Does the Linguistic Expectancy Bias Extend to a Second Language?

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Abstract
The linguistic expectancy bias (LEB) reflects the tendency to describe expectancy-consistent behavior more abstractly than expectancy-inconsistent. The current studies replicate the LEB in Portuguese and examine it in a second language (English). Earlier studies found differences in processing a first (L1) and a second language (L2), shaping affective and cognitive processes. We did not expect these differences to shape the LEB because controlled lexical decisions (e.g., use of verbs, adjectives) are unlikely, even when using L2. Participants wrote stereotypically male or female behavioral descriptions for male and female targets. A new group of participants read those descriptions and was asked about their causes. Expectancy-consistent behavior was described more abstractly and shaped more dispositional inferences in L1 and L2. Aside from replicating the LEB in a different language, these studies indicate that structural features of language preserve a linguistic bias with implications for social perception even when using a second language.

Keywords
linguistic expectancy bias, second language, language use, language abstraction, interpersonal communication, social attribution

Language is a powerful social tool that is a vehicle to pass on a message and an instrument to shape the message. Indeed, this makes the communicative process susceptible to subtle linguistic biases, such as those involved in transmitting and maintaining stereotypes (e.g., Maass et al., 1989; Wigboldus et al., 2000).

It has long been established that the language one uses to describe ingroup and outgroup behavior varies - the *Linguistic Intergroup Bias* (LIB; Maass et al., 1989). People use abstract terms (e.g., adjectives, nouns) to describe ingroup members' desirable behavior

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and outgroup members' undesirable behavior (e.g., the ingroup member is *helpful*; the outgroup member is *aggressive*). In contrast, an ingroup member showing undesirable behavior and an outgroup member engaged in desirable behavior are both described with concrete terms (e.g., the ingroup member *pushes* someone; the outgroup member *opens the door* to someone).

Concrete or abstract linguistic representations of behavior convey different types of information. While more abstract descriptions lead to generalizations across situations about the targets of such messages, concrete messages refer to the here and now of a behavior and suggest that the behavior in question is situated. This systematic difference in abstraction has been consistently replicated across different languages such as Italian (e.g., Maass et al., 1989), Dutch (e.g., Werkman et al., 1999), Japanese (e.g., Tanabe & Oka, 2001), or French (e.g., Assilaméhou & Testé, 2013), and successfully applied to the study of stereotypes and intergroup relations (e.g., Gorham, 2006; Maass, 1999; Maass et al., 1996, 1998; Maass & Arcuri, 1996; Rubini & Semin, 1994).

The LIB was initially explained based on ingroup protective motives (Tajfel & Turner, 1979): when the ingroup is threatened, the LIB is used to maintain a positive image even in the presence of contrary evidence (Maass et al., 1996; Maass & Arcuri, 1996). Subsequently, a more recent interpretation suggested that the LIB relies on representing typical and stable knowledge in more abstract terms: expectancy-consistent behavior is described with more abstract predicates than expectancy-inconsistent behavior regardless of valence (e.g., Maass et al., 1995). However, it has also been argued that the informational distinction between expected and unexpected behaviors can be socially motivated as well (e.g., Fiedler et al., 2003).

Research on the LIB shows that the use of language contributes in a subtle but powerful way to the representation of stereotypes, that is, to positive perceptions of ingroup members

and negative perceptions of outgroup members by receivers of these messages. However, Wigboldus et al. (2000) have a broader take on this by providing additional support that expectancy-consistent behavior is described at a higher level of abstraction than expectancy-inconsistent behavior, regardless of the target group membership – the *Linguistic Expectancy Bias* (LEB). Moreover, by communicating expectancy-consistent behavior more abstractly, a sender should lead receivers to infer that the behavior in question is due to the target's character (i.e., dispositional inferences). In contrast, more concrete descriptions (made for expectancy-inconsistent behavior) are likely to lead receivers to infer that the target's behavior is driven by situational constraints (i.e., situational inferences). These predictions were experimentally examined by Wigboldus et al. (2000). Participants were asked to describe events in which a female or male friend revealed stereotypical male and stereotypical female behavior. These descriptions were then randomly distributed to the participants, who were asked about the causes of the behavior described. To determine the level of linguistic abstraction in the behavioral descriptions, the authors used the Linguistic Category Model (LCM, Semin & Fiedler, 1988), a powerful tool to analyze how people use interpersonal terms when representing social events in communication (Semin, 2012) and, therefore, a useful model for research on stereotype communication (Maass et al., 1989). This model distinguishes between four types of predicates (from concrete to abstract): Descriptive action verbs (DAV) represent the most concrete representation whereby the verb unequivocally corresponds to the behavior in question (e.g., John *hits* Mary); Interpretive action verbs (IAV) provide a framework for the behavior that can subsume different functions as a function of context (e.g., John *hurts* Mary); State verbs (SV) correspond to the description of the state of the target with no verifiable behavior (e.g., John *hates* Mary); and Adjectives (ADJ) describe dispositional properties of a target (e.g., John is *aggressive*).

Wigboldus and colleagues' (2000) results confirmed that expectancy-consistent behavior is communicated with more abstract predicates than expectancy-inconsistent behavior. Critically, more abstract descriptions subsequently led to stronger dispositional inferences than the less abstract ones produced for expectancy-inconsistent behavior, thereby endorsing stereotypical beliefs (Wigboldus & Douglas, 2007). The LEB was further replicated in German (Fiedler et al., 2003) and Dutch (Wigboldus et al., 2006) while uncovering important moderators such as interpersonal communication goals but also establishing the validity of the LEB effect at an individual level.

However, and to our knowledge, the LEB has always been examined in participants using their native language (L1). There is no evidence of whether this effect can be observed with participants using a second language (L2).

Due to professional, educational, and social demands, mastering a second language is critical nowadays. However, several studies have shown that communicating in L1 or L2 shapes affective and cognitive processes differently. For example, speakers' perceptions of language emotionality are higher in L1 than in L2 (e.g., Dewaele, 2004, 2008; Dewaele & Nakano, 2013; Garrido & Prada, 2021; see Caldwell-Harris, 2015; Pavlenko, 2012, for reviews). Other research examining the psychophysiological markers of somatic and autonomic activity has also shown that emotional words produce higher physiological arousal when presented in L1 (see Harris, 2004). Memory performance for emotional words (e.g., Anooshian & Hertel, 1994; Marmolejo et al., 2009) or words encoded in emotional scenarios (e.g., Saraiva et al., 2021) presented in L1 is also higher than in L2. A different line of studies also showed that using a second language reduces decision-making bias and fosters more utilitarian decisions in moral dilemmas (e.g., Costa et al., 2014; Hayakawa et al., 2017), suggesting that in L2, decision-making is more deliberate and less intuitive than in L1 (see Costa et al., 2017; Hayakawa et al., 2016, for reviews). These differences were further

documented in studies showing that, in contrast to L1, information processing in L2 recruits more brain areas related to control processes (Branzi et al., 2016).

One of the most prominent accounts for the observed differences in processing a first and a second language suggests that L2 engages emotions less than L1 does. These differences arguably result from L1 being acquired and used in an emotionally rich context (e.g., family, friends), whereas L2 is often learned and used in more emotionally detached contexts (e.g., school, work; Keysar et al., 2012). The reduced emotional processing engaged in L2 could reduce the impact of affective states on people's decisions and enhance deliberative processing (Costa et al., 2017; Hayakawa et al., 2016), namely allowing people to exert higher control on their linguistic choices in L2. Using L2 is also likely to enhance psychological distance (Costa et al., 2017; Hayakawa et al., 2016), leading to a more abstract construal level (e.g., Trope & Liberman, 2010) and a more objective perspective of the situation. Finally, the increased difficulty in processing a more disfluent language may also signal the need for more careful processing (Costa et al., 2017; Hayakawa et al., 2016) and trigger more deliberative thinking (e.g., Oppenheimer, 2008).

The literature has already shown how language and its systematic biases can shape social communication and influence social perception (e.g., Maass et al., 1989; Semin, 2000; Wigboldus et al., 2000). There are also a few studies indicating that in bilinguals, the native language enhances cultural biases, namely, more favorable implicit attitudes towards the social group associated with the language of the test (Danziger & Ward, 2010; Ellis et al., 2015, 2018; Ogunnaike et al., 2010). However, research on how processing differences in L1 and L2 might contribute to the communication of stereotypes has not yet been reported.

The first goal of the current work is to examine the LEB in Portuguese (Study 1), one of the most spoken languages in the world, with more than 200 million native speakers

(Lewis, 2009). This replication will further ascertain the LEB as a reliable phenomenon. The second and main goal of this work is to examine the LEB in a second language (Study 2).

In the face of earlier work suggesting the reduced emotionality, an increased construal level, or perceived disfluency in a second language, the LEB might not be observed in L2. An alternative prediction emerges from the 'Architecture of Linguistic Behavior' (Semin, 2006), which distinguished four different levels of language use. At the utterance or surface level, thematic or topical choices are driven consciously by explicit goals and their situated relevancies (Sperber & Wilson, 1995). This surface level of language use is scaffolded by the lower layers of language use, namely phonemes, as constituents at the primary level of organization, with morphemes at the second and phrase structure at the third level. These three levels escape conscious access. The proposed automaticity of lexical decisions finds empirical support in the recurrent finding that people use a biased selection of predicates (verbs and adjectives) even when explicitly instructed not to do so (e.g., Douglas & Sutton, 2006). This suggests that controlled lexical decisions are highly unlikely, even when using a second language. Highly automated lexical decisions about the use of verbs and adjectives are likely to be driven by first language habits. Since the function they fulfill is identical across Portuguese and English, the LEB should also be observed in L2.

To test our predictions, we conceptually replicated Wigboldus et al.'s (2000) in L1 (Studies 1) or L2 (Studies 2). We expected to observe the LEB in L1 (i.e., European Portuguese) and determine whether this linguistic bias extends to a second language (i.e., English).

Studies 1a & 1b

In Study 1a, participants were asked to describe stereotypically (desirable or undesirable) male and female behaviors for a female or a male target. We expected that behavior

consistent with the target stereotype (e.g., male target performing a stereotypically male behavior) would be communicated with a higher level of abstraction than behavior inconsistent with the target stereotype (e.g., male target performing a stereotypically female behavior) - LEB replication (Hypothesis 1). In Study 1b, a new group of participants received a sample of the descriptions of the target generated in the first study. They had to use these descriptions to make inferences about the targets. We expected that expectancy-consistent behavioral descriptions (more abstract) would lead to more dispositional inferences compared to expectancy-inconsistent (more concrete) ones (Hypothesis 2).

Method

Participants. In the original study that we were replicating, the sample included 33 participants. Since the main purpose of Study 1a was to obtain descriptions for the second study, we approximated the original sample size (N = 35). However, six participants did not comply with the instruction and were excluded from the data analysis. The final sample consisted of 29 Portuguese native-speakers (M_{age} = 29.62; *SD* = 8.72; 18F).

Given the changes introduced in the original procedure, namely running two separate studies instead of using a within-participants design, we calculated a new sample size for Study 1b with an a *priori* power analysis (G*Power). Using as reference a medium effect size (η_p^2 = .06, Cohen, 1988) and a power 1-β = 0.80 to detect the interaction between target gender (female vs. male) and behavior stereotypicality (female vs. male), a sample of 126 participants was determined. A total of 125 Portuguese native-speakers volunteered for the study (96F; M_{age} = 28.82; *SD* = 9.35).

Design. The overall design of the two studies was similar to the original study: a 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) mixed

design. The variables of behavior desirability and behavior stereotypicality were manipulated within participants. In Study 1a, the dependent variable was the linguistic abstraction level calculated using the LCM (Semin & Fiedler, 1989). In Study 1b, the standardized mean of four dispositional inference questions was the dependent variable.

Procedure. All procedures were conducted following the ethical guidelines of the host institution. The studies were programmed in the Qualtrics online platform, and participants were invited to participate through social network websites. The procedure was similar to that of the original study with two exceptions: data were collected online, and the participants in Study 1a were different from those participating in Study 1b. In both studies, after reading the informed consent and agreeing to participate, participants provided sociodemographic information (i.e., native language, age, and gender).

In Study 1a, participants were asked to think of a good male or female friend (target manipulation, random order) and provide background information about this friend (e.g., when they first met him/her) to ensure they were actually thinking about someone. Then, they were asked to write down four short behavioral descriptions about their friend that they had witnessed. These descriptions were asked to be of a desirable stereotypically male behavior, a desirable stereotypically female behavior, an undesirable stereotypically male behavior, and an undesirable stereotypically female behavior. The order of the descriptions was random between participants. After writing the fourth description, participants were thanked and debriefed.

Study 1b presented 16 descriptions (eight for each target gender), selected from Study 1a, based on their different degrees of linguistic abstraction. We selected eight descriptors with low to mid abstraction (coded as 1 and 2) and eight with mid to high abstraction (coded 3 and 4); see Data Analysis in Study 1a for further details on the coding. For stimuli

generalizability purposes, each set of eight descriptions for each target gender were divided into two equivalent blocks of four: desirable stereotypically male (e.g., X loves sports - SV), undesirable stereotypically male (e.g., X made a sex joke at the party - IAV), desirable stereotypically female (e.g., X was always very kind to a friends' children - ADJ), and undesirable stereotypically female (e.g., X began to cry for no reason - DAV). Each participant was presented with a random block of four behavioral descriptions of a male or a female target. Within each block, the descriptions were randomly presented, one at a time. After reading each description, two sets of questions were presented, as in the original study. The first set accessed participants' dispositional inferences: a) estimate the likelihood of the target repeating the described behavior in the future (indicate a percentage); estimate the extent to which b) the behavior described was due to the situation in which the target was (situation attribution) or c) to his/her personality (person attribution), on a scale from 1 (*not at all*) to 7 (*very much*); d) the behavior described was *due to the situation* (1) or *due to the personality* (100). These questions were presented in random order. The second set of four questions constituted a manipulation check. Participants were asked to indicate for each description, on a scale from 1 (*not at all*) to 7 (*very much*), to what extent they considered the behavior described as desirable, undesirable, stereotypically male, and stereotypically female. These questions were also presented randomly. After reading the four descriptions and answering the two sets of questions for each one, participants were thanked and debriefed.

Results[1]

Study 1a

Data analysis. The descriptions generated were categorized according to the LCM (Semin & Fiedler, 1989) by four independent raters, two of them blind to the goals of the study, and all of them blind to the experimental conditions. All verbs and adjectives of each description

were identified, and the scoring established by the model was applied. Descriptive-action verbs (corresponding to 1 point; representing the most concrete level of description), interpretative action verbs (2 points), state verbs (3 points), and adjectives (4 points; representing the most abstract level of description) were counted. A general abstraction score (between 1 and 4) was obtained by dividing the total score for all predicates by the total number of predicates. Inter-rater agreement was 91%, and disagreements between raters were resolved jointly by two of the raters. In Study 1b, the answers to the question "situation attribution" were reversed, and the standardized average of the four dispositional inference questions for each description was calculated. Higher values on this scale mean more dispositional inferences.

Level of abstraction. First we calculated the level of abstraction of the descriptions obtained in Study 1a (see Table 1). A 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) ANOVA revealed the expected significant interaction between target gender and behavior stereotypicality, $F(1, 25) = 8.92$, $p = .006$, $\eta p^2 = .263$, 90% CI [.05, .45].

Insert Table 1 about here

Planed comparisons indicated that the behavior of male targets was described more abstractly when stereotypically male ($M = 2.60$, $SE = .25$) than stereotypically female ($M = 1.85$, $SE = .20$), $F(1, 25) = 12.82$, $p = .001$, $\eta p^2 = .339$, 90% CI [.10, .52]. The level of abstraction of female targets behavior, was higher when this behavior was stereotypically female ($M = 2.24$, $SD = .21$) than stereotypically male ($M = 2.07$, $SD = .27$) but this

difference was not significant, $F(1,25) = .528$, $p = .474$. Notably, replicating the original study, stereotype-consistent descriptions ($M = 2.43$, $SE = .17$) were communicated more abstractly than stereotype-inconsistent descriptions ($M = 1.96$, $SE = .14$), $t(28) = 3.01$, $p = .005$, $d = .55$, 90% CI [.22, .87].

A three-way interaction between participant gender, target gender and behavior desirability was also observed, $F(1, 25) = 5.51$, $p = .027$, $\eta p^2 = .181$, 90% CI [.01, .38]. Planed comparisons revealed that the level of abstraction was higher when female participants described female undesirable behavior than desirable behavior, $F(1,25) = 4.81$, $p = .038$, $\eta p^2 = .161$, 90% CI [.01, .36]. The remaining differences were not statistically significant (all p's > .100).

Study 1b

Dispositional inferences. To confirm the effectiveness of stereotypicality and desirability of the targets' behavior manipulation, a separate ANOVA 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) was conducted for each of the four manipulations. As expected, stereotypically male behavioral descriptions were considered more typically male ($M = 3.68$, $SE = .24$) than typically female ($M = 2.88$, $SE = .17$), $F(1, 121) = 12.19$, $p < .001$, $\eta p^2 = .092$, 90% CI [.03, .18]. Likewise, stereotypically female behavioral descriptions were considered more typically female ($M = 4.30$, $SE = .23$) than typically male ($M = 2.60$, $SE = .17$), $F(1, 121) = 58.25$, $p < .001$, $\eta p^2 = .325$, 90% CI [.21, .42]. Desirable behavioral descriptions were considered significantly more desirable ($M = 5.47$, $SE = .15$) than undesirable ($M = 2.76$, $SE = .16$), $F(1, 121) = 142.33$, $p < .001$, $\eta p^2 = .540$, 90% CI [.44, .61], and undesirable behavioral descriptions were considered more undesirable ($M = 4.45$, $SE = .17$) than desirable ($M = 2.50$, $SE = .16$), $F(1, 121) = 62.58$, $p <$

.001, ηp^2 = .341, 90% CI [.23, .44]. These results indicated that the manipulation had worked as intended.

To analyze the inferences made, we conducted another 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) ANOVA with the dispositional inferences scale as dependent variable (α = 0.68). This analysis showed the expected target gender and behavior stereotypicality interaction, $F(1, 121) = 12.88$, $p < .001$, $\eta p^2 = .096$, 90% CI [.03, .18].

Planed comparisons revealed that behavior of female targets led to more dispositional inferences when the behavior was stereotypically female (M = .15, SE = .11) than stereotypically male (M = -.15, SE = .09), $F(1,121) = 8.16$, p = .005, ηp^2 = .063, 90% CI [.01, .14]. Likewise, behavior of male targets led to more dispositional inferences when stereotypically male (M = .06, SE = .05) than stereotypically female (M = -.08, SE = .07), $F(1, 121) = 4.92$, p = .028, ηp^2 = .039, 90% CI [.00, .11]. No other significant main or interaction effects were observed.

Taken together, these results confirmed that when the described behavior is stereotypically consistent with the target gender, the causes of such behavior are more likely to be attributed to the targets' personality (M = .11, SE = .08) than when the behavior is stereotypically-inconsistent (M = -.12, SE = .08).

Studies 2a & 2b

In Study 1, the LEB was replicated. Expectancy-consistent behaviors were described more abstractly, and these more abstract descriptions prompted more dispositional inferences. In Study 2, we examined whether this linguistic bias would generalize to L2. To this end, native Portuguese speakers performed the same tasks as in Studies 1 but in English. If first language

habits that drive highly automated lexical decisions about verb and adjective use are identical across a native and a second language, then the LEB effect should be observed in L2. We would expect that stereotype-consistent behavior would be described more abstractly and that this higher abstraction would lead to more dispositional inferences. If, however, the described differences in cognitive and affective processes involved in L1 and 2 were to affect language use and the type of inferences made, we would not expect a LEB generalization to L2.

Participants. Like in Study 1a, 35 participants were required for Study 2a. Because data collection was set to stop at the end of a sampling day, the sample was somewhat larger (N = 43, 28F, M_{age} = 24.72; *SD* = 6.94). All participants were Portuguese native-speakers and were proficient in English[2] ($M_{EnglishTest}$ = 20.51; *SD* = 2.46).

For Study 2b, a sample of 76 participants was determined by an a *priori* power analysis (G * Power), using as reference the effect size observed in Study 1b (η_p^2 = .096) and a power 1-β = 0.80 to detect the interaction between target gender (female vs. male) and behavior stereotypicality (female vs. male). Because data collection was set to stop at the end of the day the required number of participants was reached, the final sample was larger than predetermined (N = 91; 65F; M_{age} = 27.38; *SD* = 8.87). All participants were Portuguese native-speakers and proficient in English ($M_{EnglishTest}$ = 20.00; *SD* = 2.37).

Design and Procedure. The design and procedure were the same as in Study 1[3]. The only difference was that participants performed the tasks in their L2 (English) and were asked to complete an English diagnostic test (*Cambridge English assessment*) at the beginning of each study.

Results

Study 2a

Level of abstraction. First we calculated the level of abstraction of the descriptions obtained (see Table 2). A 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) ANOVA revealed, a significant interaction between target gender and behavior stereotypicality, $F(1,39) = 6.20$, $p = .017$, $\eta p^2 = .137$, 90% CI [.01, .30].

Insert Table 2 about here

Planned comparisons indicated that behavior of female targets was described more abstractly when stereotypically female ($M = 2.33$, $SE = .14$) than stereotypically male ($M = 1.97$, $SE = .15$). Likewise, behavior of male targets was described more abstractly when stereotypically male ($M = 2.55$, $SE = .19$) than stereotypically female ($M = 2.10$, $SE = .19$). However, these differences did not reach statistical significance, $F(1, 39) = 3.27$, $p = .078$ and $F(1, 39) = 3.08$, $p = .087$, respectively. Nevertheless, as in Study 1, stereotype-consistent descriptions ($M = 2.46$, $SE = .17$) were communicated more abstractly than stereotype-inconsistent ones ($M = 2.00$, $SE = .17$), $t(42) = 3.15$, $p = .003$, $d = .48$, 90% CI [.21, .74].

To further examine the role of L2 proficiency (e.g., Costa et al., 2017; Pavlenko, 2012) in the abstraction level of the described behavior, we conducted a regression analysis, using the English test score as an independent variable and the mean abstraction level as the dependent variable. The results were not significant, $\beta = -.005$, $p = .975$, suggesting that L2 proficiency did not affect the abstraction level of the descriptions.

Study 2b

Dispositional inferences. To confirm the effectiveness of the manipulation of the stereotypicality and desirability of the targets' behavior, an ANOVA 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) was conducted for each of the four manipulations. The results revealed that stereotypically male behavioral descriptions were considered more typically male (M = 3.90, SE = .20) than typically female (M = 3.06, SE = .14), $F(1, 87) = 20.50$, $p < .001$, $\eta p^2 = .191$, 90% CI [.08, .35]. Likewise, stereotypically female descriptions were considered more typically female (M = 4.15, SE = .19) than typically male (M = 2.94, SD = .16), $F(1, 87) = 29.58$, $p < .001$, $\eta p^2 = .254$, 90% CI [.13, .37]. The desirable descriptions were considered significantly more desirable (M = 5.32, SD = .17) than undesirable (M = 2.61, SD = .16), $F(1, 87) = 120.58$, $p < .001$, $\eta p^2 = .581$, 90% CI [.47, .66], and the undesirable descriptions were considered more undesirable (M = 4.75, SD = .17) than desirable (M = 2.12, SD = .15), $F(1, 87) = 107.17$, $p < .001$, $\eta p^2 = .552$, 90% CI [.43, .63]. These results confirm the effectiveness of the manipulations.

To analyze the inferences made by the participants we conducted the same 2 (participant gender: male vs. female) × 2 (target gender: male vs. female) × 2 (behavior desirability: desirable vs. undesirable) × 2 (behavior stereotypicality: male vs. female) mixed ANOVA having the dispositional inferences scale as dependent variable (α = 0.59). The interaction effect between target gender and behavior stereotypicality was significant, $F(1, 87) = 31.90$, $p < .001$, $\eta p^2 = .268$, 90% CI [.14, .38]. Planned comparisons further showed that when the behavioral descriptions of male targets were stereotypically male, more dispositional inferences were made (M = .31, SE = .07) than when the descriptions were stereotypically female (M = -.10, SE = .08), $F(1, 87) = 21.98$, $p < .001$, $\eta p^2 = .202$, 90% CI [.09, .32]. Likewise, the behaviors of female targets led to more dispositional inferences when the described behavior was stereotypically female (M = .06, SE = .09) than stereotypically

male (M = -.30, SE = .08), $F(1, 87) = 11.86$, $p = .001$, $\eta p^2 = .120$, 90% CI [.03, .23]. These results replicate the LEB, suggesting that when the described behavior is stereotypically-consistent with the target gender, the causes of such behavior are more likely to be attributed to the target's personality (M = .18, SE = .08) than when the behavior is stereotypically-inconsistent (M = -.20, SE = .08), even when L2 is used.

A significant main effect of target gender was also observed, $F(1, 87) = 6.51$, $p = .012$, $\eta p^2 = .070$, 90% CI [.01, .17], revealing more inferential dispositions for behavioral descriptions of male (M = .10, SE = .06) than female targets (M = -.12, SE = .07).

To further examine the role of L2 proficiency in the dispositional inferences made by participants, we conducted two regression analyses, using the English test score as an independent variable and the mean of dispositional inferences scores for stereotypically-consistent and stereotypically-inconsistent behaviors as the dependent variables. The results were significant for stereotypically-consistent behaviors, $R^2_{adj} = .06$, $\beta = .257$, $p = .014$. This analysis suggests that as L2 proficiency increases, more dispositional inferences for stereotypically-consistent behaviors were made. The effect of L2 proficiency on the dispositional inferences made for stereotypically-inconsistent behaviors was not significant, $R^2_{adj} = -.006$, $\beta = .071$, $p = .506$.

Discussion

Linguistic biases are known to influence social perception (e.g., Maass et al., 1989; Wigboldus et al., 2000). These biases have been systematically observed in a first language, but little is known about their emergence and consequences in a second language.

Communicating in a second language is increasingly relevant. However, information processing in L1 and L2 seems to be different. The present study explored whether these differences extend to social perception, namely to the consequences of linguistically biased

information in the communication and maintenance of social stereotypes. While previous studies suggest that in L2, people engage in more deliberate processes reducing biases in moral judgments and decisions (e.g., Costa et al., 2017; Hayakawa et al., 2017), we argued that the structural properties of language should perpetuate the LEB, even in a second language. Specifically, while at the utterance level, language is accessed consciously, at the lexical level, the different layers of language are highly habitualized and automatic (Semin, 2006). These highly automated lexical decisions about the use of verbs and adjectives are driven by first language habits.

To examine our predictions, we conceptually replicated the work by Wigboldus and colleagues (2000) in a previously unexamined L1 (Portuguese, Studies 1 a-b) and, for the first time, in L2 (English, Studies 2 a-b). The results from the two studies revealed that both in L1 and L2, expectancy-consistent behavior was communicated more abstractly than expectancy-inconsistent one (although not always significant for both female and male targets).

In both studies, we also examined whether the differences in linguistic abstraction resulting from the consistency between the expectation about the target and its behavior influenced the types of inferences made by the participants. The results were clear in showing that a higher level of linguistic abstraction involved in describing expectancy-consistent behavior led to stronger dispositional inferences than descriptions of expectancy-inconsistent behavior. Moreover, these results were observed in both L1 and L2, suggesting that linguistic variations associated with the abstraction level play an important role in transmitting and maintaining stereotypes even when using a second language.

Study 1 constitutes an important replication of the LEB in a different language and a different culture. Replication studies endorse the veracity of previous results and findings and examine whether or not the results are generalizable to other domains and contexts (Diener & Biswas-Diener, 2019; Godinho et al., 2019; Godinho & Garrido, 2016; Ijzerman et al., 2013;

Pashler & Wagenmakers, 2012). Therefore, the observation of the LEB with European-Portuguese native speakers further confirms the robustness of this linguistic bias.

The findings in Study 2, where the LEB was observed in a second language, are particularly relevant considering previously reported processing differences between L1 and L2, and particularly the benefits of using L2 in reducing biases in several contexts (Costa et al., 2017; Favreau & Segalowitz, 1983; Hayakawa et al., 2017; Keysar et al., 2012). These studies suggest that L2 prompts more deliberate processes, with the potential to reduce the emergence of the LEB. The results of Study 2 suggest, however, that L2 is not immune to linguistic bias and provide convergent evidence that while the situated meaning of utterances may be monitored, the choice of words (predicates) may escape intentional monitoring (Semin, 2006). In other words, possibly due to lexical automaticity, communicating in L2 does not seem to be an impeding or attenuating factor in the communication of stereotypes through language bias or in the type of inferences that this biased communication induces. Finally, the LEB was observed in L2 independent of L2 proficiency. Likewise, although more dispositional inferences were observed in proficient bilinguals of L2, the pattern of inferences made as a function of linguistic abstraction converged across the two languages. While the literature points out the role of L2 proficiency on observed differences between L1 and L2 (e.g., Eilola et al., 2007; Ferré et al., 2010), these differences did not seem to emerge, at least when automated lexical decisions are involved.

A possible limitation of the current studies is that in Studies 1a and 2a, the LEB was only observed for overall stereotypically consistent and inconsistent behavior (and not always significant for both female and male targets). Moreover, for convenience purposes derived from the online data collection procedure, in Studies 1b & 2b, we used a selected sample of behavioral descriptions obtained in Studies 1a & 2a (instead of using all the produced descriptions). While this procedure might have boosted the magnitude of the LEB observed

in Studies 1b & 2b, it does not undermine the fact that more abstract descriptions lead to more dispositional inferences. Nevertheless, future studies should directly replicate the original paradigm in a second language retaining all the behavioral descriptions obtained in Study 1a & 2a as input for the inferential tasks required in Study 1b & 2b. A single study (using the same participants) with two tasks, as used in the original study, would also constitute an interesting contribution.

To the best of our knowledge, this study represents the first demonstration of the LEB in Portuguese. Importantly, this study also represents the first attempt to extend the LEB to a second language. Taken together, these two contributions reinforce the robustness of previous results and the generalizability of the LEB, and the fact that biases in predicate use seem to escape conscious monitoring. Nevertheless, the present study does not exhaust the study of the differences between communicating in L1 and L2 in the context of social perception, which require further research with different paradigms, different languages, and the examination of moderators and boundary conditions.

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Notes

1. The raw data and the syntax used in the reported analyses are available at OSF (https://osf.io/ga5ef/?view_only=d5c0b1076bfe4de5baeea294c1208161)
2. Before starting the task, participants completed a diagnostic test of their English level (*Cambridge English assessment*) with 25 multiple-choice questions. To participate in the study, their score should be equal to or greater than 16 points (out of 25), which corresponds to the Cambridge English's Preliminary level (PET), commonly known as B1 level. According to the Cambridge School, participants with this level of English proficiency have practical language skills for everyday use. For participants who did not obtain this score, the study ended after the completion of the English test. The tests available on the website change from time to time. Similar tests can be found at https://www.cambridgeenglish.org/test-your-english/
3. Overall, the observed mean scores across the two languages were not significantly different (p = .813) and seem to overlap across different linguistic categories in L1 and L2 (DAV: p = .186; IAV: p = .936; ADJ: p = .915; the only exception being SV that were significantly higher in L2 than in L1, p = .035).

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Table 1. Mean Level of Abstraction as a Function of Target Gender and Behavior Stereotypicality (L1)

	Behavior Stereotypicality			
Target Gender	Stereotypically male		Stereotypically female	
	M	*SE*	*M*	*SE*
Male	2.60	.25	1.85	.20
Female	2.07	.27	2.24	.21

Table 2. Mean Level of Abstraction as a Function of Target Gender and Behavior Stereotypicality (L2)

	Behavior Stereotypicality			
Target Gender	Stereotypically male		Stereotypically female	
	M	*SE*	*M*	*SE*
Male	2.55	.19	1.97	.15
Female	2.10	.19	2.33	.14

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