.02, p = .890, \eta_p^2 < .001$, and the NCI model, $F(1, 794) = 0.04, p = .851, \eta_p^2 < .001$.

We also conducted a 2 (Accountability) $\times$ 2 (Processing Time) ANOVA on the total time participants took to complete the dilemma task. Mean response times across the four experimental conditions are presented in Table 3. As expected, there was a significant main effect of Processing Time, $F(1, 794) = 79.67, p < .001, \eta_p^2 = .090$, indicating that participants in the unlimited-time condition took longer to read and respond to the moral dilemmas than participants in the time-pressure condition. There was no significant main effect of Accountability, $F(1, 794) = 0.91, p = .341, \eta_p^2 = .001$, and no significant two-way interaction of Processing Time and Accountability, $F(1, 794) = 0.11, p = .742, \eta_p^2 < .001$. Information on the distribution of participant-level median response times and response times at the item-level are provided in the Supplement to the IDA at <https://osf.io/8z5y9/>.

Together, these results confirm the hypotheses that (a) processing time increases sensitivity to consequences and (b) accountability increases sensitivity to moral norms. Because time to read and respond to the moral dilemmas was uniquely influenced by processing time and not by accountability, the findings are consistent with the idea that accountability influences moral judgments independent of processing time (see Lerner & Tetlock, 1999). While processing time also influenced sensitivity to moral norms in the IDA with the original CNI model, this effect was not robust against changes in model specifications. The significant effect of accountability on general action tendencies in Experiment 2 seems to be a false positive, in that this effect did not replicate in the IDA with the combined data from both studies regardless of model specifications (see Button et al., 2013).

General Discussion

The main goal of the current work was to provide more nuanced insights into the effects of cognitive deliberation on moral-dilemma judgments by (a) distinguishing between effects of accountability and processing time and (b) disentangling effects on welfare maximization, norm adherence, and general action tendencies. While the results of the two individual experiments were mixed, the results of the IDA support the hypotheses that (a) processing time influences moral-dilemma judgments via welfare maximization and (b) accountability influences moral-dilemma judgments via norm adherence. Consistent with our first hypothesis, the IDA revealed that (a) sensitivity to consequences was weaker under conditions of time pressure versus unlimited time (consistent with the results of Experiment 2) and (b) sensitivity to moral norms was stronger under conditions of accountability versus no accountability (consistent with the results of Experiment 1). Both effects were robust against changes in model specifications. While the IDA with the original CNI model also revealed an unexpected effect of processing time on norm adherence (consistent with the results of Experiment 2), this effect was not statistically significant in analyses with an alternative model in which the positions of the *C* and *N* parameters were reversed (i.e., NCI model). The IDA revealed no significant effects on general action tendencies, suggesting that the effect of accountability on general preference for inaction versus action in Experiment 2 was a false positive.

Implications

The finding that accountability increased sensitivity to moral norms in Experiment 1 and the IDA is consistent with prior research suggesting that people who anticipate having to justify their choices to others adjust their judgments in a way to gain others' approval (see Rom & Conway, 2018) and social perceptions of moral character are linked to perceived sensitivity to

moral norms (see Gawronski, 2022; Ng & Gawronski, 2026). Importantly, accountability increased sensitivity to moral norms without affecting processing time, a finding that is consistent with prior findings (Ng et al., 2025) and supportive of the idea that effects of accountability and processing time are functionally distinct. Whereas accountability shapes judgments by influencing reasoning about what is likely to be approved by others (Lerner & Tetlock, 1999), processing time merely shapes the amount of cognitive resources that is devoted to or available for a focal task (Moors & De Houwer, 2006).

By clarifying how accountability shapes moral-dilemma judgments, the current work also provides deeper insights into the mechanisms underlying prior findings. Hashimoto et al. (2022) found that concerns about potential negative evaluations from others weaken relative preference for utilitarian over deontological judgments. However, it remained unclear in this work whether prospective social evaluations (a) reduced characteristically utilitarian judgments, (b) increased characteristically deontological judgments, or (c) concurrently shaped both. The finding that accountability affects moral-dilemma judgments via sensitivity to moral norms suggests that concerns about potential negative evaluations from others increase deontological norm adherence instead of decreasing utilitarian welfare maximization.

The obtained effects of processing time and accountability further support the idea that different aspects of cognitive deliberation can influence moral-dilemma judgments in ways that counteract each other in the traditional dilemma paradigm (see also Byrd & Conway, 2019). Specifically, the current findings suggest that processing time is associated with stronger sensitivity to consequences, whereas accountability is associated with stronger sensitivity to moral norms. In addition, while stronger sensitivity to consequences is associated with a stronger preference for utilitarian over deontological judgments in the traditional dilemma paradigm,

stronger sensitivity to moral norms is associated with a weaker preference for utilitarian over deontological judgments (Gawronski & Ng, 2025). Thus, if the two effects are conflated, the overall outcome is a null effect of cognitive deliberation on moral judgments in the traditional dilemma paradigm, consistent with the null effects found in meta-analyses (Fahrenwaldt et al., 2025; Rehren, 2024).

More broadly, the current findings support the notion that different aspects of cognitive deliberation can influence judgments and decisions in functionally distinct ways (see De Neys, 2025). Whereas processing time influences moral-dilemma judgments via utilitarian welfare maximization, accountability influences moral-dilemma judgments via deontological norm adherence. These findings pose an explanatory challenge to dominant theoretical accounts of moral-dilemma judgments, such as the mDPM (Greene, 2008). According to the mDPM, characteristically deontological judgments are rooted in automatic emotional reactions to the idea of causing harm, while characteristically utilitarian judgments result from controlled cognitive analyses of costs and benefits. The latter assumption is consistent with the current finding that processing time increased utilitarian welfare maximization, as captured by the CNI model's C parameter (see also Kroneisen & Steghaus, 2021). However, the mDPM's assumption about the psychological underpinnings of deontological judgments is difficult to reconcile with the finding that deontological norm adherence on the CNI model's N parameter increases with concerns about accountability (see also Ng et al., 2025). Together, these findings echo concerns that the current body of evidence calls for more nuanced theories that can account for empirically observed influences on moral-dilemma judgments that are difficult to reconcile with the mDPM (see Gawronski & Ng, 2025).

To avoid potential misunderstandings of this conclusion, it is worth noting that there is no a priori conflict between the mDPM and the CNI model (see Dale & Gawronski, 2023; Gawronski & Ng, 2025). Whereas the CNI model is a descriptive theory that captures patterns of responses at the behavioral level (see Figure 1), the mDPM is a mechanistic theory that aims to explain behavioral responses by identifying their underlying mental processes (see Gawronski & Bodenhausen, 2015). Thus, there is no a priori reason to expect that behavioral data obtained with the CNI model should conflict with the mDPM's assumptions about underlying mental processes. In fact, the observed effect of time pressure on the CNI model's *C* parameter capturing sensitivity to consequences is perfectly consistent with the mDPM's assumption that characteristically utilitarian judgments are rooted in controlled cognitive analyses of costs and benefits (see Kroneisen & Steghaus, 2021). Yet, consistency between the two theories is not guaranteed either, in that some behavioral data obtained with the CNI model may be difficult to reconcile with the mental-process assumptions of the mDPM, such as the obtained effect of accountability on sensitivity to moral norms. Findings of the latter kind pose an explanatory challenge for the mDPM, calling for alternative mechanistic accounts that can explain these findings—and ideally generate novel predictions that can be empirically confirmed.

Limitations

A notable limitation is that, while our two hypotheses were supported by the results of the IDA, the two individual experiments obtained mixed results, in that each experiment supported one hypothesis but not the other. The second experiment also revealed two unexpected effects that did not emerge in the first experiment. We acknowledge that these inconsistencies may undermine trust in the reliability of the obtained effects. However, insufficiently large samples are known to increase the likelihood of both false positives (Button et al., 2013) and false

negatives (Maxwell et al., 2015), which may have contributed to the mixed results across the two experiments. The results of the IDA give us greater confidence about (a) which outcomes of the two individual studies are real, (b) which significant effects are false positives, and (c) which null effects are false negatives. Specifically, the IDA suggests that the significant effect of processing time on sensitivity to consequences as well as the significant effect of accountability on sensitivity to moral norms are real, and that the corresponding null effects in the individual studies are false negatives. Conversely, the null effect of accountability on general action tendencies in the IDA suggests that the corresponding significant effect in Experiment 2 is a false positive. Importantly, the latter conclusion suggests that the statistically significant effects in the IDA are not merely due to larger sample sizes being able to detect smaller effects. Instead, the larger sample size in the IDA provided greater sensitivity in discerning “signal” from “noise,” in that some of the inconsistencies were due to false negatives while others were due to false positives.

Another potential objection is that the 30-second response-window in the time-pressure condition might have been too long, which could have undermined its effectiveness in influencing moral-dilemma judgments. In deciding on the length of the response window in the current studies, we relied on prior CNI-model work by Kroneisen and Steghaus (2021) who used a response window of 35 seconds to manipulate processing time. Consistent with the conclusions from the current studies, Kroneisen and Steghaus found that time pressure reduced sensitivity to consequences without affecting sensitivity to moral norms and general preference for inaction versus action. While we initially considered using the same 35-second response-window used by Kroneisen and Steghaus, we decided to utilize a slightly shorter response-window of 30 seconds. This decision was based on informal analyses of response times in prior studies from our lab in

which participants read and responded to the same battery of moral dilemmas without time restrictions (see Footnote 2). Supporting the effectiveness of the time restriction in the current studies, response times were significantly shorter in the time-pressure condition compared to the unlimited-time condition, with a consistent medium-size effect of $\eta_p^2 = .090$ in Experiment 1, Experiment 2, as well as the IDA. Thus, while the 30-second response-window in the current studies may seem long for a manipulation of processing time, it was highly effective in influencing response times and it replicated findings of prior work using a slightly longer response window (Kroneisen & Steghaus, 2021).

A related concern is that the employed procedure to manipulate processing time might have been too noisy to produce reliable effects with small sample sizes, requiring larger samples like the one in the current IDA. More reliable effects may be obtained with advanced methods from research on text comprehension. For example, in a study by Cummins and Cummins (2012), moral dilemmas were presented as vertically scrolling text with only 2.5 lines of text visible at a time. After the entire dilemma had been presented, participants were asked: *Is it appropriate to [take the action] in order to [produce the outcome]?* Participants in the time-pressure condition had to respond within a time window that was equivalent to 200 milliseconds multiplied by the number of words in the decision question. Participants in the unlimited-time condition had no time restrictions for their response. Because response times in this procedure are less affected by reading speed, it may provide a cleaner manipulation of decision time and, thus, more reliable effects compared to the current processing-time manipulation.

A final concern is that aggregating responses across multiple dilemmas might conceal theoretically meaningful differences across items. In line with this concern, Cummins and Cummins (2012) found that time pressure affected moral judgments only on dilemmas that

produce high baseline rates of characteristically utilitarian responses; time pressure had no significant effect for dilemmas with low baseline rates of characteristically utilitarian responses. Such item-level differences cannot be identified within the CNI-model approach employed in the current work, because it aggregates responses across all basic dilemmas of a given variant. In addition to being unable to detect potential differences at the item level, the measurement noise resulting from potential item-level differences could reduce the sensitivity of the three model parameters in detecting experimental effects in studies with small samples, which may explain why accountability and processing time showed inconsistent results across the two individual studies (despite confirming the predictions in the IDA). The second and third authors of the current article are currently working on an alternative statistical approach to address this problem (Ng et al., 2026). Future work using this alternative approach may provide deeper insights into potential differences in the effects of accountability and processing time at the item-level.

Conclusion

Prior research has obtained conflicting evidence on whether cognitive deliberation increases support for actions that maximize wellbeing in a utilitarian sense yet violate moral norms in a deontological sense, as suggested by prominent theories of moral-dilemma judgment. The current work provides more nuanced insights into this question by (a) distinguishing between accountability and processing time as distinct aspects of cognitive deliberation, and (b) using a computational modeling approach to disentangle effects on welfare maximization, norm adherence, and general action tendencies in moral-dilemma judgments. Our findings suggest that processing time and accountability influence moral-dilemma judgments in different ways, in that (a) processing time increases welfare maximization and (b) accountability increases norm adherence without affecting processing time. These findings provide more nuanced insights into

how different aspects of cognitive deliberation influence moral-dilemma judgments, posing an explanatory challenge to prominent models of moral-dilemma judgment.

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Table 1. *Example of a moral dilemma involving either a proscriptive or a prescriptive norm where the benefits of action are either greater or smaller than the costs of action. Dilemmas adapted from Gawronski et al. (2017). Reprinted with permission from the American Psychological Association.*

Proscriptive Norm Prohibits Action		Prescriptive Norm Prescribes Action	
Benefits of Action Greater than Costs	Benefits of Action Smaller than Costs	Benefits of Action Greater than Costs	Benefits of Action Smaller than Costs
You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.
The virus is highly contagious and deadly to seniors and children. The only medication that can effectively stop the virus from spreading has severe side-effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side-effects.	The virus is highly contagious and can cause severe stomach cramps. The only medication that can effectively stop the virus from spreading has severe side-effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side-effects.	The virus is highly contagious and can cause severe stomach cramps. The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.	The virus is highly contagious and deadly to seniors and children. The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.
Is it acceptable in this case to give the student the medication?	Is it acceptable in this case to give the student the medication?	Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?	Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?

Table 2. *Instructions by condition.*

	No Accountability	Accountability
Unlimited Time	For each story, we ask that you think carefully about your response. You will not have to justify your decisions or explain your reasoning. Your responses will remain confidential. You will have unlimited time to read each dilemma and make your choice. Please take as much time as necessary to respond.	For each story, we ask that you take a moment to think about reasons that would justify your choice and respond accordingly. At the end of the task, you will be asked to explain your reasoning. Your justifications may be shown to other participants in the study. You will have unlimited time to read each dilemma and make your choice. Please take as much time as necessary to respond.
Time Pressure	For each story, we ask that you think carefully about your response. You will not have to justify your decisions or explain your reasoning. Your responses will remain confidential. You will have 30 seconds to read each dilemma and make your choice. Please make sure to respond within the time frame.	For each story, we ask that you take a moment to think about reasons that would justify your choice and respond accordingly. At the end of the task, you will be asked to explain your reasoning. Your justifications may be shown to other participants in the study. You will have 30 seconds to read each dilemma and make your choice. Please make sure to respond within the time frame.

Table 3. Means and 95% Confidence Intervals of Completion Times in Seconds and Moral-Judgment Parameters by Accountability and Processing Time Conditions.

	No Accountability				Accountability			
	Time Pressure		Unlimited Time		Time Pressure		Unlimited Time	
	<i>M</i>	95% CI	<i>M</i>	95% CI	<i>M</i>	95% CI	<i>M</i>	95% CI
Experiment 1								
Time (seconds)	846	[764.94, 927.63]	1469	[1151.74, 1786.90]	924	[850.76, 997.70]	1565	[1388.87, 1740.81]
<i>C</i> Parameter	.19	[0.153, 0.218]	.19	[0.156, 0.224]	.21	[0.177, 0.247]	.22	[0.191, 0.252]
<i>N</i> Parameter	.47	[0.411, 0.523]	.51	[0.452, 0.566]	.56	[0.500, 0.617]	.61	[0.555, 0.667]
<i>I</i> Parameter	.54	[0.486, 0.588]	.57	[0.516, 0.623]	.56	[0.505, 0.623]	.56	[0.499, 0.628]
Experiment 2								
Time (seconds)	833	[739.25, 926.28]	1274	[1089.33, 1458.05]	830	[744.78, 915.89]	1333	[1153.05, 1512.31]
<i>C</i> Parameter	.16	[0.132, 0.196]	.23	[0.197, 0.263]	.16	[0.132, 0.195]	.20	[0.165, 0.228]
<i>N</i> Parameter	.50	[0.447, 0.559]	.58	[0.517, 0.640]	.52	[0.468, 0.578]	.57	[0.517, 0.633]
<i>I</i> Parameter	.63	[0.584, 0.686]	.65	[0.585, 0.706]	.55	[0.501, 0.609]	.59	[0.534, 0.648]
IDA								
Time (seconds)	839	[777.39, 901.40]	1371	[1187.82, 1554.23]	878	[820.94, 934.12]	1450	[1323.49, 1576.33]
<i>C</i> Parameter (CNI)	.17	[0.152, 0.197]	.21	[0.186, 0.234]	.19	[0.164, 0.212]	.21	[0.187, 0.231]
<i>N</i> Parameter (CNI)	.49	[0.446, 0.525]	.54	[0.502, 0.586]	.54	[0.501, 0.581]	.59	[0.553, 0.633]
<i>I</i> Parameter (CNI)	.59	[0.550, 0.624]	.61	[0.568, 0.650]	.56	[0.518, 0.598]	.57	[0.531, 0.618]
<i>C</i> Parameter (NCI)	.31	[0.274, 0.350]	.40	[0.356, 0.444]	.34	[0.304, 0.382]	.43	[0.385, 0.470]
<i>N</i> Parameter (NCI)	.40	[0.364, 0.431]	.42	[0.388, 0.455]	.44	[0.409, 0.480]	.47	[0.432, 0.500]
<i>I</i> Parameter (NCI)	.59	[0.550, 0.624]	.61	[0.569, 0.650]	.56	[0.518, 0.598]	.57	[0.530, 0.616]

Note. *C* Parameter = Sensitivity to Consequences; *N* Parameter = Sensitivity to Moral Norms; *I* Parameter = General Preference for Inaction versus Action; IDA = Integrative Data Analysis.

Figure 1. Processing tree of the CNI model of moral-dilemma responses predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms and consequences involving benefits of action that are either greater or smaller than the costs of action. Adapted from Gawronski et al. (2017). Reprinted with permission from the American Psychological Association.

