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Power and moral dilemma judgments: Distinct effects of memory recall versus social roles☆

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ABSTRACT

Counter to the lay belief that power corrupts people's sense of morality, social psychological theories suggest that the effects of power on moral judgment are rather complex and multifaceted. To test competing predictions derived from these theories, five experiments used the CNI model to investigate whether power affects responses to moral dilemmas by influencing (1) sensitivity to morally relevant consequences, (2) sensitivity to moral norms, or (3) general action tendencies regardless of consequences and norms. Results showed that recalling a personal experience involving high (vs. low) power decreased sensitivity to moral norms (Experiments 1a, 1b, 3). Being assigned to a social role involving high (vs. low) power had inconsistent effects across studies (Experiments 2a, 2b, 3), showing increased sensitivity to moral norms in an integrative data analysis. The findings support calls for more nuanced theoretical accounts that specify how psychological and structural aspects of power differentially influence behavior.

1. Introduction

Common wisdom holds that power corrupts people's sense of morality. However, from the perspective of social psychological theories, this idea oversimplifies the rather complex relation between power and morality. According to these theories, power has multifaceted psychological effects that can either enhance or impair moral behavior (Lammers, Galinsky, Dubois, & Rucker, 2015). In the current research, we were interested in the effects of power 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 mathematical model to disentangle different determinants of moral dilemma judgments (Gawronski, Armstrong, Conway, Friesdorf, & Hütter, 2017), we tested competing predictions about whether power affects moral dilemma judgments by influencing (1) people's sensitivity to consequences, (2) their sensitivity to moral norms, or (3) general action tendencies regardless of consequences and norms (or some combination of the three). As we explain later in this article, our findings support the idea that power is not a unitary construct, in that different manipulations of power produced opposite effects. Thus, in addition to providing deeper insights into the manner by which power influences moral dilemma judgments, our findings echo calls for more nuanced theoretical accounts that specify how different aspects of power influence behavior (e.g., Galinsky, Rucker, & Magee, 2015; Smith & Hofmann, 2016; Sturm & Antonakis, 2015; Tost, 2015; Tost & Johnson, 2019).

1.1. Moral dilemma judgments

Inspired by historical debates in moral philosophy, psychological research on moral judgment has been shaped by the distinction between utilitarianism and deontology. From a utilitarian view, 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. Conversely, if the same behavioral option decreases overall well-being, it is deemed morally unacceptable. In contrast, from a deontological view, the moral status of a behavioral option is derived from its consistency with moral norms. If a behavioral option is consistent with moral norms, it is deemed morally acceptable. Conversely, if a behavioral option is inconsistent with moral norms, it is deemed morally unacceptable.

To investigate the determinants of utilitarian and deontological judgments, psychologists have relied on hypothetical scenarios that pit the consequences of a given action for the greater good against the consistency of that action with moral norms (e.g., Bartels, 2008; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Moore, Clark, &

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Kane, 2008; Nichols & Mallon, 2006; Starcke, Ludwig, & Brand, 2012; 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). 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). 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.

1.2. 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 dilemma paradigm treats utilitarian and deontological judgments as bipolar opposites (i.e., accepting one option implies rejecting the other) although their underlying processes have been 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 response tendencies, differences in the strength of deontological response tendencies, or a combination of the two (e.g., Friesdorf, Conway, & Gawronski, 2015). 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 practice is problematic, because it confounds the two moral principles with general action tendencies (Gawronski, Conway, Armstrong, Friesdorf, & Hütter, 2016). The principle of utilitarianism is conceptually distinct from general action tendencies, because it supports action only when action increases well-being, but it would suggest inaction when inaction increases well-being. Similarly, the principle of deontology is conceptually distinct from general action tendencies, because it supports inaction only when a proscriptive norm prohibits action, but it would suggest action when a prescriptive norm prescribes action (see Janoff-Bulman, Sheikh, & Hepp, 2009).

Based on an in-depth analysis of these ambiguities, Gawronski and Beer (2017) suggested that they could be resolved by comparing judgments across four types of moral dilemmas involving different combinations of consequences and norms: (1) dilemmas in which a proscriptive norm prohibits action, and the benefits of action for overall well-being are greater than the costs; (2) dilemmas in which a proscriptive norm prohibits action, and the benefits of action for overall well-being are smaller than the costs; (3) dilemmas in which a prescriptive norm prescribes action, and the benefits of action for overall well-being are greater than the costs; (4) 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 proposal, Gawronski et al. (2017) presented a mathematical model that provides quantitative estimates of three independent determinants of moral dilemma judgments: (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference for inaction versus action regardless of consequences and norms. Sensitivity to consequences and sensitivity to moral norms represent the key aspects of utilitarianism and deontology, respectively. Additionally, general preference for inaction is closely related to the tendency for harm caused by action to be perceived as worse than equivalent harm caused by inaction (i.e., *omission bias*; Cushman, Young, & Hauser, 2006; Spranca, Minsk, & Baron, 1991).

Using a multinomial modeling approach (Batchelder & Riefer, 1999; Hütter & Klauer, 2016), Gawronski et al.'s (2017) CNI model 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 Fig. 1), a response pattern that is sensitive to moral norms (second row in Fig. 1), and a response pattern of general inaction versus general action regardless of consequences and norms (third and fourth row in Fig. 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.[1] Previous research using the CNI model has provided valuable insights into the effects of cognitive resources (Gawronski et al., 2017, Studies 2a and 2b), emotional involvement (Gawronski et al., 2017, Studies 3a and 3b), psychopathy (Gawronski et al., 2017, Studies 4a and 4b), incidental emotions (Gawronski, Conway, Armstrong, Friesdorf, & Hütter, 2018), testosterone (Brannon, Carr, Jin, Josephs, & Gawronski, 2019), language use (Białek, Paruzel-Czachura, & Gawronski, 2019), and acute stress (Li, Gao, Zhao, & Li, in press). Expanding on this research, the current work used the CNI model to gain deeper insights into the effects of power on moral dilemma judgments.

1.3. Power and moral dilemma judgments

Power is commonly defined in *structural* terms as "asymmetric control over valued resources in a social relationship" (Galinsky et al., 2015, p. 422). Most theories of power share the assumption that power as a feature of social structures influences people's *psychological* sense of power, which can shape behavioral outcomes in a myriad of ways (Galinsky et al., 2015). In addition to overcoming the limitations of past approaches to studying moral judgments, the CNI model is a particularly valuable tool for investigating multifaceted effects of power on moral dilemma judgments, because it permits simultaneous tests of competing predictions implied by extant theories of power.

First, some theories suggest that high power leads to a preference for stability to protect one's status in the social hierarchy (Lammers & Stapel, 2009). Because rules stabilize the status quo, people in high-power positions are assumed to be especially attracted to rules. Thus, given that moral norms represent a particular type of rule, high power should be associated with greater concerns about moral norms than low power. Conversely, people in low-power positions are claimed to focus more on the detection of potential negative effects of the current hierarchy. As a result, they tend to be more concerned about outcomes than people in high-power positions. In terms of the CNI model, these assumptions suggest that (1) high power, compared to low power, should increase people's sensitivity to moral norms in the model's *N* parameter, and (2) high power, compared to low power, should decrease people's sensitivity to consequences in the model's *C* parameter.

Second, previous research suggests that (1) high power is associated with more abstract construals of judgment-relevant information (e.g., Magee, Milliken, & Lurie, 2010; Smith & Trope, 2006) and (2) abstract

[1] For the *C* and the *N* parameter, the neutral reference value is zero (i.e., estimates significantly greater than zero indicate that responses were influenced by consequences or moral norms, respectively). For the *I* parameter, the neutral reference value is 0.5 (i.e., estimates > 0.5 indicate a general preference for inaction and estimates < 0.5 indicate a general preference for action).

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

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

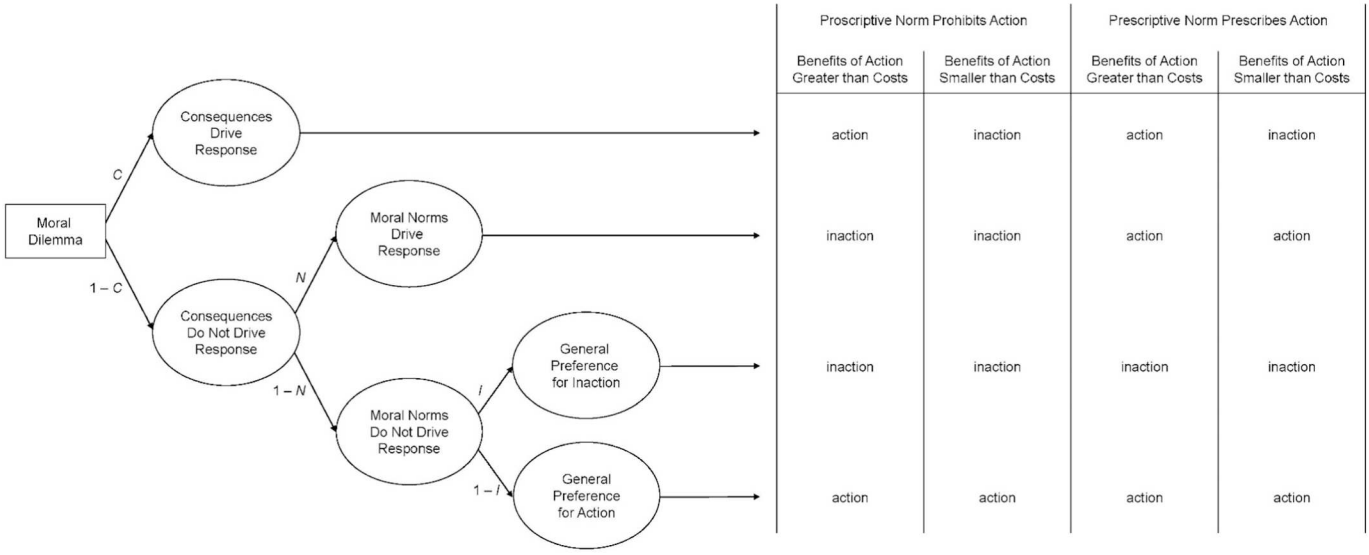

Fig. 1. Multinomial processing tree predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms and consequences involving benefits of action that are either greater or smaller than costs of action. Figure adapted from Gawronski et al. (2017). Reprinted with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

construals lead to an enhanced focus on outcomes in a utilitarian sense (e.g., Aguilar, Brussino, & Fernández-Dole, 2013; Amit & Greene, 2012). Together, the two sets of findings suggest that high power may increase concerns about consequences in moral dilemmas. In terms of the CNI model, this hypothesis leads to the prediction that high power, compared to low power, should increase people's sensitivity to consequences in the model's *C* parameter.

Third, some theories suggest that high power makes people less susceptible to social influence (Magee & Smith, 2013) and less likely to attend to the feelings and perceptions of others (Galinsky, Magee, Inesi, & Gruenfeld, 2006). To the extent that these effects include reduced concerns about norm violations, high power may decrease people's adherence to moral norms. In terms of the CNI model, this hypothesis leads to the prediction that high power, compared to low power, should decrease people's sensitivity to moral norms in the model's *N* parameter.

Finally, high power has been claimed to increase engagement in focal actions by enhancing approach tendencies and reducing behavioral inhibition (e.g., Galinsky, Gruenfeld, & Magee, 2003; Hirsh, Galinsky, & Zhong, 2011; Keltner, Gruenfeld, & Anderson, 2003). From the perspective of these theories, high power may promote action regardless of consequences and regardless of moral norms. In terms of the CNI model, this hypothesis leads to the prediction that high power, compared to low power, should decrease people's general preference for inaction versus action in the model's *I* parameter.

It is worth noting that, with two exceptions, these theoretically derived predictions are not mutually exclusive. For example, in terms of the CNI model, a stronger preference for action as a result of high power does not conflict with a potential effect of power on sensitivity to consequences. Whereas the former effect should be reflected in a significant effect on the model's *I* parameter, the latter effect should be reflected in a significant effect on the model's *C* parameter. Moreover, neither of these effects would conflict with the idea that power influences people's sensitivity to moral norms, which should be reflected in a significant effect on the model's *N* parameter. The only two cases where the reviewed theories lead to conflicting predictions concerns the direction of power effects on sensitivity to consequences and sensitivity to moral norms. Whereas some theories suggest that high power should be associated with a weaker sensitivity to consequences (Lammers & Stapel, 2009), other lines of work suggest that high power should be associated with a stronger sensitivity to consequences (Aguilar et al., 2013; Amit & Greene, 2012; Magee et al., 2010; Smith & Trope, 2006). Moreover, whereas some theories suggest that high power should be associated with a stronger sensitivity to moral norms (Lammers & Stapel, 2009), other accounts suggest that high power should be

associated with a weaker sensitivity to moral norms (Galinsky et al., 2006; Magee & Smith, 2013). A major advantage of the CNI model is that it permits conceptually stringent tests of all of these predictions by providing independent estimates of (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference for inaction versus action regardless of consequences and norms. Thus, the CNI model can provide a more nuanced understanding of multifaceted effects of power on moral judgments by disentangling multiple simultaneous effects that are conflated in the traditional dilemma approach.

1.4. The current research

The current research tested the five theoretically derived predictions using two manipulations of power: (1) a memory-based manipulation in which participants were asked to recall a personally relevant event involving either high or low power (see Galinsky et al., 2003) and (2) a role-based manipulation in which participants were randomly assigned to either a high-power or low-power role in a dyadic interaction task (see Anderson & Berdahl, 2002). 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 two manipulations, and one additional study that directly compared the two manipulations (Zwaan, Etz, Lucas, & Donnellan, 2018). In line with concerns about selective reporting of statistically significant effects (Ioannidis, Munafo, Fusar-Poli, Nosek, & David, 2014), we report the results of all five studies regardless of their outcome. To provide a stronger basis for interpretations of the obtained effects, we also conducted an integrative analysis of the data from all five studies (Curran & Hussong, 2009). For each study, we aimed to recruit 60 participants per cell, which provides a statistical power of 0.80 to detect a medium between-group effect of $d = 0.52$ in the difference between two independent mean values (two-tailed). 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/v54ks/.

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 Fig. 1, the CNI model provides four non-redundant 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 A).[2] 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.[3] 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. In the current work, we used the CNI model to investigate whether power affects moral dilemma judgments by influencing (1) sensitivity to consequences, (2) sensitivity to moral norms, or (3) general preference for inaction versus action regardless of consequences and norms (or some combination of the three).

2. Experiment 1a

Experiment 1a tested effects of power on moral dilemma judgments using a memory-based manipulation adapted from Galinsky et al. (2003). Toward this end, participants were asked to write about a personally relevant experience in which they had either low or high power. After the memory recall task, participants completed a validated set of 24 moral dilemmas for research using the CNI model (Gawronski et al., 2017).

2.1. Method

2.1.1. Participants

A total of 142 undergraduate students at the University of Texas at Austin were recruited for a one-hour battery on impression formation and moral judgment.[4] The battery included the current experiment and another study that was unrelated to the topic of this experiment. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a *high-power* or *low-power* condition. Due to experimenter error, data from two participants were lost, leaving us with a final sample of 140 participants (82 women, 58 men; $M_{age} = 19.03$, $SD_{age} = 0.93$).

2.1.2. Power manipulation

Participants were asked to write about a personally relevant experience in which they had either high or low power (see Galinsky et al., 2003). Participants in the high-power condition received the following instructions for the memory task:

> *Please recall a particular incident in which you had power over another individual or individuals. By power, we mean a situation in which you controlled the ability of another person or persons to get something they wanted, or were in a position to evaluate those individuals. Please do not click "continue" until you have thought of a situation in which you had power over another person or people. Please describe this situation in which you had power—what happened, how you felt, etc.*

Participants in the low-power condition received the same instructions, the only difference being that participants were asked to recall an incident in which someone else had power over them. Participants had 3 min to write about the recalled event.

[2] 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.

[3] Note that poor goodness-of-fit in multinomial modeling does not necessarily question the adequacy of the model in describing the data (see Gawronski et al., 2017, Footnote 6). Because large sample sizes lead to smaller confidence intervals for the predicted response probabilities, the likelihood of significant deviations between actual and predicted response probabilities increases as a function of sample size. In studies with large sample sizes, the adequacy of a multinomial model in describing the data can be evaluated by means of the effect size measure Cohen's *w*. According to Cohen (1988), a *w* of 0.10 represents a small effect, a *w* of 0.30 represents a medium effect, and a *w* of 0.50 represents a large effect. Significant deviations with an effect size of $w < 0.10$ are typically treated as minor and, thus, irrelevant for the adequacy of the model in describing the data.

[4] Due to 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.

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 6. The neutral reference value of equal numbers of action and inaction responses is 3.

	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
Experiment 1a (memory recall)								
Low power	2.74	[2.44, 3.05]	1.14	[0.87, 1.42]	4.61	[4.32, 4.91]	3.24	[2.94, 3.55]
High power	3.07	[2.76, 3.38]	1.49	[1.21, 1.76]	4.46	[4.16, 4.75]	3.26	[2.95, 3.56]
Experiment 1b (memory recall)								
Low power	3.05	[2.68, 3.42]	1.50	[1.15, 1.85]	4.50	[4.15, 4.85]	2.97	[2.62, 3.31]
High power	3.22	[2.85, 3.59]	1.80	[1.45, 2.15]	4.25	[3.90, 4.60]	2.93	[2.59, 3.27]
Experiment 2a (social roles)								
Low power	2.89	[2.50, 3.28]	1.20	[0.86, 1.53]	4.52	[4.22, 4.82]	3.35	[2.97, 3.72]
High power	2.44	[2.05, 2.84]	0.93	[0.60, 1.27]	4.98	[4.67, 5.28]	3.40	[3.02, 3.78]
Experiment 2b (social roles)								
Low power	2.73	[2.40, 3.06]	1.32	[1.03, 1.60]	4.47	[4.19, 4.74]	3.23	[2.89, 3.58]
High power	2.98	[2.65, 3.31]	1.47	[1.18, 1.75]	4.83	[4.56, 5.11]	3.35	[3.00, 3.70]
Experiment 3 (memory recall)								
Low power	2.67	[2.35, 3.02]	1.06	[0.77, 1.35]	4.80	[4.51, 5.09]	3.63	[3.28, 3.97]
High power	3.14	[2.81, 3.48]	1.27	[0.98, 1.56]	4.55	[4.26, 4.84]	2.97	[2.63, 3.31]
Experiment 3 (social roles)								
Low power	3.11	[2.77, 3.44]	1.31	[1.02, 1.60]	4.80	[4.51, 5.09]	3.44	[3.09, 3.78]
High power	2.90	[2.57, 3.24]	1.03	[0.74, 1.32]	4.75	[4.45, 5.04]	3.54	[3.19, 3.89]

2.1.3. Manipulation checks

After completion of the memory task, participants rated their agreement with five statements about their feelings of power in the recalled event: (1) *I felt in charge of the situation*. (2) *I felt that I had power over another person*. (3) *I felt that I had control over another person*. (4) *I felt that another person had power over me*. (5) *I felt that another person had control over my actions*. To rule out potential effects of the power manipulation via emotional states (see Gawronski et al., 2018; Langner & Keltner, 2008), participants additionally rated their agreement with six statements about their currently experienced emotions: (1) *In the present moment, I feel happy*. (2) *In the present moment, I feel exhilarated*. (3) *In the present moment, I feel sad*. (4) *In the present moment, I feel satisfied*. (5) *In the present moment, I feel content*. (6) *In the present moment, I feel disappointed*. Ratings on both measures were provided on 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

2.1.4. Moral dilemma task

After completion of the manipulation checks, participants read and responded to Gawronski et al.'s (2017) validated set of 24 moral dilemmas for research using the CNI model. 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 4 parallel versions of 6 basic scenarios that varied in terms of whether (1) the dilemma involved a proscriptive norm that prohibits action or a prescriptive norm that prescribes action and (2) 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.*

2.2. Results

2.2.1. Manipulation checks

Ratings of subjective power were aggregated by reverse coding the two negatively framed items of the power scale (i.e., items 4 and 5; see above) and calculating mean scores across the five power items (Cronbach's $\alpha = 0.91$). Higher scores on the resulting index reflect greater subjective power. Consistent with the intended effect of our experimental manipulation, participants in the high-power condition reported greater power in the recalled event than participants in the low-power condition (Ms = 5.29 vs. 2.20, respectively), $t(138) = 24.74$, $p < .001$, $d = 4.18$. To investigate whether the power manipulation affected participants' emotional state, we reverse coded the two negatively framed emotion items (i.e., items 3 and 6; see above) and calculated mean scores across the six emotion items (Cronbach's $\alpha = 0.85$). Higher scores on the resulting index reflect higher levels of positive emotions. There was no significant difference in self-reported positive emotions between participants in the high-power versus low-power condition (Ms = 4.74 vs. 4.62, respectively), $t(138) = 0.67$, $p = .507$, $d = 0.11$.

2.2.2. Moral dilemma judgments

Responses to the moral dilemmas were aggregated by calculating the sum of *action* responses to the four types of moral dilemmas as a function of high versus low power. Means and 95% confidence intervals are presented in Table 2. 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). Following Gawronski et al. (2017), effect sizes of between-group 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, $G^2(2) = 2.72$, $p = .257$, $\omega = 0.028$. There was no significant effect of power on the C parameter, $\Delta G^2(1) = 0.26$, $p = .611$, $d = 0.09$, and the I parameter,

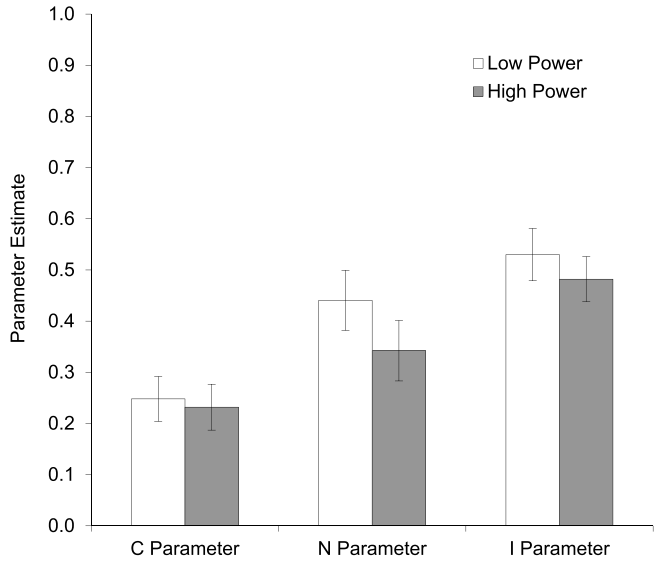

Fig. 2. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power manipulated through a memory task (low power vs. high power), Experiment 1a. Error bars depict 95% confidence intervals.

$\Delta G^2(1) = 1.96$, $p = .161$, $d = 0.24$ (see Fig. 2). The only significant effect emerged for the *N* parameter, which showed a weaker sensitivity to moral norms in the high-power condition compared to the low-power condition, $\Delta G^2(1) = 5.39$, $p = .020$, $d = 0.40$ (see Fig. 2). These results suggest that power influences moral dilemma judgments by reducing sensitivity to moral norms. There seems to be no effect of power on sensitivity to consequences or general preference for inaction versus action regardless of consequences and norms.[5]

2.3. Discussion

In line with accounts suggesting that high power may reduce concerns about norm violations, participants asked to recall a high-power experience showed a weaker sensitivity to moral norms than participants asked to recall a low-power experience. There was no evidence that high power would increase or decrease sensitivity to consequences or that high power would reduce general preference for inaction versus action regardless of consequences and norms.

3. 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.

3.1. Method

3.1.1. Participants

A total of 120 undergraduate students at the University of Texas at Austin (88 women, 32 men; $M_{age} = 18.72$, $SD_{age} = 1.07$) were recruited for a one-hour battery on first impressions and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a *high-power* or *low-power* condition.

3.1.2. 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 memory manipulation of power and the manipulation checks were identical to Experiment 1a.

3.2. Results

3.2.1. Manipulation checks

Ratings of subjective power (Cronbach's $\alpha = 0.91$) and positive emotions (Cronbach's $\alpha = 0.87$) were aggregated in line with the procedures in Experiment 1a. Consistent with the intended effect of our experimental manipulation, participants in the high-power condition reported greater power in the recalled event than participants in the low-power condition ($Ms = 5.29$ vs. 2.20, respectively), $t(118) = 20.21$, $p < .001$, $d = 3.70$. Replicating the findings of Experiment 1a, there was no significant difference in self-reported positive emotions between participants in the high-power versus low-power condition ($Ms = 4.64$ vs. 4.41, respectively), $t(118) = 0.98$, $p = .329$, $d = 0.18$.

3.2.2. Moral dilemma judgments

The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. The CNI model fit the data well, $G^2(2) = 0.11$, $p = .945$, $\omega = 0.006$. 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 high-power condition compared to the low-power condition, $\Delta G^2(1) = 3.97$, $p = .046$, $d = 0.37$ (see Fig. 3). There were no significant effects of power on the *C* parameter, $\Delta G^2(1) = 0.69$, $p = .407$, $d = 0.15$, and the *I* parameter, $\Delta G^2(1) = 0.14$, $p = .705$, $d = 0.07$ (see Fig. 3).[6]

3.3. Discussion

The results of Experiment 1b provide further support for the conclusion that high power reduces people's sensitivity to moral norms. As with Experiment 1a, there was no evidence that high power would increase or decrease sensitivity to consequences or that high power would reduce general preference for inaction versus action regardless of consequences and norms.

4. Experiment 2a

To investigate the generality to the obtained effects across different power manipulations, Experiment 2a tested effects of power on moral dilemma judgments using a role-based manipulation adapted from Anderson and Berdahl (2002). Toward this end, participants were

[5] Following Gawronski et al. (2017, 2018), we also 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 to analyzing moral dilemma judgments, a preference for action over inaction on this type of dilemma would be interpreted as a preference for utilitarian over deontological responses (e.g., sacrifice the life of one to save multiple others). There was no significant difference in the preference for action over inaction on this type of dilemma between participants in the high-power versus low-power condition, $t(138) = 1.50$, $p = .136$, $d = 0.25$ (see Table 2).

[6] Analyses using the traditional approach did not show a significant effect of power on participants' preference for action over inaction in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being, $t(118) = 0.63$, $p = .528$, $d = 0.12$ (see Table 2).

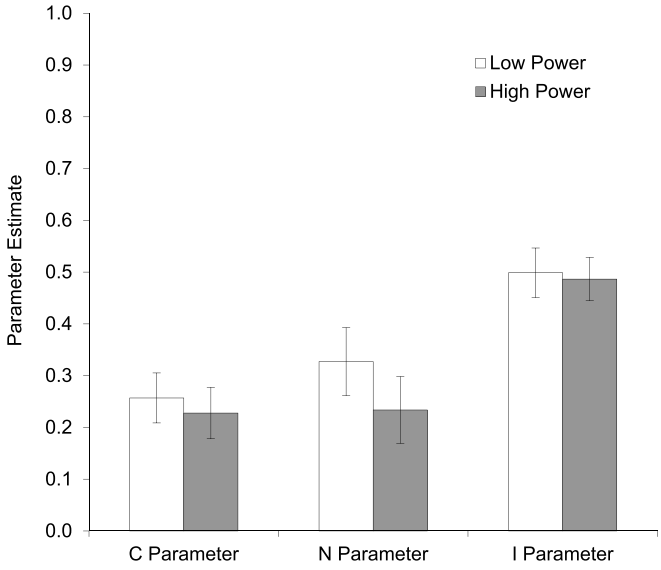

Fig. 3. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power manipulated through a memory task (low power vs. high power), Experiment 1b. Error bars depict 95% confidence intervals.

randomly assigned to either a high-power or low-power role in a dyadic interaction task. After the interaction task, participants completed the same validated set of 24 moral dilemmas for research using the CNI model (Gawronski et al., 2017). Based on the assumption that different manipulations of power are functionally equivalent (e.g., Galinsky et al., 2003), we expected to replicate the findings of Experiments 1a and 1b.

4.1. Method

4.1.1. Participants

A total of 91 undergraduate students at the University of Texas at Austin were recruited for a one-hour battery on impression formation and moral judgment (62 women, 29 men; M_{age} = 18.95, SD_{age} = 0.94).[7] The battery included the current experiment and another study that was unrelated to the topic of this experiment. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a *high-power* or *low-power* condition.

4.1.2. Power manipulation

Participants were randomly assigned to either a high-power or a low-power role in a dyadic interaction task (see Anderson & Berdahl, 2002). Toward this end, participants were told that they would have to coordinate with a partner on an organizational task and that one of them would be assigned the role of *Manager* (i.e., high-power role) and the other would be assigned the role of *Intern* (i.e., low-power role). Participants were further told that their role assignments would be based on their responses in a personality questionnaire. Participants received the following instructions for the personality questionnaire:

> *Research in psychology has demonstrated that good leaders possess certain combinations of personality traits. For this reason, we would like you to rate your agreement with the following statements so that we can better gauge who between you and your partner should manage later tasks.*

Participants then rated their agreement with ten statements about their ability to understand other people and their preference for complex problems, which were meant to be face valid statements regarding characteristics important for leadership. Items were selected from the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988) and the Relational-Experiential Inventory (REI; Epstein, Pacini, Denes-Raj, & Heier, 1996). After completing the questionnaire, participants were assigned to their respective roles. These roles, while ostensibly being based on their responses in the questionnaire, were randomly assigned to participants to experimentally manipulate high versus low power. The participant assigned to the Manager role was told that they would be in charge of directing the Intern during an upcoming task and that they would be able to evaluate the Intern at the end of the task. Conversely, the participant assigned to the Intern role was told that they would receive directions from their Manager while completing a task and that their Manager would evaluate them at the end of the task. Additionally, both participants were told that the Manager's evaluation of the Intern would not be seen by the Intern and that the Intern would not have an opportunity to evaluate the manager.

After receiving their role assignments, participants were moved into their respective "offices" within the lab suite. To increase the salience of the two roles for the duration of the experiment, these "offices" were set up to resemble one of a high-power individual and one of a low-power individual, respectively. The Manager's office was labeled with a printed sign outside of the door, had a framed "Manager" sign on the desk, and included a high-end Hermann Miller Aeron chair. Additionally, there was a *Harvard Business Review* magazine on the desk and permanent shelve units that contained various psychology books and the materials the Intern needed to complete their tasks. Conversely, the Intern office was much smaller than the Manager office and was used to store several old CRT monitors. Additionally, the Intern office was labeled with a handwritten note outside of the door, had a piece of spiral notebook paper with "Intern" written on it hanging on the wall behind the computer, and included a simple four-leg chair.

Participants assigned to the Intern role had to complete a series of tasks, such as retrieving a coffee mug of water for the Manager, sharpening pencils, preparing survey packets, and washing the Manager's coffee mug. The materials they needed to complete each of these tasks were stored in their Manager's office, and they had to receive approval from their Manager to obtain these materials and to move on to the next task. Managers were told that they would need to initial beside each task on their Intern's assignment sheet and that they had the power to have the Intern re-do tasks if they were not pleased with the work quality. Additionally, both participants were told that the Manager would be taking into account the Intern's efficiency, quality of work, and independence when evaluating them. Once the Intern completed all of their tasks, both participants completed a survey packet. The Manager's survey packet contained a form on which they evaluated their Intern, as well as their own performance. Conversely, the Intern's packet contained a form on which they evaluated their own performance.[8]

4.1.3. Manipulation checks

After completion of the social role task, participants rated their agreement with five statements about their feelings of power in the social role task: (1) *I felt in charge of the task*. (2) *I felt that I had power over my partner*. (3) *I felt that I had control over my partner's actions*. (4) *I felt that my partner had power over me*. (5) *I felt that my partner had control over my actions*. To rule out potential effects of the power manipulation

[7] Due to low sign-ups and a considerable number of "no-shows" in the academic term in which the study was run, the final sample in Experiment 2a was smaller than the desired sample of 120 participants.

[8] To recruit participants in pairs, we posted two slots for each experimental session. In five cases, only one of the two participants showed up for the study. In these cases, participants were randomly assigned to one of the two roles and a confederate took the respective other role. Excluding these five participants from the analysis did not change the overall pattern of results.

via emotional states (see Gawronski et al., 2018; Langner & Keltner, 2008), participants additionally rated their agreement with six statements about their currently experienced emotions: (1) *In the present moment, I feel happy*. (2) *In the present moment, I feel exhilarated*. (3) *In the present moment, I feel sad*. (4) *In the present moment, I feel satisfied*. (5) *In the present moment, I feel content*. (6) *In the present moment, I feel disappointed*. Ratings on both measures were provided on 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

4.1.4. Moral dilemma task

After completion of the manipulation checks, participants completed the same moral dilemma task as in Experiments 1a and 1b.

4.2. Results

4.2.1. Manipulation checks

Ratings of subjective power (Cronbach's $\alpha = 0.87$) and positive emotions (Cronbach's $\alpha = 0.85$) were aggregated in line with the procedures in Experiment 1a. Consistent with the intended effect of our experimental manipulation, participants in the high-power condition reported greater power in the social role task than participants in the low-power condition (*M*s = 5.34 vs. 3.47, respectively), $t(89) = 8.15$, $p < .001$, $d = 1.75$. There was no significant difference in self-reported positive emotions between participants in the high-power versus low-power condition (*M*s = 4.96 vs. 4.65, respectively), $t(89) = 1.44$, $p = .154$, $d = 0.30$.

4.2.2. Moral dilemma judgments

The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. The CNI model fit the data well, $G^2(2) = 2.52$, $p = .284$, $\omega = 0.034$. In line with the results of Experiments 1a and 1b, there was a significant effect of the power manipulation on the *N* parameter, $\Delta G^2(1) = 8.06$, $p = .005$, $d = 0.60$. However, the direction of this effect was opposite to the one in Experiments 1a and 1b, in that participants in the high-power condition showed a stronger sensitivity to moral norms compared to participants in the low-power condition (see Fig. 4). There were no significant effects of power on the *C* parameter, $\Delta G^2(1) = 0.22$, $p = .642$, $d = 0.10$, and the *I* parameter, $\Delta G^2(1) = 0.10$, $p = .747$, $d = 0.07$ (see Fig. 4).[9]

4.3. Discussion

Consistent with the findings of Experiments 1a and 1b, Experiment 2a obtained no evidence that power would increase or decrease sensitivity to consequences or that high power would reduce general preference for inaction versus action regardless of consequences and norms. Yet, opposite to the findings of Experiments 1a and 1b, Experiment 2a found a stronger (rather than weaker) sensitivity to moral norms as a result of high power.

5. Experiment 2b

The conflicting findings in the three preceding studies raise important questions about the reproducibility of power effects on moral dilemma judgments (Open Science Framework, 2015). On the one hand, it is possible that the significant effects in these studies are false positives that would produce an effect size close to zero in a meta-analytic synthesis. On the other hand, it is possible that the conflicting findings reflect systematic differences between the two manipulations of power (e.g., Tost & Johnson, 2019). To address the possibility of systematic differences between the two manipulations of power, Experiment 2b explored whether the results of Experiment 2a replicate in a follow-up using the same measures and materials.

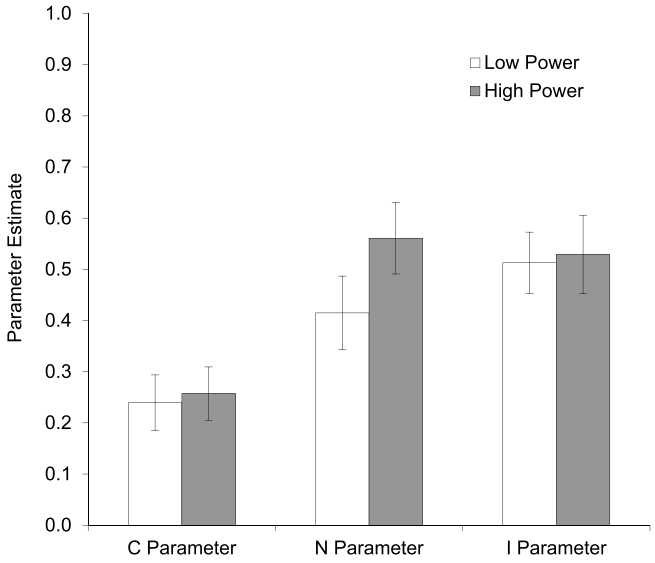

Fig. 4. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power manipulated through a social role task (low power vs. high power), Experiment 2a. Error bars depict 95% confidence intervals.

5.1. Method

5.1.1. Participants

A total of 120 undergraduate students at the University of Texas at Austin (67 women, 53 men; $M_{age} = 19.37$, $SD_{age} = 1.35$) were recruited for a one-hour battery on social-political issues and moral judgment. The battery included the current experiment and another study that was unrelated to the topic of this experiment. Participants received research credit for an introductory psychology course. Participants were randomly assigned to either a *high-power* or *low-power* condition.

5.1.2. 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 social-role manipulation and the manipulation checks were identical to Experiment 2a.[10]

5.2. Results

5.2.1. Manipulation checks

Ratings of subjective power (Cronbach's $\alpha = 0.89$) and positive emotions (Cronbach's $\alpha = 0.85$) were aggregated in line with the procedures in Experiment 1a. Consistent with the intended effect of our experimental manipulation, participants in the high-power condition reported greater power in the social-role task than participants in the low-power condition (*M*s = 5.09 vs. 3.06, respectively), $t(118) = 9.49$,

[9] Analyses using the traditional approach did not show a significant effect of power on participants' preference for action over inaction in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being, $t(89) = 1.61$, $p = .110$, $d = 0.34$ (see Table 2).

[10] Following the procedure in Experiment 2a, we posted two slots for each experimental session in order to recruit two participants for each session. In cases where only one of the two slots were taken, participants responded only to the moral dilemmas without completing the social role task. Responses from these participants were not included in the current analyses. The only other difference to Experiment 2a was that there were no signs outside of the two "offices."

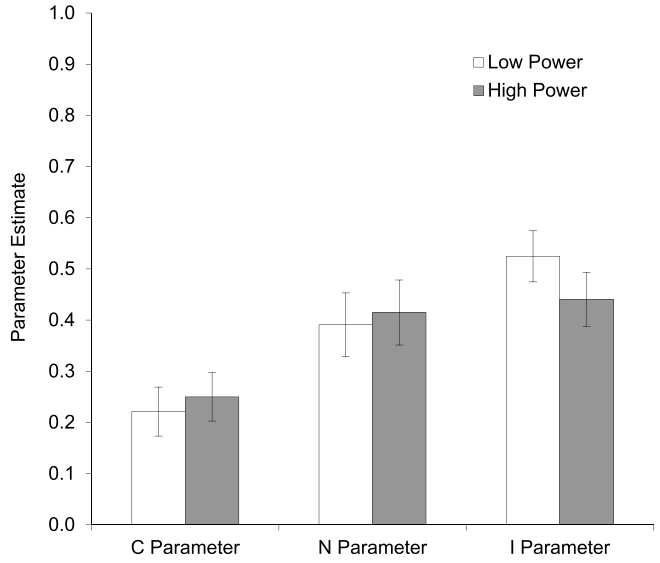

Fig. 5. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power manipulated through a social role task (low power vs. high power), Experiment 2b. Error bars depict 95% confidence intervals.

$p < .001$, $d = 1.74$. Different from the previous three studies, there was a marginal difference in self-reported positive emotions, in that participants in the high-power condition tended to report more positive emotions than participants in the low-power condition (*Ms* = 4.98 vs. 4.64, respectively), $t(118) = 1.97$, $p = .051$, $d = 0.36$.

5.2.2. Moral dilemma judgments

The data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. The CNI model fit the data well, $G^2(2) = 0.41$, $p = .817$, $\omega = 0.012$. In contrast to the results of the previous three experiments, there was no significant effect of the power manipulation on the *N* parameter, $\Delta G^2(1) = 0.28$, $p = .599$, $d = 0.10$ (see Fig. 5). There was also no significant effect on the *C* parameter, $\Delta G^2(1) = 0.71$, $p = .401$, $d = 0.15$ (see Fig. 5). The only significant effect emerged for the *I* parameter, in that participants in the high-power condition showed a weaker general preference for inaction than participants in the low-power condition, $\Delta G^2(1) = 5.13$, $p = .024$, $d = 0.42$ (see Fig. 5).[11]

5.3. Discussion

Experiment 2b failed to replicate the main findings of Experiment 2a. Whereas high power increased sensitivity to moral norms in Experiment 2a, high power reduced participants' general preference for inaction versus action in Experiment 2b. Neither of these effects was statistically significant in the respective other study.

6. Experiment 3

Experiment 3 aimed to address four questions arising from the inconsistent findings of the previous studies. First, it is unclear whether the obtained differences in the effects of memory recall and social roles reflect systematic differences between the two manipulations or random differences in the effects of two functionally equivalent procedures (e.g., differences resulting from sampling error). To address this question, participants in Experiment 3 were randomly assigned to the high-power or low-power condition of either the memory-recall or the social-roles manipulation, allowing us to directly compare effects of memory recall and social roles.

Second, we aimed to address whether the inconsistent effects of the social-role manipulation stem from incidental aspects of participants' experiences during their interaction with another participant. In addition to the problem that responses from participants within the same dyad are not independent in a statistical sense (Kenny, Kashy, & Cook, 2006), it is possible that incidental aspects of the interactions in the organizational task influenced moral judgments over and above the effects of role-power, thereby reducing the statistical power to detect effects of role-power.[12] Experiment 3 aimed to address this issue by administering the moral judgment task in the social-roles condition immediately after participants had been assigned to their respective roles without completing the dyadic interaction part (e.g., Gruenfeld, Inesi, Magee, & Galinsky, 2008; Lammers, Stapel, & Galinsky, 2010).

Third, Experiment 3 used an improved manipulation check to compare the relative effectiveness of the two power manipulations. Instead of asking participants to report their subjective feelings of power in the recalled situation (Experiments 1a, 1b) or the anticipated organizational task (Experiments 2a, 2b), the manipulation check in Experiment 3 assessed participants' general sense of power in the current moment. To the extent that moral judgments are influenced by participants' general sense of power rather than feelings of power that are specific to an unrelated event, the manipulation checks in the previous studies may be suboptimal indicators of the relative effectiveness of the two power manipulations. Experiment 3 aimed to address this concern by using a manipulation check assessing participants' general sense of power.

Fourth, Experiment 3 investigated whether the obtained differences in the effects of memory recall and social roles are rooted in different construals of power. Based on the distinction between power-as-opportunity and power-as-responsibility (Scholl et al., 2018), high power induced by memory recall may increase the salience of opportunities, whereas high power induced by social roles may increase the salience of responsibilities. To the extent that power has different effects on moral judgments depending on whether it is construed in terms of opportunities or in terms of responsibilities (e.g., Tost & Johnson, 2019), different construals associated with memory recall and social roles may explain the obtained inconsistencies between the two manipulations. To address this question, Experiment 3 included measures of perceived opportunity and perceived responsibility to capture participants' subjective construal of power, as induced via memory recall versus social roles.

6.1. Method

6.1.1. Participants

A total of 257 undergraduate students at the University of Texas at Austin were recruited for a one-hour 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. Participants received research credit for an introductory psychology course. Data from two participants were lost due to an automatic update that caused the lab software to freeze, leaving us with a final sample of 255 participants (169 women, 85 men, 1 other; $M_{age} = 19.14$, $SD_{age} = 1.25$).[13] Participants were randomly assigned to one of the four

[11] Analyses using the traditional approach did not show a significant effect of power on participants' preference for action over inaction in moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh the costs to well-being, $t(118) = 1.07$, $p = .289$, $d = 0.20$ (see Table 2).

[12] Because the small number of moral dilemmas does not permit reliable estimates of CNI model parameters at the level of individual participants (Gawronski et al., 2017), it is not feasible to statistically account for the non-independence of dyadic data in Experiments 2a and 2b (see Kenny et al., 2006).

[13] Due to excessive sign-ups at the end of the academic term, the final sample in Experiment 3 was slightly larger than the desired sample of 240 participants.

conditions of a 2 (Power: low vs. high) × 2 (Manipulation: memory recall vs. social roles) between-subjects design.

6.1.2. Procedure

Participants were asked to read and respond to the 24 moral dilemmas of the previous four experiments, using the same fixed random order. The memory-recall manipulation was identical to the one in Experiments 1a and 1b. The social-roles manipulation was identical to the one in Experiments 2a and 2b with the exception that participants completed the moral judgment task immediately after they had been assigned to their respective roles without completing the dyadic interaction part. After completion of the moral judgment task, participants in the social-roles conditions were asked to contact the experimenter for further instructions on the organization task. The experimenter informed participants that there is not enough time left in the session to complete the organization task, and participants were thanked and given full credit.

6.1.3. Measures

The moral judgment task and the control measure of self-reported emotions were identical to the previous studies. Different from the focus on participants' experiences in the recalled situation (Experiments 1a and 1b) and the role-play (Experiments 2a and 2b), the manipulation check in Experiment 3 assessed participants' general sense of power. Toward this end, participants were asked to rate their agreement with five statements on 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*): (1) *I feel in charge of the situation*. (2) *I feel that I have power over another person*. (3) *I feel that I have control over another person*. (4) *I feel that another person has power over me*. (5) *I feel that another person has control over my actions*. In addition, participants were asked to rate how powerful and powerless they feel right now on two 7-point scales ranging from 1 (*not at all*) to 7 (*very much*). To measure different construals of power, participants were also asked to complete a 4-item scale assessing perceived opportunity and a 4-item scale assessing perceived responsibility. Both scales were directly adapted from Scholl et al. (2018). The four items of the perceived opportunity measure were: (1) *I have opportunities for achieving important goals*. (2) *I am aware that I do not depend on others*. (3) *I can see what my opportunities are*. (4) *I can do things the way I want*. The four items of the perceived responsibility measure were (1) *I am responsible for achieving important goals*. (2) *I am aware that others depend on me*. (3) *I can see what my responsibilities are*. (4) *I can make sure that things go well*. Perceived opportunity and perceived responsibility were measured with 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The manipulation check, the two measures of power construals, and the control measure of self-reported emotions were administered after the power manipulation but before the completion of the moral judgment task.

6.2. Results

6.2.1. Manipulation checks

Responses on the seven items measuring general sense of power were aggregated by reverse coding the three negatively framed items (i.e., items 4, 5, and 7; see above) and calculating mean scores across the seven items (Cronbach's $\alpha = 0.81$). Higher scores on the resulting index reflect a stronger general sense of power. Ratings of perceived opportunity (Cronbach's $\alpha = 0.66$) and perceived responsibility (Cronbach's $\alpha = 0.71$) were aggregated by calculating mean scores for each of the two scales. Ratings of self-reported positive emotions (Cronbach's $\alpha = 0.83$) were aggregated in line with the procedures in Experiment 1a. Each of the four measures was submitted to a 2 (Power) × 2 (Manipulation) ANOVA.

General sense of power revealed a significant main effect of Power, $F(1, 251) = 52.55$, $p < .001$, $\eta_p^2 = 0.173$, which was qualified by a significant two-way interaction of Power and Manipulation, $F(1, 251) = 8.02$, $p = .005$, $\eta_p^2 = 0.031$. Although participants in the high-power condition reported significantly stronger feelings of power than participants in the low-power condition for both the memory-recall manipulation (Ms = 4.66 vs. 3.43, respectively), $t(126) = 7.07$, $p < .001$, $d = 1.25$, and the social-roles manipulation, (Ms = 4.44 vs. 3.90, respectively), $t(125) = 3.15$, $p = .002$, $d = 0.56$, the effect of the memory-recall manipulation was significantly larger compared to the effect of the social-roles manipulation.

Perceived opportunity revealed a marginal main effect of Manipulation, $F(1, 251) = 2.80$, $p = .095$, $\eta_p^2 = 0.011$, which was qualified by a significant two-way interaction of Power and Manipulation, $F(1, 251) = 5.28$, $p = .022$, $\eta_p^2 = 0.021$. Further analyses revealed that participants in the memory-recall condition showed higher levels of perceived opportunity when they were asked to recall a high-power experience than when they were asked to recall a low-power experience (Ms = 5.20 vs. 4.76, respectively), $t(126) = 2.39$, $p = .018$, $d = 0.42$. There was no significant effect of high versus low power in the social-roles condition (Ms = 5.12 vs. 5.22, respectively), $t(125) = 0.67$, $p = .502$, $d = 0.12$.

Perceived responsibility revealed a marginal main effect of Manipulation, $F(1, 251) = 3.71$, $p = .055$, $\eta_p^2 = 0.015$, which was qualified by a significant two-way interaction of Power and Manipulation, $F(1, 251) = 4.86$, $p = .028$, $\eta_p^2 = 0.019$. Further analyses revealed that participants in the memory-recall condition tended to show higher levels of perceived responsibility when they were asked to recall a high-power experience than when they were asked to recall a low-power experience (Ms = 5.87 vs. 5.59, respectively), $t(126) = 1.89$, $p = .061$, $d = 0.33$. There was no significant effect of high versus low power in the social-roles condition (Ms = 5.85 vs. 5.97 respectively), $t(125) = 1.15$, $p = .250$, $d = 0.20$.

Self-reported positive emotions revealed a significant two-way interaction of Power and Manipulation, $F(1, 251) = 4.74$, $p = .030$, $\eta_p^2 = 0.019$, indicating that participants in the memory-recall condition reported stronger positive emotions when they were asked to recall a high-power experience than when they were asked to recall a low-power experience (Ms = 4.89 vs. 4.44, respectively), $t(126) = 2.54$, $p = .012$, $d = 0.45$. There was no significant effect of high versus low power in the social-roles condition (Ms = 4.67 vs. 4.79, respectively), $t(125) = 0.61$, $p = .543$, $d = 0.11$.

6.2.2. Moral dilemma judgments

The moral judgment data were aggregated in line with the procedures of Experiment 1a. Means and 95% confidence intervals are presented in Table 2. The CNI model was fit to the data with the three parameters varying freely across the four experimental conditions, $G^2(4) = 12.15$, $p = .016$, $\omega = 0.045$.[14] This model was used as the baseline model for tests whether the obtained estimates for a given parameter significantly differ across the four experimental conditions.[15] Analyses revealed a significant difference across conditions for the N parameter, $\Delta G^2(3) = 12.29$, $p = .006$, $\omega = 0.045$, but not for the C parameter, $\Delta G^2(3) = 2.85$, $p = .415$, $\omega = 0.017$, and the I parameter, $\Delta G^2(3) = 3.58$, $p = .311$, $\omega = 0.024$ (see Fig. 6). Replicating the results of Experiments 1a and 1b, further analyses revealed that participants in the memory-recall condition showed a weaker sensitivity to moral norms when they were asked to recall a high-power experience than when they were asked to recall a low-power experience, $\Delta G^2(1) = 10.25$, $p = .001$, $d = 0.57$. There was no significant effect of

[14] Because the effect size of the observed deviation between predicted and observed response probabilities was smaller than Cohen's (1988) benchmark for a small effect ($w = 0.10$), it can be dismissed as minor and, thus, irrelevant for the adequacy of the model in describing the data (see Footnote 3).

[15] Because there is no straightforward way to test interaction effects of multiple factors within multinomial modeling, we tested whether the obtained estimates for a given parameter significantly differ across the four experimental conditions.

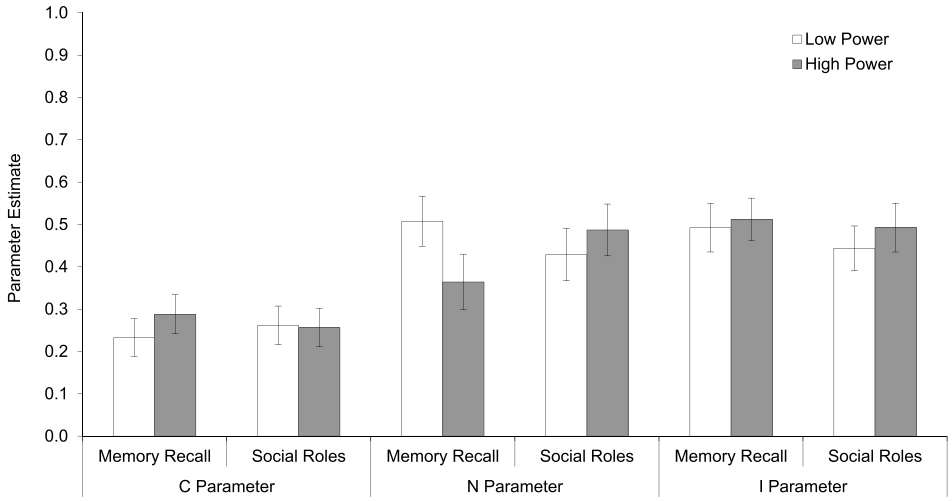

Fig. 6. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power (low vs. high) manipulated through a memory recall task or social role task, Experiment 3. Error bars depict 95% confidence intervals.

high versus low power in the social-roles condition, $\Delta G^2(1) = 1.72$, $p = .190$, $d = 0.23$. Moreover, sensitivity to moral norms was significantly weaker for participants who were asked to recall a high-power experience compared to participants who were assigned to a high-power role, $\Delta G^2(1) = 7.29$, $p = .007$, $d = 0.48$. Conversely, sensitivity to moral norms tended to be stronger for participants who were asked to recall a low-power experience compared to participants who were assigned to a low-power role, $\Delta G^2(1) = 3.24$, $p = .072$, $d = 0.32$.[16]

6.3. Discussion

The results of Experiment 3 suggest that the inconsistent effects of memory recall and social roles in the previous studies reflect systematic differences between the two manipulations rather than random differences in the effects of two functionally equivalent procedures (e.g., differences resulting from sampling error). In addition, the results of Experiment 3 suggest that the obtained differences between the two manipulations are independent of incidental aspects of the interactions in the organizational task, which may influence moral judgments over and above the effects of role-power. Consistent with the hypothesis that high power induced by memory recall increases the salience of opportunities, participants who were asked to recall a high-power experience showed higher levels of perceived opportunity than participants who were asked to recall a low-power experience. However, there was no evidence for the hypothesis that high power induced by social roles increases the salience of responsibilities. Instead, perceived responsibility was influenced only by the memory recall manipulation, in that participants who were asked to recall a high-power experience tended to show higher levels of perceived responsibility than participants who were asked to recall a low-power experience. Because the memory recall manipulation also showed a much stronger effect on participants' general sense of power, it is possible that the obtained differences between memory recall and social roles are due to a weaker effectiveness of the social-role manipulation in influencing participants' general sense of power and associated construals of power. If that is the case, the obtained differences may reflect a lower statistical power in detecting effects of social roles that are functionally equivalent to the effects of memory recall (Maxwell, Lau, & Howard, 2015). To address this possibility, we conducted an integrative analysis of the data from all five experiments (Curran & Hussong, 2009). Based on the total number of participants who completed the memory-recall task ($N = 388$) and the social-roles task ($N = 338$), the integrative data analysis had a power of 0.80 in detecting a small between-group difference of $d = 0.29$ (two-tailed) between high-power and low-power groups in the memory-recall task and a small between-group difference of $d = 0.31$ (two-tailed) between high-power and low-power groups in the social-roles task.

7. Integrative data analysis

The CNI model was fit to the combined data from all five studies with the three parameters varying freely across the four groups of (1) memory recall – low power, (2) memory recall – high power, (3) social roles – low power, (4) social roles – high power, $G^2(4) = 11.49$, $p = .022$, $\omega = 0.026$.[17] This model was used as the baseline model for tests whether the obtained estimates for a given parameter significantly differ across the four groups. Analyses revealed a significant difference across conditions for the *N* parameter, $\Delta G^2(3) = 41.50$, $p < .001$, $\omega = 0.049$, but not for the *C* parameter, $\Delta G^2(3) = 0.42$, $p = .935$, $\omega = 0.005$, or the *I* parameter, $\Delta G^2(3) = 1.44$, $p = .695$, $\omega = 0.009$ (see Fig. 7). Further analyses revealed that participants showed a weaker sensitivity to moral norms when they were asked to recall a high-power experience than when they were asked to recall a low-power experience, $\Delta G^2(1) = 19.53$, $p < .001$, $d = 0.45$. In contrast, participants showed a stronger sensitivity to moral norms when they were assigned to a high-power role than when they were assigned to a low-power role, $\Delta G^2(1) = 6.50$, $p = .011$, $d = 0.28$. Moreover, sensitivity to moral norms was significantly weaker for participants who were asked to recall a high-power experience compared to participants who were assigned to a high-power role, $\Delta G^2(1) = 38.75$, $p < .001$, $d = 0.66$. There was no significant difference in the sensitivity to moral norms between participants who were asked to recall a low-power experience and participants who were assigned to a low-power role,

[16] A 2 (Power) × 2 (Manipulation) ANOVA using the traditional approach revealed marginal interaction between Power and Manipulation, $F(1, 251) = 3.72$, $p = .055$, $\eta_p^2 = 0.015$ (see Table 2). Further analyses revealed that, for participants in the memory-recall condition, traditional judgment scores tended to be greater in the high-power condition compared to the low-power condition, $t(126) = 1.85$, $p = .066$, $d = 0.33$. There was no significant effect of high versus low power in the social-roles condition, $t(125) = 0.86$, $p = .390$, $d = 0.15$.

[17] Because the effect size of the observed deviation between predicted and observed response probabilities was smaller than Cohen's (1988) benchmark for a small effect ($w = 0.10$), it can be dismissed as minor and, thus, irrelevant for the adequacy of the model in describing the data (see Footnote 3).

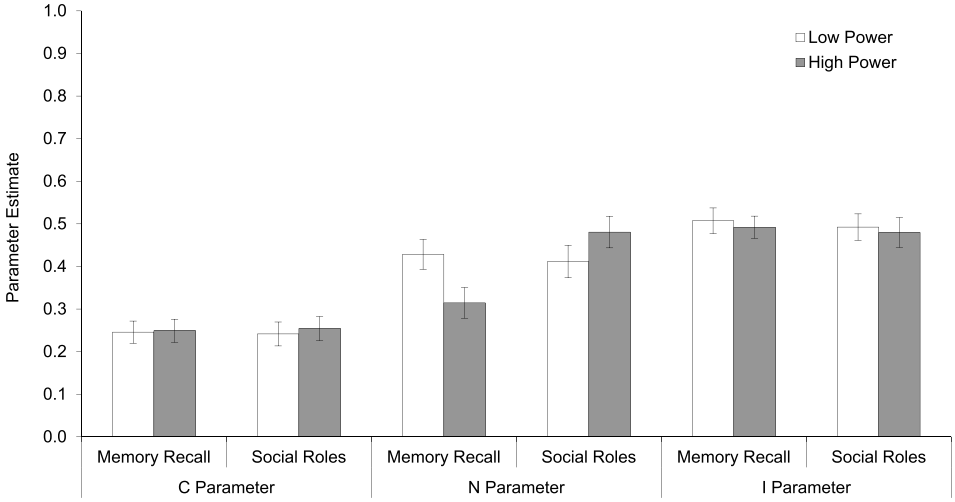

Fig. 7. Parameter estimates of sensitivity to consequences (*C*), sensitivity to norms (*N*), and general preference for inaction versus action (*I*) as a function of power (low vs. high) manipulated through a memory recall task or social role task, combined data from Experiments 1a, 1b, 2a, 2b, 3. Error bars depict 95% confidence intervals.

$\Delta G^2(1) = 0.41$, $p = .521$, $d = 0.07$. These results suggest that low statistical power was indeed an important factor that contributed to the inconsistent effects of the social-roles manipulation in Experiments 2a, 2b, and 3. However, different from the argument that low statistical power undermined the detection of a social-roles effect that is functionally equivalent to the one of memory recall, the two manipulations showed opposite effects on moral judgments. Whereas high (vs. low) power manipulated via memory recall *decreased* sensitivity to moral norms, high (vs. low) power manipulated via social roles *increased* sensitivity to moral norms.[18]

8. General discussion

The main goal of the current research was to test competing predictions regarding the effect of power on moral dilemma judgments. Drawing on the CNI model of moral decision-making (Gawronski et al., 2017), we were particularly interested in whether power affects moral dilemma judgments by influencing (1) sensitivity to consequences, (2) sensitivity to moral norms, or (3) general preference for inaction versus action regardless of consequences and norms (or some combination of the three).

We initially assumed that different manipulations of power are functionally equivalent in the sense that they would have corresponding effects on moral judgments. These assumptions turned out to be incorrect. In Experiments 1a, 1b, and 3, we found that a memory-based manipulation of high (vs. low) power (see Galinsky et al., 2003) *decreased* sensitivity to moral norms. In contrast, our integrative data analysis of Experiments 2a, 2b, and 3 suggests that a role-based manipulation of high (vs. low) power (see Anderson & Berdahl, 2002) *increased* sensitivity to moral norms. Together, these findings pose a challenge to the assumption that different manipulations of power are functionally equivalent.

[18] A potential concern is that the social-roles manipulation in Experiment 3 was not equivalent to the one in Experiments 2a and 2b, in that Experiment 3 did not include role-congruent interactions between participants after the role assignment. To address this concern, we conducted an integrative analysis of social-role effects in the combined data of Experiments 2a and 2b without including the data of Experiment 3. The pattern of results was identical, in that assignment to a high-power (vs. low-power) role significantly increased sensitivity to moral norms, $\Delta G^2(1) = 4.96$, $p = .026$, $d = 0.31$, without affecting sensitivity to consequences, $\Delta G^2(1) = 0.88$, $p = .347$, $d = 0.13$, and general preference for inaction over action, $\Delta G^2(1) = 2.51$, $p = .113$, $d = 0.22$. Although the effect of power on sensitivity to norms was not statistically significant in Experiment 3, it was directionally consistent with this pattern (see Fig. 6).

8.1. Power and morality

In addition to highlighting important differences between extant manipulations of power, the current findings provide valuable insights into the processes by which power influences morality. To the extent that the memory-recall manipulation influenced moral judgments via differences in *psychological* power and the social-roles manipulation influenced moral judgments via differences in *structural* power, the conflicting effects of the two manipulations may reflect a more substantial difference in the mechanisms underlying the effects of power on moral judgments. On the one hand, we found that a memory-based manipulation of high (vs. low) power reduced sensitivity to moral norms. This finding is consistent with theories of *psychological* power suggesting that high power makes people less susceptible to social influence (Magee & Smith, 2013) and less likely to attend to the feelings and perceptions of others (Galinsky et al., 2006), which may decrease people's adherence to moral norms. On the other hand, we found that a role-based manipulation of high (vs. low) power increased sensitivity to moral norms. This finding is consistent with theories of *structural* power suggesting that high power leads to a preference for stability to protect one's status in the social hierarchy (Lammers & Stapel, 2009), which increases people's attraction to moral norms as a means to protect the status quo. Thus, although the current findings pose a challenge to the idea that different manipulations of power are functionally equivalent, they are in line with recent advances suggesting that psychological and structural aspects of power can have distinct effects (e.g., Galinsky et al., 2015; Smith & Hofmann, 2016; Sturm & Antonakis, 2015; Tost, 2015; Tost & Johnson, 2019).

In line with these considerations, it is possible that being assigned to a high-power vs. low-power power role increases the salience of the implied structural difference in social status, which may influence moral dilemma judgments via differential concerns about the validation of this status difference. Whereas participants assigned to a high-power role may try to validate the status difference by enforcing role-related rules, participants assigned to a low-power role may be less concerned about role-related rules, even when they feel content to follow these rules (Lammers & Stapel, 2009). To the extent that differential concerns about rules generalize to moral norms as a particular type of rules, assignment to a high-power (vs. low-power) role may increase sensitivity to norms in moral dilemmas. In contrast, recalling a personally relevant experience of high versus low power may increase the salience of one's superiority versus inferiority in the recalled situation, which may influence moral dilemma judgments via feelings of psychological distance (see Lammers, Galinsky, Gordijn, & Otten, 2012; Magee & Smith, 2013). To the extent that feelings of psychological distance reduce concerns about norm violations, high power should decrease

people's sensitivity to moral norms whereas low power should increase sensitivity to moral norms.

The distinction between psychological and structural aspects of power may also explain why effects of social roles were less reliable than the effects of memory recall. To the extent that (1) being assigned to a high-power versus low-power role influences both aspects of power and (2) the two aspects have opposite effects on sensitivity to moral norms, any downstream outcomes of social roles should depend on the relative size of two effects. If the impact of structural power is greater than the impact of psychological power, being assigned to a high-power versus low-power role should increase sensitivity to moral norms. Conversely, if the impact of structural power is smaller than the impact of psychological power, being assigned to a high-power versus low-power role should decrease sensitivity to moral norms. Moreover, if the two effects are similar in size, they should cancel each out, leading to an overall null effect of social roles on sensitivity to moral norms (for similar arguments regarding the effects of power on moral judgments, see Fleischmann, Lammers, Conway, & Galinsky, 2019). Finally, even if the effect of structural power is greater than the effect of psychological power (as suggested by the results of our integrative data analysis), the observable net impact of structural power on sensitivity to moral norms may be relatively small, requiring larger sample sizes for a reliable detection of a statistically significant effect. To the extent that being asked to recall a high-power versus low-power experience influences psychological power without affecting structural power, effects of memory recall may be more reliable compared the effects of social roles (as observed in the current studies).

Interestingly, the current studies did not reveal any evidence for the hypothesis that power would influence sensitivity to consequences, regardless of whether power was manipulated via memory recall or social roles. Based on research showing that high power leads to more abstract construals of decision-relevant information (e.g., Magee et al., 2010; Smith & Trope, 2006) and abstract construals lead to an enhanced focus on outcomes in a utilitarian sense (Aguilar et al., 2013; Amit & Greene, 2012), a potential prediction is that high power should increase sensitivity to consequences. An alternative prediction is that high power should decrease sensitivity to consequences, given that people in low-power positions are more likely to focus on the detection of potential negative outcomes of the current hierarchy than people in high-power positions (Lammers & Stapel, 2009). Neither of these predictions was confirmed in the current studies. There was also no reliable evidence for the prediction that high power would reduce general preference inaction versus action regardless of consequences and norms, as suggested by research showing that high power enhances approach tendencies and reduces behavioral inhibition (e.g., Galinsky et al., 2003; Hirsh et al., 2011; Keltner et al., 2003). Although these results may be due to low statistical power in detecting relatively small effects of power on sensitivity to consequences and general action tendencies, the current findings suggest that power is more likely to influence moral judgments via sensitivity to moral norms.

By using a formal modeling approach to studying power effects on moral dilemma judgments, the current research expands on recent work by Fleischmann et al. (2019) who used an adaptation of Jacoby's (1991) process dissociation (PD) to disentangle "utilitarian" and "deontological" inclinations in moral dilemma judgments (see Conway & Gawronski, 2013). Different from the current findings, Fleischmann et al. did not find any direct relations between power and the two PD parameters. Yet, individual differences on the generalized sense of power scale (Anderson & Galinsky, 2006) were positively correlated with individual differences in three moral reasoning styles (i.e., integration, deliberation, rule-orientation), which in turn showed opposite relations to the two PD parameters. Based on the results of simultaneous mediation analyses, the authors concluded that power influences moral thinking styles in a manner that has opposing effects on utilitarian and deontological inclinations, leading to an overall null effect on each of the two PD parameters.

To illustrate the relation between the current research and Fleischmann et al.'s (2019) findings, it is worth noting a few differences between the two lines of work. First, different from the experimental approach in the current studies, Fleischmann et al. used an individual difference approach to investigate relations between power and moral dilemma judgments. Although Fleischmann et al. established the causal effect of power on moral thinking styles with an experimental manipulation of power, the obtained correlations between self-reported power and moral dilemma judgments do not permit any conclusions about causal effects of power. Second, the PD approach utilized by Fleischmann et al. focuses exclusively on moral dilemmas involving proscriptive norms. It does not consider moral dilemmas involving prescriptive norms (see Janoff-Bulman et al., 2009). As a result, the two parameters of the PD model confound utilitarian inclinations with a general preference for action and deontological inclinations with a general preference for inaction (see Gawronski et al., 2016). The CNI model used in the current studies resolves this confound. By extending the focus to moral dilemmas involving prescriptive norms, the CNI model provides separate estimates of (1) sensitivity to consequences in a utilitarian sense, (2) sensitivity to moral norms in a deontological sense, and (3) general preference for inaction versus action regardless of consequences and norms. Another advantage of the CNI model is that it is more sensitive in detecting experimental influences, because its parameter estimates are less affected by measurement error (see Gawronski et al., 2017). Consistent with this conclusion, a reanalysis of the current data with the PD model found no statistically significant effects of the current power manipulations on either of the two PD parameters (see Supplementary Materials). Thus, in addition to providing deeper insights into (1) differences between extant manipulations of power, (2) the multifaceted nature of power effects on moral dilemma judgments, and (3) the particular manner in which power influences moral dilemma judgments, the current findings provide further evidence for the value of the CNI model in uncovering the determinants of moral dilemma judgments.

8.2. Caveats

Although memory recall produced more reliable effects on moral judgments than social roles, it is worth noting that manipulations involving social roles are closer to the definition of power as "asymmetric control over valued resources in a social relationship" (Galinsky et al., 2015, p. 422). Manipulations involving social roles also seem closer to actual sources of power in natural settings, suggesting that they may be superior in capturing the effects of power in real-world contexts that confound multiple components (e.g., psychological and structural power). From a methodological view, it is also worth noting that memory-based manipulations of power may be more susceptible to other detrimental factors, and these factors may account for the differential effects obtained in the current studies. For example, Lammers, Dubois, Rucker, and Galinsky (2017) found that the ease of recalling relevant experiences moderates the effectiveness of memory-based manipulations of power. In line with research on the ease-of-retrieval effect (Schwarz et al., 1991), Lammers et al. replicated well-established power effects on confidence, disobedience, and unethical behavior only when participants experienced the retrieval of relevant memories as easy. However, all of these effects were significantly reduced when participants experienced the retrieval of relevant memories as difficult. Thus, different from our post-hoc explanation in terms of psychological and structural power, the findings by Lammers et al. suggest a general method-related moderator (i.e., ease of retrieving memories) that may account for observed difference between memory-based and role-based manipulations of power. Specifically, it is possible that participants in the current studies experienced the retrieval of relevant memories as difficult, which may have led to a reversal of the "default" effect of power on moral dilemma judgments. According to this interpretation, power may generally increase sensitivity to moral norms, but the

experienced difficulty of retrieving relevant memories may reverse the typical effect of power.

Although the current studies do not include any data that could rule out this interpretation, we deem ease of retrieval less plausible compared to the distinction between psychological and structural power. Although Lammers et al. (2017) found a significant attenuation of power effects when the retrieval of relevant memories was experienced as difficult, it is worth noting that they did not find a systematic reversal when retrieval was difficult. Moreover, although the theoretically predicted main effects of power were not statistically significant in two of the four studies by Lammers et al., the obtained differences between conditions were directionally consistent with the theoretically expected effects. Thus, ease of retrieval may help to explain the fragility of power effects in studies using memory-based manipulations of power. However, it seems less plausible as an explanation of directly opposing effects, as found in the current studies. In fact, the obtained effect of recalled memories on sensitivity to moral norms was more reliable compared to the effect of social roles. Based on these findings, it seems unlikely that ease of retrieval contributed to the difference between memory-based and role-based manipulations of power.

8.3. Conclusion

Drawing on extant theories of power, the main goal of the current research was to test competing predictions about whether power affects moral dilemma judgments by influencing (1) people's sensitivity to consequences, (2) their sensitivity to moral norms, or (3) general action tendencies regardless of consequences and norms (or some combination of the three). Counter to the assumption that extant manipulations of power are functionally equivalent, our studies found opposite effects of memory-based and role-based manipulations of power. Supporting the idea that high psychological power reduces concerns about norms violations, recalling an experience involving high (vs. low) power *decreased* sensitivity to moral norms. Yet, consistent with the idea that high structural power increases attraction to rules as a means to protect one's status in the social hierarchy, being assigned to a social role involving high (vs. low) power *increased* sensitivity to moral norms. Together, these findings echo calls for more nuanced conceptualizations that specify how different aspects of power influence moral judgments and other psychological outcomes.

Open practices

All data and materials are available at https://osf.io/v54ks/.

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Appendix A

Model equations for the estimation of sensitivity to consequences (C), sensitivity to moral norms (N), and general preference for inaction versus action regardless or 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.

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

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

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

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

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

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

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

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

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2019.103908.

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