Journal of Experimental Psychology: Learning, Memory, and Cognition

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Funded by:

- Catalan Government
- Catalan Government (FI-DGR)
- European Community, European Research Council
- John Templeton Foundation
- National Science Foundation
- Spanish Government, Consolider Ingenio
- Spanish Government, Ministry of Economy and Competitiveness
- Spanish Government

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Word Count: 14,302 (main text) + 134 (abstract) + 1,015 (endnotes) = 15,451 words

Abstract

Though moral intuitions and choices seem fundamental to our core being, there is surprising new evidence that people resolve moral dilemmas differently when they consider them in a foreign language (Cipolletti et al., 2015; Costa et al., 2014a; Geipel et al., 2015): People are more willing to sacrifice one person to save five when they use a foreign language compared to their native tongue. Our findings show that the phenomenon is robust across various contexts and that multiple factors affect it, such as the severity of the negative consequences associated with saving the larger group. This has also allowed us to better describe the phenomenon and investigate potential explanations. Together, our results suggest that the foreign language effect is most likely attributable to an increase in psychological distance and a reduction in emotional response.

Abstract Word Count: 134

Keywords

Foreign language, bilingualism, moral psychology, decision-making

OUR MORAL CHOICES ARE FOREIGN TO US

In March of 1841, 41 survivors of a sinking ship occupied a leaky lifeboat as a raging storm intensified around them. It became clear that the overloaded boat would sink with all aboard, so the crew threw the adult males into the sea in order to save the women and children. When the remaining survivors were rescued, one of the sailors, Alexander Holmes, was charged with murder (United States v. Holmes).

How we respond to these moral dilemmas is thought to reflect our core moral fabric, deeply held values and convictions of right and wrong. There is new evidence suggesting that these responses can be influenced by the language context. Specifically, when using a foreign language compared to a native one, people are much more likely to choose to sacrifice one person to save many people (Cipolletti, McFarlane, & Weissglass, 2015; Costa et al., 2014a; Geipel, Hadjichristidis, & Surian, 2015).

We conducted several studies aimed at assessing: a) the robustness of the foreign language effect in several contexts and b) the influence of various factors on the presence of the foreign language effect. These studies help to provide a more complete understanding of the phenomenon and evaluate potential explanations for it.

Moral dilemmas in a native language and a foreign language

Most of the studies assessing people's choices in moral dilemmas have been conducted in the participants' native language.[1] In such studies, people show a strong aversion to opt for a choice in which one person's life is sacrificed to save many people, such as in the "Footbridge" (Thomson, 1985), a variant of the "Trolley" problem or "Switch" (Foot, 1978). In this dilemma you imagine you are standing on a footbridge above a train track. An out-of-control trolley is heading towards five people. The only way to stop the trolley from killing these five people is to push a heavy man off the bridge and in front of the trolley. You have to decide if you would push the man to his death in order to save the five

people. The great majority of people refuse to do this on the grounds that it violates their core morality (Cushman, Young, & Hauser, 2006; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Greene, Nystrom, Engell, Darley, & Cohen, 2004; Thomson, 1986; Valdesolo & DeSteno, 2006). Thus, in the Footbridge dilemma, most people choose not to sacrifice one to save five.

However, people's choices change with relatively small variations in the context. For instance, in the Switch dilemma, you can save the five people by pulling a lever to switch the train to a different track. There is one man on the other track, so switching the track will kill him. While the consequences of action in the Footbridge and Switch dilemmas are the same, killing one would save five, the great majority of people choose this option in Switch but not Footbridge (e.g., Greene et al., 2001).

Much research has investigated why people's choices are so different in these two cases as well as in conceptually similar ones (e.g., Moore, Clark, & Kane, 2008; Nakamura, 2013; Nichols & Mallon, 2006). For instance, people are less likely to sacrifice the one man when this involves exerting personal force, e.g., pushing him, relative to when it does not, e.g., pushing a button, flipping a switch, or using a pole to push the man (Greene et al. 2009). People also find this option less permissible when the man's body stops the train so that killing the man is instrumental (the direct means) to saving the five people, as opposed to the man's death being a side-effect of switching the track (e.g., Cushman,Young, & Hauser, 2006). According to Lieberman (2007; p. 275), the neuroimaging results from Greene et al. (2001) are consistent with the notion that people weigh their personal involvement in the decision-making process more heavily in contexts like the Footbridge dilemma than those like Switch. Indeed, the dilemmas vary in the potential repercussions of taking action and, consequently, they may be processed differently. In the Footbridge dilemma, choosing the utilitarian option makes one guilty of intentional homicide, whereas in the Switch dilemma

this is not immediately obvious and therefore may be easier to justify – switching the track saves five lives and only afterwards does the person on the other track die, a detail about which one could feign ignorance.[2] Finally, one of the key differences between these two dilemmas may be the intuitiveness of choosing to sacrifice one to save five. That is, in the Switch dilemma, the choice to sacrifice one person is intuitive in that it is instantly compelling to most, whereas the same choice is counterintuitive in the Footbridge dilemma due to emotional conflict (Kahane et al., 2012). Indeed, people tend to make the intuitive choice in both dilemmas – utilitarian for Switch and deontological for Footbridge – which is consistent with the assertion that these decisions are largely automatic or intuitive (e.g. Haidt, 2001).

However, there is another factor that seems to modulate the likelihood of choosing to sacrifice one to save five. Importantly, this factor is orthogonal to the content: the language in which the dilemma is presented. Costa et al. (2014a) showed that willingness to push the man to his death more than doubles when people consider the dilemma in a foreign language compared to a native one. They demonstrated this effect using English, Hebrew, and Korean as a native language, and English, French, and Spanish as a foreign language. In addition, the effect was present for native English speakers using Spanish and for native Spanish speakers using English, showing that indeed the foreign-ness of the language is what affected people's choices. Cipolletti et al. (2015) as well as Geipel et al. (2015) replicated the basic effect with several language populations and found a remarkably similar pattern: Choices to save the larger number of people doubled when using a foreign language relative to the native tongue for Footbridge but not Switch. Thus, the existing studies demonstrate that the effect generalizes across different language pairings, and as such it cannot be explained by cultural norms.

Potential explanations for the effect of language

While the foreign language effect has been well-established, there is scarce evidence regarding its origins or how it is modulated by factors that affect people's choices in native language contexts. In what follows, we review various factors that lead to an increase in utilitarian choices in general, and then report differences between native and foreign language processing that could account for the presence of the foreign language effect. We then outline various explanations that may account for the effect and introduce the studies we conducted to assess them.

Typically, the choice to sacrifice few lives to save many has been described as "utilitarian", as it is consistent with a preference for maximizing overall welfare, whereas the choice to not do so has been described as "deontological" since this is consistent with a preference for adhering to moral rules such as "do not kill". However, such choices need not necessarily be indicative of the motivation that drives them.

Choosing to sacrifice one person to save many may indicate actual utilitarian inclination of an impartial concern for the greater good of humanity, but it may also indicate a variety of other things (see Kahane, 2015; Kahane, Everett, Earp, Farias, & Savulescu 2015). For example, such choices are associated with traits that are consistent with enhanced cognitive control such as increased need for cognition (Conway & Gawronski, 2013; Wiech et al., 2013) and increased working memory capacity (Moore et al., 2008). Enhanced cognitive control would prompt choosing the option best suited by the cost-benefit analyses, which would be congruent with the simple explanation that it is better to save a greater number of lives (Kahane et al., 2012; 2015). Alternatively, choosing to sacrifice one person could indicate a reduction in social or emotional processing such as reduced aversion to causing harm (Bartels & Pizarro, 2011; Cushman, Gray, Gaffey, & Mendes, 2012; Wiech et al., 2013) or reduced empathy (Choe & Min, 2011). Furthermore, deontological and

utilitarian inclinations are affected by different factors. Thus, while utilitarian choices are associated with cognitive control, deontological choices are associated with empathic concern, perspective taking, and religiosity (Conway & Gawronski, 2013). Therefore, it could also be that a so-called utilitarian choice may not indicate strong utilitarian inclinations, but instead weak deontological ones (Conway & Gawronski, 2013). This account is consistent with Greene's dual process model (e.g., Greene, 2007) in that the two systems in question are separate, affected by different factors, and that which is most active will determine the response.

Thus, our focus is on the willingness to sacrifice one to save five, independent of whether it is due to decreased deontology or increased utilitarianism. Both accounts of moral choice would predict that the use of a foreign language would decrease the likelihood of responding in a manner consistent with automatic processing (either emotional: Greene et al., 2001; or intuitive: Kahane et al., 2012) and increase the likelihood of responding in a manner consistent with controlled processing. Furthermore, both accounts would predict an effect of language only for decisions that elicit strong emotional conflict, which would make it such that choosing to sacrifice one to save five is not the intuitive response and, therefore, this choice may require more controlled processing. For example, in Footbridge the utilitarian choice requires the use of personal force and the person's death is instrumental, but this is not the case for the Switch dilemma. These two differences between the dilemmas arguably contribute to stronger emotional conflict and the utilitarian response being less intuitive in the Footbridge dilemma. Furthermore, these differences between the dilemmas have been argued to be critical in eliciting different moral intuitions and response tendencies (e.g., Cushman, 2013; Railton, in press). First, people may have learned through experience that the use of personal force leads to bad outcomes, and therefore considering applying such force elicits a negative response. Second, instrumental harm is typically considered to be worse than

equivalent harm that occurs as a side-effect (e.g., Foot; 1978; Cushman et al., 2006), and individuals who find the former acceptable (representing harm as a subordinate goal) are often considered to be deficient in emotion-based processing (e.g., Koenigs et al., 2007). This would explain why the phenomenon has been consistently found in the Footbridge dilemma but not in the Switch dilemma. We will now explain this in more detail.

The idea is that using a foreign language, as opposed to a native one, would prompt more controlled processing, a reduced emotional response and an increase in psychological distance. Independent evidence suggests that all of these factors can lead to an increase in utilitarian choices in dilemmas that involve substantial emotional conflict. Such choices have been associated with controlled processing (Greene et al., 2001; Greene et al., 2004; Kahane et al., 2012), with compromised emotional processing (in individuals with brain lesions in areas that regulate emotion: e.g., Koenigs et al., 2007; in healthy intoxicated individuals: Duke & Bègue. 2015), and with psychological distance (Aguilar, Brussino, & Fernández-Dols, 2013).

There is some evidence showing that people may experience less intense emotional reactions to aversive stimuli in a foreign language (e.g. Dewaele, 2004; Harris, Ayçiçegi, & Gleason, 2003; Pavlenko, 2005; Puntoni, de Langhe, & van Osselaer, 2009). For example, childhood reprimands elicit decreased physiological responses in a foreign versus a native language (e.g., Harris et al., 2003) and this may be dependent on the age of acquisition (e.g., Harris, 2004). This is because there are at least two major differences between the acquisition of a native and a foreign language: the amount of exposure and the contexts of use. Native language words benefit from more years of exposure and typically occur in more varied and emotional contexts. Even with equal proficiency and maximum use of two languages, the native language is perceived as emotionally stronger and is prefered for emotional expression (Dewaele, 2011). That is, while proficient foreign language users may understand the

semantics of emotional words, they may not feel their full effect (for the *emotional contexts of learning theory* see Harris, Gleason, & Ayçiçegi, 2006).

The difference in the contexts of acquitision between a native and a foreign language may also lead to the latter being less sensorily or emotionally embodied (e.g. Pavlenko, 2012). Because foreign languages are typically not learned in naturalistic contexts, words may not occur in conjunction with affective states. Foreign language classrooms do not provide sufficient opportunity for socialization or grounding the terms in bodily experience and this may reduce the emotional impact of foreign language words (e.g. Dewawle, 2004; Pavlenko, 2004). Furthermore, because of the differences in acquisition between a native and a foreign language, foreign language words are processed less automatically (Colbeck & Bowers, 2012; Segalowitz, Trofimovich, Gatbonton, & Sokolovskaya, 2008; Winskel, 2013; but see Eilola, Havelka, & Sharma, 2007; Sutton, Altarriba, Gianico, & Basnight-Brown 2007). However, even when a foreign language is just as automatic in terms of processing aversive stimuli, the physiological response to these stimuli is larger in the native language (Eilola & Havelka, 2011).

It is also possible that a foreign language does not reduce overall emotionality, but selectively affects negative or positive affect (Wu & Thierry, 2012; Hadjichristidis, Geipel, & Savadori, 2015). Indeed, there is some evidence that negative words, but not positive ones, are less embodied in a foreign language than in a native tongue (e.g., Foroni, 2015; Sheikh & Titone, 2015). This suggests that in a foreign language, there may be less emotional conflict regarding negative content or a higher preference for the positive over the negative. Furthermore, the use of a foreign language dampens the emotional salience of the self (Ivaz, Costa, & Duñabeitia, 2015). This would predict that, when using a foreign language compared to a native one, people would be less inclined to base their choices on self-relevant factors, perhaps resulting in a more emotionally distant decision process.

This is consistent with a related explanation for the effect of language: Using a foreign language might create more psychological distance than using a native one (Costa et al., 2014a; Keysar, Hayakawa, & An, 2012). Indeed increasing psychological distance seems to increase utilitarian preferences by shifting focus from the means, the sacrifice of one, to the goal or the outcome, saving five. For instance, Aguilar et al. (2013) demonstrated that considering moral dilemmas from a more distant perspective leads to greater willingness to sacrifice for the greater good even when this choice has negative consequences for oneself. Hence, if using a foreign language increases psychological distance, it may prompt potential gains, such as five lives, to be more salient or important than potential losses, such as one life. Indeed, the reduced emotional response and psychological distance accounts are not mutually exclusive. A more distant perspective could lead to a decrease in affective processing given the reduced salience of potential losses. This is congruent with the findings regarding the foreign language effect on economic decisions; when using a foreign language, people are less likely to base their choices on avoidance of negative outcomes and are less susceptible to the effects of prospective loss, risk, and uncertainty than when using a native language (Costa, Foucart, Arnon, Aparici, & Apesteguia, 2014; Keysar et al., 2012). Given all the ways in which using a foreign language may affect the manner in which people consider moral dilemmas, it is important to assess whether choices are affected by the same factors in foreign language contexts as in native language ones.

Overview of the studies

We report nine experiments that evaluate the robustness of the foreign language effect and various factors that affect it. This has allowed us to better describe the phenomenon and investigate potential explanations. The experiments are organized in three sets. In the first set of studies (Experiments 1a and 1b), we replicate the phenomenon directly and conceptually. We also test and rule out an alternative explanation, that the effect of language might result

from random responding. In the second set of studies, we assessed two additional alternative accounts. Experiment 2a tested whether increased cognitive control that results from language switching can account for the increase utilitarian choice. Experiment 2b evaluated whether using a foreign language prompts different social inferences about the group membership of the actors. In the third set of studies (Experiments 3a-3e), we assessed the role that action and consequences, as well as focus on them, play in the foreign language effect. This was to assess if these factors affect choice in native and foreign language contexts differently, which would be consistent with our proposed explanation. Finally, we also investigated whether proficiency level has a reliable effect on the phenomenon. Together, these investigations provide some explanation for the phenomenon as well as delineating its boundaries.

Experiments

General Methods

Although the experiments differed in some aspects, they also shared many methodological details.

Participants, Materials and Procedure: For each experiment, we collected samples of around 100 participants per language condition. We gathered the data from groups of 10 to 50 students attending university classes of varying majors, such as education, linguistics, literature, engineering, and psychology. The classes took place at universities in Spain (Universitat Pompeu Fabra, Universitat de Barcelona, Universitat Autònoma de Barcelona, Universitat de Girona, Universitat Rovira i Virgili, and Universitat Jaume I). Participants were late learners of English, which was typically their second language after Spanish or third after Spanish and Catalan[3]. To have relatively homogeneous samples, participants were excluded if they had lived in an English-speaking country for more than 12 months, had a native language that was not native to Spain, were under 18 years or over 40 years of age, did

not complete the entire survey, had previously encountered the dilemmas, or reported understanding less than 50 % of the dilemmas (in the foreign language condition). See Table 1 for the number of participants excluded from each study.

All materials were translated from English into Spanish, approved by multiple native speakers of Spanish, and back-translated for comparability (Brislin, 1970). For all experiments, each group of participants was randomly assigned to a language condition. Hence, participants received the instructions and materials in only one language (except for Experiment 2a). Each participant was presented with two dilemmas and the order of presentation was counterbalanced (except for Experiment 2a). The participants were reassured that there were no right or wrong answers, asked to respond in the order that the questions appeared, and to not change their answers once they had responded. Participants were asked to respond "yes" or "no" to each dilemma. All participants were asked for their age, native language(s), and gender. Within each experiment, the native and foreign language groups had comparable ages and gender distributions.

In each experiment, we presented participants with both the Footbridge and Switch dilemmas. As we have seen in previous studies, the use of a foreign language seems to affect choice in the Footbridge dilemma, but not in the Switch dilemma. Hence, the Switch dilemma in the current studies served as a control condition.

After responding to both dilemmas, participants assigned to the foreign language condition provided language background information. This included: what percentage of the dilemmas they comprehended, the age of first exposure to English, number of months spent in an English-speaking country, and self-reported proficiency in reading, writing, speaking, and comprehension (using a Likert-like scale of 1, low proficiency, to 7, high proficiency). This information can be found in Table 2.

The experiments lasted approximately 15 minutes and the experimenter remained in the classroom for the duration of the experiment.

Experiment 1: Replications and the role of vocabulary knowledge

These studies aimed at replicating the original foreign language effect and assessing the contribution of language knowledge.

Experiment 1a. Exact replication and the role of vocabulary knowledge

Experiment 1a was conducted as an exact replication of Costa et al.'s (2014a) study. Participants were presented with the Switch and Footbridge dilemmas in either their native language (Spanish) or a foreign language (English). We also investigated if foreign language vocabulary knowledge about key words in the dilemmas (ability to correctly translate them) modulates the effect. If the effect persists even when those using their foreign language possess sufficient vocabulary knowledge to understand the dilemmas, this would suggest that it is not driven by a lack of comprehension leading to random responding.

Method

Participants, Materials and Procedure

Two hundred and eleven participants were included in Experiment 1a. One hundred and five (64% female) participated in their native language and 106 (81% female) in their foreign language.

The dilemmas presented were as follows:

The Switch dilemma:

> A train is going down a track very fast towards five people. The train has a problem and cannot be stopped. Five people will die if you stay on this track. There is another track that you can use to divert the train. At the end of this track there is one man that will die if you change the track. Would you change the track?

The Footbridge dilemma:

> A train is going down a track very fast towards five people. The train has a problem and cannot be stopped, unless a heavy weight is dropped on the track. There is a very fat man next to you - your only way to stop the train is to push him onto the track, killing him to save five people. Would you push him?

After responding to the moral dilemmas, we gauged the relevant vocabulary knowledge in English by asking participants to translate ten key words or phrases into Spanish ('towards', 'change the track', 'five people', 'divert', 'stay', 'heavy weight', 'drop', 'push', 'kill', 'save'). These terms were chosen as they pertain to a variety of aspects of the dilemmas such as the details of the utilitarian actions required in each dilemma, the consequences, and the general content. We then constructed a measure of language knowledge by each participant's translation score, calculating the total number of words/ phrases they correctly translated out of the possible 10.

Results and Discussion

There was a significant effect of language on choice in the Footbridge dilemma such that participants who used their foreign language (FL) made significantly more choices to save the larger number of people than those who used their native language (NL) (FL: 43% vs. NL: 19%; χ^2 (1, N = 211) = 14.55, $p < .001$). Unlike previous studies, this was also the case for the Switch dilemma (FL: 87% and NL: 74%; χ^2 (1, N = 211) = 5.27, $p = .022$).

We split the responses from the foreign language group in two groups according to the median translation score in the vocabulary test[4]: a) low level: participants with translation scores lower than 8 (out of 10), and b) high level: participants with translation scores higher than 8. None of the participants scored lower than 5.

There was a significant difference between choices made by the low and high level groups for the Footbridge dilemma such that the low level group was more likely to choose to save the larger number of people (low level group: 56% vs. high level group: 33%; χ^2 (1, N = 104) = 5.61, p = .018). There was no significant difference between the low and high level groups in choices for the Switch dilemma (low level 90% vs. high level 83%; χ^2 (1, N = 104) = 1.32, p = .25). Importantly, both foreign language groups were made significantly more choices to save the larger number of people than the native language group (NL: 19%) in the Footbridge dilemma (low level vs. native χ^2 (1, N =157) = 21.84, p <. 001; high level vs. native χ^2 (1, N = 157) = 3.59, p = .058). For Switch, the difference was significant only for the low level group (NL: 74%; χ^2 (1, N = 157) = 5.55, p = .018).

Another way to assess the effect of foreign language proficiency is to split participants (median) according to their self-reported proficiency measured by a) the percentage of understanding of the dilemmas reported and b) the average score in the four abilities (reading, writing, speaking, and listening). While both of these measures of self-reported proficiency were included in the analyses, the former value was given priority as one's subjective sense of having understood the particular text at hand seems more likely to gauge relevant proficiency than if they feel proficient in their foreign language in general. Here, no differences between the low level and the high level groups were observed (Footbridge 45% vs. 42%; Switch: 89% vs. 85%).

Finally, we assessed whether the frequency of utilitarian responses to Footbridge increases as foreign language proficiency decreases. We conducted a logistic regression

treating translation score and average self-reported proficiency in the four abilities as continuous variables to evaluate if they significantly predict choice. A test of the full model against a constant only model was not significant, indicating that including proficiency measures did not improve the model (chi square = 3.01, p = .22, df = 2). While the Exp(B) values suggest that every decreased unit of proficiency increases the odds ratio of making the utilitarian choice for both translation score (Exp(B) = .89) and average self-reported proficiency (Exp(B) = .78), neither predictor was significant (translation: β =-0.11, SE =.14, p = .43; reported proficiency: β = -0.25, SE =.23, p = .28).

In this experiment, we replicated the foreign language effect for the Footbridge dilemma: People were more willing to choose the utilitarian choice when using their foreign language compared to when using their native one. We also found that the phenomenon was present when people had high vocabulary knowledge. This suggests that the origin of the phenomenon cannot be entirely attributed to a lack of understanding.

Experiment 1b: Conceptual replication with different dilemmas

Thus far, most published studies that demonstrated the foreign language effect on responses to moral dilemmas have only used the Footbridge and Switch versions of the Trolley problem (although see Geipel et al., 2015; Study 3). In order to assess the generalizability of the pattern – effect of language for Footbridge-like but not Switch-like dilemmas – in this experiment, we conducted a conceptual replication using the following dilemmas:

The Hospital dilemma (adapted from Thomson, 1985):

> You are working in a hospital. There is a fire in the street, and there is smoke coming through the hospital's ventilation system. In one room of the hospital

there are five patients. In another room there is only one patient. If you do nothing the smoke will go into the room with the five patients and they will die. There is a button that diverts the ventilation system. If you push the button, the smoke will go into the room with one patient and the patient will die, but the five patients in the other room will be safe. Would you push the button?

The Terrorist dilemma (adapted from Greene et al., 2001):

You are negotiating with terrorists to save a group of six tourists that have been captured. The leader of the terrorists gives you the choice: if you choose one tourist and shoot him, the other five tourists will be safe; if you decide not to kill anybody, the terrorist will kill five tourists and one will be safe. Would you kill one tourist?

These dilemmas are conceptually similar to Switch and Footbridge, respectively. The Hospital dilemma is similar to the Switch dilemma in that sacrificing the one person does not require direct personal force and the death of that person could be interpreted as a side effect of saving five people. Given that the effect of language tends to be minimal when dealing with these less personal scenarios, we did not expect to find the foreign language effect for the Hospital dilemma. On the other hand, the Terrorist dilemma is similar to Footbridge as it requires direct personal force to kill one person, a death that is instrumental to saving the other five; hence, for this dilemma we expected to find an effect of language.

In our view, a reduction in emotional response and an increase in psychological distance should lead those using a foreign language to be less sensitive to variations such as the use of personal force and the instrumentality of the death. A reduction in emotional response in particular for negative and self-relevant emotions should reduce the aversion to using personal force and the person's death being instrumental. In a similar vein, an increase in psychological distance would limit the weight of personal involvement (force) and the

means (an instrumental murder) relative to the consequences. Therefore, we expect to replicate the pattern previously found for conceptually similar dilemmas, which would predict an effect of language for Terrorist but not Hospital.

Method

Participants, Materials and Procedure

One hundred and seventy-three participants were included in Experiment 1b. Ninety-three (84% female) participated in their native language (Spanish) and 80 (84% female) in their foreign language (English).

The materials are detailed above. The same procedure was used as in Experiment 1a.

Results and Discussion

There was a significant effect of language on choice in the Terrorist dilemma such that participants who used their foreign language (FL) made significantly more choices to save the larger number of people than those who used their native language (NL) (FL: 54% vs. NL: 39%; χ^2 (1, N = 173) = 3.92, p = .048). This difference was not significant for the Hospital dilemma (FL: 83% vs. NL: 73%; χ^2 (1, N = 173) = 2.17, p = .14).

Following the same procedure as in Experiment 1a, we also investigated the effect of self-reported foreign language proficiency. Here, proficiency did not significantly affect people's choices (Terrorist: low level 55% vs. high level 52.5%; Hospital: low level 80% vs. high level 85%).

In this experiment, we replicated the pattern previously found: there was a foreign language effect for Terrorist but not Hospital, as expected given the effect for Footbridge and not Switch.

Experiment 2: Language switching and social inferences

In these two studies we investigated the role of language switching and social inferences in the presence of the foreign language effect.

Experiment 2a: Is the foreign language effect a consequence of language switching?

It has been argued that the foreign language effect could be driven by language switching rather than foreign language use per se (Oganian, Korn, & Heekeren, 2016). The argument goes as follows: Since participants presumably use the native language in normal circumstances, when they are confronted with dilemmas in their foreign language, they are required to switch languages. This switching activity may lead to an increase in cognitive control that may in turn affect the way the dilemma is processed. Indeed, independent evidence suggests that increasing cognitive control could be associated with an increase in utilitarian choices (see introduction). Hence, it is possible that the foreign language effect is no more than a switching effect in disguise.

If this is correct, then asking all participants to switch languages before responding to the Footbridge dilemma should attenuate or remove the effect of language. The reasoning is the following: If participants are presented with the Footbridge dilemma in the native language preceded by the Switch dilemma in their foreign language, utilitarian choices in Footbridge should increase for this group as a result of language switching, thus limiting the impact of language. To assess this issue, we first presented participants with the Switch dilemma, in either their native or foreign language and then evaluated responses to the Footbridge dilemma in the other language. If language switching is what causes the effect in the Footbridge dilemma, then it should not be present here. However, if the effect is not a consequence of language switching, but depends on the language of presentation of the key dilemma, then the phenomenon should persist.

Method

Participants, Materials and Procedure

Two hundred and four participants were included in Experiment 3. One hundred and one (85% female) participated using their native language (Spanish) for Footbridge (Native Footbridge) and 103 (75% female) participated using their foreign language (English) for Footbridge (Foreign Footbridge).

Unlike previous experiments, here all participants received the instructions in their native language. Participants then received the Switch dilemma followed by the Footbridge dilemma. The dilemmas are the same as those in Experiment 1a. Crucially, we manipulated the languages in order to examine the effect of language switching. Those in the Foreign Footbridge condition received the Switch dilemma in their native language, and then the Footbridge dilemma in their foreign language. Those in the Native Footbridge condition received the Switch dilemma in their foreign language and then the Footbridge in their native language.

Results and Discussion

There was a significant effect of language on choice in the Footbridge dilemma such that participants who used their foreign language (FL) made significantly more choices to save the larger number of people than those who used their native language (NL) for the Footbridge dilemma (FL: 47% vs. NL: 29%; χ^2 (1, N = 204) = 6.95, p = .008). There was no effect of language on responses to Switch (FL: 84 % vs. NL: 91%; χ^2 (1, N = 204) = 2.39, p = *.12*).

We also investigated the effect of self-reported foreign language proficiency. We only evaluated choices based on information presented in their foreign language (responses to

Footbridge for Foreign Footbridge and responses to Switch for Native Footbridge). For Footbridge, the effect of proficiency was not significant (low level 54% vs. high level 39%; $\chi^2 = (1, N = 103) = 2.22$, $p = .14$). For Switch, there was an effect of proficiency (low level 75% vs. high level 94%; χ^2 (1, N = 101) = 7.19, $p = .007$).[5]

In this experiment, even though all participants switched languages, we found that using a foreign language for Footbridge still lead to more choices to save the larger number of people (18%) than using the native language. Indeed, the magnitude of the foreign language effect was similar when no language switch was involved (Experiment 1a; 24%).

In order to directly evaluate the possibility that language switching may diminish the effect of language, we compared the results of the Footbridge dilemma from Experiment 2a to those from Experiment 1a. We did this by fitting a logistic regression with two between-subjects bivalent factors (Experiment – 1a vs. 2a – x Language – native vs. foreign). If having all participants switch languages reduces the impact of language, then we should find a significant interaction between these two factors.

The results showed a main effect of Language (Wald statistic = 7.76, $p = .005$), but not of the language context (Experiment) (Wald statistic = 2.62, $p = .105$) or of the interaction (Wald statistic = 0.887, $p = .346$). That is, although numerically speaking the magnitude of the effect was larger when not all participants were required to switch languages (24%) than when they were (18%), these variations were not significantly different from one another.

In this experiment, we showed that the foreign language effect was present when all participants are required to switch languages. Moreover, the comparison of the results of this experiment to those of Experiment 1a revealed that requiring all participants to switch languages does not significantly reduce the foreign language effect. Hence, the presence of

the phenomenon cannot be attributed to an increase in cognitive control associated with language switching.

Experiment 2b: Is the foreign language effect a consequence of social inferences?

In this experiment we assessed the potential role that social inferences may have in the presence of the foreign language effect. It is possible that the use of the native language may prompt participants to infer that the actors in the dilemmas are in-group members whereas the use of their foreign language may prompt participants to infer that they are out-group members. These different attributions may contribute to the effect by altering how participants relate to the actors and, consequently, the value these lives are given. Indeed, independent evidence reveals that the in-group or out-group status of the actors involved in a moral dilemma can affect the decisions that people make (e.g., Swann, Gomez, Dovidio, Hart, & Jetten, 2010).

To evaluate this issue, the dilemmas included in Experiment 2b explicitly stated the group membership of the five victims such that they were the same for both language groups. In addition, this experiment varied group membership, specifying that the five victims were either in-group (Spanish) or out-group (American). If the impact of a foreign language is contingent on different group membership inferences by those using one language or another, then making group membership explicitly the same would undo the effect. On the other hand, if the effect persists, this suggests that it cannot be attributed to different social inferences.

Method

Participants, Materials and Procedure

Three hundred and ninety-nine participants were included in Experiment 2b. They were randomly assigned to either the "In-Group" or "Out-Group" condition and to participate

in either their native (Spanish) or foreign language (English). Hence, there were four groups of participants in this experiment. In the In-Group conditions, ninety-five (69% female) participated in their native language and 99 (71% female) in their foreign language. In the Out-Group conditions, one hundred and three (81% female) participated in their native language and 102 (84% female) in their foreign language.

Participants in the In-Group conditions were told that the five people were Spanish whereas those in the Out-Group conditions were told that the five people were American. For both the Switch and Footbridge dilemmas, participants received the exact scenarios used in Experiments 1a and 2a, except that the first line was adjusted to identify the five victims' nationalities as in-group or out-group in the following manner: "A train is going down a track very fast towards five Spanish [American] people."

Results and Discussion

There was a significant effect of language on choice in the Footbridge dilemma such that participants who used their foreign language (FL) made significantly choices to save the larger number of people than those who used their native language (NL). This was the case both for the In-Group condition (FL: 27% vs. NL: 15%; χ^2 (1, N=194) = 4.57, p = .033) and the Out-Group condition (FL: 36% vs. NL: 19%; χ^2 (1, N=205) = 7.26, p = .007). There was no effect of language on responses to Switch (In-group: FL: 72% vs. NL: 75%; χ^2 (1, N =194) = 0.23, p = .64; Out-group: FL: 80% vs. NL: 78%; χ^2 (1, N = 205) = 0.23, p = .63).

We also investigated the effect of self-reported foreign language proficiency. There were no significant differences between the low level and high level groups (Footbridge: In-Group: 30% vs. 24%; Out-Group: 33% vs. 39%; Switch: In-Group: 74% vs. 69%; Out-Group: 76% vs. 84%), and all foreign language groups gave more utilitarian responses than the native language groups in Footbridge.

In this experiment, we showed that the effect of language was present when the group membership of the actors in the dilemma was specified. However, it may be that the effect of language was larger when the victims were out-group members (17%) compared to when they were in-group ones (12%).

In order to more directly evaluate whether the effect of group membership (in- vs. out-group) interacts with the effect of language, we fitted a logistic regression with two between-subjects bivalent factors (Social context - in-group vs. out-group - x Language – native vs. foreign). If the victims' social group affects the foreign language effect, then we should find an interaction between these two factors. However, the results showed that they do not interact (Wald statistic = 0.030, p = .862). That is, the size of the effect of language was the same regardless of whether the victims were in-group or out-group members.

In this experiment, we observed the foreign language effect despite specifying the in-group/out-group status of the actors involved in the dilemma. Hence, this suggests that the foreign language effect cannot be explained by different social inferences, given that the effect remains present when the dilemmas does not allow for such inferences. Furthermore, the effect of language was the same whether the victims were in-group or out-group.

Thus far the current studies have provided evidence that the moral foreign language effect is robust and present in various contexts. They have also shown that the effect cannot be attributed to a) a lack of understanding associated with foreign language processing, b) an increase in cognitive control associated with language switching, or c) different social inferences prompted by the language of presentation. In the next five experiments, we addressed further factors that may affect the presence of the phenomenon, paying special attention to how actions and consequences modulate its magnitude.

Experiment 3: Actions, consequences and focus

The first three studies of this section addressed the role of the type of action involved in the dilemma and the way that the choice is framed, in the presence of the foreign language effect. The reasoning for this was the following: It is possible that the foreign language effect is a result of reducing the aversion elicited by the action required to save the larger number of lives. In the Footbridge dilemma, pushing the man off the bridge is by itself an action that elicits aversion regardless of its outcome. Indeed, independent research has shown that people tend to experience high levels of aversion to performing typically violent actions even in mock situations that do not lead to any harmful consequences (pulling the trigger of a toy gun) (Cushman et al., 2012; see also: Miller & Cushman, 2013; Miller, Hannikainen, & Cushman, 2014). As these authors argue, this aversion may be one of the main reasons that people avoid choosing to sacrifice a person when it involves violent action. Furthermore, some claim that intuitions differ for Switch and Footbridge because of the type of action involved and whether or not we have experience with it leading to negative outcomes (for a discussion of model-free versus model-based control; see Cushman, 2013; Railton, in press). Therefore, it is reasonable to think that any factor that reduces action aversion could lead to an increase in utilitarian choices.

Using a foreign language could be one of them; as we have argued, there is evidence suggesting that the use of a foreign language decreases emotional response and increases psychological distance relative to that of a native language. Importantly, both of these factors would predict a decrease in action aversion and an increase in choosing to sacrifice the one to save the larger number of people. First, a reduction in emotional response even in healthy individuals leads to this, presumably by reducing social cognition e.g., empathy (Duke & Bègue, 2015). Second, it has been shown that inducing psychological distance leads to an increase in willingness to sacrifice for the greater good (Aguilar et al., 2013), presumably by increasing the focus on outcomes (*ends*) as opposed to actions (*means*). Hence, the use of a

foreign language could lead to a reduction in the importance of the means or an increase in the importance of the consequences, altering the way the problem is considered. Indeed, there is recent evidence suggesting this is the case: Geipel and colleagues found that foreign language use reduces the weight of the means (intentions) and increases the weight of the outcomes in moral evaluations, (Geipel, Hadjichristidis, & Surian, 2016). Furthermore, the authors argue that this is consistent with a reduction in intuitive processes – which is congruent with there being an effect of language for Footbridge but not Switch.

In order to investigate these issues, Experiments 3a and 3b assessed whether the foreign language effect is a result of reduced action aversion by a) making the action less aversive by removing personal force and b) framing the choice in terms of the consequences of inaction, which should limit the potential contribution of action aversion. Experiment 3c investigated the salience of the trade-off between the means and the consequences in the foreign language effect. Specifically, whether the foreign language effect would persist when this trade-off is made highly salient. Given that the use of a foreign language may prompt more focus on the consequences than on the means required to achieve it, making the trade-off very explicit may reduce the impact of language.

The remaining two studies investigated the role of the negative consequences associated with saving the larger group. Reduced emotional response and increased psychological distance would lead to a reduction in a) the salience or importance given to self-relevant emotions and b) the sensitivity to the negative relative to the positive consequences of action. Therefore, Experiments 3d & 3e investigated if the severity of the negative consequences has less weight in choices made in foreign language contexts than native ones. We explain this reasoning in more detail in the introduction of these experiments.

Experiment 3a: Reducing action aversion

In this experiment, we assessed whether the foreign language effect would be present when the action needed to save the larger number of people is less aversive (pushing a button instead of pushing a man). The idea was that if the foreign language effect is driven by reduced action aversion, then it should be attenuated or absent when the action involved in the dilemma elicits less aversion.

To evaluate this hypothesis, we used a version of the Footbridge dilemma (adapted from Greene et al., 2009) in which saving the larger number of people does not involve physically pushing the fat man to his death. Instead, it requires a rather neutral action: pushing a button. However, the consequence of this action is that the man falls onto the track, stops the trolley and dies, and this leads to saving five people. While the consequence of taking action was the same as in the standard Footbridge dilemma, this "Button" version did not require physical contact, personal force, or a typically negative action. Indeed, pushing a button is not intrinsically associated with negative consequences, but pushing a man is. The Button dilemma still differed from Switch in that a man's death is instrumental whereas in the Switch dilemma this death can be construed as a side-effect. Therefore, this experiment also allowed us to assess the role of personal force in the phenomenon. If the effect of the foreign language is the result of a reduced aversion to this factor, then the phenomenon should be reduced.

Method

Participants, Material and Procedure

Two hundred and two participants were included in Experiment 3a. One hundred (68% female) participated in their native language (Spanish) and 102 (78% female) in their foreign language (English).

Participants received the Switch (as in previous experiments) and Button dilemmas.

For the Button dilemma, participants received the following scenario:

> A train is going down a track very fast towards five people. The train has a problem and cannot be stopped, unless a heavy weight is dropped on the track. There is a very fat man next to the track - your only way to stop the train is to push a button that will make him fall onto the track, killing him to save five people. Would you push the button?

Results and Discussion

Using the foreign language (FL) lead to more choices to save the larger number of people in Button than using the native language (NL) and this difference was marginally significant (FL: 67% vs. NL: 55; χ^2 (1, N = 202) = 2.89, p = .089). There was no effect of language on responses to the Switch dilemma (FL: 75% vs. NL: 78%; χ^2 (1, N = 202) = 0.18, p = .67).

We also investigated the effect of self-reported foreign language proficiency. There was no effect of proficiency for the Button dilemma (low level: 67% vs. high level: 67%). There was an effect of proficiency for Switch (low level 63% vs. high level 88%; χ^2 = (1, N = 102) = 8.96), p = .003).[6]

This experiment showed a clear trend towards the presence of a foreign language effect in the Button dilemma. However, it failed to reach conventional significance. A further way to assess whether the effect is driven by reduced action aversion is to compare its magnitude when the action required to achieve the utilitarian goal involved personal force and a typically violent action (pushing the man; Experiment 1a) to when it did not (pushing the button; Experiment 3a). We did this by fitting a logistic regression with two between-subjects bivalent factors (Experiment - 1a vs. 3a - x Languages - native vs. foreign).

The results showed significant main effects of both factors (Experiment: Wald statistic = 26.57, $p < .001$; Language: Wald statistic = 11.78, $p = .001$), but the interaction was not significant (Wald statistic = 2.57, $p = .11$). Thus, it appears that the effect of language was similar in these two contexts.

To further explore the potential difference in the effect sizes found for the Footbridge dilemma between Experiments 1a and 3a, we calculated odds ratios as a means to quantify the associations between language and utilitarian choice. Here they represent the odds that choosing the utilitarian option will occur given the use of the foreign language, compared to the odds of choosing it given the use of the native language (see Szumilas, 2010). If the odds ratio is greater than 1, then choosing the utilitarian option is considered to be more likely given the use of the foreign language.

At a descriptive level, the odds ratios between language and choice were ordered as expected: 3.258 and 1.636 for Experiments 1a and 3a respectively. This suggests that the foreign language effect may have been larger when the action required to save the larger number of people was highly aversive (pushing a man) than when it was not (pushing a button). In addition, the increase in choosing to act in Experiment 3a compared to Experiment 1a was numerically larger for native language users (36%) than for foreign language users (24%). This may suggest that reducing action aversion had a larger effect on those using the native language. Thus, the effect of reducing action aversion may have had a larger impact on those using their native language relative to those using their foreign language; however, the lack of a significant interaction in the logistic regression precludes us from definitively drawing this conclusion.[7]

Thus, we found that the magnitude of the foreign language effect was statistically similar whether the action that leads to saving the larger number of people involved personal force or not. Hence, it appears that the phenomenon cannot be attributed, solely, to the

potential reduction in action aversion that the use of a foreign language may confer. However, our conclusions are tentative given that both the main effect for Experiment 3a and the interaction between language and experiment (1a vs. 3a) are arguably marginal. Nevertheless, in numerical terms, the magnitude of the phenomenon was larger when the action involved personal force, which leaves open the possibility that action aversion may contribute to it to some degree. In the next experiment, we further explored this issue from a different perspective.

Experiment 3b. The effect of asking about actions or consequences

As described above, the foreign language effect may come about because of a difference in the way the dilemma is considered by each language group. We have argued that a foreign language context might reduce action aversion or lessen its importance relative to the consequences (as compared to a native language context). If this is the case, it would reduce the impact of action aversion and subsequently favor choosing to sacrifice the one in Footbridge. Indeed, in the previous experiment, we observed a reduction (numerically speaking) in the magnitude of the foreign language effect when action aversion was presumably reduced. Another way to assess the potential contribution of action aversion is to frame the dilemmas' choices such that they do not focus on taking action. This can be achieved by stressing the consequences of inaction (five people will die) rather than focusing on the action itself (e.g., pushing the man), when presenting the choices. Previous research shows that similar manipulations lead to an increase in utilitarian choices (Petrinovich & O'Neill, 1996). After all, intuitively, it seems more acceptable to say "no" to "Would you let five people die?" (or "yes" to "Would you save the five people?"), than "yes" to "Would you push the man?"

In this experiment, we asked the following question after the Footbridge dilemma: "Would you let five people die?" instead of "Would you push the man?" Creating conditions that, presumably, would reduce the impact of action aversion on choice allows us to further explore its potential role in the foreign language effect. Specifically, this increases the salience of the cost associated with inaction and makes the choice to save the larger number more intuitive. This manipulation should increase willingness save the larger number in the Footbridge dilemma (but not in Switch; see Broeders, Van Den Bos, Müller, & Ham, 2011).

If reduced action aversion is the main cause of the foreign language effect, then it should not be present here as action aversion would be minimal.

Method

Participants, Material and Procedure

One hundred and ninety participants were included in Experiment 3b. Ninety-seven (69% female) participated in their native language (Spanish) and 93 (72% female) in their foreign language (English).

Participants received the same Switch ("Consequence Switch") and Footbridge ("Consequence Footbridge") dilemmas as in Experiments 1a. Unlike before, rather than asking participants whether they would "change the track" or "push him", they were asked whether they would "Let five people die?" Also unlike before, here the same question was posed for both dilemmas.

Results and Discussion

There was a significant effect of language on choice in Consequence Footbridge such that those who used their foreign language (FL) made significantly more choices to not let five people die than those who used their native language (NL) (FL: 60% vs. NL: 41%; χ^2 (1,

N = 190) = 6.84, p = .009). There was no effect of language for the Consequence Switch dilemma (FL: 83% vs. NL: 84%; χ^2 (1, N = 190) = 0.017, p = .90).

We also investigated the effect of self-reported foreign language proficiency. There were no significant effects (Consequence Footbridge: low level 53% vs. high level 67%; χ^2 (1, N = 93) = 1.96, p = .16; Consequence Switch: low level 83 % vs. high level 83%).

The results of this experiment revealed that the foreign language effect was also present when the dilemmas are framed in terms of the consequences of inaction, which would presumably reduce the potential effects of action aversion. This suggests that the phenomenon is indeed robust as it is not contingent on questions about action or affirmative responses. Hence, although a reduction in action aversion may contribute to the presence of the foreign language effect, the current results suggest that it cannot fully account for it.

Experiment 3c. The trade-off between the means and the consequences

In this experiment, we further assessed potential differences in the way the dilemma is considered depending on the language. We did so by focusing attention on the trade-off between the means and the consequences posed by the dilemma. As we have argued above, people may give different importance to actions and consequences in their responses depending on the language context. Indeed, it is possible that the use of a foreign language prompts more focus on the consequences than on the trade-offs that one has to make to achieve them. In this context, making the trade-offs very explicit by focusing attention both on the consequences and on the means required may reduce the impact of language. We explored this issue by asking participants the following question after the Footbridge dilemma: "Would you let five people die by not pushing him?"

Method

Participants, Materials and Procedure

Two hundred and one participants were included in Experiment 3c. One hundred and three (46% female) participated in their native language (Spanish) and 98 (57% female) in their foreign language (English).

Participants received the Footbridge and Switch dilemmas as in Experiment 1a, but with different final questions. The "Consequence Action Switch" dilemma ended with the question "Would you let five people die by not changing the track?" and the "Consequence Action Footbridge" dilemma ended with the question "Would you let five people die by not pushing him?"

Results and Discussion

There was no significant difference in choosing to not let five people die for the Consequence Action Footbridge dilemma between those who used their foreign (FL) and native language (NL) (FL: 41% vs. NL: 38%; χ^2 (1, N = 201) = 0.18, p = .67). Similarly, there was no difference for the Consequence Action Switch dilemma (FL: 76% vs. NL: 79%; χ^2 (1, N = 201) = 0.28, p = .60).

We also investigated the effect of self-reported foreign language proficiency. For Consequence Action Footbridge, there was a significant effect of proficiency (low level 53% vs. high level 29%; χ^2 (1, N = 98) = 6.08, p = .014), but for Consequence Action Switch there was not (low level 82% vs. high level 69%; χ^2 (1, N = 98) = 1.99, p = .16). For the Consequence Action Footbridge dilemma, the low level group chose marginally more often not to let five people die (53%) compared to the native language group (38%) (χ^2 (1, N = 152) = 3.13, p = .077), but there was no effect of language for the high level group (29%; χ^2 (1, N =152) = 1.26, p = .26).

This experiment showed that the foreign language effect disappeared when the choice posed by the dilemma stressed the trade-off between the consequences and the action required to achieve them.

In the last two experiments we have shown that the foreign language effect was modulated by the wording of the question posed in the dilemma. The effect was strongest when action was made explicit (Experiment 1a - would you push the man?), weaker when the consequences of inaction were made explicit (and the choice to save the larger number was more intuitive) (Experiment 3b - would you let five people die?), and null when the link between the two was made explicit (Experiment 3c - would you let five people die by not pushing the man?).[8] This pattern of results identifies the contribution of action aversion and an explicit focus on the trade-off have on the presence of the effect. In the following two experiments, we evaluated the way in which consequences contribute to the foreign language effect.

Experiments 3d & 3e: The negative consequences associated with saving the larger group

In the following two experiments we assessed the role that the consequences associated with saving the larger group have in the presence of the foreign language effect. Part of the reluctance to opt for this choice in the Footbridge dilemma could be due to the emotional reaction elicited by the negative consequences (being responsible for sacrificing a man's life) that result from said choice. In other words, the idea of intentionally sacrificing the life of a person may elicit such a negative reaction ('I don't want to kill anyone') that it prevents participants from accessing the logic behind the trade-off (one life for five lives). Reducing such aversion would allow for more cost-benefit analyses. Hence, if using a foreign

language reduces the aversion elicited by the negative consequences of sacrificing the one, this could partially explain the effect.

If this is the case, then reducing the emotional reaction elicited by the consequences of acting may increase the inclination to choose this option and reduce the potential role that language may play. Arguably, a reduction in the degree of harm associated with sacrificing the one would lead to a reduction in the aversion elicited by said choice. This would, in turn, lead to an increase in choices to save the larger number of people. In fact, previous research has shown that decreasing the extent of harm increases willingness to choose this option in moral dilemmas when using a native language (Trémolière & De Neys, 2013). Imagine an extreme case: by pushing the man you save five lives, but he only suffers minor injuries such as a broken toe. Note that the action would be the same, pushing a man, but the consequences would likely elicit a much less intense emotional reaction. In such examples – or even in less extreme ones as those used in the following experiments – it is likely that the foreign language effect would disappear, if indeed the phenomenon is basically attributable to a reduction of the emotional reaction to the negative consequences.

Said reaction could in part be attributable to self-relevant emotions about the negative consequences that making the utilitarian choice would have for one personally (e.g., the extent to which it is punishable). Failure to anticipate these self-relevant emotions has been linked with an increase in utilitarian choices (e.g., in individuals with brain lesions: Ciaramelli, Muccioli, Làdavas, & di Pelligrino, 2007; Moretto, Làdavas, Mattioli, & di Pelligrino, 2010). Hence, it may be that the use of a foreign language promotes willingness to make this choice by reducing the importance of these emotions (see Ivaz et al., 2015 for evidence suggesting that the self is less emotionally salient in a foreign language context compared to a native one). If reducing the extent of harm associated with acting to save the larger number of people reduces the intensity of self-relevant emotions, we expect that this

would have a larger effect on those using the native language. By increasing utilitarian choices for those using the native language, this would likely limit the effect of language.

Indeed, a reduction in sensitivity to negative consequences would also be consistent with another related explanation for the foreign language effect. Perhaps, as we have argued, a foreign language context elicits psychological distance, compared to that of a native language. If this is the case, it may encourage participants to assess the trade-off in more general terms (harming one to save five) and therefore to dismiss, to a certain degree, how much harm is inflicted on the sacrificed person. As argued, an increase in psychological distance may also promote more focus on the positive than the negative. This would be consistent with results showing that using a foreign language decreases negative affect and/or increases positive affect (Hadjichristidis et al., 2015; Wu & Thierry, 2012) and that negative, but not positive words, are less embodied in the foreign language context (Foroni, 2015; Sheikh & Titone, 2015). If this is the case, then variations in the negative consequences should have a smaller effect on those using a foreign language than those using a native one.

Hence, if a foreign language reduces sensitivity to the negative consequences (or increases sensitivity to the positive ones) associated with the action required to save the larger number of people, the specific degree of harm associated with this action would be less impactful.

We assessed these issues by altering the Footbridge dilemma such that the utilitarian choice would leave the fat man permanently disabled (Experiment 3d) or seriously injured (Experiment 3e).

Experiment 3d. Disability

Method

Participants, Materials and Procedure

One hundred and ninety-seven native Spanish speakers were included in Experiment 3d. Ninety-six (67% female) participated in their native language (Spanish) and 101 (67% female) in their foreign language (English).

Participants received the same Switch dilemma as in previous experiments and a modified "Disabled Footbridge" dilemma. For the Disabled Footbridge dilemma, participants received the following scenario:

> A train is going down a track very fast towards five people. The train has a problem and cannot be stopped, unless a heavy weight is dropped on the track. There is a very fat man next to you - your only way to stop the train is to push him onto the track. If you push the fat man, he will be disabled, unable to walk, for the rest of his life. Would you push him?

Results and Discussion

The foreign language effect persisted for the Disabled Footbridge dilemma χ^2 (1, N = 197) = 5.54, p = .019), with those using the foreign language (FL) more frequently choosing to save the larger number of people than those using the native language (NL) (FL: 40% vs. NL: 24%; χ^2 (1, N = 197) = 5.54, p = .019). There was no significant difference between languages for the Switch dilemma (FL: 75% vs. NL: 79%; χ^2 (1, N = 197) = 0.43, p = .51).

We also investigated the effect of self-reported foreign language proficiency. There were no significant effects (Injured Footbridge: low level 36% vs. high level 43%; Switch: low level 73 % vs. high level 78%).

In this experiment, we observed that the foreign language effect was present when the negative consequences of saving the larger number of people were somewhat less severe than death. This suggests that the phenomenon is not limited to cases of lethal harm.

Experiment 3e. Injury

Method

Participants, Materials and Procedure

Two hundred and twenty-three native Spanish speakers were included in Experiment 3e. Of these participants, one hundred and seventeen (83% female) participate in their native language (Spanish) and 106 (84% female) participated in their foreign language (English).

Participants received the same Switch dilemma as before and the modified "Injured Footbridge" dilemma. For the Injured Footbridge dilemma, participants received the following scenario:

> A train is going down a track very fast towards five people. The train has a problem and cannot be stopped, unless a heavy weight is dropped on the track. There is a very fat man next to you - your only way to stop the train is to push the man onto the track, causing him serious injuries, to save these five people. Would you push him?

Results and Discussion

Those who used their foreign language (FL) made more choices to save the larger number of people than those who used their native language users (NL) for the Injured Footbridge dilemma but this difference was not statistically significant (FL: 43% vs. NL:

36%; χ^2 (1, N = 223) = 1.31, p = .25). There was no effect of language on choices made in Switch (FL: 67% vs. NL: 64%; χ^2 (1, N = 223) = 0.20, p = .65).

We also investigated self-reported foreign language proficiency. There were no significant differences between groups (Injured Footbridge: low level 43% vs. high level 43%; Switch: low level 72% vs. high level 62%).

In this experiment, we found that the foreign language effect was absent when the negative consequences of saving the larger number of people were rather less severe and permanent than death. This reveals a potential boundary of the phenomenon, namely that the effect decreases when the negative consequences of taking action are diminished.

To more directly assess this issue, we compared the results for different Footbridge dilemmas that vary in the degree of the harmful consequences associated with pushing the man: death (Experiment 1a), disability (Experiment 3d) and injury (Experiment 3e). We did this by fitting a logistic regression with two between-subjects factors (3 experiments - 1a, 3d, 3e - x 2 languages - native vs. foreign). We expected to find the strongest association between language and choice when the severity of harm is highest (Experiment 1a), a weaker association when it is reduced (Experiment 3d), and the weakest association when it is the least severe (Experiment 3e).

The results showed a significant main effect of Experiment (Wald statistic = 7.97, p = .005) but not of Language (Wald statistic = 1.34, p = .25). More importantly, their interaction was significant (Wald statistic = 4.48, p = .034). The direction of the effect was as expected: The odds ratios between language and choices equaled 3.258, 2.081, and 1.369 for Experiments 1a, 3d and 3e, respectively.[9] Thus, this suggests that the effect of language is diminished when the negative consequences of the action associated with the utilitarian choice are made less severe.

Indeed, the frequencies of utilitarian choices changed significantly across these three experiments for the native language group (χ^2 (2, N = 318) = 8.56, p = .014) but not for the foreign language group (χ^2 (2, N = 313) = 0.40, p = .82), suggesting that those using a foreign language context are relatively insensitive to the amount of harm associated with the utilitarian choice.

In these experiments, we observed that reducing the severity of the negative consequences of saving the larger number of people also reduces or eliminates the foreign language effect. This suggests that the way consequences are treated when facing moral dilemmas might depend on the language of presentation and, specifically, that the use of a foreign language may decrease sensitivity to negative consequences.

Analyses across experiments

In this section, we consider the entire set of experiments by performing meta-analyses and exploring the impact of foreign language proficiency.

We performed meta-analyses to assess the pervasiveness, robustness and heterogeneity of the effect of language on each type of dilemma (Switch and Footbridge), which allowed us to reach several conclusions. First, there is a robust effect of language when the individual is faced with Footbridge-type dilemmas: Choosing to save the larger number of people is more likely when using the foreign than the native language. For an overview of the frequency of these choices made for each version of Footbridge see Figure 1. Second, there is no significant effect of language when the individual is faced with Switch-type dilemmas. There might be either no effect or perhaps the effect is so small that our data does not have enough power to detect it, although this option seems unlikely given the results of previous studies. Thus, it seems that there is only an effect of language when the choice to save the

larger number is counterintuitive due to the aversion elicited by the dilemma's content.[10] Third, the effects are very stable for both types of dilemmas.

For the details of the meta-analyses see the Appendix. For an overview of the effect sizes for each dilemma in each experiment, see Table 3; for an overview of the percent of utilitarian choices made for each dilemma and experiment by language, see Table 4.

<Insert Figure 1 about here>

Another issue that we explored was the effect of foreign language proficiency on the magnitude of the foreign language effect. As we have seen, the effect of proficiency was disparate for individual experiments. However, when all experiments were combined,[11] choices to sacrifice one to save five seem to increase numerically with a decrease in proficiency. We split the aggregate foreign language sample into three bins according to their self-reported proficiency (using the same criteria used for the analyses for each experiment). Those in the low proficiency group had an average understanding of 71% and an average score of 4.2/7 in the four abilities; those in the intermediate proficiency group had an average understanding of 94% and an average score of 4.7/7 in the four abilities; those in the high proficiency group all reported understanding of 100% of the dilemmas and had an average score of 5.8/7 in the 4 abilities.

For the Footbridge dilemma, the rate of utilitarian choices significantly differed between the low and intermediate proficiency groups (52% vs. 42%; $\chi^2 = (1, N = 592) = 6.52$, $p = .01$) and the low and high proficiency groups (52% vs. 43%; $\chi^2 = (1, N = 591) = 5.14$, $p = .023$), but not between the intermediate and high proficiency groups (42% vs. 43%; $\chi^2 = (1, N = 591) = 0.08$, $p = .78$). Importantly, all three proficiency groups made significantly more choices to save the larger number of people (low proficiency: $\chi^2 = (1, N = 1205) = 39.32$, p

< .001; intermediate proficiency: $\chi^2 = (1, N = 1205) = 9.46$, $p = .002$; high proficiency: $\chi^2 = (1, N = 1204) = 11.76$, $p < .001$) when compared to those who used the native language (32% utilitarian choices). There were no effects of proficiency or language on choices in the Switch dilemma.[12] Hence, these results replicate previous observations (Costa et al. 2014a; Geipel et al., 2015) in that the higher the proficiency in the foreign language, the smaller the increase in choices to save the larger number of people relative to the native language. What is fundamental, however, is that those participants with a high level of proficiency in the foreign language still made significantly more choices to save the larger number of people than those using their native language.

It is possible that the frequency of utilitarian choices increases as an inverse function of proficiency. To further assess the potential contribution of proficiency to the effect of language in Footbridge, we also conducted a logistic regression, treating average self-reported proficiency in the four abilities as a continuous variable to evaluate if this significantly predicts choice. Self-reported proficiency was not a significant predictor of choice (chi square = 1.86, $p = .17$, df =1). While the Exp(B) value suggests that every decreased unit of proficiency increases the odds ratio of making the utilitarian choice by .92, this effect was not significant ($\beta = -0.08$, SE = .06, $p = .17$). As such, the results suggest that foreign language proficiency, when treated as a continuous variable, did not affect responses to the Footbridge dilemma. While this suggests that proficiency may not play a significant role in the effect (unlike some previous analyses), this is congruent with prior results in that it argues against the effect being solely attributable to a lack of understanding.

General Discussion

In this article, we reported 9 experiments (including 2000 participants) exploring the foreign language effect on moral choice. Two main issues were assessed: a) the robustness of

the foreign language effect in several contexts and b) the effect of various factors on the presence of the foreign language effect. This has helped to better describe the phenomenon and investigate potential explanations.

Next, we briefly summarize the main results of the different experiments and, subsequently, we discuss their implications.

In the first set of studies (Experiments 1a - 1b), we asked the following two questions: a) **is the foreign language effect robust and can the pattern be extended to other dilemmas?** and b) **does foreign language vocabulary knowledge affect the magnitude of the phenomenon?** The answer to these two questions is positive. The foreign language effect was present in the Footbridge dilemma and extended to the conceptually similar Terrorist dilemma. On the other hand, the phenomenon was not present for the Hospital dilemma, as with the Switch dilemma. Furthermore, the magnitude of the effect was larger for those speakers with less knowledge of the foreign language, although present overall.

In the second set of studies (Experiments 2a - 2b), we asked the following two questions: a) **is the foreign language effect the result of increasing cognitive control due to language switching**? and b) **is the foreign language effect a consequence of social inferences prompted by language context**? The answer to these two questions is negative. The foreign language effect was present when all participants (including those using the native language) were required to switch languages. Furthermore, the magnitude of the effect was similar irrespective of whether all participants switched languages or not. The foreign language effect was also present when the dilemmas did not allow for social inferences about the actors. Indeed, the effect was present when the dilemmas specified the actors as either in-group or out-group members. Moreover, the magnitude of the effect did not differ between these two contexts.

In the third set of studies (Experiments 3a - 3e), we asked several questions. First, **is the foreign language effect a result of reduced action aversion?** The answer to this question is unclear. The effect was marginally significant (Experiment 3a) when the action required to save the larger number of people was arguably less averse (pushing a button) than in the original study (pushing a man). Furthermore, the effect was also present (Experiment 3b) when the choice in the dilemma was framed in terms of the consequences of inaction (letting five people die), which would presumably reduce the potential impact of action aversion. The second question we asked was **whether the foreign language effect would persist when the trade-off between the means and the ends is made highly salient.** The answer to this question is no. This condition stressed both the action and the consequences: "would you let five people die by not pushing the man". In this case, the foreign language effect disappeared.

Finally, the last two experiments addressed the question: **Is the foreign language effect a result of reduced sensitivity to the negative consequences of action?** The answer to this question is positive. This manipulation increased utilitarian choices for those using their native but not those using their foreign language. Thus, when the negative consequences associated with the utilitarian choice were reduced (injury or disability) compared to the original study (death), the foreign language effect was reduced or absent.

What are all these results telling us about the nature of the foreign language effect?

One of the most remarkable observations of our studies is the rather robust effect of language on responses to moral dilemmas. As can be appreciated in Figure 1, choices to save the larger number of people were always more frequent, in numerical terms, in the foreign language context than in the native one. The meta-analyses confirmed the stability of the

effect across different versions of the moral dilemmas. Hence, the phenomenon is robust and generalizable.

We also showed that some potential explanations related to the collateral effects of using a foreign language cannot account for the presence of the phenomenon. First, the effect is not due to an increase in cognitive control associated with language switching. Second, the effect is not due to potential social inferences about the status of the actors in the dilemmas that could be prompted by using one language or another. Furthermore, the in-group or out-group status of the actors does not seem to affect the presence of the foreign language effect. Third, the foreign language effect cannot be wholly attributed to random responding as a result of having a poor understanding of the dilemma (see also Geipel et al., 2015, for convergent evidence). The effect was present for participants with high vocabulary knowledge and proficiency in the foreign language, albeit in a smaller magnitude. In addition, subsequent analyses showed that self-reported foreign language proficiency was not a significant predictor of utilitarian choice, which suggests that even though proficiency does contribute to the effect, it does not account for a large portion of it. Furthermore, it seems unlikely that the effect would be due to a lack of comprehension driving random responding, because this would also predict an effect of language for Switch (in the opposite direction). Given that this is not the case, it is highly improbable that the use of a foreign language would affect the comprehension of Footbridge but not Switch.

Having shown the pervasiveness of the phenomenon and excluded some potential explanations, we devised five studies to assess the role of actions and consequences in the presence of the foreign language effect.

We argued that the foreign language effect could in part be explained by reduced aversion to the action associated with saving the larger number of people. This hypothesis was based on two facts. First, people tend to be averse to typically violent actions regardless

of whether they bring harmful consequences or not. For example, people are highly aroused by pulling the trigger of a toy gun aimed at the experimenter's head even when this has no consequences (Cushman et al., 2012). Second, it has been argued that foreign language contexts reduce the emotional reaction conveyed by the message (see introduction). That is, despite understanding the message, it does not elicit as strong of an emotional reaction as in the native language. While foreign language contexts may elicit a reduced emotional response compared to native ones, and reduced action aversion would lead to an increase in choosing to save the larger number of people, the results of Experiments 3a and 3b suggest that such a reduction in aversion cannot fully account for the presence of the foreign language effect. This is because the effect was marginally present when the action associated with the utilitarian choice arguably elicited less aversion (pushing a button instead of pushing a man). Furthermore, the effect remained when the choice in the dilemma was framed in terms of the consequences of inaction. However, we cannot conclude that a reduction in action aversion does not contribute to the phenomenon at all: The magnitude of the effect was numerically smaller in the contexts that would arguably dampen the potential contribution of action aversion (pushing a button and stressing the consequences of inaction). Moreover, the effect of varying the aversion elicited by the action was smaller, numerically speaking, on those using the foreign language than those using the native language. Hence, together these results suggest that although a reduction in action aversion may contribute to the magnitude of the foreign language effect, it cannot account for the lion's share.

The final experimental effort was devoted to assessing whether the foreign language effect stems from a different way of evaluating the consequences of making the utilitarian choice. This was motivated by two related hypotheses. First, part of the reluctance to opt for the utilitarian choice in the Footbridge dilemma could be the emotional reaction elicited by the negative consequences (being responsible for sacrificing a man's life) of making such a

choice. If this reaction is attenuated when using a foreign language, this would then facilitate making the utilitarian choice. Second, it may be that the use of a foreign language prompts the dilemma to be represented in more general terms (harming one to save five), which would then decrease the potential aversion elicited by the personal repercussions of making the utilitarian choice and, thus, result in an increase of them. This issue was assessed by reducing the negative consequences associated with the choice to save the larger number of people. Indeed, this manipulation seems to have affected the magnitude of the foreign language effect; it decreased with the severity of the negative consequences (death, disability, injury). In fact, this reduction affected choices in the native language context to a larger extent than in the foreign. These observations suggest that, at least part of the foreign language effect may arise due to the way consequences are construed.

This pattern of results may suggest that a foreign language context alters the manner in which the dilemma is considered; specifically, foreign language use may prompt an increase in psychological distance (relative to that of native language use). If this is the case, then it would affect the way actions and consequences are valued, such that they are appraised differently than in a native language context. More concretely, this would dampen the aversion experienced when confronted with typically violent actions, lead to a reduced sensitivity to the negative consequences incurred by the choice to save the larger number of people, and increase sensitivity to the positive consequences associated with said choice (see below). Each of these, in turn, would lead to an increase in willingness to make the trade-off of one life for five.

When the decision-making context elicits a distant perspective, this appears to reduce sensitivity to negative emotions. For example, when making decisions for others, people are less loss and risk averse than when making decisions for themselves (Beisswanger, Stone, Hupp, & Allgaier, 2003; Polman, 2012a). This could be partly due to regulatory focus

(Higgins, Shah, & Friedman, 1997), which could focus people on different aspects of the decision depending on their motivation. This, in turn, could be mediated by psychological distance: People who decide for themselves are more prevention-focused and those who decide for others are more promotion-focused. This means that low psychological distance leads to focusing on the negative whereas high psychological distance leads to focusing on the positive (Beisswanger et al., 2003; Polman, 2012b). This is consistent with our finding that when using a foreign language, people appear to be less likely to make decisions based on avoidance of negative outcomes (harming one person) and more likely to focus on potential gains (saving lives). As argued above, this is also congruent with the evidence regarding the foreign language effect on economic decisions (Costa et al., 2014b; Keysar et al., 2012).

Finally, we cannot claim that the use of a foreign language makes one more utilitarian per se. The current methods do not allow for the dissociation of deontological and utilitarian inclinations and further research should apply a process dissociation approach (e.g. Conway & Gawronski, 2013). Regardless, what we can claim given the current set of results is that there is an effect of language on choice. As we have argued, this may be due to the use of a foreign language prompting different considerations regarding the means and consequences.

It is critical to understand how and when our moral choices may be affected by language. The nine studies reported here contribute to our understanding of the factors and processes that affect moral choice by providing support for the pervasiveness of the foreign language effect across different contexts. Furthermore, the current work offers initial insights on the potential processes underlying the impact of a foreign language on moral choice. While most of us might never face a choice as extreme as the one made by Alexander Holmes and the crew as the lifeboat began to sink, we are all faced with moral dilemmas –

whether in the workplace, in our political or religious stances, or in our personal lives. The fact that these important decisions could be influenced by the native-ness of the language we use has far reaching implications given the millions of people who use a foreign language every day.

Author Contributions

All authors contributed to study concept and design. Data collection was performed by JC, MA, AF. Data analysis was completed by JC, SH, AF under the supervision of JB. All authors contributed to drafting the manuscript and approved the final version for submission.

Acknowledgements

We would like to thank the professors who helped us collect the data by giving us access to their students. We would also like to thank our colleagues for their comments, and Leigh Burnett and Candice Frances for editorial suggestions. All materials are available upon request from the authors.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

This research was partially funded by grants from the Spanish Government (PSI2011-23033, Consolider Ingenio 2010 CSD2007-00048, and Ministry of Economy and Competitiveness PSI2014-52181-P), from the Catalan Government (SGR 2009-1521), from the European Research Council under the European Community's Seventh Framework (FP7/2007-2013 Cooperation grant agreement 613465-AThEME), from the John Templeton Foundation and the National Science Foundation #1520074 to the University of Chicago. Joanna D. Corey was supported by a grant from the Catalan Government (FI-DGR).

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Figures

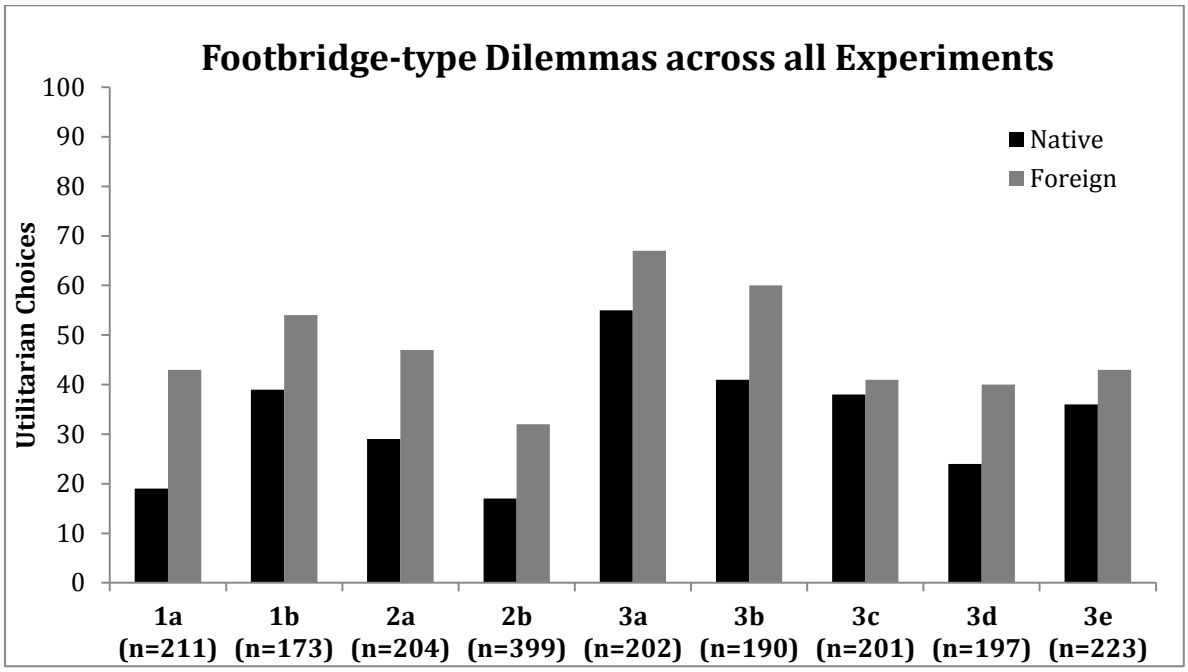

Figure 1. Percent of utilitarian for Footbridge-type dilemmas in the native and foreign language conditions across all experiments.

Tables

Table 1. Number of participants excluded in each of the experiments for either Comprehension/Demographic problems (as described in the General Methods) or for having previous exposure to the experimental dilemmas.

Experiment	Demographic/ Comprehension Exclusions	Previous Experience with Dilemmas	Total Exclusions
Exp 1a	28	49	**77**
Exp 1b	3	0	**3**
Exp 2a	17	0	**17**
Exp 2b	19	38	**57**
Exp 3a	10	0	**10**
Exp 3b	12	0	**12**
Exp 3c	3	0	**3**
Exp 3d	18	107	**125**
Exp 3e	22	0	**22**

Table 2. Demographic and background information for all participants in Foreign Language conditions including age at time of experiment, age of first English exposure, months spent abroad in an English-speaking country, self-rated English proficiency (1-7 with 7=fully fluent) for reading, writing, listening and speaking, and average % of foreign experiment materials understood.

Experiment	Age of Exposure	Months Abroad	Reading	Writing	Listening	Speaking	% Understood
Exp 1a	6.5	<1	5.4	4.9	5.4	4.5	87%
Exp 1b	6.1	<1	5.2	4.4	5.3	4.1	92%
Exp 2a	6.8	<1	5.2	4.5	5.1	4.1	88%
Exp 2b	7.1	<1	5.5	4.8	5.4	4.6	92%
Exp 3a	6.9	<1	4.9	4.4	4.9	3.9	80%
Exp 3b	6.8	<1	5.1	4.4	5.2	4.0	85%
Exp 3c	6.5	<1	5.6	4.8	5.5	4.4	91%
Exp 3d	6.5	1	5.6	5.0	5.5	4.6	93%
Exp 3e	6.8	<1	5.1	4.5	5.2	4.0	89%

Table 3. Effect size indices across all experiments

Risk Ratio values and the 95% confidence intervals for each experimental condition

Type of Dilemma	Experimental condition	RR	95%CI
Switch-type	Exp1a / Switch	1.168	[1.337; 1.021]
	Exp1b / Hospital	1.128	[1.323; 0.962]
	Exp2a / Switch (Language switch)	1.084	[1.203; 0.978]
	Exp2b / Switch (In-Group)	0.960	[1.138; 0.809]
	Exp2b / Switch (Out-Group)	1.035	[1.192; 0.899]
	Exp3a/ Switch	0.968	[1.127; 0.831]
	Exp3b / Switch (Consequence)	0.992	[1.127; 0.872]
	Exp3c /Switch (Consequence Action)	0.960	[1.117; 0.826]
	Exp3d / Switch	0.950	[1.106; 0.817]
	Exp3e /Switch	1.045	[1.264; 0.864]
Footbridge-type	Exp1a / Footbridge	2.278	[3.574; 1.452]
	Exp1b / Terrorist	1.389	[1.925; 1.002]
	Exp2a / Footbridge (Language switch)	1.623	[2.351; 1.121]
	Exp2b / Footbridge (In-Group)	1.851	[3.308; 1.035]
	Exp2b / Footbridge (Out-Group)	1.868	[2.989; 1.168]
	Exp3a/ Footbridge Button	1.212	[1.517; 0.969]
	Exp3b / Footbridge (Consequence)	1.460	[1.950; 1.093]
	Exp3c/Footbridge (Consequence Action)	1.078	[1.520; 0.765]
	Exp3d/ Footbridge Disabled	1.653	[2.541; 1.075]
	Exp3e /Footbridge Injured	1.209	[1.674; 0.873]

Table 4. Percentage of utilitarian choices for both language conditions and dilemmas for each experiment, and the difference in this percentage between language groups for each dilemma and experiment.

						Difference in Utilitarian Choices Foreign – Native	
		Switch		**Footbridge**			
Experiment	**N**	**Native**	**Foreign**	**Native**	**Foreign**	**Switch**	**Footbridge**
1a	211	74	87	19	43	13	24
1b	173	73	83	39	54	10	15
2a	204	91	84	29	47	-7	18
2b	399	76	76	17	32	0	15
3a	202	78	75	55	67	-3	12
3b	190	84	83	41	60	-1	19
3c	201	79	76	38	41	-3	3
3d	197	79	75	24	40	-4	16
3e	223	64	67	36	43	3	7

Appendix

We evaluated three aspects of the data: 1) The pervasiveness of the effect of language by determining effect sizes for each type of dilemma and experiment, 2) the robustness of the effect of language across experiments for each type of dilemma, 3) the heterogeneity of the effects for each type of dilemma. The procedures used are meta-analytic techniques for synthesizing values of effect size indices (Borenstein, Hedges, Higgins, & Rothstein, 2009; Cooper, Hedges & Valentine, 2009). We have combined the results from the Switch-type and the Footbridge-type dilemmas separately. In order to preserve the assumptions of the statistical models, we only combined results from samples of different participants.

To determine the robustness of the foreign language effect for each dilemma in each experiment, we have obtained the Risk Ratio index, based on the proportion of utilitarian responses given by those using the foreign and the native languages. Those proportions being p_f and p_n, the index is calculated as Risk Ratio = p_f / p_n (Fleiss & Berlin, 2009). When in a given experiment there is no language effect, the Risk Ratio value is around 1. Values significantly above 1 reflect higher rates of utilitarian responses when using the foreign than the native language. When the interval includes the value 1, the null hypothesis (no association between the language and decision) must be maintained, whereas when the interval completely exceeds the value 1 (lower bound > 1), it can be concluded that there is a significant language effect in the expected direction.

As expected, in almost all of the Switch-type dilemmas there is no evidence of a significant association between the language and the propensity to make utilitarian choices. Only in 1 of 10 experiments (Experiment 1a) the result is statistically significant (close to the expected 5% type I error rate). On the contrary, in 7 of 10 of the Footbridge-type dilemmas there is evidence of a significant association between language and choice. Next, we analyzed across the experiments for each type of dilemma, combining the 10 Risk Ratio values. For

each set of the two types of dilemma, we have combined these estimates under a Random Effects model, weighting the Risk Ratio values by the inverse variance method (Hedges & Olkin, 1985). Two main models are usually employed to combine independent estimates (Borenstein, Hedges, Higgins, & Rothstein, 2010; Hedges & Vevea, 1998). *Fixed effect* models assume that all the studies are essentially identical; then, between-study differences are due to sampling error alone. *Random effects* models assume that, in addition to sampling error there are other sources of between study variability; as a consequence, the studies combined for a Random Effects model estimate different parametric values. In general, in psychology the assumption that there is some variability in the parameter across the studies is more realistic. Random Effects models reflect this feature adding a separate variance term (the so-called *specific variance*).

The specific variance has been estimated by the restricted maximum likelihood method (Raudenbush, 2009). Calculations have been carried out using *METAFOR* (Viechtbauer, 2010), an *R* package for meta-analysis (R Development Core Team, 2010).

As expected, the results reveal that we should maintain the null hypothesis for Switch-type dilemmas and reject it for Footbridge-type ones: The combined estimate with the Switch-type dilemmas is 1.033 (95%CI: 1.083; 0.986), whereas for the Footbridge-type dilemmas it equals 1.437 (95%CI: 1.639; 1.260). The conclusion is clear. The synthesis of 10 independent experimental conditions that employed Switch-type dilemmas does not show evidence of a significant association between the language and the propensity to choose the utilitarian response. On the contrary, the synthesis of 10 experimental conditions that employed Footbridge-type dilemmas shows evidence of a significant association. The direction of the effect is as expected: when faced with Footbridge-type dilemmas, utilitarian choices are more probable when using the foreign language than the native one.

Finally, we assessed the degree of heterogeneity of the effect size values, as is important when doing meta-analyses. This is accomplished by the Cochrane-*Q* test (Hedges & Olkin, 1985), the I^2 index (Higgins, Thompson, Deeks, & Altman, 2003; Higgins & Thompson, 2002), and the value of the specific variance estimated. The *Q* test yields no significant effects in either set of experimental conditions [Switch-type dilemmas: Q(9) = 9.12, p = .43; Footbridge-type dilemmas: Q(9) = 12.68, p = .18]. However, this test has low power when the sample of estimates is small, as in our study (k = 10). The I^2 index is a descriptive value that reflects the percentage in which the observed variability exceeds the expected variability due to sampling. It is often recommended as a complement of the *Q* test (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). The 25%, 50% and 75% values of I^2 are taken as the references for low, medium, and high degrees of variability (Higgins et al., 2003). In our results the values are I^2 = 6.1% for the Switch-type dilemmas, and I^2 = 26.9% for the Footbridge-type dilemmas.

The empirical variance of the values must be compared with the degree of variability expected by mere sampling. When the values show a significantly higher level of heterogeneity, it is explained by the random effect component of the model. This reflects the fact that the studies are performed under a variety of circumstances, participants, procedures, etc.; these factors yield some variability in the actual effects that the individual studies are estimating. So, fitting a Random Effects model involves estimating the specific variance of the random factor. As the Switch-type dilemmas are in all but one of our experiments (Experiment 1b) essentially the same (the standard Switch dilemma), not very much heterogeneity is expected. On the contrary, the Footbridge-type dilemmas employed along the experiments have been presented with some variations in the linguistic context, in the text concerning the consequences for the utilitarian sacrifice (death, disability, injury) or the details of utilitarian action, or highlighting some aspects of the decisional context. This

should generate some extra variability in the effects that would be reflected in the specific variance. As expected, the variance is higher for the Footbridge-type than for the Switch-type dilemmas. When combining the estimates for each type of dilemma we find that the specific variances equal 0.0003 and 0.0118 for the Switch- and Footbridge-type dilemmas, respectively. The pattern of results of the *Q*-test, the I^2 index and the specific variance values indicates that there is more heterogeneity in the Footbridge-type than in the Switch-type dilemmas.

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[1]It is well known that the overwhelming majority of research participants in the field of psychology are undergraduate students, most often from the United States (Arnett, 2008). Given that international students make up only 4% of all university students in the US (Open Doors Report, 2014), it can be assumed that most research is conducted in the participants' native tongue.

[2] There are still further differences between the dilemmas. Such as whether the action required to save five involves a morally relevant object (person) or not (switch), the locus of intervention is either a morally relevant object (person) or not (train) (Waldmann & Dietrich, 2007), the victim is described as a person or compared to a heavy object, and whether the action would be acceptable in another context (switching a train track) or not (pushing a person) (see Waldmann, Nagel & Wiegmann, 2012). These differences may contribute to the intuitiveness of the utilitarian choice varying across the dilemmas.

[3]Knowledge of Catalan did not affect participants' responses in either the Spanish (native language) or English (foreign language) conditions.

[4]In order to determine the effect of relevant language knowledge, we further pruned the data to include only those participants who correctly translated at least three of the 5 terms that were essential for understanding the dilemmas ("towards", "change the track", "push", "kill" and "save"; this lead to the exclusion of 2 participants). This was to ensure sufficient comprehension of the dilemmas.

[5]When compared to the native language group (91% utilitarian choices) for the Switch dilemma, the low level group differed significantly (χ^2 (1, N = 154) = 7.82, p = .005), but the high level group did not (χ^2 (1, N = 153) = 0.35, p = .55).

[6]For the Switch dilemma, compared to those who used the native language (78% utilitarian choices), the low level group differed significantly (63%; χ^2 (1, N = 151) = 3.97, p = .046), but the high level group did not (88%; χ^2 (1, N = 151) = 2.34, p = 0.13).

[7]When the previous analyses were repeated for the Switch dilemma, the results were different. There was a significant main effect of Language (Wald statistic = 5.28, p = .022) but not of Experiment (Wald statistic = 0.39, p = .53). There was also a significant interaction (Wald statistic = 3.81, p = .051). The main effect of language was due to the fact that globally speaking there were more utilitarian choices made by those using the foreign than the native language. This appears to be primarily driven by Experiment 1a in which foreign language users were significantly more utilitarian, resulting in the interaction.

[8]In order to evaluate the effect of how the choice posed by the dilemma is framed, we compared the responses to the Footbridge dilemma in three experiments as a function of the question (the only difference between the experiments): "would you push the man?" (Experiment 1a), "would you let five people die?" (Experiment 3b) and "would you let five people die by not pushing the man?" (Experiment 3c). We did this by fitting a logistic regression with two between-subjects factors (3 experiments – 1a, 3b, 3c - x 2 languages – native vs. foreign). We expected to find the strongest association between language and decision when only action was made explicit, a moderate effect of language when only consequences were made explicit, but none when the trade-off between the two was made explicit. The results showed a significant main effect of Question (Wald statistic = 8.316, p = .004), but not of Language (Wald statistic = 0.49, p = .49). More importantly, we found a significant effect of the interaction between language and question (Wald statistic = 2.89, p = .020). The Odds Ratio between language and choice equaled 3.258, 2.157 and 1.132 for Experiments 1a, 3b, and 3c respectively. This pattern was consistent with our expectations. When these analyses were repeated for the Switch dilemma, the results were different. There was no main effect of any of the factors (Experiment: Wald statistic = 0.60, p = .44; Language: Wald statistic = 0.89, p = .35), but the effect of the interaction was significant (Wald statistic = 4.18, p = .041). This was probably due to the fact that we found a significant association between language and choices in Experiment 1a for the Switch dilemma. This effect did not appear again in any of the other experiments and may be a type I error.

[9]Again, we also analyzed the results for the Switch dilemma. We did not find any significant effects (Experiment: Wald statistic = 3.014, p = .083; Language: Wald statistic = 0.023, p = .88; interaction: Wald statistic = 1.78, p = .18). This was expected given that the Switch dilemma was identical across the three experiments.

[10] It is also possible that there is a ceiling effect for Switch given that roughly 80% of those using the native language routinely endorses utilitarian action, which would not leave room for an effect of language. However, this seems unlikely given that we did find the phenomenon for Switch in Experiment 1a, and because in at least one experiment where there would be room for an effect of language (e.g. Experiment 3e) none was found.

[11]Experiment 2a was excluded from these analyses because it differed from the other experiments in that a) the order of the dilemmas was not counterbalanced across participants, and b) participants switched languages between dilemmas.

[12]There were no significant effects for the Switch dilemma. Neither for proficiency: low compared to intermediate proficiency (77% vs. 78%; χ^2 (1, N = 592) = 0.01, p = .92), low compared to high proficiency (77% vs. 77%; χ^2 (1, N = 591) = 0.01, p = .91), and intermediate compared to high proficiency (78% vs. 77%; χ^2 (1, N = 591) = 0.05, p = .83). Nor for language (native group: 76% utilitarian): low proficiency (χ^2 (1, N = 1205) = 0.35, p = .56), intermediate proficiency (χ^2 (1, N = 1205) = 0.5, p = .48), and high proficiency (χ^2 (1, N = 1204) = 0.19, p = .66).