Foreign Language Effect in Decision-making: How Foreign Is It?

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Abstract

It has been shown that decisions and moral judgments differ when made using native languages compared to foreign languages. Cross-linguistic differences appeared in foreign languages that monolinguals typically acquired in school and used neither routinely nor extensively. We replicated these differences with two populations of proficient, native bilinguals (Italian-Venetian; Italian-Bergamasque). Venetian and Bergamasque are spoken in households and informal circles, unlike Italian, which is also used in more formal contexts. The findings reported in foreign languages for the Asian Disease Problem and the Footbridge Dilemma were reproduced in Venetian and Bergamasque. Our results show that language effects on decision-making and moral judgments are not restricted to foreign languages. The explanation proposed for foreign languages of cross-linguistic differences in emotion responses does not apply to our proficient, native bilinguals, who showed emotion responses of equal intensity in their languages. We propose that the contexts in which bilinguals use a language – either native, **regional** or foreign – could affect decisions.

Psychological research has revealed that the decisions we make depend in part on contextual factors that affect the way in which decisions and their consequences are viewed. The language in which decisions are made was recently recognized as one such factor, as suggested by results showing differences between decisions made using native as compared to foreign languages. This language effect appeared with markedly different decisions involving risky prospects (Gao, Zika, Rogers, & Thierry, 2015; Hadjichristidis, Geipel, & Savadori, 2015; Hayakawa & Keysar, 2018; Keysar, Hayakawa, & An, 2012; Korn, Heekeren, & Oganian, 2018; Oganian, Korn, & Heekeren, 2016), monetary choices (Costa, Foucart, Arnon, Aparici, & Apesteguia, 2014; Winskel, Ratitamkul, Brambley, Nagarachinda, & Tiencharoen, 2016), and moral dilemmas (Brouwer, 2019; Chan, Gu, Ng, & Tse, 2016; Cipolletti, McFarlane, & Weissglass, 2016; Costa, Corey, Hayakawa, Aparici, Vives, & Keysar, 2017; Costa, Foucart, Hayakawa, Aparici, Apesteguia, Heafner, & Keysar, 2014; Geipel, Hadjichristidis, & Surian, 2015a, b; Im Shin & Kim, 2017). When using foreign languages, people demonstrated less susceptibility to biases effecting decision-making (**e.g.,** Gao et al., 2015; Keysar et al., 2012). Furthermore, foreign languages prompted utilitarian moral judgments that aimed to promote the greater good rather than the fulfillment of moral principles (**e.g.,** Costa et al., 2014). In all prior studies, the language effect was only demonstrated in a specific group of bilinguals – monolinguals with knowledge of a foreign language typically acquired in school. No language effects were found with serial bilinguals who were proficient in L2 but learned it later in life (Cavar & Tytus, 2018, but see Bialek & Fugelsang, 2019). Here, we investigate whether or not the language effect extends to another type of bilinguals, those who acquired both languages early in life and have used them regularly throughout their adult life. Answering this question is relevant not only for setting the

perimeter of the language effect, but also for characterizing the mechanisms underlying variations in decision-making and moral judgments related to language.

A number of bilingual groups across the world routinely use distinct languages to communicate in different environments (Coulmas, 2013; de Bot, 2019). One language is acquired within the domestic circle and spoken almost exclusively in the family or with friends, neighbors, and acquaintances. Reflecting its official status, bilinguals' other language is compulsory in formal settings, including schooling, public institutions, administrative functions, and religious services, and is predominant in public media. The widespread use outside of the domestic environment ensures an early exposure to this language, while its acquisition is reinforced by formal training. Conforming to these linguistic requirements, these bilinguals become *de facto* proficient in both languages. This type of sociolinguistic scenario is encountered in several areas of Italy, where several millions of people speak Italian, the official national language, along with regional languages (ISTAT, 2014; Mioni & Arnuzzo Lansweert, 1979; Muljačić, 1997). The regional languages of Italy are often referred to as Italian dialects, a definition that has been questioned on linguistic and historical grounds. A number of lexical, syntactic, and phonetic features make each regional language largely unintelligible to Italian monolinguals or speakers from other regions. If cross-linguistic intelligibility were the criterion for defining a language (Auer, 2005; Chambers & Trudgill, 1998), the regional languages should then represent distinct languages from Italian (Berruto, 2005; Ferguson, 2007; Tuttle, 1997). Historically, Italian itself was originally a regional language sharing its Latin roots and similarities with modern Romance languages with the other regional languages of Italy (Maiden, 1995). We investigated two of these regional languages – Venetian that is used in the northeast region of Italy, and Bergamasque that is spoken in the northern Italian city of Bergamo and the

nearby area. Formal linguistic training and literacy do not exist in Venetian or Bergamasque, which are nowadays exclusively oral languages (Sanga, 1997; Tuttle, 1997). The lack of written codification contributes to the marginalization of these regional languages to informal settings. Because of their language acquisition and use, Italian-Venetian and Italian-Bergamasque bilinguals represent an interesting test-case for investigating if different decisions are made even when both languages are acquired early and used skillfully.

Processing differences found between native and foreign languages are absent with the languages that bilinguals speak fluently. The task devised by Meuter and Allport (1999) highlight process differences – or the lack thereof – in spoken word production. In this task, a cue (e.g., color) signals the language in which a picture or a digit has to be named. The significant increase in naming latencies that appears when switching between native and foreign languages (Meuter & Allport, 1999) is not observed between the languages spoken by proficient bilinguals (Costa & Santesteban, 2004; Costa, Santesteban, & Ivanova, 2006). Italian-Venetian bilinguals, too, showed comparable costs in switching between both languages (Scaltritti, Peressotti, & Miozzo, 2017), a finding attesting high linguistic competence that also underscores key disparities with the processes underpinning foreign languages.

Most of the explanations concerning the discrepant decisions induced by native and foreign languages are framed within the distancing process hypothesis (Keysar et al., 2012). Some core ideas of this hypothesis are shared with dual-system theories in decision-making (Kahneman, 2003; Sloman, 1996) and moral psychology (Greene, Nystrom, Engell, Darley, & Cohen, 2004; Haidt, 2007). According to this hypothesis, using foreign languages weakens the effects of intuitive and affective processes, instead promoting the types of cognitive-controlled mechanisms that support more deliberate, analytical, and utilitarian decisions. In this way,

decisions are more strongly affected by emotion when made in native languages relative to foreign languages.

Research aimed to identify the features specific to foreign languages that promote the distancing process. An explanation that has received extensive consideration relates the distancing process to emotion (Costa et al., 2014; Hayakawa, Costa, Foucart, & Keysar, 2016; Keysar et al., 2012). The rationale is two-pronged. On the one hand, emotions promote intuitive, gut-feeling decisions and judgments of the kind made using native languages (Greene, 2004; Haidt, 2007). On the other hand, there is empirical evidence showing weakened emotional responses while using foreign languages, as reviewed in Caldwell-Harris (2015) and Pavlenko (2017). It was thus proposed that the use of foreign languages should yield decisions that are less subject to framing effects and more targeted on utilitarian goals. It is generally agreed upon that emotion processing is similar between the languages used by proficient, native bilinguals (Anooshian & Hertel, 1994; Degner, Doycheva, & Wentura, 2012; Dewaele, 2004; Iacozza, Costa & Duñabeitia, 2017; Pavlenko, 2017; Sheikh & Titone, 2015). Under an emotion-based explanation of the language effect, we should then expect proficient, native bilinguals to make similar decisions in both of their languages. Whether or not this prediction holds for decisions made by the bilinguals participating in our study depends on whether or not emotion is similarly processed in Italian as opposed to Venetian or Bergamasque. Because of the prevalent use in domestic and informal settings, emotional responses could be stronger in Venetian or Bergamasque, in which case decisions would differ when made in these languages as opposed to Italian. To test the emotion-based explanation more directly, we compared the strength of emotional responses when using Italian and Venetian.

Investigating Italian, Venetian and Bergamasque also provides an opportunity to explore the role of sociolinguistic features in decision making, specifically if decision differences stem from the contrasting environments in which the languages are used. As a result of these environmental differences, some topics could be communicated or discussed more commonly in one language. Furthermore, information encountered in environments that are universally valued and revered would be recognized as more authoritative and collectively shared compared to information exchanged within informal settings (Coulmas, 2013; Johnstone, 2011). And these differences would be further exacerbated by literacy, the primary source of a large body of knowledge and the medium through which information is embodied in a network of formal knowledge extending from science to literature (Roberts & Street, 1997). In this way, the environment determines not only what information is encountered in a given language but also its socially recognized value.

The distinct sociolinguistics of Italian, Venetian, and Bergamasque could matter in light of evidence suggesting that decisions depend on the information available at the time of making the decisions (Johnson, Häubl, & Keinan, 2007; Weber, Johnson, Milch, Chang, Brodschool, & Goldstein, 2007). When decisions have multiple outcomes, the final choice is in part determined by what information is retrieved and how early in the decision process the information becomes available. This was demonstrated, for example, with the endowment effect, which is typically studied by randomly designating participants as sellers or **choosers** (Kahneman, Knetsch, & Thaler, 1991). Sellers receive a good (e.g., a mug) that they later sell, whereas chooser decide between the good and amounts of cash. The values that sellers assign to the good are usually at least twice those proposed by choosers. Johnson et al. (2007) found that the values of the good depend on the information more readily available in the context that participants experience –

e.g., positive thoughts concentrate on the good among sellers but on the money among choosers. These results reveal that the decision frame determines what information is retrieved and ultimately what final decisions are made.

In the endowment effect, the perspective of selling or choosing provides the critical frame; in other decisions, other frames are at play. The language in which decisions are taken could also contribute to determining the decision frame. In line with evidence that memories include a trace of the language in which they were formed (Marian & Neisser, 200; Puntoni, De Langhe, & Van Osselaer, 2008; Schrauf & Rubin, 2000), language could facilitate the retrieval particularly of information that is strongly associated with the language itself. Furthermore, a language could also activate cultural norms and values. For example, depending on the culture that language activates, using that language lead to choices that are either more cooperative or competitive (Akkermans, Harzing, & Van Witteloostuijn, 2010; **Geipel et al., 2015a; Gawinkowska, Paradowsi, & Bilewic, 2013; Hadjichristidis, Geipel, & Surian, 2019**). The framing effect of language would be especially visible cross-linguistically, when different information is salient in the distinct environments where the languages are used. As this type of scenario arises between Italian and Venetian or Bergamasque, different decisions would be made in Italian as opposed to Venetian or Bergamasque.

Asymmetries also exist between native and foreign languages. A large body of knowledge is first acquired in the native language, the one in which most of the speakers continue to exchange information. By contrast, the amount of knowledge absorbed through foreign languages is restricted by its acquisition in school and its limited use. These asymmetries resemble those between Italian and Venetian or Bergamasque, which reflect the narrower range of issues covered when using regional languages. While native languages and Italian are the

privileged vehicle for the acquisition and exchange of knowledge, both foreign languages and Italian regional languages are subordinate to another language. These similarities suggest that the same type of decisions would take place in Italian and native languages, whereas decisions in Venetian or Bergamasque would dovetail with those in foreign languages.

To summarize, three interlocked questions are addressed in the present study: First, do the differences between the decisions made in native and foreign languages appear between the languages used by native, proficient bilinguals? Second, are differences in the decisions made by native, proficient bilinguals stemming from cross-linguistic differences in emotion? Third, do the differences in the decisions made by native, proficient bilinguals relate to the sociolinguistic specificity of their languages? We examined the Asian Disease Problem and the Footbridge Dilemma, the tasks most extensively researched in prior studies on the foreign language effect on decision making (Chan et al., 2016; Cipolletti et al., 2016; Corey, Foucart, Botella, Hayakawa, Aparici & Costa 2017; Costa et al., 2014; Geipel et al., 2015a; Hayakawa et al., 2017; Hayakawa & Keysar, 2018; Im Shin & Kim, 2017; Keysar et al., 2012; Oganian et al., 2016; Winskel et al., 2016). As each task highlights distinct aspects of decisions, we aim to provide a rather extensive investigation of the effects of Italian, Venetian and Bergamasque on decision making. Furthermore, the replicability of our results was tested by investigating the Footbridge Dilemma with Italian-Venetian bilinguals and Italian-Bergamasque bilinguals. Finally, to assess the impact of emotion, we compared the strength of emotion elicited in Italian and Venetian.

Study 1: Emotion Ratings

A leading explanation links the effect of foreign languages on decision making to the specificity of emotion processing in foreign languages (Costa et al., 2014; Hayakawa et al., 2016; Keysar et al., 2012). We examined emotion processing in proficient, native Italian-

Venetian bilinguals to determine if an emotion-based explanation holds for the decisions made in their languages. One of the cross-linguistic differences in emotion processing appeared when phrases, marketing slogans, swearwords, and taboo words were rated for emotional intensity (Caldwell-Harris & Ayçiçeği-Dinn, 2009; Caldwell-Harris, Tong, Lung, & Poo, 2011; De Langhe, Puntoni, Fernandes, & Van Osselaer, 2011; Dewaele, 2004; Puntoni et al., 2008), a fundamental dimension of emotion (Barrett, Mesquita, Ochsner, & Gross, 2007). We focused on two of the prior findings that showed cross-linguistic differences in emotion intensity ratings. In Task 1, Italian-Venetian bilinguals rated the emotional intensity of endearments (*I miss you!*), insults (*I'm sick of you!*), and reprimands of the kind parents use to admonish children (*Be good!*) [Footnote 1]. These types of phrases were appraised as emotionally stronger in the native language (Caldwell-Harris & Ayçiçeği-Dinn, 2009; Caldwell-Harris et al., 2011). We examined if phases were appraised differently when presented in Italian as opposed to Venetian. In Task 2, we investigated the anchor contraction effect (ACE), which is observed when the emotion-related words that are used to anchor the rating scale are presented either in the native language or in a foreign language (De Langhe et al. 2011). Because the anchoring words are perceived as emotionally less intense in the foreign language, the scale would appear as more contracted when labeled in this language. To illustrate, the intensity of 5 in a 7-point scale labeled in the native language would correspond to a value greater than 5 when the scale is labeled in a foreign language. To compensate for such a scale restriction, more intense ratings would be chosen, therefore ACE reflects the systematic tendency to report stronger emotions when the scale is in a foreign language. The lack of ACE with non-emotional ratings or pictorial scales showing emoticons (De Langhe et al. 2011) confirms that ACE implicates changes in the language used for the emotional scale. In Task 2, we compared the

ratings selected when using rating scales with anchoring words presented either in Italian or Venetian.

Because Venetian is exclusively oral, only spoken phrases or pictures were presented for ratings. Tasks 1 and 2 were administered through the web to different groups of Italian-Venetian bilinguals. Participants were randomly presented to the tasks in Italian or Venetian. The same general procedure was followed with both tasks: first, participants completed the task; next, they responded to questions that queried their Venetian proficiency; lastly, they filled out a written questionnaire on language use. **Furthermore, an objective measure of language proficiency was introduced in Study 1 in part to assure that participants tested via web responded with the required compliance.**

Methods

Participants. A 'snowball' procedure was used for participant enrollment through social media. We directly contacted a few bilinguals asking them to send the participation invitation to other bilinguals, who in turn disseminated it further. Separate contact chains were created for Task 1 and Task 2. Potential participants were informed that participation in the web-based study required a good knowledge of Venetian. We excluded participants who reported to be younger than 18 years old, did not complete each part of the study, or that responded before the completion of the auditory presentation in the emotion rating task. We split participants in two groups: higher proficiency (6/7 correct responses in the Venetian language test; n = 408), and lower proficiency (< 6 correct responses; n = 95). Participants in the higher proficiency group were more likely to report exposure to Venetian in the native family (mean: 80% vs. 67%; $\chi^2(1) = 5.51$, $p = .02$), and chose higher Venetian proficiency ratings, both in production (mean: 7.5 vs. 6.6; t(484) = 3.19, p = .001) and comprehension (mean: 8.6 vs. 7.8; t(487) = 4.13, p <

.001). To ensure a proficient knowledge of Venetian, we conservatively analyzed the responses

of participants in the higher proficiency group (see Table 1 and Fig. 1 for participants'

demographics and language background).

Materials and Procedure. a. *Emotion Rating Tasks*. In Task 1, we tested 15 phrases (5

endearments, 5 insults, and 5 reprimands; see list in Appendix 1). 13/15 phrases received lower

emotional intensity ratings when, in previous studies (Harris, 2004; Caldwell-Harris & Ayçiçeği-

Dinn, 2009; Caldwell-Harris et al., 2011), they were presented in the foreign language (English).

The original English phrases were translated into Italian and Venetian. Different female speakers

recorded the phrases in Italian and Venetian. Phrases recorded in the two languages were of the

same duration (in sec). The intensity of the affective responses was measured using the Self-

Assessment Manikin (SAM; Bradley & Lang, 1994), a non-verbal scale that is suitable for

assessment in different countries and cultures (Morris, 1995) as well as with oral languages like

Venetian. Seven levels of emotional intensity are displayed in SAM by a graphic character

whose appearance ranges from excited with eyes open to sleepy with eyes closed. **Phrases**

appeared one at a time in randomized order, along with the SAM scale. Participants in Task 1

were instructed to select the character's appearance that best expressed the intensity of the

emotional response induced by the phrase.

In Task 2, we investigated ACE, and as in De Langhe et al. (2011) participants rated the

intensity of a specific emotion (e.g., fear) induced by a picture. We tested ten Italian emotion

words that received high valence ratings (n = 5) and low valence ratings (n = 5) according to

norms from Zammuner (1988). The words were paired with pictures from the Open Affective

Standardized Image Set (OASIS; Kurdi, Loxano, & Banaji, 2017), an open-access standardized

database of affective images normed for valence and arousal. In a pretest, 30 Italian speakers

rated the emotion intensity of a pool of pictures paired with the Italian emotion words, using a 1-7 scale (1 = very low; 7 = very high). We excluded pairs with exceedingly high or low ratings to avoid floor and ceiling effects. The intensity of the selected pairs (n = 10) ranged from 1.7 to 5.1 (see Appendix B for the complete list of word-picture pairs). The ten Italian emotion words were translated into Venetian. In the audio recordings prepared for each word-picture pair, the emotion word and the anchoring points of the rating scale were presented either in Italian or Venetian. For example, the text of the recording for *fear* translates, into English, as "Look at this picture. How much fear do you feel? A lot of fear or no fear? A score of 1 means you do not feel any fear, and a score of 7 means you feel a lot of fear." Different female speakers recorded the materials in Italian and Venetian. The rating scale appeared together with the picture and the audio-recording, and consisted of a horizontal line with the Arabic digits 1-7 aligned beneath, equidistantly one from the other. Participants indicated their ratings by selecting the corresponding digit. Word-picture pairs were shown in a different random order for each participant.

b. *Venetian Language Test*. Participants' knowledge of Venetian was assessed through a short 7-item grammaticality test. The morpho-syntactic features we examined (e.g., double introductions in subordinate clauses; clitic subject pronouns) distinguish Venetian from Italian (Ferguson, 2007; Poletto, 200; Tuttle, 1997). We created 7 minimal pairs, each formed by a sentence and its ungrammatical counterpart that differed by a single word or minor variation in word order. Each sentence pair was preceded by an introductory sentence that provided some context, as in the English translation of the following example in which the preamble sentence "When I realize that's very late, I say…" headed the sentence "I wonder where she is." The introductory sentences were written in Italian, whereas the minimal pairs were presented

auditorily in Venetian. Because differences were minimal (e.g., by a single phonemes), the minimal pairs were formed by short sentences (3-5 words long). The sentence pairs and the sentences within each pair were both presented in random order. Participants were instructed to listen carefully to each sentence pair and indicate whether the first or the second sentence was correct. Task instructions were written in Italian.

c. *Language Use Questionnaire*. Participants filled out the written questionnaire developed by Scaltritti et al. (2017), which queries about the acquisition, proficiency, and use of Venetian, as well as the familiarity with foreign languages. [Footnote 2] Proficiency was self-rated using a 1-10 point scale (1 = "none"; 10 = "perfect"). Subjective proficiency ratings were found to correlate strongly in Venetian with objective measures of proficiency (Scaltritti et al., 2017).

In Task 1, Task 2, and the Venetian language test, participants could replay the audio-recording before finalizing the response and were instructed to click the arrow icon in order to move to the next item. Stimuli presentation and response recording were operated through Qualtrics (https://www.qualtrics.com). The introduction at the beginning of the study and the experimental task (including the instructions) were randomly presented in only one language; in this way, up to the completion of the experimental task, participants were exposed to a single language (Italian or Venetian).

Analyses. Participants tested in Italian and Venetian were compared for age and gender by means of linear and logistic regressions respectively, entering Language (Italian, Venetian) as predictor and using the package lme4 (Bates, Maechler, & Bolker, 2011) included in the software R (R Core Team, 2016). Ratings were examined using Linear Mixed Models with participants as random effect; the fixed predictors were Language and Type of Phrases in Task 1 (Type of Emotions in Task 2) and their interaction. The effects of language were further

inspected with analyses conducted on each type of phrase (Task 1) or on individual emotions (Task 2), using the package lsmeans (Lenth & Lenth, 2018) and the Tukey correction method for multiple comparisons.

Results

Task 1 (Phrase Rating). The number of participants presented with the Italian and the Venetian version of the task were 97 and 120, respectively. The two groups were comparable for age and gender, ps < .47. The mean ratings chosen for the phrases presented in Italian and Venetian are shown in Table 2. Analyses on the ratings showed no significant effects of Language, $\chi^2(1) < 1$, and Type of Phrases (endearments, insults, reprimands; $\chi^2(2) = 1.92$, p = .38), nor a significant interaction, $\chi^2(2) = 2.69$, p = .26. The analyses focusing on individual types of phrases revealed similar ratings between Italian and Venetian, ps > .84.

Task 2 (ACE). The participants tested in Italian (n = 116) and Venetian (n = 114) were matched for age and gender, ps > .14. As shown in Table 3, the ratings chosen for each emotion were very similar for both languages. Analyses revealed a lack of Language effect, $\chi^2(1) < 1$, but a significant effect of Type of Emotions, $\chi^2(9) = 1004.53$, p < .001, and a significant interaction, $\chi^2(9) = 17.49$, p = .041. To investigate if the interaction reflected language differences appearing with only some emotions, the ratings provided in Italian and Venetian were analyzed for each individual emotion. The lack of any significant language differences, ps > .56, rules out this sort of explanation for the interaction.

Our failure to reproduce the language effects demands we carefully consider if it reflects aspects of our procedure or their fragile replicability. It is unlikely that our results reflected the auditory presentation we introduced because of the lack of literacy in Venetian. In fact, Harris (2004) showed that the phrases we tested in Task 1 were rated as emotionally more intense, in

the native language, when presented auditorily. Furthermore, the ratings that Kurdi et al. (2017) obtained in English for the pictures tested in Task 2 proved to be significant predictors of the ratings obtained for these pictures in Italian and Venetian, $\chi^2(1) = 327.57$, p < .001. This result makes it unlikely that our procedure altered in a significant way how ratings were assigned. Concerning replicability, language differences were found with the phrases of Task 1 using ratings as well as measuring skin conductance responses (Caldwell-Harris & Ayçiçeği-Dinn, 2009), whereas the effect of scale labelling investigated in Task 2 was demonstrated in multiple experiments (De Langhe et al., 2011). However, our results are consistent with the idea that differences in emotion processing disappear when languages are acquired early and spoken proficiently (Anooshian & Hertel, 1994; Degner et al., 2012; Dewaele, 2004; Iacozza et al., 2017; Pavlenko, 2017; Sheikh & Titone, 2015). Interestingly, this prediction was confirmed by the ratings that proficient speakers of foreign languages chose for the phrases tested in Task 1 (Harris, 2004).

The comparable intensity we found for the affective responses experienced in Italian and Venetian has implications not only for characterizing emotion processing in each of these languages, but also for making predictions on whether or not differences would appear between decisions made in these languages. As we discussed in the Introduction, the emotion-based explanation of the effects of foreign languages on decision making (Costa et al., 2014; Hayakawa et al., 2016; Keysar et al., 2012) anticipates that just as emotion processing is similar between Italian and Venetian so would be the decisions made in these languages. This prediction was tested in Study 2 and Study 3.

Study 2: Asian Disease Problem

The Asian Disease Problem (Tversky & Kahneman, 1981), shown in Table 4, requires making a choice between an option with a sure prospect (Medicine A) and an alternative option with a risky outcome (Medicine B). Although the two formulations of the problem describe identical outcomes, differences in the wording were designed to promote an interpretation either in terms of gains (lives saved) or losses (deaths). Under the gain frame, most people choose the option with a sure perspective; however, under the loss frame, the preferred choice shifts to the risky perspective (Levin, Schneider, & Gaeth, 1998; Tversky & Kahneman, 1981).

A detailed account of these findings is provided under prospect theory (Tversky & Kahneman, 1981). The theory assumes that three key features of decision-making – the influence of reference points on subjective value, diminishing returns on value, and the tendency for losses to 'loom larger' than gains – vary between choices framed as potential gains or potential losses. Regarding gains, the function that maps outcomes onto subjective values was found to have a concave shape. Because of this concavity, the value attached to saving 200,000 lives for certain is subjectively greater than the 1-in-3 chance of saving 600,000 lives, even though the objective expected value is the same for both options. The preference for the sure gain in lives to a gamble with an equal expected value reflects risk-aversion in the domain of gains. In contrast, the function corresponding to the subjective value of losses has a convex shape and a steeper slope than the function of gains, as a loss of x is typically more unappealing than a gain of x is appealing. Because of these features, the value of losing 400,000 lives is subjectively greater than the 2-in-3 chance of losing 600,000 lives. The risky choice becomes a more attractive option when compared to the reference point of zero deaths that is adopted for losses, as the risky choice would result in fewer deaths. The preference for a gamble to the sure gain with an equal expected value reflects risk-seeking in the domain of losses.

Surprisingly, the ubiquitous framing effect disappeared when responses to the Asian Disease Problem were given in a variety of foreign languages – the option with a sure perspective is now chosen equally frequently when the problem is framed in terms of gains or losses (Costa et al., 2014; Keysar et al., 2012; Oganian et al., 2016; Winskel et al., 2016). Under prospect theory (Tversky & Kahneman, 1981), this outcome reflects decreased risk aversion in foreign languages. As the aversiveness for possible losses is reduced, similar decisions are expected in conditions of gains and losses, as indeed observed in foreign languages. Evidence of reduced risk aversion was reported with bets made in foreign languages (Costa et al., 2014; Keysar et al., 2012), a result strengthening the explanation of the lack of the framing effect in foreign languages. Study 2, in which the Asian Disease Problem was presented ether in Italian or Venetian, examined whether or not the framing effect appeared in both of the languages spoken by our proficient, native bilinguals.

Methods

Participants. For recruitment, we used a word-of-mouth procedure whereby participants were referred by acquaintances as probable Venetian speakers. **They were tested individually by an experimenter. Language proficiency was assed using the self-scored Venetian proficiency questionnaire described in Study 1** (1 = "none"; 10 = "perfect"). We split participants in two groups according to self-scored **ratings**: higher proficiency group (≥ 7 ratings; n = 195), and lower proficiency group (< 7 ratings; n = 78). As in Study 1, we conservatively focused on the participants with higher proficiency. The participants in the higher proficiency group of Study 2 rated their Venetian proficiency, on average, 9.1 in production and

9.3 in comprehension; 98% of them reported an early exposure to Venetian (additional data about demographics and language background are presented in Table 1 and Fig. 1). Participants in the lower proficiency group chose lower proficiency scores for production (mean = 5.4; t(268) = 19.30, p < .001) and comprehension (mean = 7.1; t(268) = 12.90, p < .001), and reported early exposure to Venetian less often (mean = 87%; $\chi^2(1) = 10.84$, $p = .001$).

Materials and Procedure. Participants in Study 2 were tested individually by an experimenter in their homes or in dedicated spaces within community centers. The experimenter communicated in the language that was randomly chosen for administering the Asian Disease Problem. Participants were first presented with the Asian Disease Problem, next with the written questionnaire on language use described in Study 1.

The English version of the problem, shown in Table 4, was translated into Italian and Venetian. The problem was presented aurally, using recorded audio-files played via computer. By presenting the experimental tasks aurally we departed from prior studies that used a written administration **(but see Brouwer, 2019)**, a change in modality that was dictated by the lack of literacy in Venetian. The same speaker recorded the problem in Italian and Venetian. The audio recordings prepared for the Italian and Venetian version of the problem were of the same duration (in sec.). To ensure proper comprehension, critical numerical details (e.g., 600,000) were also shown visually on PowerPoint slides appearing in sync with the audio recordings. Participants were instructed to produce an oral yes/no response at the end of the presentation of the problem.

Analyses. Group comparisons for age and gender were carried out as in Study 1. The effects of Language (Italian, Venetian) and Frame (Gain, Loss) on participants' choices were examined through logistic regressions.

Results

The numbers of participants presented with the gain and loss framing were 49 and 50 in Italian, and 49 and 47 in Venetian, respectively. The four groups were comparable for sex and age, ps > .35. Analyses on decisions revealed a significant interaction between Language and Frame, b = 1.24, 95% CI [0.06, 2.43]; OR = 3.44, 95% CI [1.05, 11.45]; $\chi^2(1)$ = 4.21, p = .04. As shown in Figure 2, the interaction is explained by variations in the framing effect: in Italian, the sure option was chosen more often when the problem was framed in terms of gains than losses (69% vs. 36%; b = -1.39, 95% CI [-2.25, -0.57]; $\chi^2(1)$ = 11.28; p < .001; effect size, Cramer's V = .33. This preference was absent in Venetian (gain frame = 67%, loss frame = 64%; b = -0.16, 95% CI [-1.00, 0.69]; $\chi^2(1)$ < 1).

The framing effect appeared in Italian, as indicated by the reduced preference for the sure choice with the loss frame. The typical finding in the Asian Disease Problem was thus replicated in the oral presentation we needed to use because of the lack of literacy in Venetian. Other critical findings of Study 2 concerned cross-linguistic differences of the framing effect, which appeared in Italian but not in Venetian. Under prospect theory (Tversky & Kahneman, 1981), these cross-linguistic differences suggest reduced risk aversion when Venetian is used. An inspection of Figure 2 further reveals that the decrease in risk aversion results from a stronger preference for the sure option, which is chosen more frequently in Venetian relative to Italian (64% vs. 36%; b = 1.14, 95% CI [0.33, 1.99]; $\chi^2(1)$ = 7.61; p < .006; effect size Cramer's V = .28). The Asian Disease Problem was tested in foreign languages in six prior studies. As shown in Figure 2, the results of four of these studies closely matched ours (Keysar et al. (2012), Exp. 1c; Costa et al. (2014), Study 1a, b; Winskel et al. (2016), Study 1) [Footnote 3]. Not only did framing effects appeared exclusively in native languages, but only responses in the loss

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condition differed, which was due to the stronger preference for the sure option in foreign languages (60% vs. 38%; $\chi^2(1) = 10.85$, $p < .001$). Crucially, all of these similarities arose between bilinguals differing markedly for proficiency and language age-of-acquisition. In essence, results of Study 2 provide a first indication that language effects on decision-making can be observed in proficient, native bilinguals. Furthermore, the replication in Venetian of the lack of framing effects – previously observed in foreign languages – suggests an equivalence between Venetian and foreign languages.

Study 3: Footbridge Dilemma

Shown in Table 4, the Footbridge Dilemma concerns a fatal accident that would cause the death of five workers, unless a bystander is pushed off a bridge and killed in their stead. The dilemma questions the appropriateness of sacrificing one innocent person in order to save multiple lives. Most respondents choose not to kill the bystander, thus conforming to a deontological view rooted in moral rules that favor individual rights (Cao, Zhang, Song, Wang, Miao, & Peng, 2017). People are usually reluctant to endorse the alternative choice, which reflects a utilitarian perspective and favors the greater good. As proposed under some neurocognitive accounts of morality, moral choices result from the interplay of two types of processes (Greene et al., 2004; Haidt, 2007). One type of process is automatic, intuitive, and emotional, giving rise to deontological responses. The other type of process is cognitively controlled, more rational, and promotes utilitarian responses. Moral choices, however, are also affected by language, as shown by the increase in utilitarian responses when the Footbridge Dilemma was presented in foreign languages (Brouwer, 2019; Chan et al., 2016; Cipolletti et al., 2016; Corey et al., 2017; Costa et al., 2014; Geipel et al., 2015a; Hayakawa & Keysar, 2018; Im Shin & Kim, 2017). [Footnote 4] Utilitarian responses could increase in foreign languages either

because of reduced consideration of deontological norms (Hayakawa et al., 2017) or lessened

concern with harming someone (Muda et al., 2018). In Study 3, Italian-Venetian bilinguals were

administered the Footbridge Dilemma either in Italian or Venetian.

Methods

  Participants. The word-of-mouth procedure described in Study 2 was used for recruitment.

As in Study 2, participants who self-rated Venetian proficiency ≥ 7 were included in the higher

proficiency group (n = 225). The averaged Venetian proficiency score for the higher proficiency

group of Study 3 was equal to 8.8 in production and 9.1 in comprehension. Furthermore, early

exposure to Venetian was reported by 93% of the participants in this group (additional data about

demographics and language background are presented in Table 1 and Fig. 1). Participants in the

lower proficiency group (n = 72) self-scored proficiency less highly in production (mean = 4.6;

$t(295) = 23.02$, p < .001) and comprehension (mean = 6.7; $t(295) = 14.15$, p < .001), and fewer

of them reported early exposure to Venetian (55%; $\chi^2(1) = 50.29$, p < .001).

  Materials, Procedure, and Analyses. Participants of Study 3 completed two tasks: first, the

Footbridge Dilemma, next the Language Use Questionnaire. The English version of the

Footbridge Dilemma presented in Table 4 was translated into Italian and Venetian. Different

speakers were recruited for the audio-recordings of the dilemma prepared in Italian and

Venetian. The recordings in the two languages were of the same length (in sec.). In all other

respects, materials, procedure, and analyses were as described in Study 2.

Results

  The participants tested in Italian (n = 111) and Venetian (n = 114) were matched for age and

gender, *p*s < .33. A significant effect Language was found in the logistic regression model

performed on participants' responses, b= 0.62, 95% CI [0.05, 1.20]; $\chi^2(1) = 4.65$, *p* = .031; effect

size Cramer's V =.14, resulting from the larger number of utilitarian decisions in Venetian (39%) than Italian (25%; Fig. 3). To investigate if decisions varied with age and gender, as shown in prior studies on moral choices (Arutyunova, Alexandrov, & Hauser, 2016; Baez, Flichtentrei, Prats, Mastandueno, García, Cetkovich, & Ibáñez, 2017; Banerjee, Huebner, & Hauser, 2010; Fumagalli et al., 2010; McNair, Okan, Hadjichristidis, & de Bruin, 2019; Rosen, Brand, & Kalbe, 2016), the predictors Age and Gender were entered separately in the logistic regression model. Neither predictor yielded significant effects, ps > .41, or significantly interacted with Language, ps > .45. The results of Study 3 paralleled the findings with native and foreign languages – in showing that language modulates moral decisions – but also the findings from Study 2 – in revealing that Venetian and foreign languages lead to similar choices.

Study 4: Footbridge Dilemma – A replication

In Study 4, which was designed as a replication of Study 3, the Footbridge Dilemma was tested with a different group of native, proficient bilinguals (Italian-Bergamasque speakers). Although Bergamasque and Venetian descended both from Latin, their distinct historical evolution led to marked differences not only at the lexical level, but also phonologically and morpho-syntactically, to the point that they are largely unintelligible to their speakers (Ferguson, 2007; Sanga, 1997; Tuttle, 1997). To highlight just a couple of these differences, Bergamasque has two additional vowels ([œ] and [y]) whereas Venetian has two additional consonants ([ŋ] and [ɰ]), and in contrast to Venetian, Bergamasque is a non-pro-drop language that has post-verbal negation. However, Bergamasque and Venetian are comparable sociolinguistically – both are oral languages spoken prevalently in domestic and informal settings. These features of Bergamasque provide a further opportunity to investigate the impact of specific typologies of language use on decision making. To recruit more participants than in Study 3, Study 4 was

conducted via web.

Methods

     Participants. An article posted on a local online-newspaper and a local online-magazine informed about the study, addressing readers with a good knowledge of Bergamasque. Exclusion criteria were those detailed in Study 1, which was also conducted via web. Proficient knowledge of Bergamasque was ensured by analyzing the responses of the 861 participants who responded correctly 9/10 times in the Bergamasque language test (see Table 1 and Fig. 1 for demographics and language background). These participants overwhelmingly reported an early exposure to Bergamasque (81%); on average, they rated their Bergamasque proficiency 7.4 in production and 8.8 in comprehension. Participants who responded correctly to fewer than 9/10 questions in the Bergamasque language test (n = 192) chose lower scores for production (mean = 5.3; $t(1050)$ = 10.54, $p < .001$) and comprehension (mean = 7.3; $t(1050)$ = 12.68; $p < .001$), and were less likely to report an early exposure to Bergamasque (50.5%; $\chi^2(1)$=68.20, $p < .001$). [Footnote 5]

     Materials and Procedure. Participants were first presented with the Footbridge Dilemma, then the language test, and lastly the written questionnaire on language use. The introduction at the beginning of the study and the experimental task (including the instructions) were randomly presented in only one language.

     a. *Footbridge Dilemma*. Material for this task was prepared as in Study 3, with the exception that we tested a Bergamasque translation of the Footbridge Dilemma and that different speakers recorded the dilemma in Italian and Bergamasque. The procedure was that of Study 1, where the task was also administered online, and analyses were carried out as in Study 3.

     b. *Bergamasque Language Test*. Participants' knowledge of Bergamasque was assessed using a short 10-item grammaticality test. We examined morpho-syntactic features (e.g., post-

verbal negation) that distinguish Bergamasque from Italian (Poletto, 200; Sanga, 1997).

Participants were presented with minimal pairs, each formed by a sentence and its

ungrammatical counterpart that differed by a single word or minor variation in word order. Each

sentence pair was preceded by an introductory sentence that provided some context. Introductory

sentences and minimal pairs were presented auditorily. Short sentences (2-5 words long) were

presented in each minimal pair in order to facilitate the grammatical judgment of auditory

sentences. In all other respects, the task was prepared and administered according to the

procedure outlined in Study 1. **As in Study 1, we used an objective measure of language**

proficiency in part to assure that the participants tested via web in Study 4 responded with

the required compliance.

    c. *Language Use Questionnaire*. The questionnaire used in Studies 1-3 for Venetian was

adapted to Bergamasque.

Results

    We tested 409 participants in Italian and 452 participants in Bergamasque. The two groups

did not differ for age or gender, ps < .19. The logistic regression model showed a significant

effect of Language, b = -0.86, 95% CI [-1.24,-0.56]; $\chi^2(1) = 28.25$, $p < .001$; effect size Cramer's

V = .18, explained by the larger number of utilitarian decisions in Bergamasque (30%) than

Italian (15%; Fig. 3). The additional inclusion in the model of the predictors Age and Gender

yielded only a significant interaction between Gender and Language, b = 1.03, 95% CI [0.32,

1.77]; OR = 2.82, 95% CI [1.38, 5.87]; $\chi^2(1) = 8.28$, $p < .004$, – for all other results, ps > .25. The

interaction arose because male participants chose the utilitarian option more frequently than

female participants in Italian (10% vs. 19%; b = 0.80, 95% CI [0.22, 1.41]; $\chi^2(1) = 7.45$, $p <$

.007, Cramer's V = .14) but not in Bergamasque (33% vs. 28%; b =-0.24, 95% CI [-0.64, 0.17];

$\chi^2(1) = 1.30$, $p = .25$). Stronger preferences for utilitarian choices were reported for men also in prior studies (Arutyunova et al., 2016; Baez et al., 2017; Fumagalli et al., 2010).

General Discussion

Our results provide an affirmative answer to the first question we set out to investigate – do the differences between the decisions made in natural and foreign languages appear between the languages used by native, proficient bilinguals? Language differences were found with distinct groups of bilinguals (Italian-Venetian and Italian-Bergamasque) in the Asian Disease Problem and the Footbridge Dilemma, the tasks most extensively researched in prior studies on the foreign language effect on decision making (Brouwer, 2019; Chan et al., 2016; Cipolletti et al., 2016; Corey et al., 2017; Costa et al., 2014; Geipel et al., 2015a; Hayakawa & Keysar, 2018; Im Shin & Kim, 2017; Keysar et al., 2012; Oganian et al., 2016; Winskel et al., 2016). Participants overwhelmingly reported (> 80%) that Venetian and Bergamasque were spoken in their native families, and were very familiar with these languages, using them, on average, between 40% and 80% of the time in the household and with friends, the informal contexts where these languages can be spoken. Our results further revealed similarities between decisions made in native languages and Italian, and decisions involving foreign languages and Venetian or Bergamasque. Thus, compared to native languages and Italian, decisions made in foreign languages and Venetian were less susceptible to framing biases, and decisions concerning moral issues were more utilitarian when presented in foreign languages, Venetian, and Bergamasque.

The second question we set out to investigate concerned the emotion experienced when our bilingual participants used each of their languages. This question was motivated by explanations relating the foreign language effect on decision making to reduced emotional responses in foreign languages (Costa et al., 2014; Hayakawa et al., 2016; Keysar et al., 2012). The ratings

provided by native, proficient Italian-Venetian bilinguals showed affective responses of equal intensity in their languages. Our results replicate the findings with fluent foreign language speakers (Caldwell-Harris, 2001; Harris, 2004) and are consistent with the widely shared idea that emotional responses are equally intense in the languages that bilinguals use frequently and proficiently (Caldwell-Harris, 2015; Pavlenko, 2017). The finding that Italian and Venetian elicited similar emotion responses but yielded different decisions is unexpected under explanations attributing the language effects to differences in emotion processing. These explanations would instead anticipate similar decisions in Italian and Venetian. However, the implications of our results for the emotion-based explanation proposed for foreign languages are unclear. On the one hand, they may add to other problematic findings that, defying predictions, did not show any causal relations between emotion and decisions in foreign languages (Chan et al., 2016; Geipel et al., 2015a, b). On the other hand, the effects induced by foreign languages could have a different source from those demonstrated by native, proficient bilinguals. Researchers drew attention to a variety of mechanisms potentially responsible for the distinctiveness of the emotion processing in foreign languages, including late acquisition (Sheikh & Titone, 2015), the lack of proficiency (Eilola & Havelka, 2011), the reduced automaticity of lexical access (Segalowitz, Trofimovich, Gatbonton, & Sokolovskaya, 2008), and frequency of use (Puntoni et al., 2009). These mechanisms could in turn underlie the specific effects of foreign languages on decision processing. Even though our results are viewed as tapping other processes than those at play with the decisions made in foreign languages, they are nevertheless useful in constraining emotion-based explanations. [Footnote 6]

The last question we set out to address related to the specific contexts in which languages are used. Italian, the official and literally codified language, can be used in formal settings,

unlike oral languages like Venetian and Bergamasque that are confined to domestic and informal settings (Ferguson, 2007; Muljačić, 1997). These contextual differences determine what information one is exposed to in each language as well as the prestige of the information, as one language is the vehicle of objective, literal, and broadly shared knowledge. We suggested that these environmental differences affect what decisions are made in a given language, based on evidence that decisions vary as a function of the information available when the decisions take place (Johnson et al., 2007; Weber et al., 2007). We also suggested that the same types of decisions would appear in foreign languages, Venetian and Bergamasque, based on the contextual similarities of these languages. Our findings aligned with these predictions.

The challenge for explanations linking decisions to information availability is to identify what information is critical for the decision at hand. In our case, the issue is to define the information favoring each of the contrasting options in the Footbridge Dilemma or the Asian Disease Problem. As suggested by Geipel et al. (2015a, b), the accessibility of social and moral rules affects the type of moral decisions people face in the Footbridge Dilemma – a greater accessibility makes judgments more likely to conform to moral norms, whereas reduced accessibility promotes more utilitarian judgments. Social and moral rules are typically acquired through native languages and become increasingly associated with episodic and autobiographical memories that are also experienced in the mother tongue. The shift toward utilitarian preferences can thus be explained by the reduced accessibility of social and moral rules in foreign languages. Social and moral rules may also be differently available in Italian and Venetian or Bergamasque. The rules that are acquired in school, discussed in print or through other media, or that relate to religious and public institutions are presented in Italian. The frequency and diversity of media with which social and moral rules are encountered in Italian makes them more salient in this

language, which in turn leads to favoring choices and judgments that are more consonant with shared norms. On the other hand, the reduced availability of social and moral rules in Venetian or Bergamasque would promote more utilitarian choices.

It is worth emphasizing two aspects of the account explaining the different decisions made in Italian **versus**. Venetian or Bergamasque in terms of information available in each language. First, this account does not anticipate that differences would appear between these languages with every type of moral judgment, nor that language differences would invariably be in the same direction. Language differences are in fact expected only when access to the information on which these decisions depend is uneven between languages. Second, this account explains the language differences observed between Italian and Venetian or Bergamasque in terms of reduced availability of information promoting deontological choices. Venetian and Bergamaque do not make their speakers more utilitarian or 'rational' individuals; rather, they bias moral judgments by making some information less available.

Prior research has described the information that once available steers decisions or leads to the systematic biases observed, for example, with the endowment effect (Johnson et al., 2007; Weber et al., 2007). Unfortunately, no studies have investigated the information that in the Asian Disease Problem modulates loss aversion, thus influencing the options favored when the decisions are presented as gains or losses. Although we cannot capitalize on prior research to characterize the information affecting the decisions made in the Asian Disease Problem in different languages, clear predictions about the nature of such information can be derived from the results obtained in foreign languages and Venetian. Foreign languages were found to reduce risk aversion (Keysar et al., 2012; Costa et al., 2014), and Venetian appeared to induce similar effects. Foreign languages and Venetian should then facilitate the retrieval of information that

diminishes risk aversion, so that the responses in the Asian Disease Problem would be equally risky irrespective of the decision frame. Clear predictions hold also for the moral decisions tested in the Footbridge Dilemma. As we argued above, information related to social and moral rules should be more available when decisions are made in native languages or Italian. Jointly, these predictions provide an opportunity (a) to test the explanation rooted on information availability and (b) to determine if such explanation extends to different kinds of decisions.

Conclusions

We went beyond the effects observed in foreign languages, investigating regional languages used in Italy by several millions of people (ISTAT, 2014) and typologically similar to the languages of many more speakers around the world (de Bot, 2019). Our choice was motivated not just by the sheer number of speakers or by the objective of mapping a wider spectrum of languages – we reasoned that Venetian and Bergamasque represent compelling test cases for shedding light on the role of emotion and context of language use in decision making. More generally, however, our investigation underscores the need of understanding if the language effects observed in foreign languages and Venetian or Bergamasque share a common source. Answering this question would further explanations of the language effects in decisions making.

Appendix A
Italian phrases translated from English and tested in Task 1 of Study 1.

Reprimands

Don't do that!	Stai fermo!
Do you want a spanking?	Vuoi prenderle?
Don't be a baby!	Non essere infantile!
Stop that!	Smettila!
Be good!	Comportati bene!

Insults

You are so ugly!	Mi fai schifo!
I'm sick of you!	Mi hai stufato!
I never want to see you again!	Non voglio più vederti!
Get lost!	Stammi lontano!
You idiot!	Sei imbecille!

Endearments

I love you!	Ti voglio bene!
I can't wait to see you!	Non vedo l'ora di vederti!
I miss you!	Mi manchi tanto!
I always think of you!	Ti penso sempre!*
I could eat you up!	Ti mangerei di baci*

* With the exception of the asterisked phrases, the Italian phrases translate English phrases tested in Caldwell-Harris and Ayçiçeği-Dinn (2009), Caldwell-Harris et al. (2011) or Harris (2004).

Appendix B
Word-picture pairs tested in Task 2 of Study 1. English translations of the emotion words presented in Italian (from Zammuner, 1998); pictures are labeled as in the OASIS database (Kurdi et al., 2017).

WORDS				PICTURES		
English	*Italian*	*Valence[a]*	*Proto-Typicality[b]*		*Valence[c]*	*Arousal[d]*
dispare	disperazione	-4.56	3.27	Fire 9	1.47	5.15
anger	rabbia	-3.13	3.47	Angry face 2	3.08	3.53
fear	paura	-3.24	3.65	Scared face 1	3.89	3.20
terror	terrore	-3.98	3.54	Bloody knife 1	1.84	4.54
sadness	tristezza	-3.29	3.37	Wall 2	4.03	1.69
cheerfulness	allegria	4.12	3.17	Dancing 6	5.81	3.69
pleasure	piacere	4.26	3.36	Grass 4	5.23	2.11
love	amore	4.56	3.57	Flowers 6	5.94	3.01
wonder/marvel	meraviglia	3.1	3.15	Snow 2	4.55	2.26
tenderness	tenerezza	3.75	2.97	Dog 6	6.49	5.03

[a] -5 = very unpleasant; 5 = very pleasant (from Zammuner, 1998). [b] Prototypicality indicates to what extent the Italian word refers to an emotion (1 = not an emotion; 4 = certainly an emotion) (from Zammuner, 1998). [c] 1 = very negative; 7 = very positive (from Kurdi et al., 1998). [d] 1 = very low; 7 = very high (from Kurdi et al., 1998).

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Footnotes

1. We did not include taboo words and swearwords, stimuli that were investigated in prior cross-linguistic studies, primarily because of difficulties in finding Italian-Venetian equivalents. Polysemy illustrates one type of difficulty. For example, the Venetian word /mona/ translates as *fool*, *idiot*, but also *cunt*, a multiplicity of meanings not shared by any Italian swearwords.

2. Only 1.5% of the participants included in Study 1-4 (n = 1,689) described themselves as native speakers of a foreign language.

3. In the two studies where results patterned differently (Keysar et al. (2012), Exp. 1a and 1b) participants could have chosen at random when responding in a foreign language – they selected the risky and safe options around 50% of the time in both gain and loss conditions. Keysar et al. (2012) controlled for the possibility of random response choices, unfortunately not with the participants of these two studies.

4. Although repeatedly associated with the Footbridge Dilemma, the replicability of foreign language effects in other moral dilemmas remains unclear. Foreign language effects were not reported in two studies that examined a number of other dilemmas (Hayakawa, Tannenbaum, Costa, Corey, & Keysar, 2017; Muda, Niszczota, Białek, & Conway, 2018). As pointed out in these studies, the lack of a foreign language effect could have resulted from the procedure used (e.g., presenting participants with a large number of dilemma) or from testing dilemmas varying in nature.

5. Italian-Bergamasque bilinguals came from a more urbanized area relative to the Italia-Venetian bilinguals in Study 1-3. This may explain why participants reported using Bergamasque less frequently than Venetian – regional languages are in fact used less commonly in urbanized areas (ISTAT, 2014).

6. A different explanation relates the distancing process to the reduced processing fluency associated with foreign-language use (Costa, Vives, & Corey, 2017; Hayakawa et al., 2017;

Keysar et al., 2012). By reducing processing fluency, foreign languages provide cues promoting deeper reasoning. This explanation was motivated by evidence that lessened perceptual fluency improved analytic reasoning (Alter, Oppenheimer, Epley, & Eyre, 2007). More recent studies, however, have questioned whether perceptual fluency affects analytic reasoning (Meyer et al. 2015; Thompson, Turner, Pennycook, Ball, Brack, Ophir, & Ackerman, 2013). We should also notice that an explanation based on processing fluency is seemingly inconsistent with our results. Because processing fluency is likely comparable between the languages of our proficient bilingual participants, decisions should not have differed between Italian and Venetian or Bergamasque.

Table 1. Demographics and linguistic background – proficient Venetian-Italian and Bergamasque-Italian bilinguals whose responses were analyzed in Study 1-4

	Study 1	Study 2	Study 3	Study 4
Regional Italian Language	Venetian	Venetian	Venetian	Bergamasque
N Participants (% Female)	408 (69%)	195 (45%)	225 (47%)	861 (44%)
Mean Age	30.6	41.5	36.6	45.1
(SD; range)	(12.3; 18-73)	(15.1; 18-67)	(15.4; 18-70)	(14.3; 18-85)
Early Exposure[a]				
Venetian	80%	98%	93%	
Bergamasque				81%
Mean Proficiency Rating[b] (SD)				
Production/Venetian	7.5 (2.3)	9.1 (0.9)	8.8 (1.0)	
Comprehension/Venetian	8.6 (1.5)	9.3 (0.9)	9.1 (1.0)	
Production/Bergamasque				7.4 (2.4)
Comprehension Bergamasque				8.8 (1.3)

[a] Participants who reported regular use of Venetian in their childhood households
[b] Self-scored ratings on a 1-10 point scale (1 = none; 10 = perfect)

Table 2. Mean rating scores (SD) – Task 1 of Study 1

Phrases	Language		Difference
	Italian	Venetian	
Reprimands	3.92 (1.6)	3.82 (1.4)	0.10
Insults	3.82 (1.8)	3.99 (1.8)	-0.17
Endearments	3.96 (1.9)	3.99 (1.7)	-0.03

Table 3. Mean ratings (SD) obtained for each emotion in Task 2 of Study 1

Emotion	Language		Difference
	Italian	Venetian	
Tenderness	5.44 (1.6)	5.75 (1.6)	-0.31
Despair	5.23 (1.7)	5.24 (1.9)	-0.01
Fear	5.12 (2.0)	4.77 (2.0)	0.35
Cheerfulness	4.70 (1.8)	4.78 (1.7)	-0.08
Terror	4.54 (2.0)	4.20 (2.1)	0.34
Wonder/marvel	4.34 (1.8)	3.73 (2.0)	0.61
Pleasure	4.09 (1.9)	4.35 (1.9)	-0.26
Love	3.91 (1.9)	3.99 (1.9)	-0.08
Anger	2.56 (1.8)	2.45 (1.8)	0.11
Sadness	2.21 (1.7)	2.20 (1.7)	0.01
Mean	*4.22 (1.3)*	*4.15 (1.6)*	*0.07*

**Table 4**. English translations of the problems used in Studies 2-4

Asian Disease Problem

Gain Frame
Recently, a dangerous new disease has been going around. Without medicine, 600,000 people will die from it. In order to save these people, two types of medicine are being made. If you choose Medicine A, 200,000 people will be saved. If you choose Medicine B, there is a 33.3% chance that 600,000 people will be saved and a 66.6% chance that no one will be saved. Which medicine do you choose?

Loss Frame
Recently, a dangerous new disease has been going around. Without medicine, 600,000 people will die from it. In order to save these people, two types of medicine are being made. If you choose Medicine A, 400,000 people will die. If you choose Medicine B, there is a 33.3% chance that no one will die and a 66.6% chance that 600,000 people will die. Which medicine do you choose

Footbridge Dilemma
An out-of-control trolley is moving toward five workers who will be killed if the trolley continues on its path. You are standing on a footbridge above the track, halfway between the oncoming trolley and the five workers. Standing beside you on the footbridge is a fat stranger. The only way to save the lives of the five workers is to push the person off the bridge. If the person falls onto the track, his fat body will stop the train. If you push him, this person will die, but the five workers will survive. Would you push this person off the bridge to save the five workers?
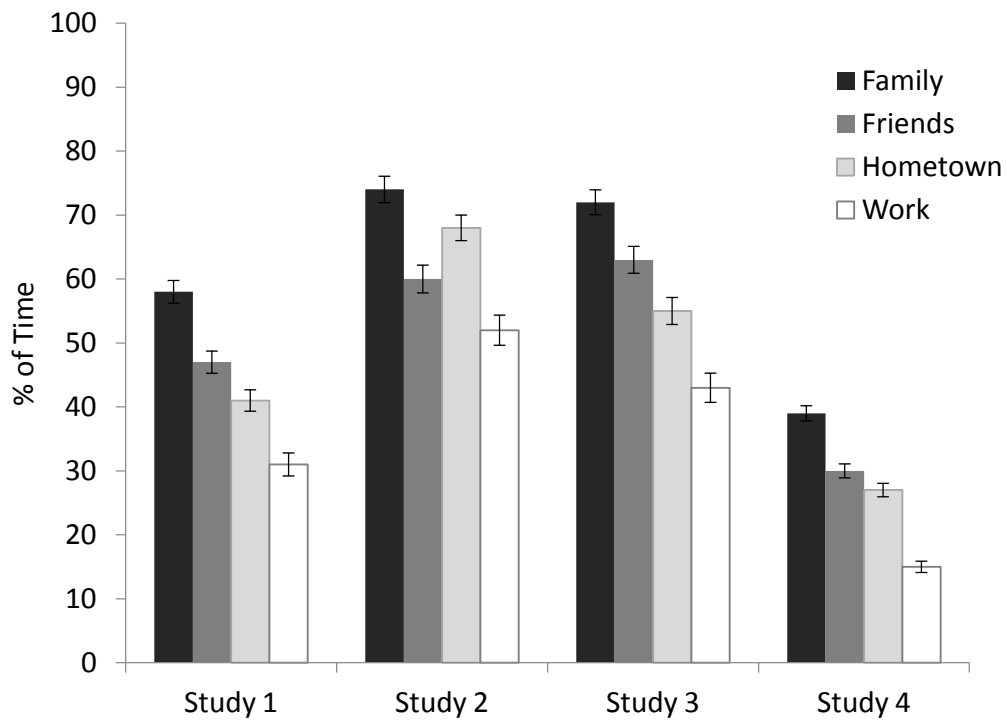
Figure 1. Estimated percentage of time in which participants experience Venetian (Study 1-3) or Bergamasque (Study 4) in different contexts of their current lives (within the family, with friends, in the hometown, at work). Error bars display standard error of the mean. As expected, Venetian and Bergamasque are used less extensively at work, as Italian may be required in this context or colleagues may only speak Italian. The high frequency with which participants reported experiencing Venetian and Bergamasque in their hometowns indicates a deep-rooted familiarity, in the community, with these languages.
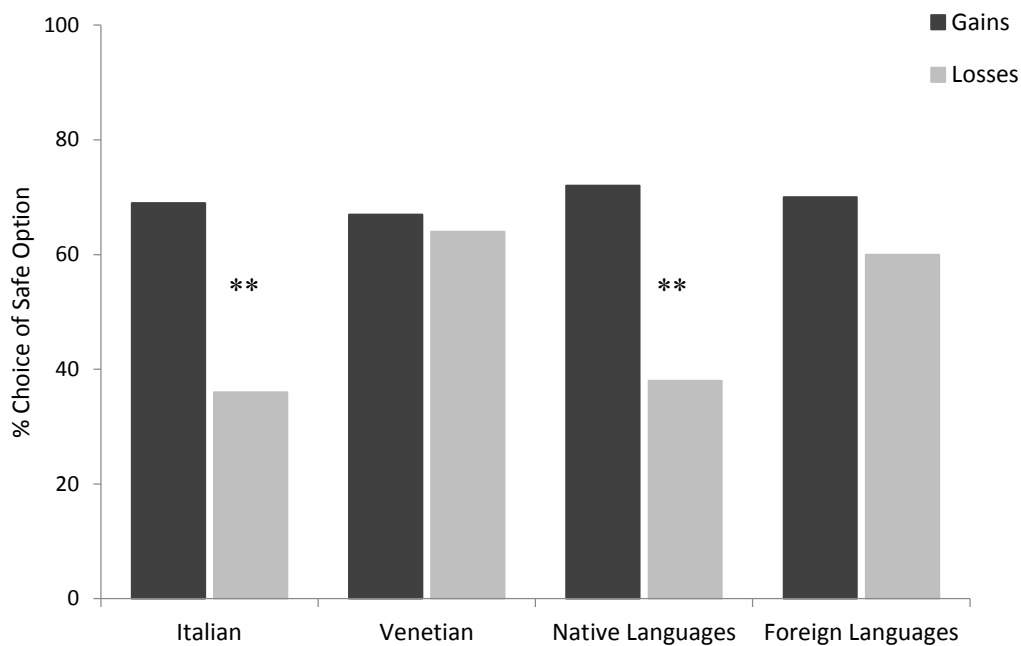
Figure 2. Choices of the safe option (%) in the Asian Disease Problem framed in terms of gains or losses. Asterisks indicate significant differences (p < .001) between gain- and loss-framed trials. In Study 2, the framing effect appeared when the problem was presented in Italian. Previously, the framing effect was found in the Asian Disease Problem when native languages were used (data aggregated from 603 responses included in Keysar et al. (2012; Exp. 1c); Costa et al. (2014; Study 1) and Winskel et al. (2016; Study 1).
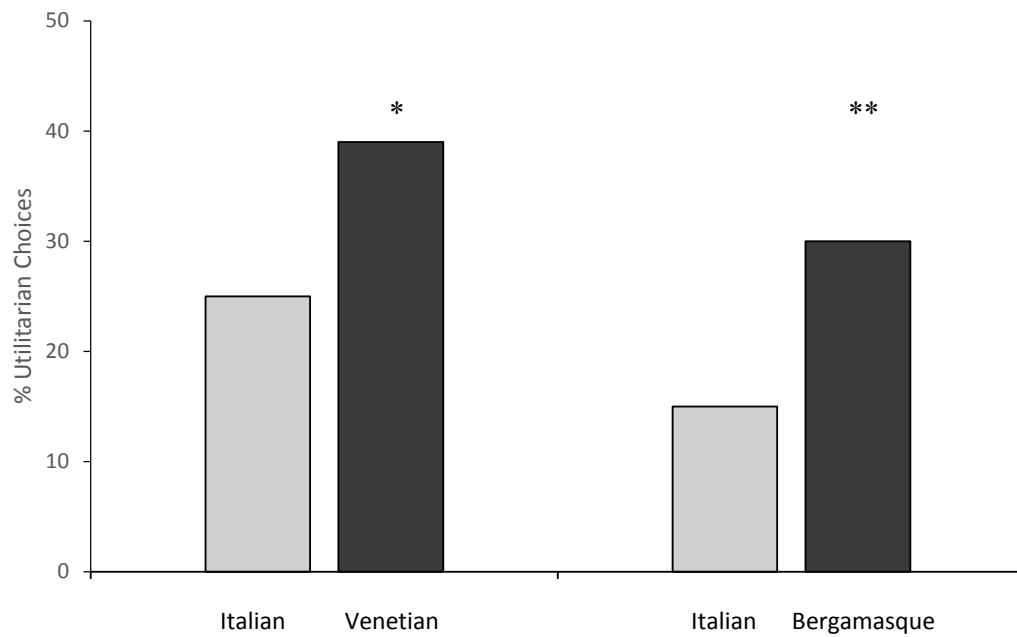
Figure 3. Significantly more utilitarian choices were made, compared to Italian, when the Footbridge Dilemma was presented in Venetian (Study 3) or Bergamasque (Study 4). *p < .05; **p < .001.

Raw data
Click here to download Raw data: Peressotti et al_Row Data.xlsx