PSYCHOPATHY AND MORAL DILEMMA JUDGMENTS: A CNI MODEL ANALYSIS OF PERSONAL AND PERCEIVED SOCIETAL STANDARDS

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Research on moral dilemma judgment suggests that higher levels of psychopathy are associated with a greater preference for utilitarian over deontological judgments. The current research investigated whether this association reflects (1) differences in the understanding of what society considers right or wrong or (2) differences in personal standards about the acceptability of certain actions. Using the CNI model, we further explored whether the obtained differences are rooted in differential standards regarding the significance of consequences, moral norms, or general action preferences. The results suggest that (1) both differences in personal standards and differences in perceived societal standards contribute to associations between psychopathy and moral dilemma judgments and (2) personal and perceived societal standards play different roles for different determinants of moral dilemma judgments. Implications for clinical and moral psychology and for research at their intersection are discussed.

Keywords: CNI model, deontology, moral dilemmas, psychopathy, utilitarianism

Imagine a person who lacks remorse or guilt for their actions, shows very little empathy or concern for others, and pathologically lies to and manipulates those around them. These characteristics are but a few of the ones that are reflective of psychopathy (Hare & Neumann, 2008). Crosscutting traditional boundaries between disciplines, associations between psychopathy and moral judgment have received considerable interest from researchers in both clinical and moral psychology. On the one hand, differences in moral judgment are informative for clinical psychologists because they can help explain other central aspects of psychopathy, such as the increased tendency to engage in antisocial behaviors (Leistico, Salekin, DeCoster, & Rogers, 2008). On the other hand, specific deficits associated with psychopathy are informative for moral

psychologists because they can provide deeper insights into the mental underpinnings of moral judgments (Conway, Goldstein-Greenwood, Polacek, & Greene, 2018).

An important question in both fields is whether associations between psychopathy and moral judgments reflect differences in personal or perceived societal standards. One possibility is that individuals high in psychopathy differ from those low in psychopathy in terms of their understanding of what society considers morally right or wrong (Blair, 1995; Blair, Jones, Clark, & Smith, 1995). Alternatively, it is possible that individuals high and low in psychopathy have a similar understanding of societal conventions about right or wrong, but instead differ in terms of their personal standards about the acceptability of certain actions (Aharoni, Sinnott-Armstrong, & Kiehl, 2012, 2014; Cima, Tonnaer, & Hauser, 2010).

The main goal of the current work was to investigate the role of personal versus perceived societal standards in associations between psychopathy and responses to moral dilemmas that pit the consequences of a given action for the greater good (*utilitarianism*) against the consistency of that action with moral norms (*deontology*) (see Greene, Nystrom, Engell, Darley, & Cohen, 2004; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). Previous research on moral dilemma judgment suggests that individuals high in psychopathy show a greater preference for utilitarian over deontological judgments than individuals low in psychopathy (for a meta-analysis, see Marshall, Watts, & Lilienfeld, 2018). Expanding on this finding, the current research investigated whether the obtained association between psychopathy and moral dilemma judgments reflects differences in personal or perceived societal standards. Using a mathematical modeling approach to disentangle different determinants of moral dilemma judgments (Gawronski, Armstrong, Conway, Friesdorf, & Hütter, 2017), we further investigated whether the obtained differences are rooted in differential standards regarding the significance of consequences, moral norms, or general action preferences (or a combination of the three).

PSYCHOPATHY AND MORAL DILEMMA JUDGMENT

Research on moral dilemma judgment has been shaped by the idea that utilitarian and deontological judgments can be measured with scenarios that pit one type of judgment against the other. The most prominent example is the trolley problem, in which a runaway trolley is approaching a group of five workers who would be killed by the trolley. In a variant called the switch dilemma, participants are asked if it would be acceptable to pull a lever to redirect the trolley to another track where it would kill only one person instead of five (Foot, 1967). In a variant called the footbridge dilemma, the five workers could be saved by pushing a man from a bridge to stop the trolley (Thomson, 1976). From a utilitarian view, 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). In contrast, from a deontological view, 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). Based on this conceptualization, judgments of these actions as acceptable have been described as characteristically utilitarian, whereas judgments of these actions as unacceptable have been described as characteristically deontological (see Conway et al., 2018).

Using the trolley problem and similar sacrificial dilemmas, several studies found that individuals high in psychopathy show a greater preference for utilitarian over deontological judgments than individuals low in psychopathy (e.g., Bartels & Pizarro, 2011; Glenn, Koleva, Iyer, Graham, & Ditto, 2010; Kahane, Everett, Earp, Farias, & Savulescu, 2015; Patil, 2015). However, in contrast to these findings, some studies found no reliable association between psychopathy and moral dilemma judgments (e.g., Glenn, Raine, Schug, Young, & Hauser, 2009). Aggregating the conflicting results, a meta-analysis by Marshall and colleagues (2018) revealed a small positive association between psychopathy and preference for utilitarian over deontological judgments ($r = .16$), suggesting that individuals high in psychopathy are more likely to accept norm-violating actions that benefit the greater good than individuals low in psychopathy.

One ambiguity in interpreting this meta-analytic finding is the role of personal versus perceived societal standards in associations between psychopathy and responses to moral dilemmas. On the one hand, it is possible that individuals high in psychopathy differ from those low in psychopathy in terms of their understanding of what society considers morally right or wrong. To the extent that (1) moral dilemma judgments are at least partly shaped by cultural knowledge of what society considers morally right or wrong, (2) society considers deontological judgments as "more moral" than utilitarian judgments (Everett, Pizarro, & Crockett, 2016; Rom, Weiss, & Conway, 2017), and (3) individuals high in psychopathy lack insight into this societal convention about right and wrong (Blair, 1995; Blair et al., 1995), individuals high in psychopathy should show a greater preference for utilitarian over deontological judgments than individuals low in psychopathy. On the other hand, it is possible that individuals high and low in psychopathy have a similar understanding of societal conventions about right or wrong, but instead differ in terms of their personal acceptance of actions that conflict with these conventions (Aharoni et al., 2012, 2014). To the extent that (1) moral dilemma judgments are at least partly shaped by people's personal willingness to violate societal conventions, (2) society considers deontological judgments as "more moral" than utilitarian judgments (Everett et al., 2016; Rom et al., 2017), and (3) individuals high in psychopathy care less about violations of societal conventions (Cima et al., 2010), individuals high in psychopathy should show a greater preference for utilitarian over deontological judgments than individuals low in psychopathy.

Although numerous studies have investigated associations between psychopathy and moral dilemma judgments, the available evidence regarding the two competing explanations is rather mixed and inconclusive. Some studies have found a significant association between psychopathy and moral dilemma judgments only when participants were asked what they would do in the described scenario, but not when they were asked whether the focal action in the scenario is acceptable or unacceptable (e.g., Pletti, Lotto, Buodo, & Sarlo, 2017; Tassy, Deruelle, Mancini, Leistedt, & Wicker, 2013). In contrast, other studies found a significant association between psychopathy and moral dilemma judgments when participants were asked whether the described action is acceptable or unacceptable (e.g., Glenn et al., 2010; Patil, 2015), raising questions about the reliability of the difference between action and acceptability judgments. Because unspecified questions about the acceptability of a given action can be interpreted to refer to either one's personal standards or perceived societal standards, the available evidence remains ambiguous about the role of personal and perceived societal standards in associations between psychopathy and moral dilemma judgments.

The current research aimed to address this question more directly by comparing associations between psychopathy and moral dilemma judgments when participants are asked either (1) whether they *personally* find the focal action in a given dilemma acceptable or (2) whether *society* would find the described action acceptable.

Another ambiguity in interpreting the association between psychopathy and moral dilemma judgments in previous research is that responses in the traditional dilemma paradigm confound effects of multiple factors (Gawronski, Conway, Armstrong, Friesdorf, & Hütter, 2016). One confound is rooted in the fact that the traditional paradigm treats utilitarian and deontological judgments as opposite ends of a bipolar continuum (i.e., accepting one option implies rejecting the other), although their underlying mental processes are theorized to be independent (see Conway & Gawronski, 2013). Another confound is rooted in the fact that utilitarian judgments in the traditional dilemma paradigm have been conflated with a preference for action (i.e., switching the lever, pushing the man), whereas deontological judgments have been conflated with a preference for inaction (i.e., not switching the lever, not pushing the man; see Crone & Laham, 2017).

The significance of these confounds for understanding associations between psychopathy and moral dilemma judgments can be illustrated with research that has used the CNI model, a multinomial model (Batchelder & Riefer, 1999; Hütter & Klauer, 2016) that resolves the two confounds by disentangling (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference for inaction over action regardless of consequences and norms in responses to moral dilemmas (Gawronski et al., 2017). Research using the CNI model suggests that the relation between psychopathy and moral dilemma judgments is much more complex, in that individuals high (vs. low) in psychopathy have (1) a weaker sensitivity to consequences, (2) a weaker sensitivity to moral norms, and (3) a weaker general preference for inaction over action regardless of consequences and norms (Gawronski et al., 2017; Körner, Deutsch, & Gawronski, 2020). A notable aspect of these findings is that individuals high in psychopathy were found to be less (not more) sensitive to consequences than individuals low in psychopathy, qualifying conclusions from research using the traditional dilemma paradigm that psychopaths are more utilitarian than non-psychopaths (cf. Bartels & Pizarro, 2011; Kahane et al., 2015). Given the complex nature of associations between psychopathy and moral dilemma judgments revealed by research using the CNI model, an important question is whether these associations arise from differences in personal or perceived societal standards. A central goal of the current research was to address this question.

THE CURRENT RESEARCH

The current study investigated the role of personal and perceived societal standards in associations between psychopathy and moral dilemma judgments. Toward this end, participants completed a standardized measure of psychopathy (Levenson, Kiehl, & Fitzpatrick, 1995) and a battery of 48 moral dilemmas for research using the CNI model (Körner et al., 2020). To investigate the role of personal versus perceived societal standards, half of the participants were asked whether they personally find the actions described in the dilemmas acceptable (personal judgment condition). The remaining half were asked whether society would find the described actions acceptable (societal judgment condition).

In addition to analyzing associations between psychopathy and preference for utilitarian over deontological judgments using the traditional approach, we used the CNI model of moral decision-making (Gawronski et al., 2017) to disentangle (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference of inaction over action regardless of consequences and norms in responses to moral dilemmas. The model quantifies the three determinants by comparing response patterns across four kinds of moral dilemmas that differ in terms of whether (1) the dilemma involves a proscriptive norm that prohibits action or a prescriptive norm that prescribes action and (2) the benefits of the described action for overall well-being are either greater or smaller than its costs for overall well-being (see Table 1 for an example). Using maximum likelihood statistics, the CNI model quantifies the extent to which responses across the four types of 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 rows 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.

Based on the shared prediction implied by the two competing explanations of associations between psychopathy and moral dilemma judgments, we expected to find a positive association between psychopathy and preference for utilitarian over deontological judgments in the personal judgment condition. Our main question was whether this association replicates in the societal judgment condition. If individuals high in psychopathy differ from those low in psychopathy in terms of their understanding of what society considers morally right or wrong (Blair, 1995; Blair et al., 1995), the association obtained in the personal judgment condition should replicate in the societal judgment condition. In contrast, if individuals high and low in psychopathy have a similar understanding of societal conventions about right or wrong, but instead differ in terms of their personal standards about the acceptability of certain actions (Aharoni et al., 2012, 2014; Cima et al., 2010), the association obtained in the personal judgment condition should be attenuated in the societal judgment condition.[1] The current study tested these competing predictions using the traditional approach, further investigating the underpinnings of the obtained results using the CNI model. Because men and women tend to differ in terms of their average psychopathy levels (Cale & Lilienfeld, 2002) and previous research has found significant gender differences in moral dilemma judgments (Friesdorf, Conway, & Gawronski, 2015), we additionally ran all analyses controlling for participant gender to confirm the reliability of the obtained associations between psychopathy and moral dilemma judgments. 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/7nscq/.

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1. To avoid potential confusion, it is worth noting that the role of personal and perceived societal standards is reflected in the *difference* between correlations in the two experimental conditions (rather than the obtained correlations within each condition).

TABLE 1. Example of a Moral Dilemma Involving Either a Proscriptive or a Prescriptive Norm Where the Benefits of Action Are Either Greater or Smaller Than the Costs of Action (Dilemmas adapted from Gawronski, Armstrong, Conway, Friesdorf, and Hütter (2017). Reprinted with permission.)

| Proscriptive Norm Prohibits Action		Prescriptive Norm Prescribes Action	
Benefits of Action Greater than Costs	**Benefits of Action Smaller than Costs**	**Benefits of Action Greater than Costs**	**Benefits of Action Smaller than Costs**
You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.	You are the director of a hospital in a developing country. A foreign student who is volunteering in the country got infected with a rare virus.
The virus is highly contagious and deadly to seniors and children. The only medication that can effectively stop the virus from spreading has severe side-effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side-effects.	The virus is highly contagious and can cause severe stomach cramps. The only medication that can effectively stop the virus from spreading has severe side-effects. Although the virus will not kill her, the student suffers from a chronic immune deficiency that will make her die from these side-effects.	The virus is highly contagious and can cause severe stomach cramps. The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.	The virus is highly contagious and deadly to seniors and children. The student suffers from a chronic immune deficiency that will make her die from the virus if she is not returned to her home country for special treatment. However, taking her out of quarantine involves a considerable risk that the virus will spread.
Would [you/society] find it acceptable in this case to give the student the medication?	Would [you/society] find it acceptable in this case to give the student the medication?	Would [you/society] find it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?	Would [you/society] find it acceptable in this case to take the student out of quarantine to return her to her home country for treatment?
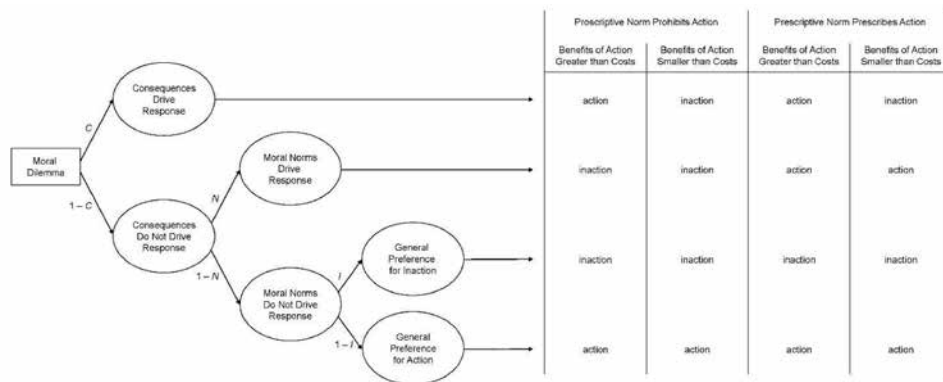
FIGURE 1. CNI model of moral decision-making predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms and consequences involving benefits of action that are either greater or smaller than costs of action. Reproduced from Gawronski, Armstrong, Conway, Friesdorf, and Hütter (2017). Reprinted with permission from the American Psychological Association.

METHOD

PARTICIPANTS

We aimed to recruit 400 participants using Amazon's Mechanical Turk (MTurk). A sample of 200 participants per condition provides a power of 80% in the detection of a correlation of $r = .20$ (two-tailed) within each condition, and a power of 80% in the detection of a difference between two independent correlations of $q = .28$ (two-tailed). Eligibility for participation was restricted to MTurk workers from the United States who were at least 18 years of age, had completed at least one previous assignment, had an approval rate of at least 95% on past assignments, and had not participated in a prior moral dilemma study from our lab. To increase data quality, several precautions were taken. First, the study included a bot prevention question at the beginning, which asked participants to solve a simple pictorially presented math problem (i.e., "8 + 7"). Second, the study included two attention checks at the end. MTurk workers who failed to solve the addition problem correctly were not allowed to participate; participants who failed any of the attention checks were excluded from data analyses. Of the 408 participants who completed all measures, 71 failed at least one attention check.[2] Data from these participants were excluded from analyses, leaving a final sample of

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2. The data set included eight additional participants beyond the desired sample of 400. Of these, requests for compensation were rejected for two participants who completed the study in less than 5 minutes after it was posted on MTurk, suggesting that they did not read the dilemmas. In addition, we rejected requests for compensation from four participants who failed to submit the correct completion code. Two participants completed the study without requesting compensation. Following our a priori exclusion criterion, we excluded participants from analyses only if they failed to pass our attention check. Of the 71 excluded participants, 31 participants were in the personal judgment condition and 40 participants were in the societal judgment condition. The overall pattern of results remained unaffected by the exclusions, with many of the reported correlations being slightly stronger in both conditions in the full sample.

337 participants (49.0% female, 50.1% male, 0.9% prefer not to answer; M_{age} = 35.53, SD_{age} = 11.22).[3] Participants were paid $3.00 for their time.

PROCEDURE AND MATERIALS

After consenting to participate and successfully completing the bot prevention question, participants first completed the primary psychopathy subscale of the Levenson's Self-report Psychopathy Scale (LSRP; Levenson et al., 1995). The subscale comprises 16 items (α = .92) that assess personality characteristics central to psychopathy, such as callousness, selfishness, and manipulativeness. Responses were measured on 4-point rating scales ranging from 1 (*disagree strongly*) to 4 (*agree strongly*). Afterwards, participants completed a battery of moral dilemmas by Körner and colleagues (2020) for research using the CNI model. The dilemma battery consisted of 12 basic scenarios in 4 variants, summing up to a total of 48 moral dilemmas (presented in fixed random order). The dilemma variants captured manipulations of consequences (i.e., the benefits of the described action for overall well-being were either greater or smaller than the costs) and focal norms (i.e., the described action was either prohibited or prescribed by a moral norm) to provide the basis for analyses using the CNI model (see Data Analysis). Depending on random assignment to the two experimental conditions, participants were asked to respond to the moral dilemmas based on what they personally find acceptable or what society would find acceptable. Participants received the following instructions before they were presented with the dilemmas:

> On the following screens you will see a series of short stories. Please read them carefully. Even though some stories may seem similar, each story is different in important ways. After each story, you will be asked to make a judgment about the appropriateness of the action described. We ask that you do not respond based on how acceptable society [you] would find the action. Instead, we ask that you respond based on how acceptable YOU [SOCIETY] would find the action. Using the mouse, click the button that best corresponds to your personal opinion [what is socially acceptable]. Please note that some stories 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. If at any time you are uncomfortable, please notify the experimenter immediately.

In the personal judgment condition, participants were instructed to respond to each dilemma according to what they personally find acceptable (*Would you find it acceptable in this case to [description of action]?*). In the societal judgment condition, participants were instructed to respond to each dilemma according to what society finds acceptable (*Would society find it acceptable in this case to [description of action]?*). Responses to the moral dilemmas were assessed using a forced-choice measure with two response options (*yes* vs. *no*). After completion of the dilemma battery, participants completed

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3. The final sample of 337 participants provides 80% power in detecting a correlation of r = .21 (two-tailed) in the personal judgment condition (n = 174), a correlation of r = .22 (two-tailed) in the societal judgment condition (n = 163), and a difference between two independent correlations of q = .31 (two-tailed).

demographic questions and two attention checks, after which they received a completion code to request compensation.[4]

DATA ANALYSIS

Moral dilemma judgments were analyzed using two different approaches. To permit comparisons with past research using the traditional approach, we first analyzed participants' preference for action over inaction on dilemmas where violating a proscriptive norm increases overall well-being (equivalent to the trolley problem). Toward this end, *yes* responses to this type of dilemma were summed up for each participant to create a *traditional dilemma score*, with higher scores reflecting a greater preference for utilitarian over deontological judgments (see Greene et al., 2004; Greene et al., 2001). To investigate associations between psychopathy and moral judgments, correlations between traditional dilemma scores and psychopathy were calculated separately for each experimental condition. Differences in associations across conditions were tested using multiple regression analyses in which traditional dilemma scores were regressed onto mean-centered scores of psychopathy, dummy-coded condition, and their interaction. To the extent that the interaction between psychopathy and condition in the prediction of traditional dilemma scores is statistically significant, the obtained associations between psychopathy and traditional dilemma scores are significantly different across conditions.

To gain more nuanced insights into the underpinnings of the obtained associations, we further investigated associations between psychopathy and the three CNI model parameters reflecting sensitivity to consequences (*C*), sensitivity to moral norms (*N*), and general preference for inaction over action regardless of consequences and norms (*I*). Because the mathematical underpinnings of the CNI model are explained in detail by Gawronski and colleagues (2017), we will only summarize the basic steps in analyzing moral dilemma judgments with the CNI model (see Gawronski, Conway, Armstrong, Friesdorf, & Hütter, 2018). Based on the processing tree in Figure 1, the CNI model provides four non-redundant equations to estimate numerical values for the three model parameters (*C*, *N*, *I*) based on the empirically observed probabilities of *action* (*yes*) versus *inaction* (*no*) responses on the four types of moral dilemmas (see Appendix).[5] 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*

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4. The first attention check was a question about leisure activities with reading-intensive instructions not to answer the question. Participants failed this attention check if they selected any of the response options, which would indicate that participants did not read the instructions. The second attention check was a reading comprehension test comprised of three questions. One question asked participants to rewrite a simple sentence (*Dan went to the store to buy fruit*) in all capital letters. Two additional questions tested participants' comprehension of the sentence (i.e., *Where did Dan go? What did Dan buy?*). Participants failed this attention check if they either wrote a nonsensical response to the first question or answered incorrectly to the second two questions.

5. 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 non-redundant equations in the full set of eight equations depicted in the Appendix.

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. In the current study, the three model parameters were estimated individually for each participant by fitting the CNI model to the aggregated moral judgment data of each participant (see Körner et al., 2020). The modeling analyses were conducted with the freeware multiTree (Moshagen, 2010) and template files for individual-difference analyses using the CNI model provided by Körner and colleagues (in press) at https://osf.io/ndf4w/. Following Gawronski and colleagues (2017), the analyses used a fixed estimation algorithm with random start values, two replications, and a maximum of 90,000 iterations. Associations between psychopathy and the three CNI model parameters were analyzed in line with the procedures to investigate associations between psychopathy and traditional dilemma scores.

RESULTS

Moral dilemma responses were aggregated by calculating the sum of *yes* responses to the four types of moral dilemmas (see Gawronski et al., 2017). With a total of 12 scenarios for each dilemma type, aggregate scores could range from 0 to 12. Higher scores reflect a greater preference for action over inaction on a given dilemma. Means and 95% confidence intervals of moral judgment data are presented in Table 2. Descriptive statistics for individual scores of the three CNI model parameters are presented in Table 3.[6] Correlations between psychopathy scores and moral dilemma indices are presented in Table 4. We present the statistical details of our findings in the Results section and elaborate on their conceptual meaning in the Discussion section.

PRELIMINARY ANALYSES

Preliminary analyses revealed that preference for utilitarian over deontological judgments was significantly lower in the personal judgment condition compared to the societal judgment condition, $t(335) = -2.92$, $p = .004$, $d = -.32$. Further analyses using the CNI Model suggest that this difference was driven by a stronger sensitivity to moral norms in the personal judgment condition compared to the societal judgment condition, as reflected in a significant difference between conditions on the N parameter, $t(335) = 2.39$, $p = .017$, $d = .26$. There was also a marginal difference on the I parameter, $t(335) = 1.79$, $p = .074$, $d = .20$, indicating that general preference for inaction over action tended to be stronger in the personal judgment condition compared to the societal judgment condition. There was no significant difference between conditions on the C parameter, $t(335) = -.09$, $p = .927$, $d = -.01$.

TRADITIONAL ANALYSIS

In line with the data analytic approach in previous research, we first examined associations between psychopathy and preference for utilitarian over deontological judgments

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6. The CNI model fit the data well at the aggregate level with all three parameters varying freely across conditions, $G^2(1) = .04$, $p = .839$. The model also fit the data well within the personal judgment, $G^2(1) = .52$, $p = .473$, and societal judgment conditions, $G^2(1) = .19$, $p = .664$.

TABLE 2. Means and 95% Confidence Intervals 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 (Scores can range from 0 to 12. The neutral reference value of equal numbers of action and inaction responses is 6.)

	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	
	M	95% CI	*M*	95% CI	*M*	95% CI	*M*	95% CI
Personal Judgment Condition	4.87	[4.49, 5.26]	2.76	[2.34, 3.19]	9.30	[8.97, 9.63]	7.02	[6.65, 7.40]
Societal Judgment Condition	5.70	[5.30, 6.10]	3.40	[2.98, 3.83]	9.10	[8.74, 9.47]	6.92	[6.55, 7.29]

on dilemmas where violating a proscriptive norm increases overall well-being (equivalent to the trolley problem). Consistent with the shared prediction implied by the two competing explanations of associations between psychopathy and moral dilemma judgments, psychopathy was positively associated with traditional dilemma scores in the personal judgment condition ($r = .33, p < .001$). Specifically, participants high in psychopathy showed a stronger preference for utilitarian over deontological judgments in their personal judgments than participants low in psychopathy. A similar association emerged in the societal judgment condition ($r = .16, p = .037$), indicating that participants high in psychopathy perceived a stronger societal preference for utilitarian over deontological judgments than participants low in psychopathy. However, the positive association in the societal judgment condition tended to be smaller compared to the positive association in the personal judgment condition, which was reflected in a marginal interaction between psychopathy and condition in the prediction of traditional dilemma scores, $\beta = -.14, t(333) = -1.84, p = .066$. Controlling for participant gender, the positive association between psychopathy and traditional dilemma scores remained statistically significant in the personal judgment condition ($r = .33, p < .001$) and the societal judgment condition ($r = .17, p = .030$). The interaction between psychopathy and condition in the prediction of traditional dilemma scores remained marginally significant when controlling for participant gender, $\beta = -.14, t(329) = -1.81, p = .071$.

CNI MODEL

Sensitivity to Consequences. Psychopathy showed a significant negative association with the C parameter in the personal judgment condition ($r = -.35, p < .001$), indicating that participants high in psychopathy were less sensitive to consequences in their personal judgments than participants low in psychopathy. A similar association emerged in the societal judgment condition ($r = -.37, p < .001$), indicating that participants high in psychopathy perceived a weaker societal sensitivity to consequences than participants low in psychopathy. There was no significant difference between correlations in the two conditions, as indicated by a non-significant interaction between psychopathy and condition in the prediction of C parameter scores, $\beta = .03, t(333) = .41, p = .679$. Controlling for participant gender, the negative association between psychopathy and C parameter scores remained statistically significant in the personal judgment condition

TABLE 3. Means and 95% Confidence Intervals of CNI Model Parameters

Variable	Personal Judgment Condition		Societal Judgment Condition	
	M	95% CI	M	95% CI
C Parameter	0.20	[0.17, 0.22]	0.20	[0.17, 0.23]
N Parameter	0.48	[0.44, 0.53]	0.40	[0.35, 0.45]
I Parameter	0.54	[0.50, 0.59]	0.49	[0.45, 0.53]

($r = -.34$, $p < .001$) and the societal judgment condition ($r = -.33$, $p < .001$). The interaction between psychopathy and condition in the prediction of C parameter scores remained non-significant, $\beta = .03$, $t(329) = .38$, $p = .704$.

Sensitivity to Norms. Psychopathy showed a significant negative association with the N parameter in the personal judgment condition ($r = -.62$, $p < .001$), indicating that participants high in psychopathy were less sensitive to moral norms in their personal judgments than participants low in psychopathy. A similar association emerged in the societal judgment condition ($r = -.49$, $p < .001$), indicating that participants high in psychopathy perceived a weaker societal sensitivity to moral norms than participants low in psychopathy. However, the negative association in the societal judgment condition was significantly smaller compared to the negative association in the personal judgment condition, which was reflected in a significant interaction between psychopathy and condition in the prediction of N parameter scores, $\beta = .15$, $t(333) = 2.20$, $p = .028$. Controlling for participant gender, the negative association between psychopathy and N parameter scores remained statistically significant in the personal judgment condition ($r = -.62$, $p < .001$) and the societal judgment condition ($r = -.47$, $p < .001$). The interaction between psychopathy and condition in the prediction of N parameter scores remained statistically significant, $\beta = .15$, $t(329) = 2.19$, $p = .030$.

General Preference for Inaction over Action. Psychopathy showed a significant negative association with the I parameter in the personal judgment condition ($r = -.27$, $p < .001$), indicating that participants high in psychopathy showed a weaker general preference for inaction in their personal judgments than participants low in psychopathy. Although there was no significant association between psychopathy and I parameter scores in the societal judgment condition ($r = -.10$, $p = .195$), the interaction between psychopathy and condition in the prediction of I parameter scores was only marginal, $\beta = .15$, $t(333) = 1.93$, $p = .054$. Controlling for participant gender, the negative association between psychopathy and I parameter scores remained statistically significant in the personal judgment condition ($r = -.24$, $p = .001$) and non-significant in the societal judgment condition ($r = -.09$, $p = .262$). The interaction between psychopathy and condition in the prediction of I parameter scores was statistically significant when controlling for participant gender, $\beta = .17$, $t(329) = 2.10$, $p = .037$.

DISCUSSION

Previous research on moral dilemma judgment suggests that individuals high in psychopathy show a greater preference for utilitarian over deontological judgments than

TABLE 4. Correlations Between Psychopathy and Moral Judgment Indices as a Function of Judgment-Type Condition (Personal Judgment vs. Societal Judgment)

	Personal Judgment Condition (n = 174)		Societal Judgment Condition (n = 163)		Difference between Conditions
	r	95% CI	r	95% CI	p
Zero-Order Correlations					
Traditional	.33***	[.19, .46]	.16*	[.01, .31]	.066
C Parameter	−.35***	[−.47, −.21]	−.37***	[−.49, −.22]	.679
N Parameter	−.62***	[−.71, −.52]	−.49***	[−.60, −.37]	.028
I Parameter	−.27***	[−.40, −.12]	−.10	[−.25, .05]	.054
Partial Correlations Controlling for Gender					
Traditional	.33***	[.19, .46]	.17*	[.02, .32]	.071
C Parameter	−.34***	[−.47, −.21]	−.33***	[−.46, −.18]	.704
N Parameter	−.62***	[−.71, −.52]	−.47***	[−.58, −.34]	.030
I Parameter	−.24**	[−.38, −.10]	−.09	[−.24, .07]	.037

Note: Traditional = traditional dilemma score. Higher scores on traditional dilemma score reflect greater preference for utilitarian over deontological judgments. Differences between correlations in the two experimental conditions are reflected in the *p*-value of the interaction of psychopathy and judgment-type condition in predicting moral judgment indices. *$p < .05$. **$p < .01$. ***$p < .001$.

individuals low in psychopathy (for a meta-analysis, see Marshall et al., 2018). The main goal of the current work was to investigate whether this association is rooted in (1) differences in the understanding of what society considers right or wrong or (2) differences in personal standards about the acceptability of certain actions. Toward this end, participants in the current study were asked either (1) whether they personally find the focal action in a given dilemma acceptable (personal judgment condition) or (2) whether society would find the described action acceptable (societal judgment condition). Using the CNI model (Gawronski et al., 2017), we further investigated whether the obtained differences are rooted in differential standards regarding the significance of consequences, moral norms, or general action preferences (or a combination of the three). If associations between psychopathy and moral dilemma judgments are driven by differences in the understanding of what society considers right or wrong (Blair, 1995; Blair et al., 1995), correlations between psychopathy and moral dilemma judgments should be similar in the two experimental conditions. In contrast, if individuals high and low in psychopathy have a similar understanding of societal conventions about right or wrong, but instead differ in terms of their personal standards about the acceptability of certain actions (Aharoni et al., 2012, 2014; Cima et al., 2010), psychopathy should be correlated with moral dilemma judgments in the personal judgment condition, but not in the societal judgment condition.

Consistent with the shared prediction implied by the two competing explanations, we found a positive association between psychopathy and preference for utilitarian over deontological judgments in the personal judgment condition. A significant positive association emerged also in the societal judgment condition, but this association tended to be weaker compared to the association in the personal judgment condition. The finding that psychopathy showed a significant positive association with

traditional dilemma scores in both conditions is consistent with the hypothesis that individuals high and low in psychopathy differ in their understanding of societal conventions about right and wrong (see Blair, 1995; Blair et al., 1995). The finding that this association was weaker in the societal judgment condition than in the personal judgment condition is consistent with the hypothesis that individuals high and low in psychopathy have a similar understanding of societal conventions about right or wrong, but instead differ in terms of their personal standards about the acceptability of certain actions (see Aharoni et al., 2012, 2014; Cima et al., 2010). Together, the two sets of findings suggest that associations between psychopathy and moral dilemma judgments are jointly driven by (1) differences in the understanding of societal conventions about right and wrong and (2) differences in personal standards about the acceptability of certain actions.

More nuanced insights into the underpinnings of these results are provided by our analyses using the CNI model (Gawronski et al., 2017), which allowed us to disentangle (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference for inaction over action regardless of consequences and norms. The findings obtained with the CNI model suggest that personal and societal standards play a different role for different determinants of moral dilemma judgments.

With respect to sensitivity to consequences, we found that (1) participants high in psychopathy were less sensitive to consequences in their personal judgments than participants low in psychopathy, (2) participants high in psychopathy perceived society to be less sensitive to consequences than participants low in psychopathy, and (3) associations between psychopathy and sensitivity to consequences did not significantly differ across the two judgment conditions. Together, these results suggest that associations between psychopathy and moral dilemma judgments involve systematic differences in the understanding of societal conventions about the significance of morally relevant consequences.

With respect to sensitivity to moral norms, we found that (1) participants high in psychopathy were less sensitive to moral norms in their personal judgments than participants low in psychopathy, (2) participants high in psychopathy perceived society to be less sensitive to moral norms than participants low in psychopathy, and (3) the association between psychopathy and sensitivity to moral norms was significantly weaker for societal judgments compared to personal judgments. Together, these results suggest that associations between psychopathy and moral dilemma judgments are partly driven by (1) differences in the understanding of societal conventions involving moral norms and (2) differences in personal standards about the acceptability of norm-incongruent actions.

Finally, with respect to general action preferences, we found that (1) participants high in psychopathy were less action averse in their personal judgments than participants low in psychopathy, (2) psychopathy was unrelated to general action preferences in the societal judgment condition, and (3) the association between psychopathy and general action preferences was significantly weaker for societal judgments compared to personal judgments. Based on conceptual links between the omission bias (see Cushman, Young, & Hauser, 2006; Spranca, Minsk, & Baron, 1991) and general action aversion on the *I* parameter, these results suggest that individuals high and low in psychopathy have a similar understanding of societal conventions regarding the moral status of actions versus inactions (e.g., difference between killing someone vs. letting someone die). Yet, they differ in terms of their personal level of general action

aversion, in that individuals high in psychopathy are less action averse than individuals low in psychopathy.

Collectively, these findings have important implications for the debate surrounding the role of personal and perceived societal standards in the moral judgments of psychopaths (see Borg & Sinnott-Armstrong, 2013). First, the current findings suggest that both differences in personal standards and differences in perceived societal standards contribute to associations between psychopathy and moral dilemma judgments, indicating that extant explanations should be treated as complementary rather than mutually exclusive. Second, our findings suggest that personal and perceived societal standards play different roles for different determinants of moral dilemma judgments, demonstrating the value of formal modeling approaches in detecting these complexities.

By uncovering the complex underpinnings of associations between psychopathy and moral dilemma judgments, the current study provides valuable insights for both clinical and moral psychology. One important insight for clinical psychology is that the greater tendency for antisocial behavior among psychopaths may be rooted in multiple distinct deficits with different psychological underpinnings (see Borg & Sinnott-Armstrong, 2013; Leistico et al., 2008). For example, regarding the significance of morally relevant consequences, individuals high in psychopathy seem to have an impaired understanding of societal conventions about how the moral status of a given action can depend on costs and benefits for the greater good. Yet, different from the nature of this deficit, individuals high in psychopathy seem to be perfectly aware of societal conventions regarding the moral status of actions versus inactions, but instead do not seem to share the level of action aversion that individuals low in psychopathy show in their personal judgments. Whereas the former deficit involves a lack of basic moral knowledge, the latter deficit involves a tendency to engage in salient actions regardless of the situation, possibly rooted in a lack of inhibition. Finally, regarding moral norms, our findings suggest that psychopaths have (1) a somewhat impaired understanding of societally accepted moral norms and, at the same time, (2) a weaker tendency to follow moral norms in their personal judgments. To the extent that antisocial tendencies among psychopaths are rooted in their personal moral judgments, the current findings suggest that any interventions to reduce antisocial tendencies among psychopaths may have to target multiple distinct deficits in order to be effective. Future research using the CNI model may provide valuable insights for the development of such interventions by identifying the psychological underpinnings of these multifaceted deficits.

These conclusions also have important implications for the field of moral psychology, in particular for research on the mechanisms underlying moral dilemma judgments. A dominant theory in this area is Greene and colleagues' (2001, 2004) dual-process theory, which assumes that utilitarian judgments are the product of deliberate cognitive analyses of costs and benefits and that deontological judgments are rooted in automatic emotional reactions to the idea of causing harm. Research using the CNI model poses a challenge to these hypotheses in that they are unable to explain the available evidence without invoking inconsistent ad hoc assumptions (for a discussion, see Gawronski et al., 2018). Yet, without a mechanistic account such as Greene and colleagues' dual-process theory, the psychological processes underlying sensitivity to consequences, sensitivity to moral norms, and general action tendencies remain

unclear. Research at the intersection of clinical and moral psychology can help fill this explanatory gap by linking the three determinants of moral dilemma judgments to known deficits in psychopaths. From this perspective, future clinical research using the CNI model may not only provide valuable insights into the multifaceted deficits of psychopaths but may also contribute to a better understanding of the processes underlying moral dilemma judgments by linking processes associated with particular deficits to the three determinants of moral dilemma judgments.

LIMITATIONS

Notwithstanding the valuable insights offered by the current study, it seems appropriate to note a few limitations. First, our findings were obtained with a subclinical sample and, therefore, do not necessarily speak to individuals meeting clinical criteria for psychopathy. Given that psychopathic characteristics vary continuously in the population (Edens, Marcus, Lilienfeld, & Poythress, 2006), our findings provide valuable insights into the relation between individual differences in psychopathy and moral dilemma judgments. However, future research is needed to investigate whether the patterns obtained in the current study replicate with populations meeting criteria of clinical psychopathy. Second, the current research focused exclusively on moral dilemma judgments rather than moral judgments more broadly (see Marshall et al., 2018). A major strength of this approach is that moral dilemmas are inherently ambiguous, in that different moral principles suggest different choices. This ambiguity provides an ideal basis for investigating the role of personal and perceived societal standards in associations between psychopathy and moral judgment, because societally approved responses are more difficult to discern compared to unambiguous cases of immoral behavior (e.g., murder). Yet, it is possible that personal and perceived societal standards play a different role in associations between psychopathy and moral judgments when the relevant actions are less ambiguous. Thus, although the current findings provide valuable insights into the complex underpinnings of associations between psychopathy and moral dilemma judgments, future research is needed to establish the generalizability of our findings to cases involving less moral ambiguity.

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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.

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

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

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

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

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

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

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

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