

## Supplemental Material: Consequences, Norms, and Generalized Inaction in Moral Dilemmas: The CNI Model of Moral Decision-Making

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### Study S1a

Study S1a tested the effects of images of the focal targets in the moral dilemmas on the three parameters of the CNI model. The manipulation was adapted from Conway and Gawronski (2013) who assumed that images of the focal targets would increase salience of harm. To the extent that increased salience of harm enhances automatic emotional responses to the idea of causing harm, deontological judgments should increase according to the dual-process model of moral dilemma judgment (see Amit & Greene, 2012). Study S1a tested whether such effects are due to differences in (1) sensitivity to consequences, (2) sensitivity to moral norms, or (3) general preference for inaction versus action.

### Method

**Participants.** Participants were recruited for a study on “how people make moral judgments” via Amazon’s MTurk. Participants received compensation of \$1.00 for completing the study. Eligibility for participation was limited to English native speakers who (1) had a HIT approval rate of at least 97% at the time of the study and (2) had not participated in prior studies from our lab using the same set of moral dilemmas. Participants were randomly assigned to either a *low salience* or *high salience* condition. Of the 223 MTurk workers who initially began the study, 202 completed all measures.<sup>1</sup> Of these participants, 7 failed to pass an instructional attention check. Data from these participants were excluded from the statistical analyses, leaving us with a final sample of 195 participants (106 women, 88 men, 1 missing;  $M_{age} = 33.32$ ,  $SD_{age} = 10.89$ ).

**Procedure and materials.** Participants were asked to read and respond to the 24 moral dilemmas from Study

1a, using the same fixed random order. To manipulate salience of harm, participants in the *high salience* condition were presented with images that supposedly showed the focal targets in the moral dilemmas (see Conway & Gawronski, 2013). The moral dilemmas were presented at the top of the screen; the images were presented below the dilemmas at the bottom of the screen. In addition, each image was presented with a short sentence, stating that the depicted individuals are the focal targets in the dilemma (e.g., *This is the abducted journalist.*). Participants in the *low salience* condition were not presented with any images while they completed the moral dilemma task. The images used for the salience of harm manipulation are presented in the Supplementary Appendix. After completion of the moral dilemmas, participants were asked to respond to the same one-item attention check of the Pilot Study.

### Results

The data were aggregated in line with the procedures of Study 1. Means and 95% confidence intervals are presented in Table S1.

**Traditional analysis.** In line with the traditional approach, we first investigated participants’ responses on moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh its costs to well-being. In the traditional approach, a preference for action over inaction on this type of dilemma would be interpreted as a preference for utilitarian over deontological responses. There was no significant effect of the salience of harm manipulation on participants’ responses on this type of dilemma,  $t(193) = 0.36$ ,  $p = .721$ ,  $d = 0.051$  (see Table S1).

**PD analysis.** PD scores were calculated in line with the procedures of Study 1a. Counter to the findings by Conway and Gawronski (2013), there were no

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<sup>1</sup> Two participants completed all measures, but did not submit a request for compensation.

significant effects of the salience of harm manipulation on the  $U$  parameter ( $M_s = .22$  vs.  $.17$ , respectively),  $t(193) = 1.19$ ,  $p = .234$ ,  $d = 0.171$ , and the  $D$  parameter ( $M_s = .64$  vs.  $.64$ , respectively),  $t(193) = 0.03$ ,  $p = .974$ ,  $d = 0.005$ .

**CNI model.** The CNI model fit the data well,  $G^2(2) = 0.68$ ,  $p = .713$ . There were no significant effects on the  $C$  parameter,  $\Delta G^2(1) = 2.15$ ,  $p = .143$ ,  $d = 0.211$ , the  $N$  parameter,  $\Delta G^2(1) = 0.10$ ,  $p = .758$ ,  $d = 0.044$ , and the  $I$  parameter,  $\Delta G^2(1) = 1.60$ ,  $p = .206$ ,  $d = 0.182$  (see Figure S1).

### Study S1b

In line with our stated practice of conducting a replication study for each variable, Study S1b tested the effects of images of the focal targets in a follow-up study using the same materials.

#### Method

**Participants.** Participants were recruited for a study on “how people make moral judgments” via Amazon’s MTurk. Participants received a compensation of \$1.00 for completing the study. Eligibility for participation was limited to English native speakers who (1) had a HIT approval rate of at least 97% at the time of the study and (2) had not participated in prior studies from our lab using the same set of moral dilemmas. Participants were randomly assigned to either a *low salience* or *high salience* condition. Of the 234 MTurk workers who initially began the study, 203 completed all measures.<sup>2</sup> Of these participants, 12 failed to pass an instructional attention check. Data from these participants were excluded from the statistical analyses, leaving us with a final sample of 191 participants (108 women, 83 men;  $M_{age} = 36.48$ ,  $SD_{age} = 11.61$ ).

**Procedure and materials.** The procedure and materials were identical to the ones in Study S1a.

#### Results

The data were aggregated in line with the procedures of Study 1a. Means and 95% confidence intervals are presented in Table S1.

**Traditional analysis.** In line with Study S1a, we first investigated participants’ responses on moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh its costs to well-being. Replicating the findings of Study S1a, there was no significant effect of the salience of harm manipulation on participants’ responses on this type of dilemma,  $t(189) = 1.08$ ,  $p = .282$ ,  $d = 0.158$  (see Table S1).

**PD analysis.** PD scores were calculated in line with the procedures of Study 1a. There was a significant effect

of Salience of Harm on the  $D$  parameter, such that  $D$  scores were higher in the low salience condition compared to the high salience condition ( $M_s = 0.75$  vs.  $0.68$ , respectively),  $t(189) = 2.08$ ,  $p = .038$ ,  $d = 0.302$ . There was no significant effect on the  $U$  parameter ( $M_s = 0.22$  vs.  $0.17$ , respectively),  $t(189) = 1.55$ ,  $p = .122$ ,  $d = 0.227$ . The current effect on the  $D$  parameter is opposite to the one obtained by Conway and Gawronski (2013) who found higher  $D$  scores in the high salience condition compared to the low salience condition.

**CNI model.** The CNI model fit the data well,  $G^2(2) = 0.84$ ,  $p = .656$ . There was a significant effect on the  $N$  parameter, such that participants in the high salience condition showed a lower sensitivity to moral norms than participants in the low salience condition,  $\Delta G^2(1) = 15.79$ ,  $p < .001$ ,  $d = 0.580$ . There was also a significant effect on the  $C$  parameter, such that participants in the high salience condition showed a lower sensitivity to outcomes than participants in the low salience condition,  $\Delta G^2(1) = 4.40$ ,  $p = .036$ ,  $d = 0.305$ . There was no significant effect of salience of harm on the  $I$  parameter,  $\Delta G^2(1) = 0.97$ ,  $p = .325$ ,  $d = 0.144$  (see Figure S2).

#### Discussion

Although the CNI model fit the data well in both Study S1a and Study S1b, images of the focal targets had inconsistent effects on the three parameters. In Study S1a, presenting images of the focal targets failed to produce any significant effects at all. In the Study S1b, the same manipulation significantly decreased scores on the  $N$  and the  $C$  parameters without affecting the  $I$  parameter. In line with our stated practice of limiting interpretations to parameter effects that replicate across studies, we refrain from drawing any conclusions from these findings. Because the two studies also failed to reproduce the original findings by Conway and Gawronski (2013), we attribute the inconsistent results to unreliable effects of Conway and Gawronski’s picture manipulation. Whereas Conway and Gawronski found a significant increase in the  $D$  parameter as a result of images of the focal targets, Study S1b found a significant decrease in the  $D$  parameter of the PD model.

#### References

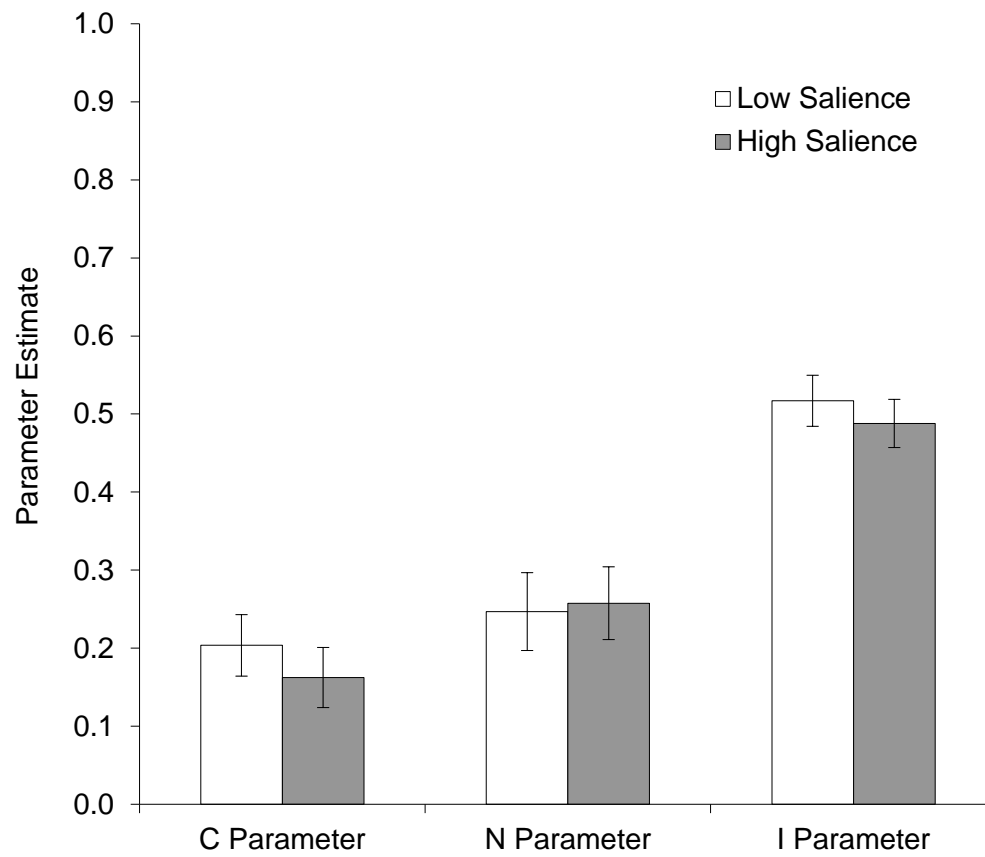
- Amit, E., & Greene, J. D. (2012). You see, the ends don’t justify the means: Visual imagery and moral judgment. *Psychological Science*, *23*, 861-868.
- Conway, P., & Gawronski, B. (2013). Deontological and utilitarian inclinations in moral decision-making: A process dissociation approach. *Journal of Personality and Social Psychology*, *104*, 216-235.

<sup>2</sup> Three participants completed all measures, but did not submit a request for compensation.

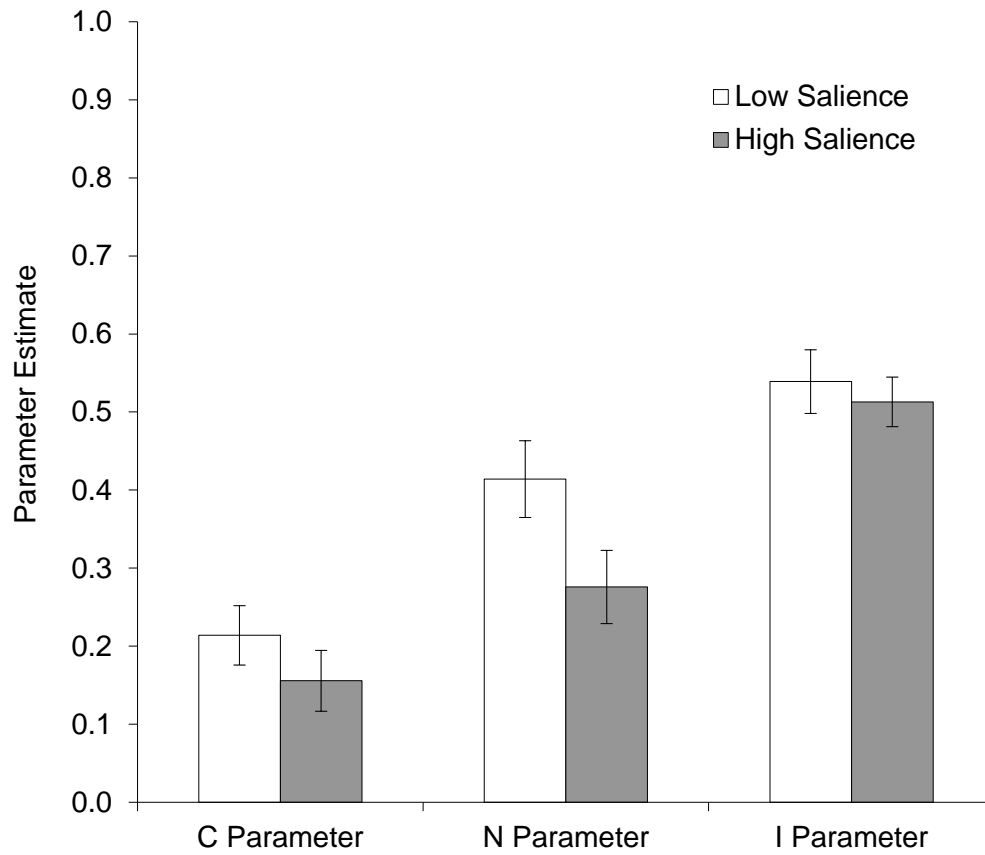
**Table S1.** Means and standard deviations of action (vs. inaction) responses on moral dilemmas with proscriptive and prescriptive norms and cost-benefit ratios involving benefits of action that are either greater or smaller than costs of action (scores can range from 0 to 6).

	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	
	<i>M</i>	95% CI	<i>M</i>	95% CI	<i>M</i>	95% CI	<i>M</i>	95% CI
Study S1a								
low salience	3.00	[2.68, 3.32]	1.71	[1.39, 2.02]	4.11	[3.82, 4.39]	2.96	[2.69, 3.22]
high salience	2.92	[2.61, 3.23]	1.88	[1.57, 2.19]	4.15	[3.87, 4.43]	3.24	[2.98, 3.50]
Study S1b								
low salience	2.58	[2.34, 2.83]	1.26	[0.98, 1.54]	4.49	[4.21, 4.77]	3.26	[2.98, 3.53]
high salience	2.77	[2.53, 3.01]	1.74	[1.47, 2.02]	4.07	[3.79, 4.35]	3.24	[2.97, 3.51]

**Figure S1.** Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of salience of harm (low vs. high), Study S1a. Error bars depict 95% confidence intervals.



**Figure S2.** Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of salience of harm (low vs. high), Study S1b. Error bars depict 95% confidence intervals.



**Supplementary Appendix**

Images Used for Salience of Harm Manipulation in Studies S1a and S1b

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