

# Effects of Incidental Emotions on Moral Dilemma Judgments: An Analysis Using the CNI Model

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Effects of incidental emotions on moral dilemma judgments have garnered interest because they demonstrate the context-dependent nature of moral decision-making. Six experiments ( $N = 727$ ) investigated the effects of incidental happiness, sadness, and anger on responses in moral dilemmas that pit the consequences of a given action for the greater good (i.e., utilitarianism) against the consistency of that action with moral norms (i.e., deontology). Using the CNI model of moral decision-making, we further tested whether the three kinds of emotions shape moral dilemma judgments by influencing (a) sensitivity to consequences, (b) sensitivity to moral norms, or (c) general preference for inaction versus action regardless of consequences and moral norms (or some combination of the three). Incidental happiness reduced sensitivity to moral norms without affecting sensitivity to consequences or general preference for inaction versus action. Incidental sadness and incidental anger did not show any significant effects on moral dilemma judgments. The findings suggest a central role of moral norms in the contribution of emotional responses to moral dilemma judgments, requiring refinements of dominant theoretical accounts and supporting the value of formal modeling approaches in providing more nuanced insights into the determinants of moral dilemma judgments.

*Keywords:* deontology, emotion, moral judgment, omission bias, utilitarianism

Unlike traditional theories that treat moral judgments as the outcome of deliberate reasoning (e.g., Kohlberg, 1969), recent approaches emphasize the fundamental contribution of emotional processes to moral judgments (see Greene & Haidt, 2002). This contribution involves a major role for both integral and incidental emotions (see Cameron, Payne, & Doris, 2013). Within the domain of moral judgment, integral emotions are states elicited by features of the

to-be-judged action, such as the emotional response to the idea of performing a particular action or the emotional response to an observed action performed by someone else (e.g., Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Haidt, 2001). Incidental emotions are states elicited by features of the broader context, which have no meaningful relation to the to-be-judged action (e.g., Schnall, Haidt, Clore, & Jordan, 2008; Valdesolo & DeSteno, 2006). Effects of incidental emotions have received a great deal of interest in moral psychology, because they demonstrate the context-dependent nature of moral judgments (Sinnott-Armstrong, 2011). Moreover, effects of incidental emotions can provide valuable insights into the role of integral emotions in moral judgments when incidental emotions counteract hypothesized effects of integral emotions (e.g., Valdesolo & DeSteno, 2006).

The main goal of the current research was to investigate the effects of incidental happiness, incidental sadness, and incidental anger on judgments in moral dilemmas that pit the consequences of a given action for the greater good (i.e., utilitarianism) against the consistency of that action with moral norms (i.e., deontology). Using a formal modeling approach to identify conceptually distinct determinants of moral dilemma judgments (Gawronski, Armstrong, Conway, Friesdorf, & Hütter, 2017), we further tested whether the three kinds of incidental emotions shape moral dilemma judgments by influencing (a) sensitivity to consequences, (b) sensitivity to moral norms, or (c) general preference for inaction

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tion versus action regardless of consequences and norms (or some combination of the three). By uncovering the particular manner in which incidental emotions influence moral dilemma judgments, the current findings provide deeper insights into the mental underpinnings of moral judgment, imposing valuable constraints on extant theories of moral decision-making.

### Moral Dilemma Judgments

Expanding on the philosophical distinction between utilitarianism and deontology, a substantial body of research in psychology has aimed to identify the determinants of utilitarian and deontological judgments. According to the principle of utilitarianism, the moral status of a behavioral option depends on its consequences for overall well-being. To the extent that a behavioral option increases overall well-being, it is deemed morally acceptable from a utilitarian view. Yet, if the same behavioral option decreases overall well-being, it is deemed morally unacceptable from a utilitarian view. According to the principle of deontology, the moral status of a behavioral option is derived from its consistency with moral norms. From a deontological view, a behavioral option is morally acceptable if it is consistent with moral norms, but it is morally unacceptable if it is inconsistent with moral norms.

To investigate the determinants of utilitarian and deontological judgments,<sup>1</sup> psychologists have relied on scenarios that pit one principle against the other (e.g., Bartels, 2008; Greene et al., 2001; Koenigs, Young, Adolphs, Tranel, Cushman, Hauser, & Damasio, 2007; Moore, Clark, & Kane, 2008; Nichols & Mallon, 2006; Starcke, Ludwig, & Brand, 2012; Strohminger, Lewis, & Meyer, 2011; Suter & Hertwig, 2011; Valdesolo & DeSteno, 2006). The most prominent example is the trolley problem, in which a runaway trolley would kill a group of five workers unless participants engage in actions to redirect or stop the trolley. In the original switch dilemma, participants have the option to pull a lever to redirect the trolley to another track, where it would kill only one person instead of five (Foot, 1967). Other variants of the trolley problem include the footbridge dilemma, in which the five workers could be saved by pushing a man from a bridge to stop the trolley (Thomson, 1976). According to the principle of utilitarianism, pulling the lever or pushing the man would be morally acceptable, because either action maximizes overall well-being (i.e., it is morally acceptable to kill one person, if it helps to save the lives of five). According to the principle of deontology, both actions are morally unacceptable, because they are in conflict with the moral norm that one should not kill other people (i.e., it is morally unacceptable to kill another person, regardless of the consequences). Thus, participants who view these actions as acceptable are usually claimed to have made a utilitarian judgment, whereas participants who view them as unacceptable are claimed to have made a deontological judgment. To account for empirically observed differences in moral dilemma judgments, Greene's (2007) dual-process theory of moral judgment postulates that utilitarian judgments result from a deliberate cognitive analysis of costs and benefits, whereas deontological judgments are the product of automatic emotional responses to the idea of causing harm.

### The CNI Model

Despite its widespread use in moral psychology, the trolley problem has been criticized on several methodological grounds.

One important critique is that the traditional paradigm treats utilitarian and deontological inclinations as bipolar opposites (i.e., stronger inclinations of one kind are associated with weaker inclinations of the other kind) although their underlying processes are claimed to be independent (Conway & Gawronski, 2013). Thus, it remains unclear whether observed differences in moral dilemma judgments reflect differences in the strength of utilitarian inclinations, differences in the strength of deontological inclinations, or a combination of the two. Another concern is that deontological judgments (e.g., not pulling the lever, not pushing the man) are conflated with inaction, whereas utilitarian judgments (e.g., pulling the lever, pushing the man) are conflated with action (Crone & Laham, 2017). This confound can undermine accurate interpretations of moral dilemma judgments, because the principle of utilitarianism supports action only when action increases well-being, but it would suggest inaction when inaction increases well-being. Similarly, the principle of deontology supports inaction only when a proscriptive norm prohibits action, but it would suggest action when a prescriptive norm prescribes action (Janoff-Bulman, Sheikh, & Hepp, 2009).

To resolve these ambiguities, Gawronski and Beer (2017) proposed an alternative approach in which judgments are compared across four types of moral dilemmas involving different consequences and norms: (a) dilemmas in which a proscriptive norm prohibits action, and the benefits of action for overall well-being are greater than the costs; (b) dilemmas in which a proscriptive norm prohibits action, and the benefits of action for overall well-being are smaller than the costs; (c) dilemmas in which a prescriptive norm prescribes action, and the benefits of action for overall well-being are greater than the costs; and (d) dilemmas in which a prescriptive norm prescribes action and the benefits of action for overall well-being are smaller than the costs (for an example, see Table 1). Expanding on this approach, Gawronski et al. (2017) presented a formal model that provides quantitative estimates of three independent determinants of moral dilemma judgments: (a) sensitivity to consequences, (b) sensitivity to moral norms, and (c) general preference for inaction versus action irrespective of consequences and norms. Whereas sensitivity to consequences and sensitivity to moral norms represent the key aspects of utilitarianism and deontology, general preference for inaction is closely related to the omission bias, which refers to the finding that harm caused by action is often perceived as worse than equivalent harm caused by inaction (Cushman, Young, & Hauser, 2006; Spranca, Minsk, & Baron, 1991).<sup>2</sup>

<sup>1</sup> Note that the terms *utilitarian* and *deontological* in reference to judgments should be read as *characteristically utilitarian* and *characteristically deontological*, insofar as each decision aligns with the majority view for each philosophical position. This interpretation does not imply that decision-makers are expressing commitments to abstract philosophical positions (see Greene, 2007; cf. Kahane, 2015).

<sup>2</sup> A potential objection to this conceptualization is that the omission bias could be interpreted in deontological terms by invoking the principle of doing and allowing. According to the principle of doing and allowing, actively causing harm represents a more serious moral transgression compared to simply allowing harm to happen. From this view, both following moral norms and general preference for inaction could be described as instances of deontological responding in a philosophical sense. However, the two ways of responding are still fundamentally different in a psychological sense, in that they (a) lead to different behavioral outcomes in cases involving prescriptive norms and (b) presumably involve different underlying mechanisms (for a discussion, see Gawronski et al., 2017).

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

Norm	Benefits of action greater than costs	Benefits of action smaller than costs
Proscriptive norm prohibits action	<p>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.</p> <p>Is it acceptable in this case to give the student the medication?</p>	<p>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 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.</p> <p>Is it acceptable in this case to give the student the medication?</p>
Prescriptive norm prescribes action	<p>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 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.</p> <p>Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?</p>	<p>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 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.</p> <p>Is it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?</p>

Note. Dilemmas adapted from Gawronski et al. (2017). Reprinted with permission.

Using multinomial modeling to quantify the three determinants of moral dilemma judgments (Batchelder & Riefer, 1999; Hütter & Klauer, 2016), the CNI model of moral decision-making (Gawronski et al., 2017) quantifies the extent to which participants' judgments in a larger set of moral dilemmas reflect a response pattern that is sensitive to consequences (first row in Figure 1), a response pattern that is sensitive to moral norms (second row in Figure 1), and a response pattern of general inaction versus general action irrespective of consequences and norms (third and fourth row in Figure 1). Sensitivity to consequences is captured by the CNI model's *C* parameter with higher scores reflecting a greater sensitivity to consequences; sensitivity to moral norms is captured by the model's *N* parameter with higher scores reflecting a greater sensitivity to moral norms; and general preference for inaction versus action is captured by the model's *I* parameter with higher scores reflecting a greater general preference for inaction and lower scores reflecting a greater general preference for action irrespective of consequences and moral norms (for other examples of multinomial modeling approaches in moral psychology, see Cameron, Payne, Sinnott-Armstrong, Scheffer, & Inzlicht, 2017; Cameron, Spring, & Todd, 2017).

Because the mathematical underpinnings of the CNI model are explained in detail by Gawronski et al. (2017), we will only summarize the basic steps in analyzing moral dilemma judgments with the CNI model. Based on the processing tree depicted in Figure 1, the CNI model provides four nonredundant mathematical equations to estimate numerical values for the three model parameters (*C*, *N*, *I*) on the basis of the empirically observed probabilities of action versus inaction responses on the four types of moral dilemmas (see Appendix).<sup>3</sup> These equations include the three

model parameters as unknowns and the empirically observed probabilities of action versus inaction responses on the four types of moral dilemmas as known numerical values. Using maximum likelihood statistics, multinomial modeling generates parameter estimates for the three unknowns that minimize the difference between the empirically observed probabilities of action versus inaction responses on the four types of dilemmas and the probabilities of action versus inaction responses predicted by the model equations using the identified parameter estimates. The adequacy of the model in describing the data can be evaluated by means of goodness-of-fit statistics, such that poor model fit would be reflected in a statistically significant deviation between the empirically observed probabilities in a given data set and the probabilities predicted by the model for this data set. Differences in parameter estimates across groups can be tested by enforcing equal estimates for a given parameter across groups. If setting a given parameter equal across groups leads to a significant reduction in model fit, it can be inferred that the parameter estimates for the two groups are significantly different. If setting a given parameter equal across groups does not lead to a significant reduction in model fit, the parameters for the two groups are not significantly different from each other.

<sup>3</sup> Note that the probability of showing an *action* response on a given type of dilemma is statistically redundant with the probability of showing an *inaction* response on that type of dilemma, because  $p(\text{action}) = 1 - p(\text{inaction})$ . Hence, there are only four nonredundant equations in the full set of eight equations depicted in the appendix.

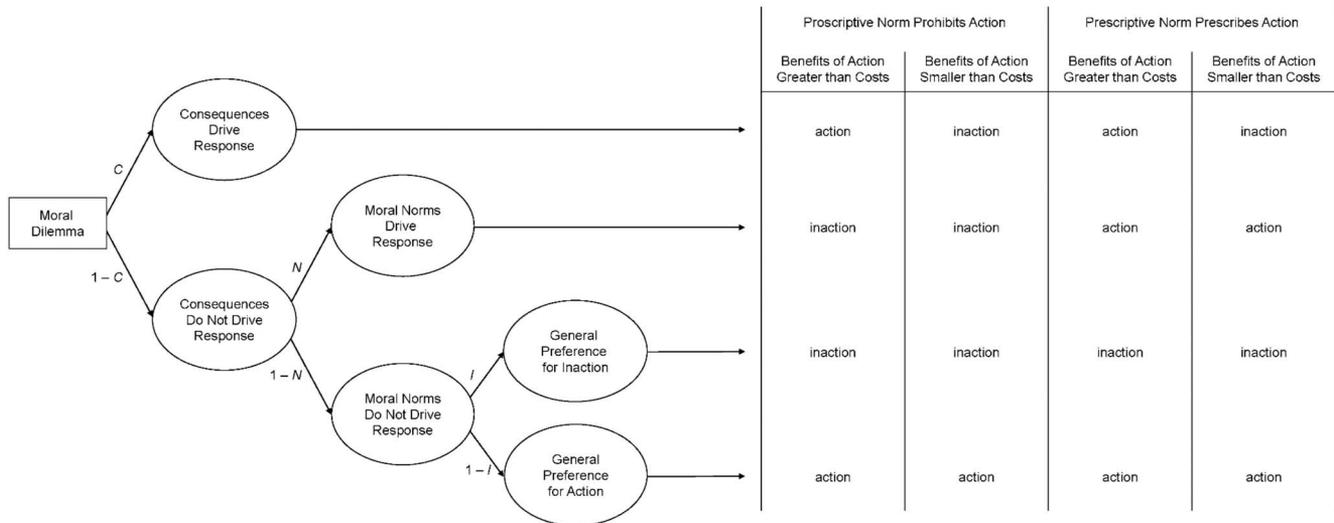


Figure 1. Multinomial processing tree predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms and consequences involving benefits of action that are either greater or smaller than costs of action. Figure adapted from Gawronski et al. (2017). Reprinted with permission.

### CNI Model Versus Dual-Process Theory

An important question concerns the relation between the CNI model and Greene's (2007) dual-process theory of moral judgment. Conceptually, the CNI model is a *descriptive* theory in the sense that it specifies patterns of behavioral responses as a function of moral dilemma characteristics (see Figure 1). It does not include any assumptions about the mental mechanisms underlying the effect of a given dilemma characteristic on behavioral responses. In contrast, Greene's (2007) dual-process theory is a *mechanistic* theory in the sense that it aims to specify the mental mechanisms underlying moral dilemma judgments. The two central hypotheses of Greene's dual-process theory are that (a) utilitarian judgments result from a deliberate cognitive analysis of costs and benefits and (b) deontological judgments are the product of automatic emotional responses to the idea of causing harm. From this perspective, the two theories are not in a competitive relation, because they are concerned with different levels of analysis (De Houwer, 2011; Gawronski & Bodenhausen, 2015). Whereas the CNI model specifies behavioral responses as a function of moral dilemma characteristics (i.e., functional level of analysis, see De Houwer, 2011), Greene's dual-process theory aims to specify the mental mechanisms underlying moral dilemma judgments (i.e., cognitive level of analysis, see De Houwer, 2011). Nevertheless, the two levels of analysis are not entirely independent, given that effects of dilemma characteristics on behavioral responses provide the empirical basis for theories about the mental mechanisms underlying these effects (De Houwer, 2011; Gawronski & Bodenhausen, 2015). Thus, the dual-process theory should be able to provide mental process explanations for the empirical findings obtained with the CNI model. Conversely, research using the CNI model imposes empirical constraints on the mental process assumptions of the dual-process theory.

This conceptualization raises the question of how the parameters of the CNI model are related to the two processes postulated by

Greene's (2007) dual-process theory. Based on a definition of utilitarian judgments as judgments that are sensitive to consequences (Gawronski & Beer, 2017), the dual-process theory would suggest that effects on the  $C$  parameter are mediated by a deliberate cognitive analysis of costs and benefits. Moreover, based on a definition of deontological judgments as judgments that are sensitive to moral norms (Gawronski & Beer, 2017), the dual-process theory would suggest that effects on the  $N$  parameter are mediated by automatic emotional responses to the idea of causing harm. However, it is not entirely clear how the dual-process theory would account for differences in general preference for inaction versus action irrespective of consequences and norms. One possibility is to interpret general preference for inaction as an instance of deontological responding by invoking the principle of doing and allowing (see Footnote 2).<sup>4</sup> In this case, the dual-process theory would have to specify whether automatic emotional responses to the idea of causing harm are assumed to underlie (a) effects of moral norms or (b) general preference for inaction (or both). Such a specification seems important not only for the sake of conceptual precision, but also for empirical reasons. For example, without additional assumptions, the dual-process theory is unable to explain the finding that a dilemma framing in terms of personal action, compared to a framing in terms of moral judgment, increased action aversion on the  $I$  parameter and decreased sensitiv-

<sup>4</sup> Another potential interpretation is that the explanatory scope of Greene's (2007) dual-process theory is limited to cases involving actions that directly inflict physical harm to another person. In this case, the dual-process theory would be unable to explain other instances of norm-congruent responses (e.g., instances involving prescriptive norms), which undermines its value as a mechanistic theory of deontological responses in general. Moreover, the dual-process theory would be unable to distinguish between genuine effects of proscriptive norms and general preference for inaction regardless moral norms, which presumably are mediated by different underlying mechanisms (see Gawronski et al., 2017).

ity to moral norms on the  $N$  parameter (Gawronski et al., 2017, Experiments 3a and 3b). In accounting for these antagonistic effects, the dual-process theory also has to accommodate the finding that cognitive load increased action aversion on  $I$  parameter, without affecting sensitivity to consequences on the  $C$  parameter or sensitivity to moral norms on the  $N$  parameter (Gawronski et al., 2017, Experiments 2a and 2b). The current work imposes further empirical constraints on the assumptions of the dual-process theory by investigating the effects of incidental happiness, sadness, and anger.

### The Current Research

The current work used the CNI model to investigate whether incidental happiness, incidental sadness, and incidental anger shape moral dilemma judgments by influencing (a) sensitivity to consequences, (b) sensitivity to moral norms, or (c) general preference for inaction versus action regardless of consequences and norms (or some combination of the three). Experiments 1a and 1b investigated effects of incidental happiness (compared to a neutral control condition); Experiments 2a and 2b investigated effects of incidental sadness (compared to a neutral control condition); and Experiments 3a and 3b investigated effects of incidental anger (compared to a neutral control condition).

Based on recent concerns about the reproducibility of psychological findings (Open Science Collaboration, 2015), we conducted one initial study and one replication for each of the three emotions. In line with concerns about selective reporting of statistically significant effects (Ioannidis, Munafo, Fusar-Poli, Nosek, & David, 2014), we report the results of all six studies regardless of whether they did or did not produce a statistically significant effect. To provide a stronger basis for interpretations of null effects, we also conducted combined analyses of the data from the two studies on each emotion. For each study, we aimed to recruit 120 participants (i.e., 60 participants per condition), which provides a statistical power of .80 to detect a medium between-groups effect of  $d = .52$  in the difference between two independent mean values (two-tailed); the combined samples of 240 participants provide a statistical power of .80 to detect a small between-groups effect of  $d = .36$  (two-tailed).<sup>5</sup> All data were collected in one shot without intermittent statistical analyses. We report all data, all measures, and all experimental conditions. All data and materials are available at <https://osf.io/e8nrt/>. The studies have been approved by the Institutional Review Board of the University of Texas at Austin under protocol # 2014-12-0010.

### Experiment 1a

Experiment 1a investigated the effects of incidental happiness on (a) sensitivity to consequences, (b) sensitivity to moral norms, and (c) general preference for inaction versus action regardless of consequences and norms. Using the trolley paradigm, Valdesolo and DeSteno (2006) found that participants were more willing to sacrifice the life of one person to save the lives of five under conditions of incidental happiness compared to a neutral control condition (see also Strohlinger et al., 2011). Based on this finding, the authors suggested that incidental happiness increases the tendency to make utilitarian judgments by counteracting the negative affect elicited by the idea of causing harm. Yet, counter to a

description in terms of increased utilitarian inclinations, Greene's (2007) dual-process theory would suggest that tempered negative affect should influence moral judgments by reducing the strength of deontological inclinations (see Conway & Gawronski, 2013). Moreover, the observed outcome could be unrelated to either of the two moral inclinations to the extent that incidental happiness simply increases the willingness to act regardless of consequences and moral norms (see Isen & Patrick, 1983). Thus, from the perspective of the CNI model (Gawronski et al., 2017), Valdesolo and DeSteno's (2006) finding could be due to (a) enhanced sensitivity to consequences, (b) reduced sensitivity to moral norms, or (c) a reduced general preference for inaction under conditions of incidental happiness.

The main goal of Experiment 1a was to test these competing hypotheses. Toward this end, half of the participants were exposed to happy music while reading and responding to a set of 24 moral dilemmas that has been validated for the use of the CNI model (see Gawronski et al., 2017). The remaining half were exposed to emotionally neutral music while reading and responding to the same dilemmas. Drawing on earlier research that used music clips to manipulate incidental emotions (e.g., Kenealy, 1988; Niedenthal & Setterlund, 1994; for a meta-analysis, see Lench, Flores, & Bench, 2011), we expected that exposure to happy versus neutral music would induce corresponding emotional states, which in turn may influence participants' responses to the moral dilemmas. Based on the competing predictions about the effects of incidental happiness, Experiment 1a tested whether incidental happiness leads to (a) an increase in the sensitivity to consequences on the  $C$  parameter, (b) a decrease in the sensitivity to moral norms on the  $N$  parameter, or (c) a decrease in the general preference for inaction on the  $I$  parameter (or some combination of the three).

### Method

**Participants.** A total of 129 undergraduate students at the University of Texas at Austin were recruited for a 1-hr battery on impression formation and moral judgment.<sup>6</sup> The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a happy or neutral condition. To avoid potential confounds between manipulations, between-subjects conditions of the preceding study were randomized independent of the two emotion conditions of the current study. Because of a computer malfunction, data from one participant were lost, leaving us with a final sample of 128 participants (74 women, 54 men;  $M_{\text{age}} = 19.07$ ,  $SD_{\text{age}} = 2.42$ ).

**Procedure.** Participants were asked to read and respond to Gawronski et al.'s (2017) validated set of 24 moral dilemmas.

<sup>5</sup> The sample size decision was based on meta-analytic data by Lench, Flores, and Bench (2011), who reported an average effect of  $d = .53$  for experimental effects of emotional music clips—the method adopted in the current studies to induce incidental emotions—on emotion-relevant outcomes.

<sup>6</sup> Because of excessive sign-ups at the end of the academic term, the final sample in Experiment 1a was slightly larger than the desired sample of 120 participants.

Each dilemma depicted participants as agents who must choose whether to perform a particular action to achieve a particular outcome. Dilemmas were presented individually on a single screen in a fixed random order. For each dilemma, participants indicated whether the described action was acceptable or unacceptable (yes vs. no). The dilemmas included four parallel versions of six basic scenarios that varied in terms of whether (a) the dilemma involved a proscriptive norm that prohibits action or a prescriptive norm that prescribes action and (b) the benefits of the described action were either greater or smaller than its costs. Participants received the following instructions before they were presented with the dilemmas:

On the following screens, you will see a series of scenarios that people may come across in life. Please read them carefully. Even though some scenarios may seem similar, each scenario is different in important ways. After each scenario, you will be asked to make a judgment about whether you find the described action appropriate or inappropriate. Please note that some scenarios refer to things that may seem unpleasant to think about. This is because we are interested in people's thoughts about difficult, real-life issues.

To manipulate incidental emotions, participants were presented with music clips via headphones before and during the completion of the moral dilemmas. Participants in the neutral condition were presented with a looped version of *Common Tones in Simple Time* by John Adams; participants in the happy condition were presented with a looped version of *Eine kleine Nachtmusik* by Wolfgang Amadeus Mozart (see Niedenthal & Setterlund, 1994). For the presentation of the music clips, participants received the following instructions after the presentation of the moral dilemma instructions:

As you read each scenario and make your judgment, we would like you to listen to a musical selection. Please put on the headphones now, and keep them on during the next task. IT IS VERY IMPORTANT THAT YOU LISTEN TO THE MUSICAL PIECE WHILE COMPLETING THIS TASK. We will begin by playing the piece for 1 min so you get used to it, and then your screen will automatically move to the first scenario. If you have any questions or concerns, please alert the experimenter now. Otherwise, press continue to begin the musical piece. Listen closely to the musical piece. The screen will move on after 1 min. Please keep listening and completing the task.

After completing all moral dilemmas, participants rated how they currently felt on six items ranging from 1 (*not at all*) to 7 (*very much*). Two items were used to measure happiness (happy, delighted), two to measure sadness (sad, depressed), and two to measure anger (angry, annoyed).

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's alpha = .82), sadness (Cronbach's alpha = .85), and anger (Cronbach's alpha = .59). Consistent with the intended manipulation of happiness, participants in the happy condition reported being happier than participants in the neutral condition ( $M_s = 3.50$  vs. 2.95, respectively),  $t(126) = 2.96$ ,  $p = .004$ ,  $d = 0.529$ . There were no significant effects of the music clips on self-reported sadness ( $M_s = 2.52$  vs. 2.86, respectively),  $t(126) = -1.46$ ,  $p = .147$ ,  $d = 0.261$ , or anger ( $M_s = 2.50$  vs. 2.68, respectively),

$t(126) = -0.78$ ,  $p = .440$ ,  $d = 0.138$ . Because aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>7</sup> we also tested unique effects of the music clips on each of the three emotions controlling for the respective other two. Toward this end, each emotion score was submitted to an analysis of covariance (ANCOVA) with emotion condition as a fixed factor and the other two emotion scores as covariates. Consistent with the intended manipulation of happiness, participants in the happy condition reported being happier than participants in the neutral condition after controlling for sadness and anger,  $F(1, 124) = 6.91$ ,  $p = .010$ ,  $\eta_p^2 = .053$ . There were no significant effects of the music clips on self-reported sadness after controlling for happiness and anger,  $F(1, 124) = 0.45$ ,  $p = .503$ ,  $\eta_p^2 = .004$ , and on self-reported anger after controlling for happiness and sadness,  $F(1, 124) = 0.24$ ,  $p = .622$ ,  $\eta_p^2 = .002$ .

**Traditional analysis.** Moral dilemma responses were aggregated by calculating the sum of action responses to the four types of moral dilemmas (see Gawronski et al., 2017). With a total of six scenarios for each dilemma type, aggregate scores could range from 0 to 6. Higher scores reflect a greater preference for action over inaction on a given dilemma. Means and 95% confidence intervals are presented in Table 2. Following Gawronski et al. (2017), we first investigated participants' responses on moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Consistent with the findings by Valdesolo and DeSteno (2006), participants in the happy condition tended to show a stronger preference for action over inaction in this type of dilemma than participants in the neutral condition, but this difference was only marginally significant,  $t(126) = 1.93$ ,  $p = .056$ ,  $d = 0.341$  (see Table 2). In terms of the traditional approach, a significant difference of this kind would be interpreted as an enhanced preference for utilitarian over deontological responses as a result of incidental happiness.

**CNI model.** CNI model analyses were conducted using the multinomial modeling software multiTree by Moshagen (2010) and the multiTree template file for CNI model analyses provided by Gawronski et al. (2017) at [http://www.bertramgawronski.com/documents/CNI-Model\\_Materials.zip](http://www.bertramgawronski.com/documents/CNI-Model_Materials.zip). Effect sizes of between-groups differences were calculated with Lipsey and Wilson's (2001) online companion to their practical introduction to meta-analysis at <https://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD8.php> using means, standard errors, and sample sizes. The CNI model fit the data well,  $G^2(2) = 2.08$ ,  $p = .354$ . There was no significant effect of happiness on the  $C$  parameter,  $\Delta G^2(1) = 0.03$ ,  $p = .854$ ,  $d = 0.033$ , or the  $I$  parameter,  $\Delta G^2(1) = 2.26$ ,  $p = .133$ ,  $d = 0.267$  (see Figure 2). The only significant effect emerged for the  $N$  parameter, which showed a weaker sensitivity to moral norms in the happy condition compared to the neutral condition,  $\Delta G^2(1) = 6.20$ ,  $p = .013$ ,  $d = 0.445$  (see Figure

<sup>7</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.34$ ,  $p < .001$ , and self-reported anger,  $r = -.35$ ,  $p < .001$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .49$ ,  $p < .001$ .

Table 2  
Means and 95% Confidence Intervals (CIs) of Action (vs. Inaction) Responses on Moral Dilemmas With Proscriptive and Prescriptive Norms and Consequences Involving Benefits of Action That Are Either Greater or Smaller Than Costs of Action

Study	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	
	<i>M</i>	95% CI						
Study 1a								
Neutral	3.03	[2.71, 3.34]	1.05	[.76, 1.33]	4.64	[4.35, 4.93]	2.88	[2.57, 3.19]
Happy	3.47	[3.15, 3.79]	1.39	[1.09, 1.68]	4.52	[4.22, 4.82]	2.77	[2.45, 3.10]
Study 1b								
Neutral	2.63	[2.29, 2.98]	1.15	[.86, 1.44]	4.67	[4.35, 4.99]	3.15	[2.84, 3.46]
Happy	3.08	[2.74, 3.46]	1.13	[1.04, 1.63]	4.50	[4.18, 4.82]	3.00	[2.69, 3.31]
Study 2a								
Neutral	3.18	[2.84, 3.51]	1.50	[1.18, 1.82]	4.71	[4.43, 4.99]	3.03	[2.69, 3.38]
Sad	3.40	[3.05, 3.75]	1.37	[1.04, 1.70]	4.72	[4.42, 5.01]	2.75	[2.40, 3.11]
Study 2b								
Neutral	3.15	[2.85, 3.45]	1.37	[1.07, 1.67]	4.63	[4.32, 4.94]	2.88	[2.51, 3.26]
Sad	2.83	[2.54, 3.13]	1.32	[1.02, 1.62]	4.67	[4.36, 4.98]	3.12	[2.94, 3.69]
Study 3a								
Neutral	3.32	[3.00, 3.63]	1.45	[1.15, 1.75]	4.38	[4.08, 4.69]	2.92	[2.59, 3.24]
Angry	3.32	[3.00, 3.63]	1.43	[1.13, 1.74]	4.47	[4.16, 4.77]	2.73	[2.41, 3.06]
Study 3b								
Neutral	3.03	[2.69, 3.37]	1.15	[.83, 1.47]	4.62	[4.31, 4.92]	3.13	[2.80, 3.27]
Angry	2.93	[2.59, 3.27]	1.22	[.90, 1.53]	4.83	[4.53, 5.14]	3.25	[2.91, 3.59]

Note. Scores can range from 0 to 6. Higher scores indicate a greater preference for action over inaction. The neutral reference value of equal numbers of action and inaction responses is 3.

2). These results suggest that incidental happiness influences moral dilemma judgments by reducing sensitivity to moral norms. There seems to be no effect of incidental happiness on sensitivity to consequences and general preference for inaction versus action regardless of consequences and norms.

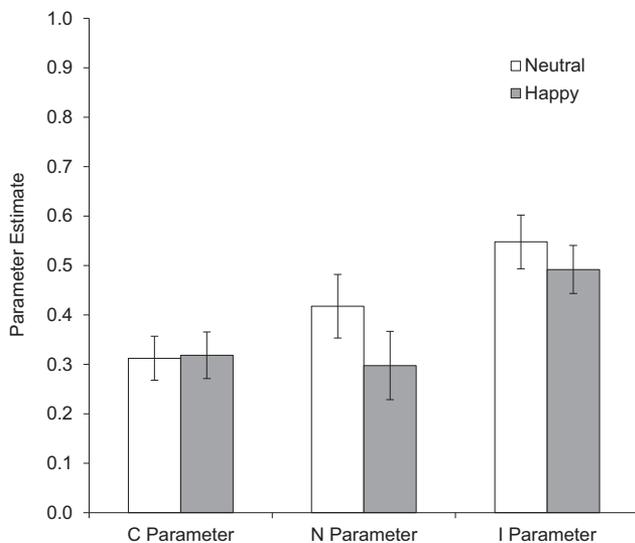


Figure 2. Parameter estimates of sensitivity to consequences (C), sensitivity to norms (N), and general preference for inaction versus action (I) as a function of incidental emotion (neutral vs. happy) in Study 1a. Error bars depict 95% confidence intervals.

## Discussion

The results of Experiment 1a suggest that incidental happiness increases the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Although this effect was only marginally significant, it is consistent with earlier findings by [Valdesolo and DeSteno \(2006\)](#) who found a greater willingness to sacrifice the life of one person to save the lives of five under conditions of incidental happiness (see also [Strohming et al., 2011](#)). Further analyses with the CNI model suggest that this effect was driven by a reduced sensitivity to moral norms as a result of incidental happiness. There was no effect of incidental happiness on sensitivity to consequences and general preference for inaction versus action irrespective of consequences and norms.

## Experiment 1b

Based on recent concerns about the reproducibility of psychological findings ([Open Science Collaboration, 2015](#)), Experiment 1b aimed to replicate the findings of Experiment 1a using the same manipulation and materials.

## Method

**Participants.** A total of 120 undergraduate students at the University of Texas at Austin (89 women, 31 men;  $M_{\text{age}} = 18.83$ ,  $SD_{\text{age}} = 1.31$ ) were recruited for a 1-hr battery on impression formation and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of

incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a happy or neutral condition. To avoid potential confounds between manipulations, between-subjects conditions of the preceding study were randomized independent of the two emotion conditions of the current study.

**Procedure and materials.** Participants were asked to read and respond to the 24 moral dilemmas of Experiment 1a, using the same fixed random order. The manipulation of incidental emotions was identical to Experiment 1a.

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's  $\alpha = .79$ ), sadness (Cronbach's  $\alpha = .78$ ), and anger (Cronbach's  $\alpha = .51$ ). Consistent with the intended manipulation of incidental happiness, participants in the happy condition reported being happier than participants in the neutral condition ( $M_s = 3.21$  vs.  $2.69$ , respectively),  $t(118) = 2.38, p = .019, d = 0.435$ . There were no significant effects of the music clips on self-reported sadness ( $M_s = 2.54$  vs.  $2.82$ , respectively),  $t(118) = -0.96, p = .337, d = 0.176$ , or anger ( $M_s = 2.42$  vs.  $2.39$ , respectively),  $t(118) = 0.14, p = .885, d = 0.026$ . Because aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>8</sup> we also tested unique effects of the music clips on each of the three emotions controlling for the respective other two. Toward this end, each emotion score was submitted to an ANCOVA with emotion condition as a fixed factor and the respective other two emotion scores as covariates. Consistent with the intended manipulation of incidental happiness, participants in the happy condition reported being happier than participants in the neutral condition after controlling for sadness and anger,  $F(1, 116) = 4.99, p = .027, \eta_p^2 = .041$ . There were no significant effects of the music clips on self-reported sadness after controlling for happiness and anger,  $F(1, 116) = 0.28, p = .600, \eta_p^2 = .002$ , and self-reported anger after controlling for happiness and sadness,  $F(1, 116) = 0.64, p = .425, \eta_p^2 = .005$ .

**Traditional analysis.** The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. Following the procedures in Experiment 1a, we first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Analyses using the traditional approach revealed that participants in the happy condition tended to have a stronger preference for action over inaction in this type of dilemma than participants in the neutral condition, but this difference was again only marginally significant,  $t(118) = 1.83, p = .070, d = 0.334$  (see Table 2). In terms of the traditional approach, a significant difference of this kind would be interpreted as an enhanced preference for utilitarian over deontological responses as a result of happiness.

**CNI model.** The CNI model fit the data well,  $G^2(2) = 0.74, p = .691$ . Replicating the results of Experiment 1a, there was a

significant effect on the  $N$  parameter, which showed a weaker sensitivity to moral norms in the happy condition compared to the neutral condition,  $\Delta G^2(1) = 4.19, p = .041, d = 0.377$  (see Figure 3). There were no significant effects of happiness on the  $C$  parameter,  $\Delta G^2(1) = 0.38, p = .538, d = 0.113$ , and the  $I$  parameter,  $\Delta G^2(1) = 0.56, p = .453, d = 0.138$  (see Figure 3).

## Discussion

Experiment 1b replicated the findings of Experiment 1a, suggesting that incidental happiness increases the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Although this effect failed to reach the conventional level of statistical significance in both Experiments 1a and 1b, it is consistent with earlier findings by Valdesolo and DeSteno (2006) who found a greater willingness to sacrifice the life of one person to save the lives of several others due to incidental happiness (see also Strohminger et al., 2011). Expanding on these results, CNI model analyses replicated the key finding of Experiment 1a, showing that incidental happiness reduced sensitivity to moral norms without affecting sensitivity to consequences and general preference for inaction versus action irrespective of consequences and norms.

## Combined Analysis of Experiments 1a and 1b

To obtain greater statistical power for the identification of small effects, we also conducted combined analyses of the data from Experiments 1a and 1b. The combined sample of the two studies ( $N = 248$ ) provides a statistical power of .80 to detect a small between-groups effect of  $d = .36$  (two-tailed).

**Traditional analysis.** We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Analyses using the traditional approach revealed that participants in the happy condition had a significantly stronger preference for action over inaction in this type of dilemma than participants in the neutral condition ( $M_s = 3.28$  vs.  $2.84$ , respectively),  $t(246) = 2.60, p = .010, d = 0.330$ . Although this effect was only marginally significant in the two individual experiments, it did reach statistical significance in the combined analysis. In terms of the traditional approach, this effect suggests an enhanced preference for utilitarian over deontological responses as a result of incidental happiness.

**CNI model.** The CNI model fit the data well for the combined data set,  $G^2(2) = 2.33, p = .312$ . Replicating the results of the two individual experiments, there was a significant effect on the  $N$  parameter, which showed a weaker sensitivity to moral norms in the happy condition compared to the neutral condition,  $\Delta G^2(1) = 10.20, p = .001, d = 0.408$  (see Figure 4). Also replicating the

<sup>8</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.31, p = .001$ , and self-reported anger,  $r = -.21, p = .023$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .40, p < .001$ .

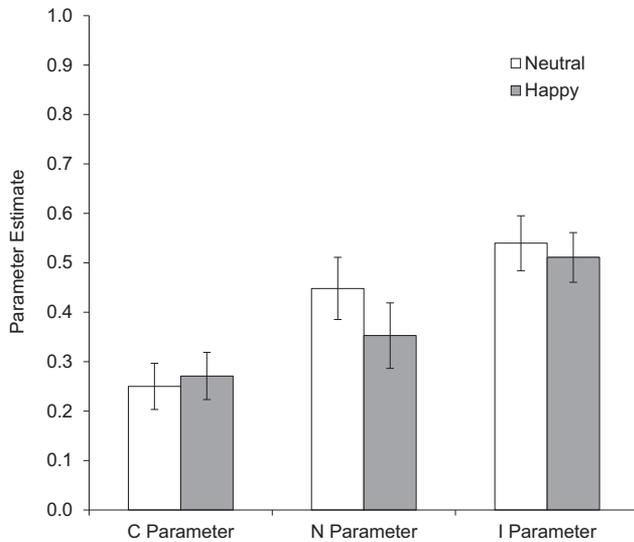


Figure 3. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. happy) in Study 1b. Error bars depict 95% confidence intervals.

results of the two individual experiments, there were no significant effects of incidental happiness on the *C* parameter,  $\Delta G^2(1) = 0.27$ ,  $p = .600$ ,  $d = 0.067$ , and the *I* parameter,  $\Delta G^2(1) = 2.54$ ,  $p = .111$ ,  $d = 0.203$  (see Figure 4). These results corroborate the conclusion that incidental happiness influences moral dilemma judgments by reducing the sensitivity to moral norms. There seems to be no effect of incidental happiness on sensitivity to consequences and general preference for inaction versus action.

### Experiment 2a

Experiment 2a expanded the focus to negative emotional states, investigating effects of incidental sadness on moral dilemma judgments. Although sadness is often treated as the bipolar opposite to happiness on a single emotional dimension, sadness differs from happiness in multiple ways (e.g., valence, arousal), which makes bipolar treatments methodologically and empirically problematic (see Bodenhausen, 1993; Isen, 1987). In one of the few studies that investigated effects of incidental sadness on moral judgments, Schnall et al. (2008) found that incidental sadness, compared to a neutral condition, reduced the disapproval of morally controversial actions (e.g., consensual sex between cousins), but the difference failed to reach statistical significance. To our knowledge, there is no prior research that investigated effects of incidental sadness on responses in moral dilemmas that pit consequences against moral norms.

Drawing on the parameters of the CNI model, there are at least three different ways by which incidental sadness may influence moral dilemma judgments. First, incidental sadness has been shown to increase cognitive elaboration (e.g., Mackie & Worth, 1989; Wegener & Petty, 1994) which, according to Greene's (2007) dual-process theory, should promote the deliberate analysis of costs and benefits. Although Greene's theory suggests that emotional processes play a central role for deontological but not

utilitarian judgments, effects of incidental sadness may be an interesting exception to the extent that sadness enhances cognitive elaboration, which should promote the cognitively effortful analysis of outcomes. Second, it is possible that negative feelings of sadness enhance concerns about norm violations, and thus sensitivity to moral norms. This hypothesis resonates with Valdesolo and DeSteno's (2006) argument regarding compensatory effects of positive affect, in that incidental sadness may enhance the negative feelings elicited by the idea of causing harm. Finally, it is possible that sadness, an emotional state associated with low action potential (Bodenhausen, 1993), enhances general preference for inaction regardless of consequences and norms. In this case, incidental sadness may reduce the relative preference for utilitarian over deontological judgments in the traditional dilemma approach. However, this effect may be independent of both sensitivity to consequences and sensitivity to moral norms, in that incidental sadness may promote inaction regardless of consequences and moral norms.

The main goal of Experiment 2a was to test these competing hypotheses. Toward this end, participants were exposed to sad or neutral music while reading and responding to Gawronski et al.'s (2017) validated set of 24 moral dilemmas. In line with the emotion induction procedure in Experiments 1a and 1b, we expected that exposure to sad versus neutral music would induce corresponding emotional states, which in turn may influence participants' responses to the moral dilemmas. Drawing on the competing predictions about the effects of incidental sadness on moral judgments, Experiment 2a tested whether sadness leads to (a) enhanced sensitivity to consequences on the *C* parameter, (b) enhanced sensitivity to moral norms on the *N* parameter, or (c) enhanced general preference for inaction versus action on the *I* parameter (or some combination of the three). Importantly, within the traditional dilemma approach, an increase in the sensitivity to consequences may be compensated by a simultaneous increase in

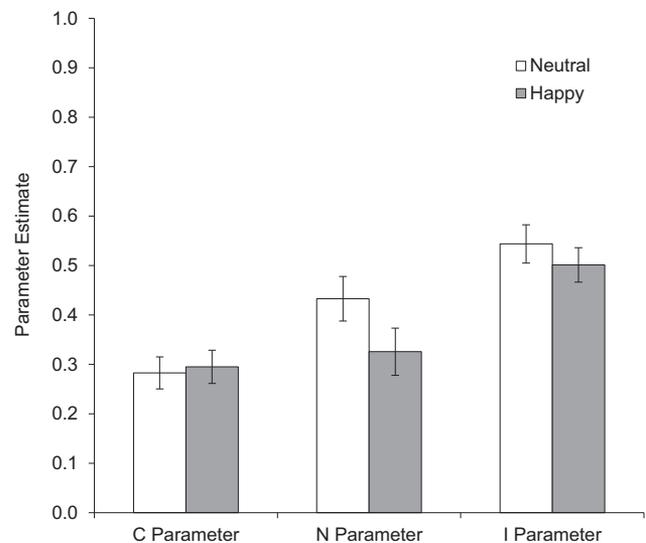


Figure 4. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. happy) in combined data from Studies 1a and 1b. Error bars depict 95% confidence intervals.

the sensitivity to moral norms or general preference for inaction. Thus, a joint operation of these influences may be concealed in the traditional approach, which would falsely suggest that incidental sadness does not have any effects on moral dilemma responses. Analyses with the CNI model can provide a more nuanced picture of the effects of incidental sadness by allowing the identification of simultaneous effects that could not be identified with the traditional approach.

## Method

**Participants.** A total of 123 undergraduate students at the University of Texas at Austin were recruited for a 1-hr battery on impression formation and moral judgment.<sup>9</sup> The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a sad or neutral condition. To avoid potential confounds between manipulations, between-subjects conditions of the preceding study were randomized independent of the two emotion conditions of the current study. Because of experimenter errors, data from four participants were lost, leaving us with a final sample of 119 participants (78 women, 41 men;  $M_{\text{age}} = 19.08$ ,  $SD_{\text{age}} = 1.91$ ).

**Procedure and materials.** Participants were asked to read and respond to the 24 moral dilemmas of Experiment 1a, using the same fixed random order. To manipulate participants' incidental emotions, participants in the neutral condition were presented with a looped version of *Common Tones in Simple Time* by John Adams; participants in the sad condition were presented with a looped version of *East Hastings* by Godspeed You! Black Emperor. Instructions for the emotion manipulation were identical to Experiment 1a. After completion of the moral dilemmas, participants were asked to complete the same manipulation check as in Experiment 1a.

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's  $\alpha = .82$ ), sadness (Cronbach's  $\alpha = .84$ ), and anger (Cronbach's  $\alpha = .66$ ). Consistent with the intended manipulation of incidental sadness, participants in the sad condition reported being sadder than participants in the neutral condition ( $M_s = 3.27$  vs. 2.51, respectively),  $t(117) = 2.82$ ,  $p = .006$ ,  $d = 0.519$ . There was also a marginal effect on self-reported happiness, such that participants in the sad condition tended to be less happy than participants in the neutral condition ( $M_s = 2.89$  vs. 3.31, respectively),  $t(117) = -1.84$ ,  $p = .068$ ,  $d = 0.338$ . There was no significant effect of the music clips on self-reported anger ( $M_s = 2.53$  vs. 2.40, respectively),  $t(117) = -0.52$ ,  $p = .606$ ,  $d = 0.095$ . Because aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>10</sup> we also tested unique effects of the music clips on each of the three emotions controlling for the respective other two. Toward this end, each emotion score was submitted to an ANCOVA with emotion condition as a fixed factor and the respective other two emotion scores as covariates. Con-

sistent with the intended manipulation of sadness, participants in the sad condition reported being sadder than participants in the neutral condition after controlling for happiness and anger,  $F(1, 115) = 7.01$ ,  $p = .009$ ,  $\eta_p^2 = .057$ . There were no significant effects of the music clips on self-reported happiness after controlling for sadness and anger,  $F(1, 115) = 1.20$ ,  $p = .276$ ,  $\eta_p^2 = .010$ , and self-reported anger after controlling for happiness and sadness,  $F(1, 115) = 1.62$ ,  $p = .206$ ,  $\eta_p^2 = .014$ .

**Traditional analysis.** The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. Following the procedures in Experiment 1a, we first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Analyses using the traditional approach did not show a significant effect of sadness on participants' preference for action over inaction in this type of dilemma,  $t(117) = 0.92$ ,  $p = .358$ ,  $d = 0.169$  (see Table 2).

**CNI model.** The CNI model fit the data well,  $G^2(2) = 0.06$ ,  $p = .972$ . There were no significant effects of sadness on the  $C$  parameter,  $\Delta G^2(1) = 2.42$ ,  $p = .119$ ,  $d = 0.288$ , the  $N$  parameter,  $\Delta G^2(1) = 0.12$ ,  $p = .734$ ,  $d = 0.063$ , or the  $I$  parameter,  $\Delta G^2(1) = 0.17$ ,  $p = .678$ ,  $d = 0.077$  (see Figure 5).

## Discussion

Counter to our predictions, Experiment 2a did not show any significant effects of incidental sadness on moral dilemma judgments. Within the traditional dilemma approach, incidental sadness did not influence the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Although analyses with the traditional approach may conceal compensatory effects on sensitivity to consequences, sensitivity to moral norms, and general preference for inaction versus action, analyses with the CNI model further support the conclusion that moral dilemma judgments were unaffected by incidental sadness. That is, incidental sadness did not enhance sensitivity to consequences on the  $C$  parameter; it did not enhance sensitivity to moral norms on the  $N$  parameter; and it did not enhance general preference for inaction versus action on the  $I$  parameter. These null effects emerged despite evidence for the effectiveness of our manipulation in inducing incidental sadness.

## Experiment 2b

Experiment 2b aimed to replicate the findings of Experiment 2a in a follow-up study using the same manipulation and materials.

<sup>9</sup> Because of excessive sign-ups at the end of the academic term, the sample in Experiment 2a was slightly larger than the desired sample of 120 participants.

<sup>10</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.34$ ,  $p < .001$ , and self-reported anger,  $r = -.26$ ,  $p = .005$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .54$ ,  $p < .001$ .

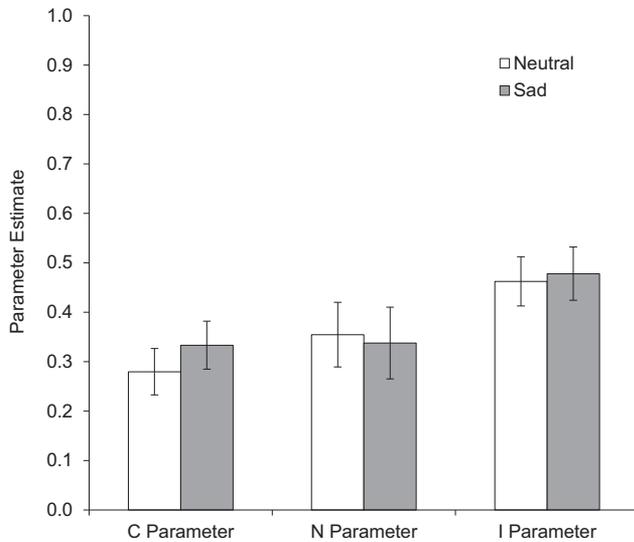


Figure 5. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. sad) in Study 2a. Error bars depict 95% confidence intervals.

## Method

**Participants.** A total of 120 undergraduate students at the University of Texas at Austin (86 women, 34 men;  $M_{\text{age}} = 18.86$ ,  $SD_{\text{age}} = 1.36$ ) were recruited for a 1-hr battery on impression formation and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a sad or neutral condition. To avoid potential confounds between manipulations, between-subjects conditions of the preceding study were randomized independent of the two emotion conditions of the current study.

**Procedure and materials.** Participants were asked to read and respond to the 24 moral dilemmas of Experiment 1a, using the same fixed random order. The manipulation of incidental emotions was identical to Experiment 2a.

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's  $\alpha = .81$ ), sadness (Cronbach's  $\alpha = .84$ ), and anger (Cronbach's  $\alpha = .72$ ). Consistent with the intended manipulation of incidental sadness, participants in the sad condition reported being sadder than participants in the neutral condition ( $M_s = 3.47$  vs. 2.68, respectively),  $t(118) = 2.68$ ,  $p = .008$ ,  $d = 0.491$ . There was also a marginal effect on self-reported happiness, such that participants in the sad condition tended to be less happy than participants in the neutral condition ( $M_s = 2.32$  vs. 2.73, respectively),  $t(118) = -1.85$ ,  $p = .067$ ,  $d = 0.339$ . There was no significant effect of the music clips on self-reported anger ( $M_s = 2.68$  vs.

2.32, respectively),  $t(118) = 1.46$ ,  $p = .148$ ,  $d = 0.266$ . Because aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>11</sup> we also tested unique effects of our emotion manipulation on each of the three emotions controlling for the respective other two emotions. Toward this end, each emotion score was submitted to an ANCOVA with emotion condition as a fixed factor and the respective other two emotion scores as covariates. Consistent with the intended manipulation of sadness, participants in the sad condition reported being sadder than participants in the neutral condition after controlling for happiness and anger, but this difference was only marginally significant,  $F(1, 116) = 3.18$ ,  $p = .077$ ,  $\eta_p^2 = .027$ . There were no significant effects of the music clips on self-reported happiness after controlling for sadness and anger,  $F(1, 116) = 0.86$ ,  $p = .357$ ,  $\eta_p^2 = .007$ , and self-reported anger after controlling for happiness and sadness,  $F(1, 116) = 0.005$ ,  $p = .945$ ,  $\eta_p^2 < .001$ .

**Traditional analysis.** The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Analyses using the traditional approach did not show a significant effect of incidental sadness on participants' preference for action over inaction in this type of dilemma,  $t(118) = 1.49$ ,  $p = .139$ ,  $d = 0.272$  (see Table 2).

**CNI model.** The CNI model fit the data well,  $G^2(2) = 0.34$ ,  $p = .842$ . Replicating the findings of Experiment 2a, there were no significant effects of incidental sadness on the *C* parameter,  $\Delta G^2(1) = 2.63$ ,  $p = .105$ ,  $d = 0.299$ , the *N* parameter,  $\Delta G^2(1) = 1.92$ ,  $p = .166$ ,  $d = 0.255$ , or the *I* parameter,  $\Delta G^2(1) = 0.04$ ,  $p = .848$ ,  $d = 0.035$  (see Figure 6).

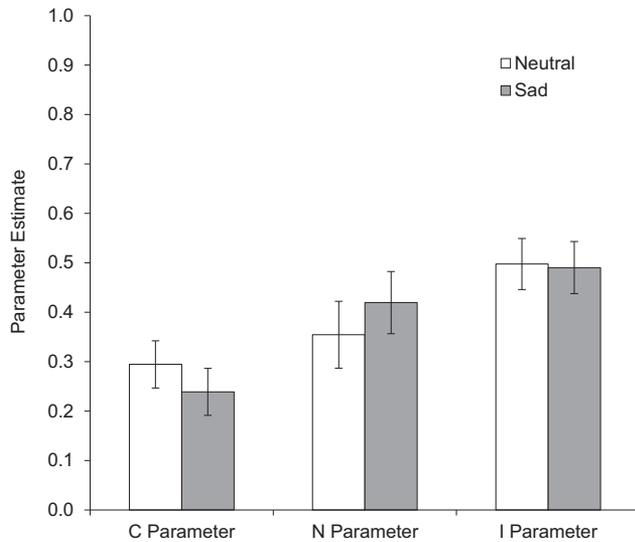
## Discussion

Although manipulations checks again confirmed the effectiveness of our emotion manipulation, Experiment 2b did not show any significant effects of incidental sadness on moral dilemma judgments. Within the traditional approach, incidental sadness did not influence the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Analyses with the CNI model further suggest that incidental sadness did not influence sensitivity to consequences, sensitivity to moral norms, or general preference for inaction versus action regardless of consequences and norms. These results replicate the findings of Experiment 2a, suggesting that moral dilemma judgments may be insensitive to effects of incidental sadness.

## Combined Analysis of Experiments 2a and 2b

To obtain greater statistical power for the identification of small effects, we also conducted combined analyses of the data from

<sup>11</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.38$ ,  $p < .001$ , and self-reported anger,  $r = -.19$ ,  $p = .036$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .59$ ,  $p < .001$ .



**Figure 6.** Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. sad) in Study 2b. Error bars depict 95% confidence intervals.

Experiments 2a and 2b. Such analyses seem particularly important in the current case, given that neither Experiment 2a nor Experiment 2b found a significant effect of incidental sadness. The combined sample of the two studies ( $N = 239$ ) provided a statistical power of .80 to detect a small between-groups effect of  $d = .36$  (two-tailed).

**Traditional analysis.** We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Replicating the results of the two individual experiments, analyses using the traditional approach did not show a significant effect of incidental sadness on participants' preference for action over inaction in this type of dilemma,  $t(237) = 0.32$ ,  $p = .747$ ,  $d = 0.042$  (see Table 2).

**CNI model.** The CNI model fit the data well for the combined data set,  $G^2(2) = 0.34$ ,  $p = .844$ . Replicating the results of the two individual experiments, there were no significant effects of incidental sadness on the *C* parameter,  $\Delta G^2(1) = 0.01$ ,  $p = .933$ ,  $d = 0.011$ , the *N* parameter,  $\Delta G^2(1) = 0.67$ ,  $p = .414$ ,  $d = 0.106$ , or the *I* parameter,  $\Delta G^2(1) = 0.03$ ,  $p = .855$ ,  $d = 0.024$  (see Figure 7). These results corroborate our conclusion that moral dilemma judgments may be unaffected by incidental sadness.<sup>12</sup>

### Experiment 3a

Experiment 3a investigated effects of incidental anger on moral dilemma judgments. Although both anger and sadness have a negative experiential quality, the two emotions differ in terms of their associated levels of arousal. Whereas sadness is characterized by low arousal, anger is characterized by high arousal (Russell,

2003). Moreover, whereas sadness has been associated with a motivational state of avoidance, anger involves a motivational state of approach (e.g., Harmon-Jones & Allen, 1998; Krieglmeier & Deutsch, 2013). Both of these features are critical for understanding potential effects of incidental anger on moral dilemma judgments, in that anger may increase general action tendencies via enhanced arousal and approach orientation. Within the traditional dilemma paradigm, such an increase in general action tendencies should lead to a greater willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Consistent with this hypothesis, several studies using the trolley problem found that incidental anger is associated with a greater willingness to sacrifice the life of one person to save the lives of multiple others (e.g., Baron, Gürçay, & Luce, 2017; Ugazio, Lamm, & Singer, 2012). However, counter to traditional interpretations of this effect in terms of increased "utilitarianism" as a result of anger, it may simply reflect an enhanced tendency to act in a state of incidental anger. Alternatively, incidental anger may reduce sensitivity to moral norms, which should similarly lead to a greater willingness to accept harmful actions in the traditional dilemma approach.

The main goal of Experiment 3a was to test these hypotheses. Toward this end, half of the participants were exposed to a music clip of free jazz with extremely discordant sounds and no traditional melody; the remaining half were exposed to emotionally neutral music. The rationale underlying this manipulation was that participants would experience the exposure to cacophonous, discordant sounds as rather aversive, which should induce a state of incidental anger.<sup>13</sup> Participants in both groups were asked to respond to Gawronski et al.'s (2017) validated set of 24 moral dilemmas while being exposed to the music clips. Drawing on the competing predictions about the effects of incidental anger on moral judgments, the study tested whether incidental anger leads to (a) an increase in the sensitivity to consequences on the *C* parameter, (b) a decrease in the sensitivity to moral norms on the *N* parameter, or (c) a decrease in the general preference for inaction versus action on the *I* parameter (or a combination of the three).

### Method

**Participants.** A total of 120 undergraduate students at the University of Texas at Austin (73 women, 47 men;  $M_{age} = 18.65$ ,  $SD_{age} = 1.01$ ) were recruited for a 1-hr battery on impression formation and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either an angry or neutral condition. To avoid potential confounds, between-subjects conditions of the preceding study

<sup>12</sup> Alternatively, it is possible that incidental sadness does influence moral dilemma judgments, but these effects may be too small to be detectable with the current sample. Based on the largest effect size in the combined analysis ( $d = 0.106$ ), one would need a sample size of  $N = 2,798$  to detect a statistically significant between-groups difference in mean values with a power of .80.

<sup>13</sup> We thank David Pizzaro for suggesting this way of manipulating incidental anger.

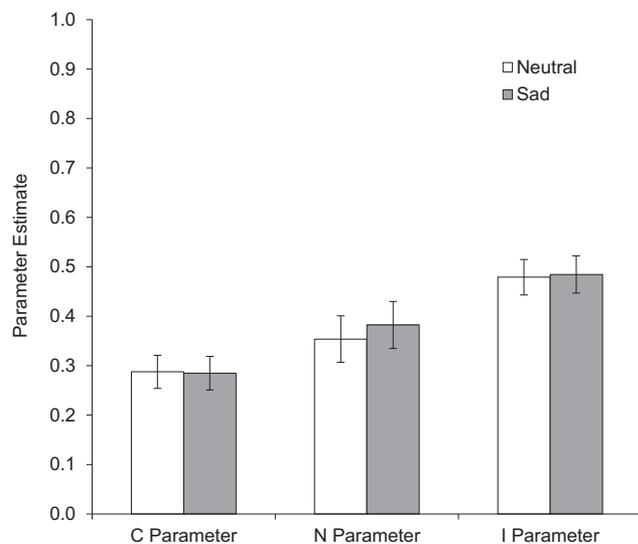


Figure 7. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. sad) in combined data from Studies 2a and 2b. Error bars depict 95% confidence intervals.

were randomized independent of the two emotion conditions of the current study.

**Procedure and materials.** Participants were asked to read and respond to the same 24 moral dilemmas of Experiment 1a, using the same fixed random order. To manipulate participants' incidental emotions, participants in the neutral condition were presented with a looped version of *Common Tones in Simple Time* by John Adams. Participants in the angry condition were presented with a looped version of *Throat I* by Little Women, a piece of free jazz with extremely discordant sounds and no traditional melody. Instructions for the emotion manipulation were identical to Experiment 1a. After completion of the moral dilemmas, participants were asked to complete the same manipulation check as in Experiment 1a.

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's  $\alpha = .71$ ), sadness (Cronbach's  $\alpha = .75$ ), and anger (Cronbach's  $\alpha = .65$ ). Consistent with the intended manipulation of anger, participants in the angry condition reported being angrier than participants in the neutral condition ( $M_s = 3.47$  vs.  $2.58$ , respectively),  $t(118) = 3.50$ ,  $p = .001$ ,  $d = 0.640$ . There was also a significant effect on self-reported happiness, such that participants in the angry condition were less happy than participants in the neutral condition ( $M_s = 2.57$  vs.  $3.01$ , respectively),  $t(118) = -2.17$ ,  $p = .032$ ,  $d = 0.397$ . There was no significant effect of the music clips on self-reported sadness ( $M_s = 2.43$  vs.  $2.73$ , respectively),  $t(118) = -1.25$ ,  $p = .213$ ,  $d = 0.228$ . Because aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>14</sup> we also tested unique effects of our emotion manipulation on each of the three emotions controlling for the respective other two. Toward this end, each emotion score was submitted to

an ANCOVA with emotion condition as a fixed factor and the respective other two emotion scores as covariates. Consistent with the intended manipulation of anger, participants in the angry condition reported being angrier than participants in the neutral condition after controlling for happiness and sadness,  $F(1, 116) = 14.71$ ,  $p < .001$ ,  $\eta_p^2 = .113$ . The effect of the music clips on self-reported happiness was only marginal after controlling for sadness and anger,  $F(1, 116) = 3.12$ ,  $p = .080$ ,  $\eta_p^2 = .026$ . For self-reported sadness, there was a significant effect of the music clips after controlling for happiness and anger, such that participants in the angry condition reported being less sad than participants in the control condition,  $F(1, 116) = 8.37$ ,  $p = .005$ ,  $\eta_p^2 = .067$ .

**Traditional analysis.** Moral dilemma responses were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Counter to the results of earlier studies (e.g., Baron et al., 2017; Ugazio et al., 2012), analyses using the traditional approach did not show a significant effect of incidental anger on participants' preference for action over inaction in this type of dilemma,  $t(118) < 0.01$ ,  $p = 1.00$ ,  $d = 0.00$  (see Table 2).

**CNI model.** The CNI model fit the data well,  $G^2(2) = 2.08$ ,  $p = .353$ . There was no significant effect of incidental anger on the *C* parameter,  $\Delta G^2(1) = 0.46$ ,  $p = .497$ ,  $d = 0.125$ , the *N* parameter,  $\Delta G^2(1) < 0.00001$ ,  $p = .999$ ,  $d < 0.001$ , or the *I* parameter,  $\Delta G^2(1) = 0.04$ ,  $p = .836$ ,  $d = 0.038$  (see Figure 8).

## Discussion

Counter to our predictions, Experiment 3a did not show any significant effects of incidental anger on moral dilemma judgments. Within the traditional dilemma approach, incidental anger did not influence the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. This finding stands in contrast to the results of earlier research with the trolley paradigm, suggesting that incidental anger is associated with a greater willingness to sacrifice the life of one person to save the lives of multiple others (e.g., Baron et al., 2017; Ugazio et al., 2012). Although manipulation checks confirmed the effectiveness of our emotion manipulation, analyses with the CNI model further showed that incidental anger did not influence sensitivity to consequences, sensitivity to moral norms, or general preference for inaction versus action.

## Experiment 3b

Experiment 3b aimed to replicate the findings of Experiment 3a in a follow-up study using the same materials.

<sup>14</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.20$ ,  $p = .027$ , and self-reported anger,  $r = -.26$ ,  $p = .004$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .33$ ,  $p < .001$ .

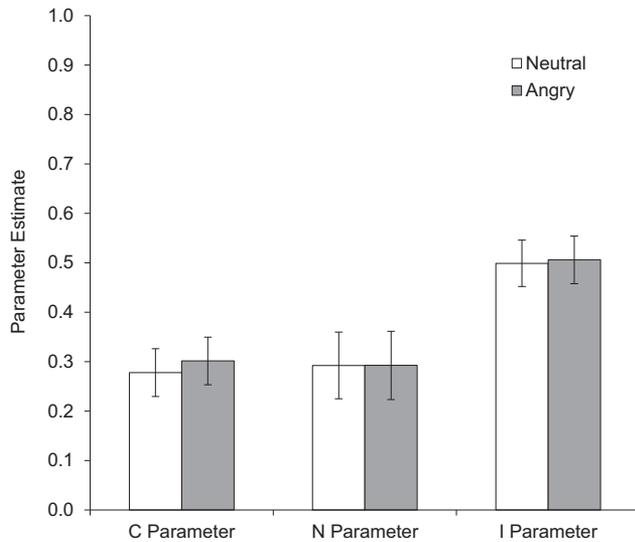


Figure 8. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. angry) in Study 3a. Error bars depict 95% confidence intervals.

## Method

**Participants.** A total of 120 undergraduate students at the University of Texas at Austin (82 women, 38 men;  $M_{\text{age}} = 18.80$ ,  $SD_{\text{age}} = 1.13$ ) were recruited for a 1-hr battery on impression formation and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. To avoid spillover effects from the manipulation of incidental emotions, the current experiment was always run as the second one in the battery. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either an angry or neutral condition. To avoid potential confounds between manipulations, between-subjects conditions of the preceding study were randomized independent of the two emotion conditions of the current study.

**Procedure and materials.** Participants were asked to read and respond to the 24 moral dilemmas of Experiment 1a, using the same fixed random order. The anger manipulation was identical to Experiment 3a.

## Results

**Manipulation check.** Emotion ratings were aggregated by calculating mean scores for happiness (Cronbach's  $\alpha = .78$ ), sadness (Cronbach's  $\alpha = .84$ ), and anger (Cronbach's  $\alpha = .60$ ). Consistent with the intended manipulation of anger, participants in the angry condition reported being angrier than participants in the neutral condition ( $M_s = 3.67$  vs. 2.58, respectively),  $t(118) = 4.37$ ,  $p < .001$ ,  $d = 0.800$ . There were also marginal effects on self-reported happiness and sadness, such that participants in the angry condition tended to be less happy ( $M_s = 2.55$  vs. 2.93, respectively),  $t(118) = -1.97$ ,  $p = .051$ ,  $d = 0.362$ , and less sad ( $M_s = 2.52$  vs. 3.05, respectively),  $t(118) = -1.76$ ,  $p = .081$ ,  $d = 0.325$ , than participants in the neutral condition. Because

aggregate scores of self-reported happiness, sadness, and anger were significantly correlated,<sup>15</sup> we also tested unique effects of the music clips on each of the three emotions controlling for the respective two other emotions. Toward this end, each emotion score was submitted to an ANCOVA with emotion condition as a fixed factor and the respective other two emotion scores as covariates. Consistent with the intended manipulation of anger, participants in the angry condition reported being angrier than participants in the neutral condition after controlling for happiness and sadness,  $F(1, 116) = 29.35$ ,  $p < .001$ ,  $\eta_p^2 = .202$ . The effect of the music clips on self-reported happiness was still marginal after controlling for sadness and anger,  $F(1, 116) = 3.80$ ,  $p = .054$ ,  $\eta_p^2 = .032$ . For self-reported sadness, the formerly marginal effect of our emotion manipulation was significant after controlling for happiness and anger, such that participants in the angry condition reported being less sad than participants in the control condition,  $F(1, 116) = 17.33$ ,  $p < .001$ ,  $\eta_p^2 = .130$ .

**Traditional analysis.** The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Analyses using the traditional approach did not show a significant effect of incidental anger on participants' preference for action over inaction in this type of dilemma,  $t(118) = 0.41$ ,  $p = .680$ ,  $d = 0.076$  (see Table 2).

**CNI model.** The CNI model fit the data well,  $G^2(2) = 2.14$ ,  $p = .343$ . Replicating the findings of Experiment 3a, there were no significant effects of incidental anger on the *C* parameter,  $\Delta G^2(1) = 0.03$ ,  $p = .859$ ,  $d = 0.033$ , the *N* parameter,  $\Delta G^2(1) = 0.66$ ,  $p = .417$ ,  $d = 0.149$ , or the *I* parameter,  $\Delta G^2(1) = 0.79$ ,  $p = .375$ ,  $d = 0.163$  (see Figure 9).

## Discussion

Although manipulations checks again supported the effectiveness of our emotion manipulation, Experiment 3b did not obtain any significant effects of incidental anger on moral dilemma judgments. Within the traditional approach, incidental anger did not influence the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. Analyses with the CNI model further revealed that incidental anger did not influence sensitivity to consequences, sensitivity to moral norms, or general preference for inaction versus action regardless of consequences and norms. These results replicate the findings of Experiment 3a, suggesting that moral dilemma judgments may be insensitive to effects of incidental anger.

<sup>15</sup> Self-reported happiness was negatively correlated with self-reported sadness,  $r = -.22$ ,  $p = .016$ , and self-reported anger,  $r = -.21$ ,  $p = .024$ ; self-reported sadness was positively correlated with self-reported anger,  $r = .35$ ,  $p < .001$ .

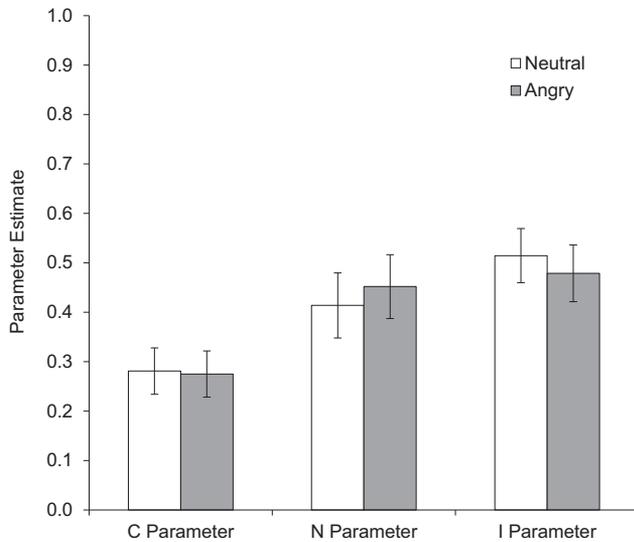


Figure 9. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. angry) in Study 3b. Error bars depict 95% confidence intervals.

### Combined Analysis of Experiments 3a and 3b

To obtain greater statistical power for the identification of small effects, we also conducted combined analyses of the data from Experiments 3a and 3b. The combined sample of the two studies ( $N = 240$ ) provided a statistical power of .80 to detect a small between-groups effect of  $d = .36$  (two-tailed).

**Traditional analysis.** We first analyzed participants' responses in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being. In the traditional approach, a greater preference for action over inaction on this type of dilemma would be interpreted as a greater preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). Replicating the results of the two individual experiments, analyses using the traditional approach did not show a significant effect of incidental anger on participants' preference for action over inaction in this type of dilemma,  $t(238) = 0.30$ ,  $p = .764$ ,  $d = 0.039$  (see Table 2).

**CNI model.** The CNI model fit the data well for the combined data set,  $G^2(2) = 4.21$ ,  $p = .122$ . Replicating the results of the two individual experiments, there were no significant effects of incidental anger on the *C* parameter,  $\Delta G^2(1) = 0.13$ ,  $p = .715$ ,  $d = 0.047$ , the *N* parameter,  $\Delta G^2(1) = 0.37$ ,  $p = .542$ ,  $d = 0.079$ , or the *I* parameter,  $\Delta G^2(1) = 0.21$ ,  $p = .645$ ,  $d = 0.060$  (see Figure 10). These results corroborate our conclusion that moral dilemma judgments may be insensitive to effects of incidental anger.<sup>16</sup>

### General Discussion

The main goal of the current research was to investigate the effects of incidental happiness, incidental sadness, and incidental anger on moral dilemma judgments. Using the CNI model of moral decision-making (Gawronski et al., 2017), we were particularly

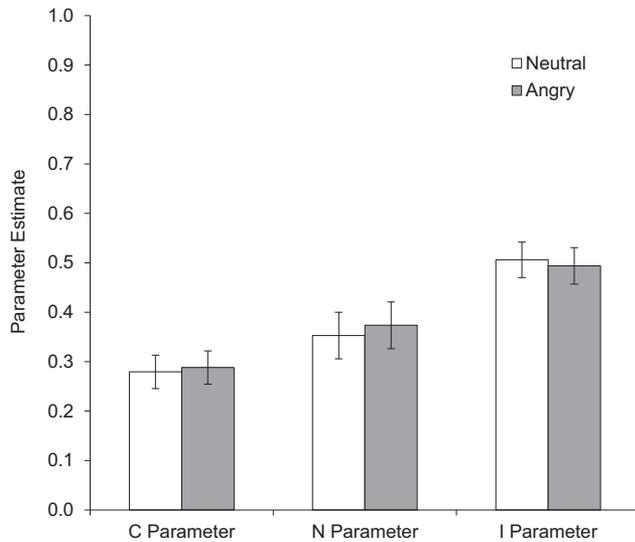
interested in whether the three kinds of emotions shape moral dilemma judgments by influencing (a) sensitivity to consequences, (b) sensitivity to moral norms, or (c) general preference for inaction versus action regardless of consequences and moral norms (or some combination of the three). Our results suggest that incidental happiness influences moral dilemma judgments by reducing sensitivity to moral norms. There were no significant effects of incidental happiness on sensitivity to consequences and general preference for inaction versus action. Moral dilemma judgments were unaffected by incidental sadness and incidental anger.

### Incidental Happiness

Using the traditional approach to analyzing moral dilemma judgments, we found that incidental happiness increased the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to aggregate well-being. This finding replicates earlier results by Valdesolo and DeSteno (2006), who found a greater willingness to sacrifice the life of one person to save the lives of multiple others under conditions of incidental happiness (see also Strohminger et al., 2011). Drawing on Greene's (2007) dual-process theory of moral judgment, Valdesolo and DeSteno argued that incidental happiness counteracts the negative affect elicited by the idea of causing harm, which in turn increases the willingness to engage in harmful action for the greater good.

Although this interpretation fits well for scenarios involving actions that are prohibited by proscriptive norms (e.g., harming or killing another person), it does not fit well for scenarios in which prescriptive norms prescribe a particular action (e.g., helping or saving another person). To illustrate this difference, consider the two dilemmas in the upper left and lower right quadrants of Table 1. In the dilemma described in the upper left quadrant, giving the student the medication would kill her, but it would save many lives by stopping the virus from spreading (i.e., proscriptive norm prohibits action, but benefits of action are greater than the costs of action). In this case, a negative emotional reaction to the idea of causing harm by performing the focal action should promote inaction—a decision that is *consistent* with the relevant proscriptive norm. In the dilemma described in the lower right quadrant (i.e., prescriptive norm prescribes action, but benefits of action are smaller than the costs of action), saving the student's life by taking her out of quarantine for proper treatment involves a risk that the virus will spread and kill many other people. In this case, a negative emotional reaction to the idea of causing harm by performing the focal action should also promote inaction—a decision that is *inconsistent* with the relevant prescriptive norm. From this perspective, negative emotional reactions to the idea of causing harm should enhance general preference for inaction rather than sensitivity to moral norms. Thus, to the extent that incidental happiness counteracts negative emotional reactions to the idea of causing harm, it should reduce general preference for inaction

<sup>16</sup> Alternatively, it is possible that incidental anger does influence moral dilemma judgments, but these effects may be too small to be detectable with the current sample. Based on the largest effect size in the combined analysis ( $d = 0.079$ ), one would need a sample size of 5,034 to detect a statistically significant between-groups difference in mean values with a power of .80.



**Figure 10.** Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of incidental emotion (neutral vs. angry) in combined data from Studies 3a and 3b. Error bars depict 95% confidence intervals.

versus action on the *I* parameter. However, this is not what we found in the current research. Instead, we found that incidental happiness led to a significant reduction in the sensitivity to moral norms on the *N* parameter, but there was no significant effect of incidental happiness on the *I* parameter.

To clarify the nature of the obtained effect of incidental happiness, it seems useful to separately consider cases involving proscriptive and prescriptive norms. In cases involving a proscriptive norm that prohibits action, our results suggest that incidental happiness reduces the likelihood of norm-congruent behavior by promoting action. Conversely, in cases involving a prescriptive norm that prescribes action, our results suggest that incidental happiness reduces the likelihood of norm-congruent behavior by promoting inaction. A potential interpretation of this pattern is that incidental happiness alleviates negative emotional reactions to the idea of violating moral norms (see Nichols & Mallon, 2006). Such an interpretation is consistent with Greene et al.'s (2001) hypothesis that deontological judgments are rooted in emotional responses. At the same time, it suggests a different interpretation of their cognitive antecedent. Instead of being elicited by the idea of causing harm, emotional responses underlying deontological judgments are more likely elicited by the idea of violating moral norms.

Although the difference between the two interpretations may seem relatively minor, it has fundamental implications for Greene's (2007) assumption that deontological judgments do not involve a reasoned application of moral norms. To the extent that deontological judgments are rooted in emotional responses to the idea of violating moral norms, thoughts about moral norms would still function as a distal determinant of deontological judgments by shaping emotional responses to the idea of norm violations as a proximal determinant (see Nichols & Mallon, 2006). Thus, although the current findings are consistent with the hypothesis that deontological judgments are rooted in emotional responses, they require a nontrivial reinterpretation of the presumed cognitive

antecedent in terms of norm violations rather than harmful action. This reinterpretation reintroduces a central role for reasoned applications of moral norms (see also Holyoak & Powell, 2016), a role that has been rejected by the dual-process theory of moral dilemma judgments (Cushman, Young, & Greene, 2010; Greene, 2007).

### Incidental Sadness

Although sadness is sometimes treated as the bipolar opposite of happiness, many emotion researchers would argue that a bipolar conceptualization of happiness and sadness simplifies the complexity of the two emotional states (e.g., Bodenhausen, 1993; Isen, 1987). The findings of the current research echo these concerns. A bipolar conceptualization would suggest that incidental sadness should influence moral judgments in a manner that is opposite to the effect obtained for incidental happiness. That is, given that incidental happiness decreased sensitivity to moral norms, incidental sadness should increase sensitivity to moral norms. Theoretically, it is certainly possible that incidental sadness increases concerns about potential violations of moral norms. However, the current studies did not provide any support for this hypothesis.

Another theoretical possibility is that incidental sadness promotes cognitive elaboration either by enhancing the motivation to engage in effortful processing (see Wegener & Petty, 1994) or by easing demands on cognitive resources (see Mackie & Worth, 1989). To the extent that utilitarian analyses of costs and benefits are cognitively effortful (see Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Suter & Hertwig, 2011), incidental sadness may increase sensitivity to consequences in a utilitarian sense. Again, the current studies did not provide any support for this hypothesis. Although this outcome may seem surprising based on Greene's (2007) dual-process theory, it seems less surprising in light of recent findings with the CNI model. Counter to the hypothesis that utilitarian analyses of costs and benefits are cognitively effortful (Greene et al., 2008; Suter & Hertwig, 2011), Gawronski et al. (2017) found that sensitivity to consequences was unaffected by cognitive load. Instead, cognitive load influenced moral dilemma judgments by increasing general preference for inaction versus action regardless of consequences and norms.<sup>17</sup> Thus, to the extent that utilitarian analyses of costs and benefits are relatively efficient in the sense that they require minimal resources, enhanced cognitive elaboration as a result of incidental sadness seems unlikely to influence people's sensitivity to consequences.

A third possibility is that sadness, an emotional state with low action potential, simply causes a general reluctance to act. As a result, incidental sadness may influence moral dilemma judgments by enhancing general preference for inaction versus action regardless of consequences and norms. Again, the current research did not provide any evidence for this hypothesis. Counter to the three theoretically derived predictions, moral dilemma judgments were unaffected by incidental sadness in the two individual experiments

<sup>17</sup> According to Gawronski et al. (2017), participants under high cognitive load may feel that they do not have the capacity to make a well-informed decision. As a result, they may prefer not to engage in any action regardless of consequences and norms, because harm caused by action is typically perceived as more severe than the same amount of harm caused by inaction (Cushman et al., 2006).

as well as the combined analyses. Of course, it is still possible that incidental sadness has actually existing effects on moral dilemma judgments that are too small to detect with sample sizes in the current research (see Footnote 12). Similarly, it is possible that other manipulations of incidental sadness are more effective in influencing moral dilemma judgments compared to the current manipulations using emotional music clips. However, in the absence of further evidence, the three hypotheses about effects of incidental sadness on moral dilemma judgments remain empirically unfounded.

### Incidental Anger

Contrary to the low action potential associated with sadness, anger is a negative emotional state with high action potential. Thus, one straightforward prediction about the effect of incidental anger is that it may reduce general preference for inaction regardless of consequences and norms. Within the traditional dilemma paradigm, this influence may lead to a greater willingness to sacrifice the well-being of one person to increase the well-being of multiple others, which is consistent with earlier evidence on effects of incidental anger (e.g., Baron et al., 2017; Ugazio et al., 2012). However, from the perspective of the CNI model, it would be premature to interpret this effect as reflecting an increase in people's concern with maximizing the greater good. Instead, it seems more likely that incidental anger increases people's willingness to perform a focal action regardless of its consequences and regardless of moral norms. Yet, counter to the results of earlier studies, there was no significant effect of incidental anger in the current research. In the traditional approach to analyze moral dilemma judgments, there was no effect of incidental anger on the willingness to act when a proscriptive norm prohibits action and the benefits of action outweigh the costs to well-being. CNI model analyses further showed that incidental anger did not influence sensitivity to consequences, sensitivity to moral norms, and general preference for inaction versus action regardless of consequences and norms. Effect sizes in the combined analysis were close to zero (all  $d$ s < 0.08), suggesting that moral dilemma judgments were indeed unaffected by incidental anger (see Footnote 16).

A potential limitation that may account for the failure to replicate earlier findings on the effects of incidental anger is that our anger manipulation had spillover effects on other emotion dimensions. Whereas the manipulations of incidental happiness and incidental sadness were relatively clean in the sense that they had a dominant effect on the focal emotional state, the manipulation of incidental anger had spillover over effects on happiness and sadness. Although these spillover effects were substantially weaker compared to the focal effect on self-reported anger, these (theoretically plausible) effects could have undermined the detection of antagonistic effects of incidental anger on moral dilemma judgments. To the extent that incidental happiness or incidental sadness have effects that are opposite to the ones of incidental anger, these effects may cancel each other out, leading to an overall null effect.

Although we cannot rule out the possibility of simultaneous antagonistic effects, it seems rather unlikely in light of the current data. First, although our manipulation of incidental sadness had relatively clean effects on self-reported emotions, incidental sadness showed no significant effects on moral dilemma judgments.

Thus, it seems implausible that incidental sadness influenced moral dilemma judgments in a manner that is opposite to the effect of incidental anger. Second, incidental happiness reduced sensitivity to norms without affecting sensitivity to consequences and general preference for inaction versus action. Based on this finding, the hypothesis of compensatory effects would imply that incidental anger increases sensitivity to norms. Such an effect seems rather implausible. If anything, one might expect incidental anger to reduce (rather than increase) sensitivity to moral norms. Thus, to the extent that incidental anger does have meaningful effects on moral dilemma judgments, these effects seem much more fragile compared to the (replicable) effect of incidental happiness. This conclusion is consistent with the results of Baron et al. (2017), who found mixed evidence for the presumed association between incidental anger and moral dilemma judgments.

Another limitation that may account for the lack of a significant effect of incidental anger is that our anger manipulation did not include a social element. In the current research, anger was induced by exposing participants to a clip of free jazz with extremely discordant sounds and no traditional melody. The rationale underlying this manipulation was that participants would experience the exposure to cacophonous, discordant sounds as aversive, which should induce a state of anger. Although manipulation checks provided strong support for the effectiveness of the anger induction, the manipulation does not include a social referent as the target of participants' anger. This aspect is different in more established approaches that induce anger by means of negative feedback by the experimenter (e.g., Stemmler, Heldmann, Pauls, & Scherer, 2001). To the extent that effects of incidental anger on moral judgments are limited to conditions that involve a social component, the latter type of manipulation might be more effective in influencing moral dilemma judgments (e.g., Ugazio et al., 2012). Future research may help to provide deeper insights into the generality of the current findings by comparing different manipulations of incidental anger.

### Open Questions and Limitations

The current research was inspired by a conceptualization of happiness, sadness, and anger as discrete emotions that may have unique effects on moral judgments. This conceptualization is consistent with the finding that, despite significant correlations between self-reported happiness, sadness, and anger, our experimental manipulations influenced self-reports of the focal emotion with no (or relatively small) spill-over effects on the two nonfocal emotions. Yet, counter to this conceptualization, a recent review suggests that there is little evidence for specific links between discrete emotions (e.g., anger vs. disgust) and moral judgments (Cameron, Lindquist, & Gray, 2015). Instead, emotional effects on moral judgments seem to occur along the two core affect dimensions of valence and arousal (see Russell, 2003). The current findings are at least partly consistent with this conclusion, in that the effect of incidental happiness may be driven by positive affect rather than a discrete emotional state of happiness. In this case, similar effects may occur for other positive emotions, such as awe and contentment.

Indeed, several of our hypotheses included specific references to core affective characteristics of the three emotions (e.g., sadness as an emotional state with low action potential; anger as an emotional

state with high action potential), highlighting the potential significance of affect and arousal as driving forces behind emotional effects on moral judgments. Nevertheless, there are two pieces of evidence that should be considered for either of the two interpretations. First, if our manipulation of incidental happiness reduced sensitivity to moral norms via positive affect, the manipulations of negative affect (i.e., sadness, anger) should have increased sensitivity to moral norms, which was not the case. Thus, positive affect alone seems insufficient to account for the current pattern of results. Second, there is at least some evidence suggesting that different positive emotions can have divergent effects on moral dilemma judgments. For example, Strohminger et al. (2011) found that mirth increased permissiveness of norm violations in the trolley paradigm, whereas elevation had the opposite effect. Future research may help to provide deeper insights into whether moral dilemma judgments are influenced by core affect or discrete emotions.

There are two other procedural aspects that should be mentioned as potential limitations of the current studies. First, the emotion induction was somewhat blatant in the sense that participants were exposed to the musical clips for one minute to “get used to it” and then throughout the entire moral dilemma task. This procedure may be deemed suboptimal, because it (a) creates a state of divided attention and (b) increases the salience of the music as the cause of one’s emotional state. Although the former aspect cannot explain differences between experimental conditions (because divided attention was equal across conditions), the latter aspect could potentially undermine effects of incidental emotions if these effects presuppose a misattribution of one’s emotional state to characteristics of the moral dilemmas (see Schwarz, 1990). Second, our instructions for the moral dilemma task included a warning that “some scenarios refer to things that may seem unpleasant to think about.” As a result of this warning, participants may have anticipated a need to down-regulate their emotional experiences, which might have reduced the impact of the emotion manipulations. Although this hypothesis conflicts with the evidence for their effectiveness in the manipulation checks, deliberate down-regulation may still mute the impact of incidental emotions on moral dilemma judgments. Future research may help to clarify the role of emotion suppression in the effects of incidental emotions on moral dilemma judgments.

### Conclusion

The main goal of the current research was to investigate how incidental happiness, incidental sadness, and incidental anger influence moral dilemma judgments. Using the CNI model of moral decision-making (Gawronski et al., 2017), we found that incidental happiness reduced sensitivity to moral norms without affecting sensitivity to consequences and general preference for inaction versus action. Counter to our predictions, incidental sadness and incidental anger did not show any significant effects on moral dilemma judgments. Although the obtained effect of incidental happiness is consistent with the dual-process hypothesis that deontological judgments are rooted in emotional responses, it suggests a reinterpretation of their cognitive antecedent. Instead of being elicited by the idea of causing harm, emotional responses underlying deontological judgments are more likely elicited by the idea of violating moral norms. This reinterpretation suggests a

central role for reasoned applications of moral norms, a role that has been rejected by dominant accounts of moral dilemma judgments. From this perspective, our findings pose an empirical challenge to extant theories, supporting the value of formal modeling approaches in providing more nuanced insights into the determinants of moral dilemma judgments.

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## Appendix

### CNI Model Equations

Model equations for the estimation of sensitivity to consequences ( $C$ ), sensitivity to moral norms ( $N$ ), and general preference for inaction versus action irrespective of consequences and norms ( $I$ ) in responses to moral dilemmas with proscriptive versus prescriptive norms and benefits of action for overall well-being that are either greater or smaller than the costs of action for well-being. Equations adapted from Gawronski et al. (2017). Reprinted with permission.

$$p(\text{inaction} \mid \text{proscriptive norm, benefits} > \text{costs}) = [(1 - C) \times M] + [(1 - C) \times (1 - N) \times I]$$

$$p(\text{inaction} \mid \text{proscriptive norm, benefits} < \text{costs}) = C + [(1 - C) \times M] + [(1 - C) \times (1 - N) \times I]$$

$$p(\text{inaction} \mid \text{proscriptive norm, benefits} > \text{costs}) = (1 - C) \times (1 - N) \times I$$

$$p(\text{inaction} \mid \text{proscriptive norm, benefits} < \text{costs}) = C + [(1 - C) \times (1 - N) \times I]$$

$$p(\text{action} \mid \text{proscriptive norm, benefits} > \text{costs}) = C + [(1 - C) \times (1 - N) \times (1 - I)]$$

$$p(\text{action} \mid \text{proscriptive norm, benefits} < \text{costs}) = (1 - C) \times (1 - N) \times (1 - I)$$

$$p(\text{action} \mid \text{proscriptive norm, benefits} > \text{costs}) = C + [(1 - C) \times M] + [(1 - C) \times (1 - N) \times (1 - I)]$$

$$p(\text{action} \mid \text{proscriptive norm, benefits} < \text{costs}) = [(1 - C) \times M] + [(1 - C) \times (1 - N) \times (1 - I)]$$

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