



Case Report

Foreign language effects on moral dilemma judgments: An analysis using the CNI model[☆]



Michał Białek^{a,b,*}, Mariola Paruzel-Czachura^c, Bertram Gawronski^d

^a University of Waterloo, Canada

^b Koźmiński University, Poland

^c University of Silesia in Katowice, Poland

^d University of Texas at Austin, United States of America

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ABSTRACT

According to the principle of utilitarianism, the moral status of an action depends on its consequences for the greater good; the principle of deontology states that the moral status of an action depends on its consistency with moral norms. Previous research suggests that processing moral dilemmas in a foreign language influences utilitarian and deontological response tendencies. However, because the two kinds of moral inclinations were confounded with general action tendencies, it remains unclear whether language effects on moral judgments reflect genuine differences in people's sensitivity to consequences and norms, or broader differences in general action tendencies regardless of consequences and norms. Using the CNI model of moral decision-making, the current research ($N = 634$) demonstrates that foreign language reduces sensitivity to consequences and sensitivity to norms without affecting general action tendencies. Implications for moral choices in international contexts and language effects on decision-making are discussed.

To some people, harming others is morally wrong regardless of whether it has positive consequences. For example, some people deem torture as immoral even if it would prevent a terrorist attack and save dozens of people. Other people focus primarily on consequences, allowing ends to justify the means. To these people, torture is acceptable to the extent that it prevents greater harm. Adopting terminology from moral philosophy, psychologists have labeled the two types of moral judgments *deontological* and *utilitarian*, respectively (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). According to the principle of deontology, the moral status of an action depends on its consistency with moral norms (e.g., torture is unacceptable because it violates the norm *do no harm*). The principle of utilitarianism states that the moral status of an action depends on its consequences (e.g., torture is acceptable if it prevents greater harm).

Interestingly, acceptance of harmful actions for the greater good has been found to differ depending on whether people process a moral dilemma in their native or a foreign language (e.g., Costa et al., 2014; Geipel, Hadjichristidis, & Surian, 2015a). In the current work, we aimed to gain deeper insights into the psychological underpinnings of this phenomenon by investigating whether language effects on moral

judgments are driven by (1) differences in the sensitivity to consequences in a utilitarian sense, (2) differences in the sensitivity to norms in a deontological sense, or (3) differences in general action tendencies regardless of consequences and norms (or a combination of the three). By providing a more nuanced understanding of how language influences moral judgments, our findings have important theoretical implications for the broader literature on language effects on decision-making (Hayakawa, Costa, & Keysar, 2016). Moreover, given that collective decisions on multi-lateral issues often require people in leadership roles to process decision-relevant information in a non-native language, our findings have important practical implications for moral decision-making at the international level.

1. Language effects on moral judgment

Early studies suggest that people show a greater preference for utilitarian over deontological options when they process moral dilemmas in a foreign language than when they process the same dilemmas in their native language (Costa et al., 2014; Geipel et al., 2015a). This difference has been claimed to reflect a genuine shift in

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* Corresponding author.

E-mail address: mbialek@kozminski.edu.pl (M. Białek).

moral inclinations rather than a failure to understand moral dilemmas in a foreign language. However, because utilitarian and deontological responses were measured in a non-independent manner (i.e., accepting one option involved rejecting the other; see Conway & Gawronski, 2013), it remained unclear whether the obtained difference reflects either (1) stronger utilitarian inclinations or (2) weaker deontological inclinations (or both) when moral dilemmas are processed in a foreign language.

Follow-up research that aimed to address this question revealed that language effects on moral judgment are much more complex. Using a process dissociation (PD) approach to independently quantify the strength of utilitarian and deontological inclinations (Conway & Gawronski, 2013), several studies suggest that processing moral dilemmas in a foreign language simultaneously reduces both deontological and utilitarian inclinations (Hayakawa, Tannenbaum, Costa, Corey, & Keysar, 2017; Muda, Niszczoła, Białek, & Conway, 2017). On the one hand, these studies found that scores on the PD model's parameter for deontological inclinations (D) were significantly lower when participants processed moral dilemmas in a foreign language, suggesting that foreign language reduces rejection of harmful actions. On the other hand, scores on the PD model's parameter for utilitarian inclinations (U) were significantly lower when participants processed moral dilemmas in a foreign language, suggesting that foreign language simultaneously reduces concerns about costs and benefits. Interestingly, the two effects cancelled each other out in the traditional approach, which pits one moral principle against the other. That is, when the dilemmas involved a forced choice between either a deontological or a utilitarian response (i.e., accepting one option involved rejecting the other), participants' choices did not significantly differ as a function of whether they processed the dilemmas in their native language or a foreign language. These findings pose a challenge to earlier conclusions that processing moral dilemmas in a foreign language makes people more utilitarian (e.g., Costa et al., 2014). Instead, people seem to become less concerned about morality when they process moral dilemmas in a foreign language, in that they show reduced levels of both utilitarian and deontological inclinations.

However, despite the superiority of the PD approach over the traditional approach, the PD approach suffers from an unresolved limitation that can produce misleading results. Conway and Gawronski (2013) pointed out that virtually all moral-dilemma studies conflated utilitarian choices with action and deontological choices with inaction. As explained by Gawronski, Conway, Armstrong, Friesdorf, and Hütter (2016), this confound is perpetuated in the D parameter of the PD model, because the model focuses exclusively on cases involving proscriptive norms (i.e., norms that specify what people should not do) without considering cases involving prescriptive norms (i.e., norms that specify what people should do). On the one hand, it is possible that rejection of morally proscribed actions on the PD model's D parameter is driven by a general adherence to moral norms. On the other hand, it is possible that rejection of morally proscribed actions on the PD model's D parameter is driven by a general preference for inaction over action. Moreover, because general response tendencies can distort both parameters of the PD model (Hütter & Klauer, 2016), the reliability and meaning of effects on the PD model's U parameter also remain unclear. Thus, although the findings obtained with the PD model suggest that foreign language reduces both utilitarian and deontological inclinations (Hayakawa et al., 2017; Muda et al., 2017), such conclusions are premature given that the PD model perpetuates the confound between the two moral principles and general action tendencies.

In sum, although there is abundant evidence that processing moral dilemmas in a foreign language influences moral judgments, it is unclear whether these effects are driven by (1) differences in the sensitivity to consequences in a utilitarian sense, (2) differences in the sensitivity to norms in a deontological sense, or (3) differences in general action tendencies regardless of consequences and norms (or a combination of the three). The first possibility is consistent with the

hypothesis that the dysfluency of processing moral dilemmas in a foreign language triggers a more thorough analysis of costs and benefits (Hayakawa et al., 2016). The second possibility is consistent with the hypothesis that processing moral dilemmas in a foreign language blunts emotional reactions associated with the violation of moral rules (Hayakawa et al., 2016). Finally, the third possibility is consistent with the hypothesis that processing moral dilemmas in a foreign language reduces general action aversion by dampening perceptions of risks (Hayakawa et al., 2016). The current research sought to test these three hypotheses using the CNI model of moral decision-making (Gawronski, Armstrong, Conway, Friesdorf, & Hütter, 2017).

2. The CNI model of moral decision-making

The CNI model is a multinomial model (Hütter & Klauer, 2016) that quantifies three determinants of moral dilemma judgments: sensitivity to consequences, sensitivity to norms, and general preference for inaction over action regardless of consequences and norms. Toward this end, the model compares responses across four types of moral dilemmas involving different 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 proscribes action, and the benefits of action for overall well-being are greater than the costs; (4) dilemmas in which a prescriptive norm proscribes action, and the benefits of action for overall well-being are smaller than the costs (for an example, see Table 1).

Based on the multinomial processing tree depicted in Fig. 1, the CNI model provides four non-redundant mathematical equations (see Appendix) that describe the probabilities of showing an *action* (vs. *inaction*) response on the four kinds of dilemmas as a function of the three postulated response determinants: sensitivity to consequences (captured by the parameter C), sensitivity to norms (captured by the parameter N), and general preference for inaction over action regardless of consequences and norms (captured by the parameter I).¹ These equations include the three model parameters as unknowns and the empirically observed probabilities of *action* (vs. *inaction*) responses on the four types of moral dilemmas as known numerical values. Using maximum likelihood statistics, these equations can be used to estimate numerical values for the three model parameters (C , N , I) on the basis of the empirically observed probabilities of *action* (vs. *inaction*) responses on the four types of moral dilemmas. Specifically, multinomial modeling generates parameter estimates for the three unknowns that minimize the difference between the empirically observed probabilities of *action* (vs. *inaction*) responses on the four types of dilemmas and the probabilities of *action* (vs. *inaction*) responses predicted by the model equations using the identified parameter estimates. The adequacy of the model in describing the data can be evaluated by means of goodness-of-fit statistics, such that poor model fit would be reflected in a statistically significant deviation between the empirically observed probabilities in a given data set and the probabilities predicted by the model for this data set. Differences in parameter estimates across groups can be tested by enforcing equal estimates for a given parameter across groups. If setting a given parameter equal across groups leads to a significant reduction in model fit, it can be inferred that the parameter estimates for the two groups are significantly different. If setting a given parameter equal across groups does not lead to a significant reduction in model fit, the parameters for the two groups are not significantly

¹ 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.

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. 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. Would you give the student the medication in this case? | 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. Would you give the student the medication in this case? |
| 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. Would you take the student out of quarantine to return her to her home country for treatment in this case? | 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. Would you take the student out of quarantine to return her to her home country for treatment in this case? |

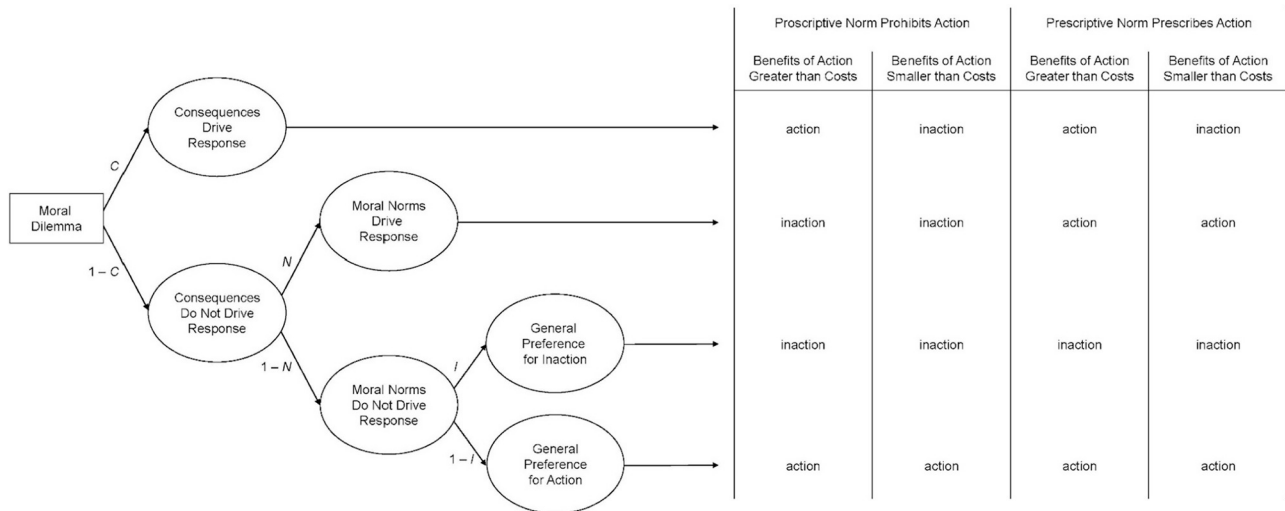


Fig. 1. CNI model of moral decision-making predicting action versus inaction responses in moral dilemmas with proscriptive and prescriptive norms and consequences involving benefits of action that are either greater or smaller than costs of action. Reproduced from Gawronski et al. (2017). Reprinted with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

different from each other (for more details on the mathematical underpinnings of the CNI model, see Gawronski et al., 2017). Using the CNI model allowed us to investigate foreign language effects on moral judgments in a more nuanced fashion by testing independent effects on (1) sensitivity to consequences, (2) sensitivity to moral norms, and (3) general preference for inaction versus action regardless of consequences and norms.²

3. Method

3.1. Participants

A total of 670 linguistic students (555 women, 104 men, 11 missing gender data) were recruited during university lectures for a study on moral judgment. Participation was voluntary without compensation. The sample included four groups of Polish bilingual students, who were fluent in either English, German, Spanish, or French in addition to their native Polish language. Participants were randomly assigned to either a

native language condition or a *foreign language* condition. Thirty-six participants who reported poor understanding of the scenarios (i.e., scores of < 5 out of 10; see below) were excluded from analyses (15 in the native language condition; 21 in the foreign language condition). Descriptions of the four samples are provided in Table 2. To maximize statistical power, our goal was to recruit as many participants as possible within one semester, aiming for a minimum of 100 participants per language pair. The final sample of 634 participants (312 native language, 322 foreign language) provided a power of 95% in detecting a small between-group difference in mean values with an effect size of $d = 0.29$ (two-tailed).

4. Procedure and materials

Half of the participants were presented with the experimental materials in their native language (i.e., Polish); the other half received the materials in a foreign language (i.e., English, German, Spanish, or French, depending on linguistic proficiency). Each set of paper-and-pencil materials consisted of 24 moral dilemmas adapted from Gawronski et al. (2017), presented in a fixed random order. The dilemma battery included 6 basic dilemmas, each of which was presented in 4

² All materials, data, and analysis files are available at <https://osf.io/fzmsa/>. We report all measures, all conditions, and all data exclusions.

Table 2

Characteristics of the four sub-samples comprising the full sample as a function of language condition (native vs. foreign) and language pair (Polish-English, Polish-German, Polish-Spanish, Polish-French).

| Sample | Condition | Language | N | % Male | Age | Foreign language proficiency | Understanding of scenarios |
|--------|------------------|----------|-----|--------|------------|------------------------------|----------------------------|
| 1 | Native language | Polish | 84 | 24 | 21.9 (5.8) | 7.85 (1.38) | 8.88 (1.12) |
| | Foreign language | English | 120 | 25 | 21.8 (3.0) | 8.19 (1.14) | 9.12 (1.06) |
| 2 | Native language | Polish | 75 | 7 | 22.3 (1.6) | 6.04 (1.64) | 8.16 (1.37) |
| | Foreign language | German | 63 | 22 | 21.8 (1.5) | 7.17 (1.41) | 7.94 (1.38) |
| 3 | Native language | Polish | 83 | 9 | 21.0 (1.6) | 5.56 (2.25) | 8.27 (1.38) |
| | Foreign language | Spanish | 80 | 17 | 22.1 (1.9) | 7.54 (1.31) | 8.35 (1.27) |
| 4 | Native language | Polish | 70 | 10 | 21.2 (2.8) | 4.00 (2.08) | 8.39 (1.24) |
| | Foreign language | French | 59 | 14 | 21.9 (2.8) | 6.44 (1.32) | 7.66 (1.46) |

parallel versions: (1) a version in which a proscriptive norm prohibits action and the benefits of action for overall well-being are greater than the costs of action; (2) a version in which a proscriptive norm prohibits action and the benefits of action for overall well-being are smaller than the costs of action; (3) a version in which a prescriptive norm prescribes action and the benefits of action for overall well-being are greater than the costs of action; (4) a version in which a prescriptive norm prescribes action and the benefits of action for overall well-being are smaller than the costs of action. Participants were asked to indicate whether they would perform the action described in a given dilemma using *yes* vs. *no* responses.³ After completion of the moral dilemma task, participants were asked to rate their language proficiency and their understanding of the scenarios in the moral dilemma task, with both measures using 10-point rating scales. The study took approximately 30 min to complete, with participants in the foreign language condition taking slightly longer than participants in the native language condition.⁴

5. Results

Overall understanding of the scenarios was high in all conditions and did not significantly differ across native and foreign language conditions for three of four samples (all $t_s < 1.53$, all $p_s > 0.12$; see Table 2). The only exception was the Polish-French sample in which understanding of dilemmas in the foreign language was lower by 0.73 points ($M_s = 8.39$ vs. 7.66), $t(127) = 3.05$, $p = .003$, $d = 0.54$. Self-reported proficiency in the respective foreign language tended to be higher in the foreign language condition compared to the native language condition for all language pairs (all $t_s > 1.96$; all $p_s < 0.06$; see Table 2).⁵

Following Gawronski et al. (2017), moral dilemma responses were aggregated by calculating the sum of *yes* responses for each of the four

³ Participants of the Polish-English sample provided their responses on 6-point rating scales. Responses were recoded into binary *yes/no* scores for the current analyses.

⁴ For additional exploratory analyses that go beyond the primary question of this study, participants were also asked to complete the Cognitive Reflection Test (CRT, Frederick, 2005). The CRT includes three mathematical problems with intuitive solutions that are incorrect. For example, on one item of the task, participants are presented with the following problem: *If it takes 5 machines 5 min to make 5 widgets, how long would it take 100 machines to make 100 widgets?* The intuitive response is 100 min, but the correct answer is 5 min. The results of analyses involving the CRT are presented in the Supplemental Materials.

⁵ Because participants in the foreign language condition showed a weaker sensitivity to consequences and a weaker sensitivity to moral norms than participants in the native language condition (see below), it seems unlikely that the obtained difference in language proficiency contributed to observed results. If anything, weaker language skills in the native language condition should impair comprehension of the dilemmas, and thereby reduce effects of consequences and norms in the moral dilemmas. Further evidence against an alternative interpretation in terms of language proficiency comes from the finding that participants in the two language groups did not significantly differ in their understanding of the moral dilemmas, $t(632) = 0.04$, $p = .969$, $d = 0.003$.

types of moral dilemmas. With a total of 6 scenarios for each dilemma type, aggregate scores could range from 0 to 6. These data permit three types of analysis: traditional analysis, PD analysis, and CNI model analysis. We report all three types of analysis, using integrative analysis of pooled individual data from the four samples (Curran & Hussong, 2009) and internal meta-analysis of the effects sizes of foreign language effects in each sample using fixed-effects method. CNI model analyses were conducted with the freeware multiTree v0.43 (Moshagen, 2010). The internal meta-analyses were conducted with the freeware JASP 9.1.0 (Love et al., 2015).

6. Traditional analysis

The traditional approach focuses exclusively on moral dilemmas involving a proscriptive norm that prohibits action in cases where the benefits of action outweigh its costs to well-being. Willingness to act on this type of dilemma is typically interpreted as a preference for utilitarian over deontological responses (Greene et al., 2001). When the data were aggregated across the four samples, integrative data analysis revealed no significant difference between native language ($M = 3.33$) and foreign language ($M = 3.27$) conditions, $t(632) = 0.54$, $p = .587$, $d = 0.04$. Consistent with this result, internal meta-analysis of the mean-level differences in the four samples revealed a meta-analytic effect size close to zero and 95% confidence intervals that included zero (see Fig. 2). These results conflict with earlier findings, suggesting that processing moral dilemmas in a foreign language leads to an increased preference for utilitarian over deontological responses in the traditional dilemma approach (e.g., Costa et al., 2014).

7. PD analysis

PD scores of utilitarian (U) and deontological (D) inclinations were calculated in line with the procedures described by Conway and Gawronski (2013), using the probabilities of *yes* responses on moral dilemmas with proscriptive norms involving benefits of action that are either greater than the costs of action (i.e., incongruent dilemmas) or smaller than the costs of action (i.e., congruent dilemmas). Replicating previous findings with the PD model (Hayakawa et al., 2017; Muda et al., 2017), integrative data analyses revealed significantly lower scores on both PD parameters in the foreign language condition compared to the native language condition. That is, PD scores of utilitarian inclinations were significantly lower when participants read the dilemmas in a foreign language ($M = 0.25$) than when they read the dilemmas in their native language ($M = 0.29$), $t(632) = 2.78$, $p = .006$, $d = 0.21$. Correspondingly, PD scores of deontological inclinations were significantly lower when participants read the dilemmas in a foreign language ($M = 0.60$) than when they read the dilemmas in their native language ($M = 0.65$), $t(632) = 2.34$, $p = .020$, $d = 0.19$. Consistent with these results, internal meta-analyses of the mean-level differences in the four samples revealed meta-analytic effect sizes with 95% confidence intervals that do not include zero for both PD parameters (see Fig. 3).

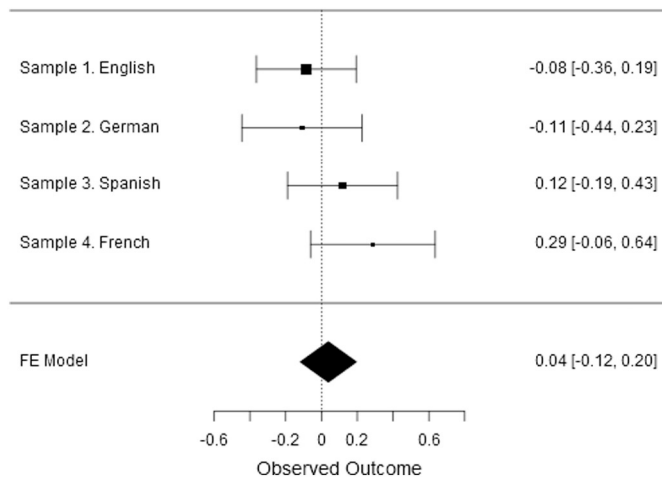


Fig. 2. Forest plot of standardized differences in traditional moral dilemma responses as a function of language condition. Higher scores reflect greater willingness to act in the native language condition compared to the foreign language condition. Effects are depicted as Cohen's *d*; error bars represent 95% confidence intervals.

7.1. CNI model analysis

For the integrative data analysis, we fit the CNI model to the data with the three model parameters varying freely across language conditions and samples, $G^2(8) = 14.29, p = .074$. This model was used as a baseline for tests whether the three model parameters are significantly different across language conditions. Toward this end, a given parameter was set equal across the two language conditions for all four samples and the fit of the constrained model was compared to the fit of the baseline model. To the extent that the fit of the constrained model is significantly lower than the fit of the baseline model, the parameter estimates are significantly different across language conditions.

Integrative data analyses revealed a significant difference between language conditions for the *C* parameter, $\Delta G^2(4) = 22.87, p < .001$, and the *N* parameter, $\Delta G^2(4) = 14.72, p = .005$, but not for the *I* parameter, $\Delta G^2(4) = 1.98, p = .739$. Overall, sensitivity to consequences on the *C* parameter was significantly lower when participants read the dilemmas in a foreign language than when they read the dilemmas in their native language (see Table 3). Moreover, sensitivity to norms on the *N* parameter was significantly lower when participants read the dilemmas in a foreign language than when they read the dilemmas in their native language (see Table 3). Participants in the two

Table 3

Mean estimates and 95% confidence intervals of CNI model parameters capturing sensitivity to consequences (*C*), sensitivity to moral norms (*N*), and general preference for inaction regardless of consequences and norms (*I*) as a function of language condition (native vs. foreign) and sample.

| Sample | Language | <i>C</i> Parameter | <i>N</i> Parameter | <i>I</i> Parameter |
|----------|----------|--------------------|--------------------|--------------------|
| Sample 1 | Native | 0.27 [0.23–0.31] | 0.26 [0.20–0.32] | 0.57 [0.53–0.60] |
| | Foreign | 0.27 [0.23–0.30] | 0.15 [0.10–0.19] | 0.56 [0.54–0.59] |
| Sample 2 | Native | 0.21 [0.17–0.26] | 0.24 [0.19–0.31] | 0.50 [0.46–0.54] |
| | Foreign | 0.19 [0.14–0.24] | 0.19 [0.13–0.25] | 0.49 [0.45–0.53] |
| Sample 3 | Native | 0.29 [0.25–0.34] | 0.25 [0.19–0.31] | 0.50 [0.46–0.53] |
| | Foreign | 0.22 [0.17–0.26] | 0.18 [0.13–0.24] | 0.49 [0.46–0.52] |
| Sample 4 | Native | 0.31 [0.27–0.36] | 0.24 [0.17–0.30] | 0.46 [0.42–0.50] |
| | Foreign | 0.17 [0.12–0.22] | 0.18 [0.12–0.24] | 0.50 [0.46–0.54] |
| Combined | Native | 0.27 [0.25–0.29] | 0.25 [0.22–0.28] | 0.51 [0.49–0.53] |
| | Foreign | 0.22 [0.20–0.24] | 0.17 [0.14–0.20] | 0.52 [0.50–0.54] |

language conditions did not significantly differ in terms of their general preference for inaction on the *I* parameter (see Table 3). Consistent with these results, internal meta-analyses revealed meta-analytic effect sizes with 95% confidence intervals that do not include zero for the *C* parameter (see Fig. 4) and the *N* parameter (see Fig. 5). For the *I* parameter, the internal meta-analysis revealed a meta-analytic effect size close to zero with 95% confidence intervals that include zero (see Fig. 6).

8. Discussion

Using the CNI model to disentangle sensitivity to consequences, sensitivity to norms, and general action tendencies (Gawronski et al., 2017), the current research provides a more nuanced understanding of how foreign language influences moral dilemma judgments. First, counter to the hypothesis that the dysfluency of processing moral dilemmas in a foreign language triggers a more thorough analysis of costs and benefits (Hayakawa et al., 2016), foreign language reduced (rather than increased) sensitivity to consequences on the CNI model's *C* parameter. Second, consistent with the hypothesis that processing moral dilemmas in a foreign language blunts emotional reactions associated with the violation of moral rules (Hayakawa et al., 2016), foreign language reduced sensitivity to norms on the CNI model's *N* parameter. Finally, counter to the hypothesis that processing moral dilemmas in a foreign language reduces general action aversion by dampening perceptions of risks (Hayakawa et al., 2016), there was no significant effect of language on general action tendencies captured by the CNI model's *I* parameter.

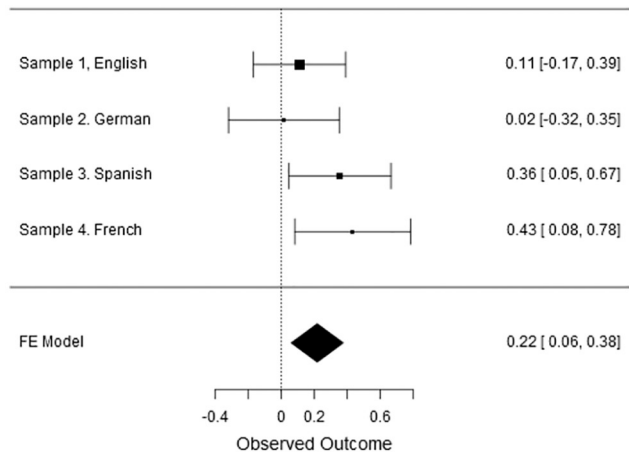
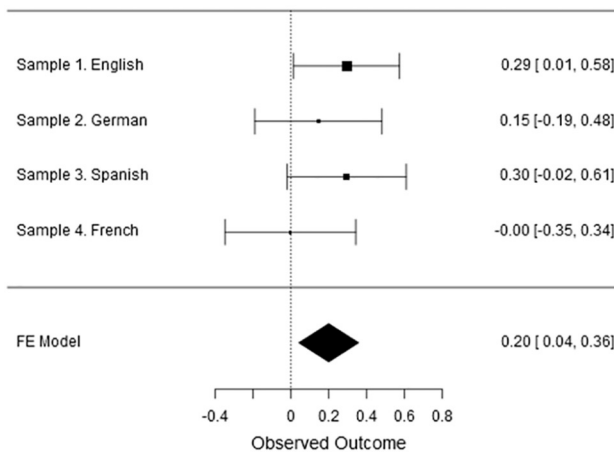


Fig. 3. Forest plot of standardized differences in deontological inclinations (left panel) and utilitarian inclinations (right panel) as a function of language condition. Higher scores reflect stronger inclinations in the native language condition compared to the foreign language condition. Effects are depicted as Cohen's *d*; error bars represent 95% confidence intervals.

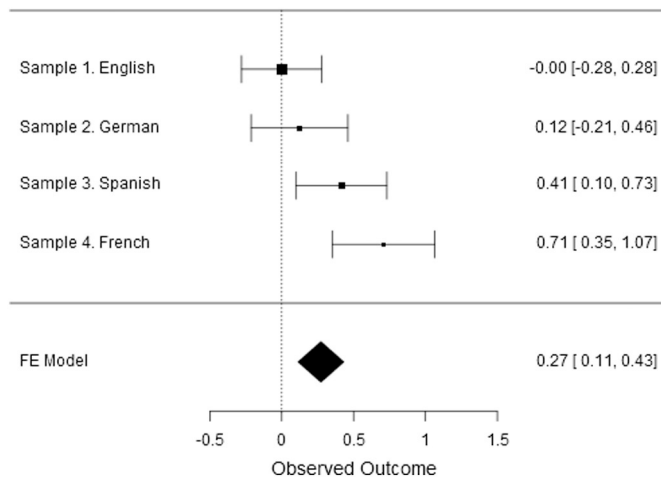


Fig. 4. Forest plot of standardized differences in sensitivity to consequences on the CNI model's *C* parameter as a function of language condition. Higher scores reflect stronger sensitivity to consequences in the native language condition compared to the foreign language condition. Effects are depicted as Cohen's *d*; error bars represent 95% confidence intervals.

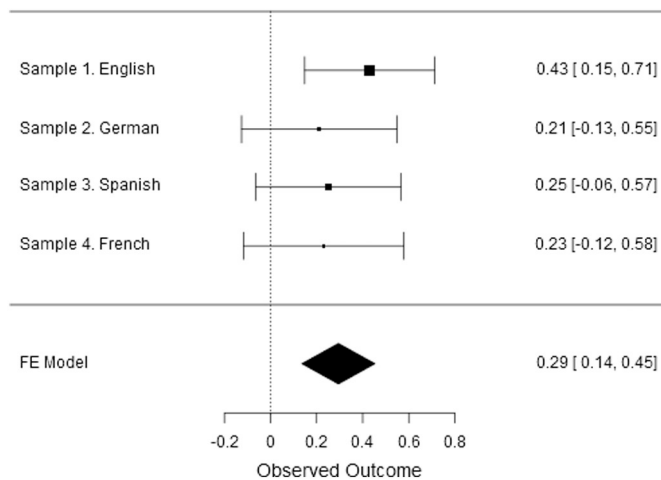


Fig. 5. Forest plot of standardized differences in sensitivity to moral norms on the CNI model's *N* parameter as a function of language condition. Higher scores reflect stronger sensitivity to moral norms in the native language condition compared to the foreign language condition. Effects are depicted as Cohen's *d*; error bars represent 95% confidence intervals.

By disentangling general action tendencies from genuine effects of consequences and norms, the current findings resolve a major ambiguity in previous studies using PD to investigate foreign language effects on moral judgments (e.g., Hayakawa et al., 2017; Muda et al., 2017). Using Conway and Gawronski's (2013) PD model, these studies found that foreign language simultaneously reduced scores on both the *U* and the *D* parameter. However, because the *D* parameter conflates sensitivity to norms with general preference for inaction over action (Gawronski et al., 2016) and general response tendencies can distort both parameters of the PD model (Hütter & Klauer, 2016), the reliability and meaning of previous findings with the PD model remains ambiguous. The current findings resolve this ambiguity, indicating that foreign language effects on moral dilemma judgments reflect genuine shifts in the two kinds of moral inclinations rather than differences in general action tendencies regardless of consequences and norms.

The current findings also add to an accumulating body of evidence showing that foreign language does not make people more utilitarian (Hayakawa et al., 2017; Muda et al., 2017), a common claim based on early research in this area (Costa et al., 2014; Geipel et al., 2015a). In

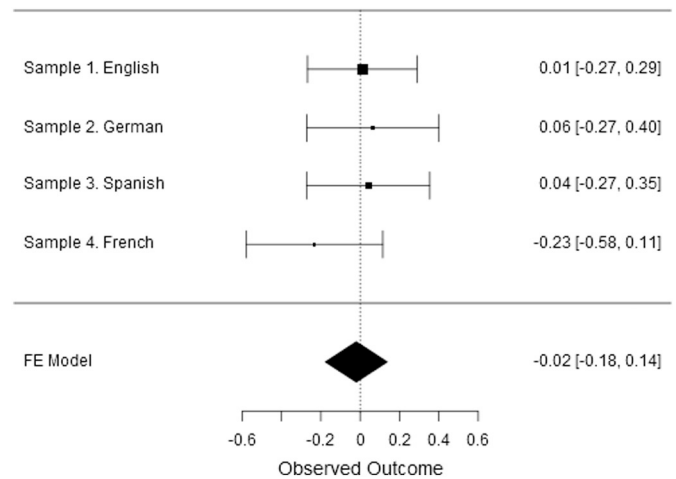


Fig. 6. Forest plot of standardized differences in general preference for inaction on the CNI model's *I* parameter as a function of language condition. Higher scores reflect stronger general preference for inaction in the native language condition compared to the foreign language condition. Effects are depicted as Cohen's *d*; error bars represent 95% confidence intervals.

fact, foreign language seems to make people *less* utilitarian in the sense that they become less sensitive to costs and benefits. Moreover, because foreign language simultaneously reduces sensitivity to norms, moral judgments are often unaffected by language when moral dilemmas pit moral norms against consequences for the greater good. In the current research, this pattern was reflected in significant effects of language on sensitivity to consequences and sensitivity to moral norms, which led to an overall null effect on moral judgments in the traditional approach (see also Hayakawa et al., 2017; Muda et al., 2017).

Overall, the current results suggest that people are less concerned about morality when they process moral dilemmas in a foreign language. This conclusion is supported by the finding that foreign language simultaneously reduced both sensitivity to consequences in a utilitarian sense and sensitivity to norms in deontological sense. This finding has important implications for decisions on multi-lateral issues at the international level, where people in leadership roles are often required to process decision-relevant information in a non-native language. Our findings suggest that concerns about norm violations and morally relevant consequences are more pronounced when the relevant information can be processed in one's native language. Thus, in cases where the morality of international decisions is deemed important, translations of information in foreign language to one's native language may help to enhance the impact of moral concerns.

The current findings also have important implications for language effects on decision-making more broadly. A growing body of evidence suggests that foreign language affects not only moral judgments, but also a wide range of non-moral phenomena in the decision-making literature (for a review, Hayakawa et al., 2016). An important question in this literature is whether foreign language effects are driven by more thorough processing of decision-relevant information or a reduced impact of emotional concerns. Although the current study did not include direct measures of deliberate processing and emotional concerns, our findings align better with the "reduced emotion" hypothesis than the "enhanced deliberation" hypothesis. Consistent with the idea that processing moral dilemmas in a foreign language blunts emotional reactions associated with the violation of moral rules, we found that foreign language reduced sensitivity to norms (see also Geipel et al., 2015a; Geipel, Hadjichristidis, & Surian, 2015b). However, in contrast to the idea that dysfluent processing of moral dilemmas in a foreign language triggers a more thorough analysis of costs and benefits, foreign language reduced (rather than increased) sensitivity to consequences. A potential explanation for the latter finding is that

processing decision-relevant information in a foreign language requires a greater amount of cognitive resources, which may undermine a thorough analysis of costs and benefits (Geipel, Hadjichristidis, & Surian, 2016). Future research may help to clarify why foreign language reduces sensitivity to consequences in responses to moral dilemmas.

Although the current work provides more nuanced insights into the psychological underpinnings of foreign language effects on moral judgments, it seems appropriate to acknowledge a few limitations. One limitation is the restricted focus of the CNI model on effects of consequences, norms, and general action tendencies. Although this focus fits well to the three hypotheses we aimed to test in the current study, foreign language may have additional effects on moral judgments that are not captured by the three parameters of the CNI model. For example, counter to the conclusion that foreign language makes people less concerned about morality, it is possible that reduced concerns about consequences and norms are compensated by enhanced reliance on alternative guides for moral decisions that differ from the notions of utilitarianism and deontology (e.g., virtue ethics; see Uhlmann, Pizarro, & Diermeier, 2015). Without substantial changes to the CNI model and empirical evidence for the validity of the modified model, it is not possible to capture alternative determinants of moral dilemma judgments.

Another limitation is that any conclusions based on research with the CNI model depend on the construct validity of its three parameters. To the extent that Gawronski et al.'s (2017) validated set of moral dilemmas for research using the CNI model does not adequately manipulate consequences and norms, doubts could be raised about the conceptual meaning of the *C* and the *N* parameter as reflecting sensitivity to consequences and sensitivity to norms, respectively. Although the evidence provided by Gawronski et al. (2017) supports their interpretation of the CNI model parameters, any findings with the model have to be evaluated with reference to this evidence.

A sample-related limitation is that, despite random assignment to the two experimental conditions, men were overrepresented in the foreign language group compared to the native language group (see Supplementary Materials). Because men and women have been found

to differ in their responses to moral dilemmas (Friesdorf, Conway, & Gawronski, 2015), the confound between participant gender and experimental groups raises the question of whether the current findings are at least partly driven by the asymmetric gender composition of the two experimental groups. To rule out this concern, we tested whether participant gender influenced moral judgments in a manner that would be in line with the obtained effects of language and the asymmetric gender composition of the two experimental groups. Different from earlier findings, we did not find any evidence for gender differences in the current study (see Supplemental Materials).

In sum, the current research demonstrates the value of formal modeling approaches in providing more nuanced insights into the determinants of moral judgments. Although traditional analysis of moral dilemma judgments revealed no significant effect of language, advanced analyses using PD and the CNI model showed that foreign language influences moral judgments in a manner that has compensatory effects within the traditional approach. Moreover, by disentangling sensitivity to consequences, sensitivity to moral norms, and general action tendencies, the current research provides more compelling evidence for the hypothesis that foreign language effects on moral judgments reflect genuine shifts in moral inclinations rather than differences in action aversion regardless of consequences and moral norms. Overall, the current findings suggest that processing moral dilemmas in a foreign language makes people less concerned about morality, in that foreign language reduces both sensitivity to consequences in a utilitarian sense and sensitivity to moral norms in a deontological sense.

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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 of consequences and norms (*I*) in responses to moral dilemmas with proscriptive versus prescriptive norms and benefits of action for overall well-being that are either greater or smaller than the costs of action for well-being. Equations adapted from Gawronski et al. (2017). Reprinted with permission

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

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

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

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

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

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

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

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

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2019.103855>.

References

- Conway, P., & Gawronski, B. (2013). Deontological and utilitarian inclinations in moral decision making: A process dissociation approach. *Journal of Personality and Social Psychology, 104*, 216–235.
- Costa, A., Foucart, A., Hayakawa, S., Aparici, M., Apesteguia, J., Heafner, J., & Keysar, B. (2014). Your morals depend on language. *PLoS One, 9*(4), e94842.
- Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods, 14*, 81–100.
- Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*, 25–42.
- Friesdorf, R., Conway, P., & Gawronski, B. (2015). Gender differences in responses to moral dilemmas: A process dissociation analysis. *Personality and Social Psychology Bulletin, 41*, 696–713.
- Gawronski, B., Armstrong, J., Conway, P., Friesdorf, R., & Hütter, M. (2017). Consequences, norms, and generalized inaction in moral dilemmas: The CNI model of moral decision-making. *Journal of Personality and Social Psychology, 113*, 343–376.
- Gawronski, B., Conway, P., Armstrong, J., Friesdorf, R., & Hütter, M. (2016). Understanding responses to moral dilemmas: Deontological inclinations, utilitarian inclinations, and general action tendencies. In J. P. Forgas, L. Jussim, & P. A. M. Van Lange (Eds.), *Social psychology of morality* (pp. 91–110). New York: Psychology Press.
- Geipel, J., Hadjichristidis, C., & Surian, L. (2015a). The foreign language effect on moral judgment: The role of emotions and norms. *PLoS One, 10*(7), e0131529.
- Geipel, J., Hadjichristidis, C., & Surian, L. (2015b). How foreign language shapes moral judgment. *Journal of Experimental Social Psychology, 59*, 8–17.
- Geipel, J., Hadjichristidis, C., & Surian, L. (2016). Foreign language affects the contribution of intentions and outcomes to moral judgment. *Cognition, 154*, 34–39.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science, 293*, 2105–2108.
- Hayakawa, S., Costa, A., & Foucart, Keysar (2016). Using a foreign language changes our choices. *Trends Cogn. Sci. 20*, 791–793.
- Hayakawa, S., Tannenbaum, D., Costa, A., Corey, J. D., & Keysar, B. (2017). Thinking more or feeling less? Explaining the foreign-language effect on moral judgment. *Psychological Science, 28*, 1387–1397.
- Hütter, M., & Klauer, K. C. (2016). Applying processing trees in social psychology. *European Review of Social Psychology, 27*, 116–159.
- Love, J., Selker, R., Marsman, M., Jamil, T., Dropmann, D., & Verhagen, A. (2015). *JASP (version 0.7) [computer software]*. Amsterdam, the Netherlands: JASP project.
- Moshagen, M. (2010). multiTree: A computer program for the analysis of multinomial processing tree models. *Behavior Research Methods, 42*, 42–54.
- Muda, R., Niszczoła, P., Białek, M., & Conway, P. (2017). Reading dilemmas in a foreign language reduces both deontological and utilitarian response tendencies. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 44*, 321–326.
- Uhlmann, E. L., Pizarro, D. A., & Diermeier, D. (2015). A person-centered approach to moral judgment. *Perspectives on Psychological Science, 10*, 72–81.