



Frequency effects of L2 English on the processing of the passive in L1 Brazilian Portuguese

Efeitos de frequência da L2 inglês no processamento da passiva em L2 português brasileiro

Mara Passos Guimarães

Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Minas Gerais / Brasil
maraguimaraes@ufmg.br

<http://orcid.org/0000-0003-0251-3013>

Abstract: This study investigated the influence of experience with L2 English in the processing of passives in L1 Brazilian Portuguese (BP) by high-proficiency bilinguals and BP monolinguals. Based on the premise that high L2 proficiency is indicative of widespread representational sharing (BERNOLET; HARTSUIKER; PICKERING, 2013) and on the observation that the passive is significantly more productive in English than in BP (GUIMARÃES; SOUZA, 2016), bilinguals' processing of the construction is expected to be facilitated by L2 exposure. Subjects performed an acceptability judgment task and two sentence elicitation tasks. Both groups considered the passive as acceptable as the active, with no significant differences between the two groups' judgments of the passive. Differences were found in the oral production of passives between bilinguals and monolinguals, but not in written production: task type influenced the production of monolinguals in that passive productivity fell significantly from the written to the oral task. The difference in productivity levels of the passive between bilinguals and monolinguals is attributed to bilinguals' exposure to the construction's distributional properties in the L2, supporting models of bilingual shared representations (HARTSUIKER; PICKERING; VELTKAMP, 2004).

Keywords: bilingualism; frequency effects; L2 proficiency; passive construction; acceptability judgment; written production; oral production.

Resumo: Este estudo investigou a influência da experiência com L2 inglês no processamento de passivas em L1 português brasileiro (PB) por bilíngues de alta proficiência e monolíngues do PB. Baseando-se na premissa de que alta

proficiência em L2 é indicativa de compartilhamento generalizado de representações (BERNOLET; HARTSUIKER; PICKERING, 2013) e na observação de que a passiva é significativamente mais produtiva em inglês do que no PB (GUIMARÃES; SOUZA, 2016) propomos uma visão construcional da construção, na qual ela é tomada como entidade teórica independente. Apesar de sintaticamente congruente no português brasileiro (PB, espera-se que o processamento da construção por bilíngues seja facilitado pela exposição à L2. A compreensão da construção foi observada através de uma tarefa de julgamento de aceitabilidade de sentenças, enquanto a produção foi observada a partir de duas tarefas de descrição de imagens (uma escrita e outra oral). Tanto bilíngues quanto monolíngues julgaram a passiva tão aceitável quanto a ativa, sem diferença significativa nos julgamentos entre os dois perfis linguísticos. Apesar de as passivas terem sido menos frequentes do que as ativas nas tarefas de produção, o tipo de tarefa influenciou o número de ocorrências de passivas dentre os monolíngues: sua produção foi similar à dos bilíngues na tarefa escrita, mas significativamente menor na tarefa oral. A diferença nos níveis de produtividade de passivas entre bilíngues e monolíngues é atribuída à exposição dos bilíngues às propriedades distribucionais da construção na L2, corroborando modelos de compartilhamento representacional bilíngue (HARTSUIKER; PICKERING; VELTKAMP, 2004).

Palavras-chave: bilinguismo; efeitos de frequência; proficiência em L2; construção passiva; julgamento de aceitabilidade; produção escrita; produção oral.

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1 Bilingual representational sharing

The study of psycholinguistics of bilingualism has long departed from the monolingual view (GROSJEAN, 1989) and has shifted towards the analysis of the bilingual linguistic system as a unique mental repository where representations from both first and second languages (L1 and L2) are available and interactive. The nature of this interaction has been widely investigated, and, in fact, there has been substantial evidence to suggest that representations are shared between L1 and L2. Much of the evidence in support of bilingual representational sharing comes from studies of cross-linguistic priming, in terms of syntax (BERNOLET; HARTSUIKER; PICKERING, 2013; BOCK *et al.*, 2007; DUSSIAS; SAGARRA, 2007; HARTSUIKER; PICKERING; VELTKAMP, 2004),

semantics (BENTIN; MCCARTHY; WOOD, 1985; SPÄTGENS; SCHOONEN, 2019; VAN HELL; DIJKSTRA, 2002), phonology (KIM; DAVIS, 2003) and pragmatics (REES; BOTT; SCHUMACHER, 2019).

However well-documented these effects may be, the bilingualism effects that support accounts of bilingual representational sharing are far from being considered universal: they may vary according to the language pair, the linguistic feature, or the bilingualism type. Therefore, this study focused on the effects of cross-linguistic influence on the comprehension and production of the passive construction by high-proficiency bilingual speakers of Brazilian Portuguese (BP) as L1 and English as L2, who acquired the L2 after the establishment of the L1 (i.e. late bilinguals) and live in a non-immersion environment (i.e. L1 dominant). Specifically, we intend to investigate whether the distributional properties of the construction in L2 causes the bilingual linguistic system as a whole to adjust its distributions, manifesting in L1 processing (ELLIS, 2002).¹

Given the significantly higher productivity level of the passive construction in English in relation to BP, attested by Guimarães and Souza (2016) *propomos uma visão construcional da construção, na qual ela é tomada como entidade teórica independente. Apesar de sintaticamente congruente no português brasileiro (PB,*² we expect the processing of passives by high-proficiency bilinguals to differ significantly from that of monolinguals. These expected effects of the passive distribution are based on the model of bilingual sentence production proposed by Hartsuiker *et al.* (2004),³ in which syntactic and pre-syntactic (lemma level) representations are shared so that the activation of a lemma node in either L1 or L2 activates combinatorial possibilities in both languages. The higher productivity levels of the passive in L2 English are expected to lead to stronger combinatorial activation and, consequently, to influence the processing of passives in the L1.

Bernolet *et al.* (2013) added a proficiency level to the model of bilingual sentence production, claiming that representations are “actually shared” only in high-proficiency bilinguals. According to the authors,

¹ This paper presents the results from the author’s unpublished MSc thesis “A análise da influência translinguística entre o PB e o inglês através da construção passiva” (2016). The original thesis was nested under a broader research project vetted by the university’s Ethics Committee.

² Detailed below.

³ Based on Levelt *et al.* (1999).

learners first store L2 representations as item- and language-specific, and then move on to more abstract and generalizable representations as the speaker increasingly experiences episodes of L2 processing. Proficiency is in fact a fundamental construct for psycholinguistics of bilingualism; however, it presents two major issues that should be tackled before any analysis can be done. The first concerns the very nature of L2 knowledge: what is it that is known when a speaker “knows” a second language? Departing from the Declarative/Procedural model proposed by Ullman (2004) despite its uniqueness, language likely depends on brain systems that also subserve other functions. The declarative/procedural (DP, L2 proficiency is understood as the automatization of grammatical and morphophonological encoding processes; automatization meaning that the shift from declarative to procedural memory may have taken place as a result of frequency of exposure to the L2. This definition is also in line with the proficiency timeline delineated by Bernolet *et al.* (2013), in which representations become generalizable as a function of L2 exposure.

The second issue concerns the operationalization of proficiency measuring. Many studies in bilingualism classify their bilingual subjects as low- or high-proficiency based on self-assessment. However, this is not a feasible method of categorization for the bilinguals analyzed in this study because of the lack of uniformity in the availability of L2 instruction for Brazilians, whose effects are unlikely to be captured in measures of time of formal study or self-assessed skills on categorical scales, for instance. As Valadares (2017) observed, the patterns of L2 use in non-immersion environments directly influence proficiency levels. Because the bilingualism effects we predict strongly depend on effects of L2 distribution on L1 production, it was essential for a validated measure to be employed. Therefore, we relied on a standardized (and cross-validated) measure to classify subjects as high-proficiency bilinguals: the Vocabulary Levels Test (VLT), first proposed by Nation (1990) and validated for bilingualism studies by Soares-Silva (2016).

2 The passive construction

The passive has been chosen as the target construction based on characteristics informative to the bilingualism effects under investigation in this study. First, the passive is syntactically and morphologically identical in BP and in English. The construction presents a promoted

object, a copula verb, the main verb in the participle form and an optional agentive by-phrase in both languages, providing a baseline that allows us to make inferences on aspects other than its surface form. Sentence (1) in BP corresponds directly to sentence (2) in English:

1. A igreja foi atingida pelo raio.
2. The church was struck by lightning.

Note that the morphosyntactic similarity of the construction in BP and English alone cannot be taken to assume that the passive in both languages are entirely equivalent constructions. Goldberg and Suttle (2010) use the passive to illustrate the virtual impossibility of finding constructions sharing form, function and distributional properties in two different languages. Specifically, the authors argue that these constructions called “passive” can differ in ways “including the presence or choice of auxiliary; the presence or choice of adposition or case that marks the agent argument, possible semantic or discourse restrictions, and overall frequency in the language” (p. 472). The linguistic pair analyzed in this study is of special interest because any discrepancies found must be related to semantic-pragmatic or overall distributional properties, given the co-occurrence of lexical items, morphological processes, word order, object promotion and agent postposition.

Second, the passive has been used as a target construction in a number of previous studies (e.g. BOCK, 1986; BOCK; GRIFFIN, 2000; HARTSUIKER *et al.*, 2004; JAEGER; SNIDER, 2013; JAEGER; SNIDER, 2007; PICKERING; BRANIGAN, 1998), offering data from other languages to which it will be possible to compare our results. Finally, Guimarães and Souza (2016) reported a discrepancy in the productivity levels of the passive construction in BP and English despite its morphosyntactic identity: speakers of L1 English produce the passive almost twice as much as speakers of L1 BP.⁴ This distributional difference provided the starting point for the analysis of crosslinguistic interference proposed in this study.

It is important to highlight that the passive is not taken as a byproduct of transformational processes, but as a construction according

⁴ See Guimarães and Souza (2016) for a detailed description of the productivity status of the passive construction in BP.

to Goldberg (2006): an independent theoretical entity represented in the procedural memory of the speaker (ELLIS, 2005; GOLDBERG, 2006). Thus, the meaning of propositions in the passive does not depend solely on the lexical items occurring in them but are instead a combination of the prototypical meaning of the construction and the semantic properties of the verb. Particularly, the passive is considered a complex construction that relates directly to the speaker's pragmatic knowledge and is motivated by the perception and categorization of the world (ELLIS, 2005).

The hypothesis that L2 distributions of the passive construction influence its processing in L1 by high-proficiency bilinguals was tested through an acceptability judgment task and two sentence elicitation tasks, described in the sections below. These experiments answer to two main purposes. First, we intend to explore bilingualism effects in this specific configuration of language pair, construction and bilingualism profile, and add to the bulk of experimentation under the shared representation account of the bilingual linguistic system. Second, we wish to observe BP speakers' processing of the passive construction in BP, so that the results we find in psycholinguistic of bilingualism studies including languages other than BP are correctly compared to ours. We will observe the familiarity and acceptability of the passive for L1 BP speakers, as well as its productivity levels in sentence elicitation tasks without any sort of manipulation such as masked priming (as in GLEITMAN *et al.*, 2007) or lexical item indication – and consequently manipulation of passive verbs bias (e.g. HARTSUIKER *et al.*, 2004).

3 Experiment 1 – Acceptability Judgment

In order to assess the influence of the distributional properties of the passive construction in English (as described in GUIMARÃES; SOUZA, 2016) on the speaker of L1 BP, we performed a speeded acceptability judgment task dividing subjects according to their linguistic profile. The markedness, relative productivity, and grammaticality status of the passive construction led us to make three predictions. First, we believe passives will rate at an intermediate acceptance level, receiving lower scores than actives and higher scores than ungrammatical descriptive sentences. Second, we predict that bilinguals' scores for active constructions will not differ from monolinguals' scores, while passive constructions will be considered more acceptable to bilinguals

than to monolinguals because of exposure to the productivity level of the construction in L2 English. Third, we expect response times to be faster for actives than for passives, and both to be faster than for ungrammatical descriptions.

Participants

The 24 subjects who took part in this task were volunteers recruited mostly among college undergraduates from the Languages and Humanities departments of the university. Ahead of the experiment itself, the volunteers were informed of the type of the task, its expected duration, and the choice to refuse or interrupt participation at any given time. Participants were divided into two groups. The first group of subjects consisted of 12 BP monolinguals and, the second, of 12 highly proficient L1 BP L2 English bilinguals.⁵ The bilinguals' level of L2 proficiency was measured using a timed version of the Vocabulary Levels Test or the VLT (NATION, 1990), a vocabulary range task that reflects speakers' overall English language knowledge. The test is composed of 90 word-definition matching items gradually decreasing in frequency (from the 2,000 to the 10,000 most frequent words), and subjects who scored 80% in the test were considered highly proficient. It is important to mention that subjects were given a time limit of 10 minutes to answer the VLT, as an effort to tap into their more automatic responses to English language items and yield a more reliable measure of L2 proficiency.

Materials

The stimuli presented 96 sentences in BP, controlled for lexical frequency and length (in syllables).⁶ The experimental items were 16 sentences in the passive construction, either 14 or 15 syllables long. They were designed using the 10 most frequent verbs occurring in the passive in BP and English oral corpora as listed by Guimarães and Souza (2016)⁷

⁵ Henceforth, this linguistic profile will be referred to only as "bilinguals".

⁶ The complete list of sentences is available in the Appendix.

⁷ Their analysis was based on data from two spoken corpora: C-Oral-Brasil I (RASO; MELLO, 2012), for BP, and the Santa Barbara Corpus of Spoken American English (DU BOIS *et al.*, 2000-2005), for English.

so that relative frequency⁸ was accounted for in both languages. There were 16 rather than 20 items in the experimental set because the verb lists shared the items “do”, “use”, “build”, and “put” (“fazer”, “usar”, “construir” and “colocar”, in BP). Subject animacy was controlled in that the subjects were animate in half of the sentences and inanimate in the other half, to examine subject animacy⁹ would influence acceptability levels of the construction. Sentences (3) and (4) below illustrate the set:

3. O adolescente foi preso por transportar drogas.
the teenager was arrested for transporting drugs
'The teenager was arrested for transporting drugs.'
4. As fantasias foram colocadas no porão.
the costumes were put in-the basement
'The costumes were put in the basement.'

The control items were 16 grammatical sentences in the active construction, either 12 or 13 syllables long. The active sentences presented the same verbs as the ones in the experimental set so that subjects would be exposed to the same verb in both the active and the passive constructions. However, unlike the passive sentences, this set presented only animate subjects to avoid the marked assignment of the agent role to inanimate entities:

5. O homem colocou os livros na mala.
the man put the books in-the suitcase
'The man put the books in the suitcase.'
6. Os policiais prenderam o suspeito.
the policemen arrested the suspect
'The policemen arrested the suspect.'

Additionally, a set of 16 ungrammatical sentences was used to gauge the acceptability status of the passive in the language:

⁸ The occurrence of the verbs in the passive over the overall occurrence of the verb in the corpus.

⁹ For a detailed discussion of the relation between animacy and voice, see Dewart (1979).

7. *A menina estava isolada dos amigos pelo pai.
the girl was isolated from-the friends by-the father.
'The girl was isolated from her friends by her father.'

Although their correspondent in English is licensed, BP presents two mappings for the verb “be”: “ser”, with a permanent reading, and “estar”, with a temporary reading. Only the verb “ser” can be used to form a licensed sentence in the passive. Sentence (8) can be translated to BP successfully as both (9), a passive without agent indication (verb “ser”), and (10), a descriptive indicating the state of the subject at the time of the utterance (verb “estar”):

8. The window was broken.
9. A janela foi quebrada.
10. A janela estava quebrada.

However, the sentence with “estar” becomes unlicensed if an agent is added:

11. The window was broken *by the heavy rain*.
12. A janela foi quebrada *pela chuva forte*.
13. ?A janela estava quebrada *pela chuva forte*.

Because of the morphosyntactic identity of BP descriptives L2 English passives, it could be expected that bilinguals would rate these descriptive sentences as less unacceptable than would monolinguals. We do not make this prediction. We understand that L1 restrictions constrain the mapping of these sentences to passives because the constructional representation evoked by the L2 English passive already maps onto an available and licensed mapping in BP. Instances where L1 restrictions were weakened for unlicensed L1 constructions have been observed for constructions such as the induced movement alternation, which shares representations but not morphosyntactic structure (SOUZA *et al.*, 2014). Unlicensed sentences such as (14) were considered more acceptable by bilinguals than by monolinguals:

14. *O capitão marchou os soldados pelo campo.
 the captain marched the soldiers around-the field
 ‘The captain marched the soldiers around the field.’

Finally, there were 48 filler items divided equally between grammatical and ungrammatical sentences of four types: problems with subject-verb agreement, causativization of unergative verbs, induced movement alternation and adjectival resultatives.¹⁰

15. O cachorro vieram para casa molhados.
 the dog came-PL to home wet-PL
 ‘The dog came home wet.’
16. O fazendeiro caiu o pêssego da árvore.
 the farmer fell the peach from-the tree
 ‘The farmer fell the peach from the tree.’
17. O instrutor correu os meninos pelo parque.
 the instructor ran the boys through-the park
 ‘The instructor ran the boys through the park.’
18. O garçom arrumou a mesa e a esfregou seca.
 the waiter cleaned the table and it-OBL wiped dry
 ‘The waiter cleaned the table and wiped it dry.’

Procedures

The items were pseudo-randomized so that no more than two sentences of the same type were shown in a row and no two subjects read the sentences in the same order. The stimuli were presented using PsychoPy (PEIRCE *et al.*, 2019), with sentences shown in black font on white background on the computer screen. Subjects were instructed to read the sentences silently and judge their level of acceptability on the computer keyboard following a 5-point Likert scale, where 1 indicated a completely unacceptable sentence and 5 a completely acceptable one.

¹⁰ For a detailed account of the licensing status of resultative constructions in BP, see Souza and Oliveira (2014).

The acceptability judgment task was timed: subjects had a time limit of 6 seconds to indicate their scores on the keyboard. The decision to perform a speed version of this widely used task was based on (SOUZA *et al.*, 2015), who reported that speakers were able to emit reliable judgments in up to 4 seconds. This time limitation intends to avoid subjects’ use of metalinguistic information or even prescriptive grammar rules. In this experiment, if subjects failed to provide a score within the time limit, the next sentence appeared automatically.

Results

Due to a programming issue, data relative to one of the sentences from the experimental set were not recorded, resulting in the analysis of 15 experimental items and 32 controls. We eliminated answers faster than 200ms because we understand that they most likely reflect subjects’ lack of attention or mechanical error rather than their conscious evaluation of the sentences. Therefore, we analyzed 1,106 answers: 379 judgments for actives, 353 judgments for passives, and 374 judgments for descriptives. We registered subjects’ scores for the sentences as well as response times (RTs) for the judgments, and processed the data using R (R Core Team, 2017).

Judgment scores

The means, standard deviations and medians for bilinguals’ and monolinguals’ judgments of passives, actives and descriptives are shown in Table 1:

TABLE 1 – Scores by bilinguals and monolinguals

| Construction | Bilinguals | | | Monolinguals | | |
|--------------|------------|--------|--------|--------------|--------|--------|
| | mean | sd | median | mean | sd | median |
| passive | 4.7151 | 0.7878 | 5 | 4.6591 | 0.8265 | 5 |
| active | 4.8438 | 0.4871 | 5 | 4.8095 | 0.6152 | 5 |
| descriptive | 3.1257 | 1.2752 | 3 | 3.4541 | 1.3143 | 4 |

Source: Produced by the author

Although Table 1 shows the scores as numeric data to facilitate the understanding of their distribution, they were not considered a continuous variable. This Likert scale refers to discrete judgments and does not have

the property of equal intervals – a sentence rated 5 is not 2.5 times more acceptable as a sentence rated 2, for example.¹¹

Therefore, an ordinal logistic regression was fitted using the CLMM function from the ordinal package (CHRISTENSEN, 2019) in R, with subjects and items as random effects; type of construction (passive, active, descriptive), linguistic profile (bilingual, monolingual) and subject animacy (animate, inanimate) as fixed effects; and score as the ordinal categorical response variable. A nested models comparison showed no effects of subject animacy ($\chi^2 = -0.3783$, $Z = -0.688$, $p = .4916$) or linguistic profile ($\chi^2 = 0.0639$, $Z = 0.149$, $p = .8812$) on sentence ratings; the comparison also showed that the best fitted model presented only construction type as the fixed effect ($\chi^2 = 1.538$, $Z = 5.282$, $p = 1.28e^{-07}$).

A post-hoc analysis of interactions revealed that neither bilinguals nor monolinguals judged passives as less acceptable than actives ($p = .6079$ for bilinguals and $p = .2928$ for monolinguals). Actives and passives were judged similarly by bilinguals and monolinguals ($p = .9998$ for actives and $p = .9925$ for passives). Both groups judged ungrammatical descriptives as less acceptable than actives and passives ($p < .0001$ for both groups and construction comparisons).

These results indicate that bilingualism did not have an effect on BP speakers' acceptance of the passive construction; indeed, the fact that monolinguals considered it as acceptable as did bilinguals indicates that the passive is fully available in BP despite its productivity differences in comparison to English. Additionally, the absence of animacy effects suggests that passives are not favored in presence of an inanimate subject, as predicted. It remains to be seen whether this holds true for production preferences, which will be the focus of experiments 2 and 3.

Response times

Subjects' response times were registered as a possible indicator of the processing cost of the sentences, in that the different levels of availability of the representations of the constructions are reflected on the time necessary to retrieve and comprehend them (MCELREE; JIA; LITVAK, 2000) speed-accuracy tradeoff (SAT). The means, standard deviations and medians for bilinguals' and monolinguals' RTs of judgments of passives, actives and descriptives are shown in Table 2:

¹¹ For a detailed description of the use of mixed models over ANOVA, see Jaeger (2008).

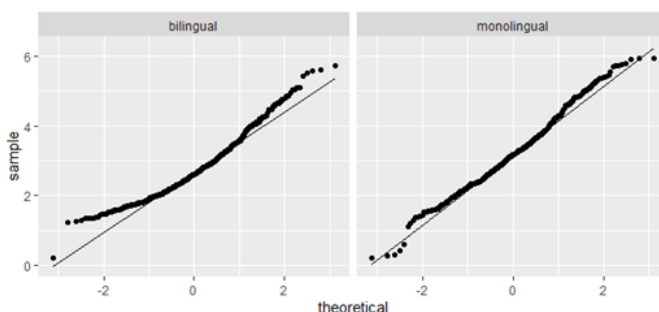
TABLE 2 – Judgment RTs by bilinguals and monolinguals in ms

| Construction | Bilinguals | | | Monolinguals | | |
|--------------|------------|-----|--------|--------------|------|--------|
| | mean | sd | median | mean | sd | median |
| passive | 2732 | 802 | 2603 | 3259 | 958 | 3189 |
| active | 2424 | 832 | 2283 | 2751 | 897 | 2641 |
| descriptive | 3087 | 841 | 2924 | 3662 | 1006 | 3567 |

Source: Produced by the author

The distribution of the RTs can be observed in Figure 1:

FIGURE 1 – Distribution of judgment RTs



Source: Produced by the author

The RT data was fitted using an LMER model (KUZNETSOVA; BROCKHOFF; CHRISTENSEN, 2017) including subjects and items as random effects, as well as fixed effects of linguistic profile, construction and subject animacy. The dependent variable was the response times of the judgments. A nested models comparison showed no effect of subject animacy ($\chi^2 = 0.029, p = .7906$). We found effects of linguistic profile ($\chi^2 = 4.811e^{-01}, p = .8812$), construction type ($\chi^2 = 5.594e^{-01}, p = 9.69e^{-12}$) and their interaction ($\chi^2 = 1.72e^{-01}, p = .0251$).

A post-hoc analysis of the interaction between linguistic profile and construction type showed that the actual significant difference in RTs refers to the judgments of descriptives in relation to the other constructions: the interaction between linguistic profile and construction can thus be interpreted as the effect of ungrammatical status of the descriptives. It would be therefore inaccurate to interpret the results as bilinguals rating sentences faster than monolinguals. Indeed, bilinguals' and monolinguals' response times did not differ in relation to the construction types ($p = .999$ for actives, $p = .9925$ for passives, and $p = .6927$ for descriptives).

Discussion

Our predictions for the score assignment were not proven true. We did not find a difference in acceptance levels of the passive as a function of linguistic profile, nor was the construction considered less acceptable than the active. Our predictions for the RTs, on the other hand, were partially correct. Neither group showed differences in RTs for actives and passives, but both groups showed differences in RTs for descriptives. The RT results and the score analysis indicate that the status of acceptability of the passive construction is the same as that of the active and that its infrequent occurrence in BP (and consequently marked status in the language) does not impose major processing difficulties. The main factor for score assignment and speed of responses was grammaticality: the unlicensed descriptive sentences with agent indication were considered less acceptable and therefore more difficult to process. Note that the RTs for passives do not suggest such processing difficulties.

These results have implications on two aspects of the passive construction in BP. First, its remarkably low productivity is not a reflection of L1 BP speakers' processing issues (as listed in the PDC account by MacDonald (2015), for example). The disregard for the passive by BP speakers, as shown in the corpus study (GUIMARÃES; SOUZA, 2016), must be related to the alternatives to achieve the same semantic-pragmatic effects available, namely the "se" particle (also called synthetic passive) and constructions with argument promotion (CYRINO, 2007; GABRIEL, 2001). Such options are illustrated in sentence 19 and 20:

19. Vende-se muitos biquinis no verão.
 sell-PART many bikinis in-the summer
 'People sell many bikinis in the summer.'
 'Many bikinis are sold in the summer.'
20. A revista está xerocando.
 the magazine is copying
 'The magazine is being copied.'

Although the mapping of the distribution of these alternatives to the passive construction could help describe the productivity status of the passive in BP, this analysis goes beyond the scope of this study. The information most relevant to our issue at hand is that, in terms of comprehension, there

is no impediment for the occurrence of the passive construction – neither in terms of acceptability nor in terms of processing cost.

4 Experiment 2 – Written Image Description

This experiment was designed to observe whether L1 BP speakers would produce written passive constructions, modulated by their linguistic profile and the position of the patient in the image. We predicted bilinguals would produce more passives than monolinguals because of exposure to L2 English. We also predicted that images with patients placed on the left would favor the production of passives in comparison to those with the patient on the right, as the reading direction of both BP and English runs from left-to-right and speakers of these languages tend to first direct their gaze to the upper left corner of a display (BERENDS; BROUWER; SPRENGER, 2015). We conjectured that this first gaze would give representational salience to the patient and, consequently, force the choice of construction to the passive (GLEITMAN *et al.*, 2007).

Participants

The subjects in this experiment were recruited following the same protocols as in Experiment 1. Their classification as either bilinguals or monolinguals was also identical. There was a total of 20 bilinguals and 20 monolinguals, aged between 18 and 30 years old. The bilinguals and the monolinguals were further subdivided into two groups, each exposed to a different stimuli list. Therefore, 10 bilinguals and 10 monolinguals saw items from list one, and the other 10 bilinguals and 10 monolinguals saw items from list two.

Materials

Stimuli consisted of 30 images and its 30 mirrored versions depicting transitive events. Thus, each event was presented twice: once with the agent on the left and the patient on the right of the image, and another with reverse positions. One version of the image belonged to list one and the other to list two, so that the same event did not appear twice in the same list and each list presented 15 images showing the patient on the left and 15 showing the patient on the right.

Each of the 30 drawings depicted an event corresponding to a verb from the previously selected list, which included verbs that could be easily represented and recognizable in image form. The events selected

were the transitive interpretations of *arrest*, *baptize*, *bite*, *breastfeed*, *catch*, *choke*, *electrocute*, *feed*, *film*, *fire*, *help*, *hit*, *hug*, *kick*, *kidnap*, *kiss*, *lick*, *lift*, *measure*, *mug*, *point*, *push*, *put make-up on*,¹² *scold*, *shoot*, *splash*, *step*, *throw*, *trip*, and *weigh*. Images were based on those used by (GLEITMAN *et al.*, 2007) in their active/passive alternation study,¹³ and selected according to clarity of the event depicted, drawing style and sharpness of lines and colors. Additionally, both agents and patients in all images were [+animate]. Figure 2 illustrates the image referring to the verb *arrest* and its mirrored version:

FIGURE 2 – Image used to depict the event “arrest”



Source: Lila Gleitman and John Trueswell

Procedures

Stimuli were presented using the EasyTestMaker platform.¹⁴ Prior to the beginning of the task, subjects were instructed to explain what they saw in each of the images with the first expression that came to mind, as if they were answering the question “What was happening?”. They were informed that they did not need to concern themselves with spelling problems, grammatical rules, or even the appropriate nouns to refer to the characters in the image (as long as they could be distinguished from one another in the description). The stimuli consisted of the image on a white background, without any text. Upon seeing the picture centered on the screen, subjects wrote a description on the box below it, using the computer keyboard. Once they were satisfied with their description, they clicked the “next” button with the mouse to see the following picture.

¹² In BP, “to put make-up on [someone]” translates as the one-word verb “maquiar”.

¹³ We thank Lila Gleitman and John Trueswell for sharing the images.

¹⁴ Available at: www.easytestmaker.com. Accessed on: March 21st, 2020.

Although the task was self-paced, they were given a time limit of 40 minutes to describe all the images; there was a countdown clock on the screen so they could manage their time.

Results

For the experimental items to be included in the analysis, they had to meet two basic requirements. First, more than 50% of the descriptions of a given image should refer to the event intended, otherwise we could not assure that the event had been correctly expressed in the image. Second, more than 50% of the descriptions should present a verb with a transitive argument structure, indicating that the role of the participants in the image were clearly interpreted as agent and patient. All descriptions of images corresponding to the verbs *point*, *push*, *scold*, *shoot*, *splash*, and *throw* were eliminated because more than 50% of participants failed to reference the intended event; all descriptions of images related to the verbs *electrocute*, *hit*, *step*, and *trip* were eliminated for failing to express a transitive event in more than 50% of the times. Therefore, only descriptions of 20 out of the 30 images presented were included in the analysis.

There was a level of tolerance regarding the lexical choices in the descriptions of the remaining 20 experimental items: descriptions were accepted if the verbs expressed the same event and occurred in the same argument structure construction. Examples of use of semantic correlates are found in the descriptions of *catch* (“pegar”, “capturar”) and *fire* (“demitir”, “desligar”, “despedir”). Semantic correlates in different argument structures such as for the verb *hug* in sentence 21, although similar in meaning, were considered invalid for constituting a construction different from actives or passives:

21. A pata está dando um abraço no pato.
 The duck.FEM is giving a hug on.the duck.MASC
 ‘The female duck is giving a hug to the male duck.’

With the exception of the images related to the verbs *bite*, *fire*, and *lift*, all experimental items had instances of descriptions presenting semantically congruent but syntactically distinct lexical items. However, these amounted to fewer than 50% of descriptions of each image, allowing

them to be included in the analysis. The final list of experimental items were descriptions of the images for *arrest, baptize, bite, breastfeed, catch, choke, feed, film, fire, help, hug, kick, kidnap, kiss, lick, lift, measure, mug, put make-up on, and weigh*.

The descriptions were classified as “active”, “passive” or “other”. A sentence was considered active if it presented a transitive verb, an agent and a patient. Passives presented a patient followed by the morphosyntactic structure of the analytic passive (verb “ser” followed by a participle) with or without an explicit agent.¹⁵ Participial clauses were also classified as actives or passives, as they clearly assign the roles of agent and patient to the participants in the event depicted. Sentences 22-25 are examples of descriptions in the active, passive, active participial clauses, and passive participial clauses:

22. O patrão está despedindo o empregado.
the boss is firing the employee
‘The boss is firing the employee.’
23. Um homem está sendo demitido.
a man is being fired
‘A man is being fired.’
24. Chefe demitindo o empregado.
boss firing the employee
‘Boss firing the employee.’
25. Homem sendo demitido de seu emprego.
man being fired from his job
‘Man being fired from his job.’

¹⁵ As opposed to English, the ambiguity between a passive and a descriptive sentence is resolved in BP through the copula verb “ser”, for passives, or “estar”, for descriptives. Therefore, the agent indication was not a requirement for classifying a description as a passive.

The descriptions categorized as “other” included reflexives, intransitives,¹⁶ structures with prepositional complements, noun phrases without participial phrases, perspective predicates (e.g. *catch* vs. *flee*), and bare present participles. These are illustrated in sentences 26-31, respectively: There was a total of 642 descriptions. Table 3 shows the distribution of types of descriptions among bilinguals and monolinguals:

TABLE 3 – Types of written descriptions by linguistic profile

| Description | Bilinguals | Monolinguals | Total |
|--------------------|-------------------|---------------------|--------------|
| passive | 53 | 52 | 105 |
| active | 245 | 170 | 415 |
| other | 38 | 84 | 122 |
| Total | 336 | 306 | 642 |

Source: Produced by the author

After removing the invalid data points, we were left with 520 descriptions. Table 4 presents the overall descriptions Bilinguals produced a total of 298 valid descriptions (53 passives and 245 actives), whereas monolinguals produced a total of 222 valid descriptions (52 passives and 170 actives). Table 4 presents the number of descriptions in the active and in the passive provided by bilinguals and monolinguals according to the position of the patient in the image:

TABLE 4 – Written descriptions per profile and patient position

| Construction | Bilinguals | | Monolinguals | | Total |
|---------------------|-------------------|--------------|---------------------|--------------|--------------|
| | left | right | left | right | |
| passive | 31 | 22 | 26 | 26 | 105 |
| active | 130 | 115 | 87 | 83 | 415 |
| Total | 161 | 137 | 113 | 109 | 520 |

Source: Produced by the author

We ran a total of four chi-square tests of independence to examine whether there was a relation between choice of construction in the descriptions (active or passive) and linguistic profile (bilingual

¹⁶ All verbs which did not present an NP complement were considered intransitives, regardless of their usual argument structure.

or monolingual), patient position in the image (left or right), or the combination between both factors (whether the position of the patient would have a stronger influence – if any at all – in either the bilingual or the monolingual groups). The four tests showed no significant association between the factors. Bilingualism did not interfere with the choice of structure ($\chi^2 = 2.172$, $df = 1$, $p = .1405$), and neither did the position of the patient for the descriptions as a whole ($\chi^2 = 0.0659$, $df = 1$, $p = .7974$), for the bilinguals' descriptions ($\chi^2 = 0.3216$, $df = 1$, $p = .5706$), or the monolinguals' ($\chi^2 = 2.970^{e-31}$, $df = 1$, $p = 1$).

Discussion

Bilinguals and monolinguals showed statistically similar production of the passive construction. Although the bilingualism effects we predicted in the beginning of this study were not found in either Experiments 1 or 2, we still did not have enough data to claim that L2 English has no effects on L1 BP. The fact that such influence was not observed in Experiment 1 was not extraordinary, given that the licensing status of the passive construction in BP – and not necessarily exposure to it in L2 English – was reflected in monolingual subjects' familiarity and acceptance of it. Experiment 2, however, manipulated subjects' L1 written production – which carries some particularities that cannot be overlooked.

First, the task did not demand great efforts from subjects' processing systems and working memory: they had a time limit of 40 minutes, of which an average of 14 was used. Thus, subjects were able to spend as much or as little time as they felt necessary depending on the ease of describing each of the images. Second, the written mode tends to favor the standard variant of the language, as it allows speakers to retract any deviations commonly regarded as “mistakes”. The possibility to plan and edit the descriptions allowed subjects to restructure them and, consequently, potentially mask their first choice of construction. The expressive use of the passive by both bilinguals and monolinguals may reflect the tendency of the construction to occur more frequently in written than in oral BP. In fact, the corpus analysis conducted by Duarte (1990) showed that the passive represents 4.7% of finite verb forms in written language, whereas Guimarães and Souza (2016) reported passives to represent 0.8% of finite verb forms in oral language. The written task has

also affected the study conducted by Maia and Cunha Lima (2014). The authors failed to observe tendencies in spoken language reflected on written tasks: in their study of coreference in BP, their initial experimental items showed subject pronouns in object position, which, while more frequent than the grammatically prescribed clitics in oral BP, increased reaction times and caused noise in their data for being exhibited in written form. Their solution was to modify experimental items to conform to standard BP. In this study, the experimental items remained similar in nature, but the answer type changed from written to oral, resulting in Experiment 3.

5 Experiment 3 – Oral Image Description

The change in the form of delivery in Experiment 3 intended to eliminate recanting or editing of any kind: we aimed for speakers' first and rawest expressions of the event apprehended. Although there were minor changes in the procedures (as detailed below), the task was essentially the same: describing the events depicted in the images. Our predictions included the ones listed in Experiment 2, with an addition of a prediction based on RT data. Not only do we expect more passives to be produced by bilinguals and in descriptions of images presenting the patient on the left, but we also predict speakers will show higher response times when using the passive construction to describe images whose patient is on the right, possibly modulated by linguistic profile.

This interaction between response times and patient position stems from the aforementioned preference for subjects to direct first gaze to the upper left corner of the display (BERENDS; BROUWER; SPRENGER, 2015); thus, passive descriptions whose patient is located on the right would imply that the subject apprehended the first participant (the agent), overlooked it and moved on to the second (the patient). It is important to clarify that the expected delay for this trial configuration does not entail that the passive is costlier to process for being a byproduct of transformational processes (CHOMSKY, 1965). We follow the notion that the passive is an independent construction that represents the speaker's focus on the patient subject upon event apprehension (ELLIS, 2005; GOLDBERG, 2006; TANNENBAUM; WILLIAMS, 1968).

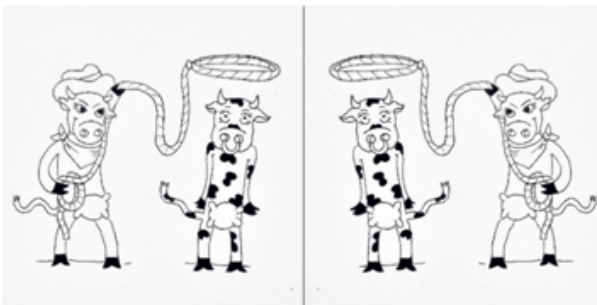
Participants

There were 24 participants in this experiment, aged between 18 and 30 years, forming two groups of 12 according to their linguistic profile: bilingual or monolingual. The criteria for recruitment and linguistic classification were the same as those of Experiment 1.

Materials

Stimuli consisted of 24 images depicting transitive events and their mirrored counterparts. The items were divided into two lists so that subjects were exposed to all the events only once, and each list presented an equal number of images with the patient on the left and on the right side. These 24 images were drawn by an illustrator according to the following guidelines: images should present animate (or personified) participants, clear black lines on a white background, and easily recognizable scenes, without any text on them. The events depicted were associated with the transitive readings of the verbs *arrest*, *bite*, *carry*, *chase*, *dress*, *dry*, *fan*, *film*, *fire*, *help*, *hold*, *kick*, *kidnap*, *kiss*, *lick*, *mug*, *noose*, *paint*, *pinch*, *pull*, *push*, *spy on*,¹⁷ *stab*, and *wake*. The list of verbs included the most successfully identified ones from Experiment 2, as well as new instrumental verbs that we expected would be easily represented in drawing. Figure 3 shows the image used for the verb *noose* and its mirrored version:

FIGURE 3 – Image used to depict the event “noose”



Source: Produced by the author

¹⁷ The verb “spy on” maps onto the single-word verb “espiar” in BP.

Procedures

Stimuli were presented using PsychoPy (PEIRCE *et al.*, 2019); the screen showed the image against a white background, without any text. Before the beginning of the task, subjects were instructed to describe the images shown as if they were answering the question “What’s happening?” with the first expression that came to mind. In the task, they were encouraged to start speaking as soon as the image appeared and to include as many details as they could in their descriptions. After they finished, they pressed a button on the computer keyboard and a new image was shown. The images changed automatically if the subjects did not press the button within 6 seconds.

Results

Items were validated following the same requirements as in Experiment 2: the correspondence between the event depicted in the image and the verb used in its description and descriptions expressing transitive events in at least 50% of the items. Additionally, descriptions whose audio files were corrupted or incomplete (precluding us from identifying the subject’s choice of construction) were also eliminated. All descriptions of images related to the verbs *dry*, *fire*, *pull*, *hold*, *push*, *stab*, and *wake* were eliminated because more than 50% of them failed to reference the event intended; all the descriptions of the image depicting the verb *chase* were eliminated because more than 50% of them failed to express a transitive event. Thus, out of the 24 initial experimental images, descriptions of only 16 were included – the ones that referred to the verbs *arrest*, *bite*, *carry*, *dress*, *fan*, *film*, *help*, *kidnap*, *kiss*, *lick*, *mug*, *noose*, *paint*, *pinch*, and *spy on*. Descriptions of each of these items reported the event intended in more than 50% of the times, although, as in Experiment 2, some of the descriptions included semantically and syntactically equivalent lexical items such as “espiair” and “observer”, for the item *spy on*, and “vestir” and “trocar”, for the item *dress*, for example.

The descriptions were classified as “active”, “passive”, or “other” following the same parameters as in Experiment 2. Descriptions under the label of “other” included reflexives, intransitives, structures with prepositional complements, and noun phrases without participial phrases. Overall, subjects produced 382 descriptions. Table 5 shows the distribution of types of descriptions by bilinguals and monolinguals:

TABLE 5 – Types of oral descriptions by linguistic profile

| Description | Bilinguals | Monolinguals | Total |
|--------------------|-------------------|---------------------|--------------|
| passive | 21 | 6 | 27 |
| active | 154 | 129 | 283 |
| other | 16 | 56 | 72 |
| Total | 191 | 191 | 382 |

Source: Produced by the author

After removing the invalid data points, we were left with a total of 310 descriptions, categorized as “passive” or “active” following the criteria described in Experiment 2. Bilinguals produced a total of 175 descriptions (154 actives and 21 passives), while monolinguals produced a total of 135 descriptions (129 actives and 6 passives). Table 6 presents the number of descriptions in the active and in the passive provided by bilinguals and monolinguals according to the position of the patient in the image:

TABLE 6 – Oral descriptions per profile and patient position

| Construction | Bilinguals | | Monolinguals | | Total |
|---------------------|-------------------|--------------|---------------------|--------------|--------------|
| | left | right | left | right | |
| passive | 9 | 12 | 2 | 4 | 27 |
| active | 78 | 76 | 61 | 68 | 283 |
| Total | 87 | 88 | 63 | 72 | 310 |

Source: produced by the author

Choice of structure

We ran the same four tests of independence as in Experiment 2. First, we examined whether position of the patient in the image had an association with the overall choice of construction. The chi-square test indicated no such association ($\chi^2 = 0.3976$, $df = 1$, $p = .5283$). Similar results were found when examining this association within the linguistic profiles, with inexpressive results among both bilinguals ($\chi^2 = 0.1915$, $df = 1$, $p = .6619$) and monolinguals ($\chi^2 = 0.0631$, $df = 1$, $p = .8017$). We did, however, find a significant association between linguistic profile and choice of structure ($\chi^2 = 4.5626$, $df = 1$, $p = .0327$), indicating that bilinguals produced significantly more passives than did monolinguals.

Response times

The response times in this experiment referred to the time between stimulus presentation and speech onset. The audio files were analyzed using the software Audacity (AUDACITY TEAM, 2019), which provided the time stamp of the speech onsets in milliseconds. Table 7 presents the means, standard deviations and medians of the RTs in Experiment 3:

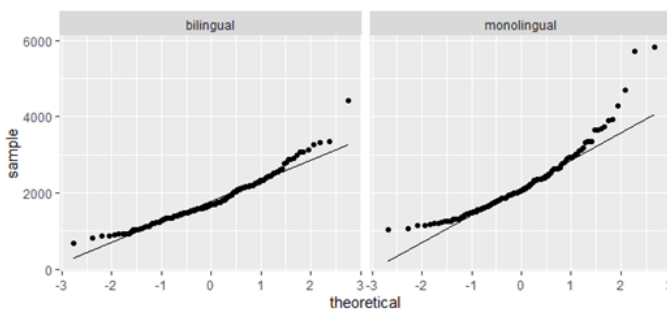
TABLE 7 – Description RTs of bilinguals and monolinguals in ms

| Description | Bilinguals | | | Monolinguals | | |
|-------------|------------|-----|--------|--------------|-----|--------|
| | mean | sd | median | mean | sd | median |
| passive | 1656 | 476 | 1531 | 2270 | 563 | 2102 |
| active | 1814 | 594 | 1719 | 2233 | 851 | 2054 |

Source: produced by the author

The distribution of the RTs for speech onset are shown in Figure 4:

FIGURE 4 – Distribution of description RTs



Source: produced by the author

The RT data was fitted using an LMER model (KUZNETSOVA; BROCKHOFF; CHRISTENSEN, 2017) including subjects and items as random effects, as well as fixed effects of linguistic profile (bilingual or monolingual), construction choice (active or passive) and patient position (left or right). The dependent variable was the response times of the speech onsets. A nested models comparison showed no effect of construction choice ($\chi^2 = -46.2, p = .7478$) or patient position ($\chi^2 = -86.35, p = .1680$). We did, however, find an effect of linguistic profile ($\chi^2 = 457.58, p = .0238$), indicating that monolinguals presented

overall longer times than bilinguals to start their descriptions, regardless of the construction they chose or the position of the patient in the image.

Written vs. oral tasks

Comparing the production from the written task in Experiment 2 and the oral task in Experiment 3, we observed no difference in the production of passive constructions by bilinguals ($\chi^2 = 2.3749$, $df = 1$, $p = .1233$), but there was a significant decrease in the number of passives produced by monolinguals in the oral task ($\chi^2 = 20.85$, $df = 1$, $p = 4.967e^{-06}$). Finally, the oral task in Experiment 3 presented significantly fewer passive descriptions overall in relation to the written task ($\chi^2 = 18.298$, $df = 1$, $p = 1.889e^{-05}$).

Discussion

The relation between the number of active and passive descriptions observed in the tasks in experiments 2 and 3 is aligned with what has been described in the literature: the passive construction is widely disfavored in relation to the active, and its occurrence requires additional (possibly pragmatic) motivation (GLEITMAN *et al.*, 2007; GOLDBERG, 2006; GUIMARÃES; SOUZA, 2016). Experiment 3 was based on an oral task as an attempt to neutralize effects of writing on speakers' descriptions observed in Experiment 2. In fact, results from Experiment 3 were different: bilinguals produced significantly more passives than did monolinguals, indicating that bilingualism was the main effect on choice of construction. However, the results from Experiment 3 should not be interpreted solely as a reflection of a solution for a methodological impairment or as a way to uncover the bilingualism effects under investigation in this study. The very fact that the results from experiment 2 and 3 differed is informative concerning the peculiarities of written and oral production.

Writing and speaking, though not dichotomic aspects of language production (MARCUSCHI, 2001), present fairly different features. Olson (2014) argues that the written mode provides potential for the occurrence of linguistic expressions that may be rare or even not at all present in speaking because of the differences in the circumstances of production: while speaking takes place in real-time mode, writing allows for careful planning, revision, and editing. Writing, thus, "takes language offline"

and, consequently, increases potential for language complexity – highly restricted in speaking (BIBER, 2009; OLSON, 2014). Based on an analysis of corpora of spoken and written texts, Biber (2009) observed that the range of typical linguistic characteristics of speaking is highly constrained in comparison to that of writing, since spoken registers share production circumstances – speech consists largely of unplanned,¹⁸ real-time interactions. According to the author, conversations are linguistically much more similar to classroom teaching than written fiction is to academic papers, for instance.

Normative grammar restrictions are also more present in writing than speaking, so much so that psycholinguistic experiments are constantly adapting to circumvent this issue to be able to extract reliable data from tasks involving writing (e.g. MAIA; CUNHA LIMA (2014), discussed before). A clear example of such attempt is the change from “grammaticality judgments” to “acceptability judgments” to try to prevent subjects’ judgments from being influenced by metalinguistic knowledge or normative grammar (BAUER, 2014; LANGSFORD *et al.*, 2019). Ideally, the shift to the term “acceptability” should prompt judgments based on linguistic experience rather than explicit knowledge.

These features of written language are acquired and developed with literacy (OLSON, 2014) and, with these peculiarities in mind, the different levels of productions of the passive construction by monolinguals are understood to reflect the writing mode. The higher number of passives produced by monolinguals in Experiment 2 is attributed to the affordances of the writing mode, which eliminated time constraints on language production as subjects used an average of 14 of the 40 minutes allotted to the task) and provided the possibility of editing their descriptions. Speaking, on the other hand, imposed time constraints inherent to the mode and forced monolinguals to rely on more easily retrievable representations (ELLIS, 2002).

An interesting occurrence took place in descriptions in both the written and the oral tasks: some verbs presented clear passive biases. The results from the sentence elicitation tasks indicate that patient location did not motivate subjects to produce descriptions using the passive, as it showed no effects on the choice of structure in either experiments 2

¹⁸ Less so in scripted speech (e.g. news broadcast), which presents characteristics of written texts.

or 3, or on the response times in the oral task. Furthermore, there is no evidence to posit a purely semantic motivation (or restriction) to the occurrence of verbs in the passive construction. Indeed, Ciriaco (2011) performed an analysis of the passive in BP which concluded that the only restriction for transitive verbs to be passivized is a compatibility with the construction's meaning of directed eventuality; that is, the unidirectional action, causation, process or state of experience expressed by the verb is inverted to fit the subject-goal in the passive construction (p. 182-183).

We therefore posit that at least some of the experimental verbs may be stored via chunking, i.e. a representational process in which co-occurring low-level features can be associated and consequently referred to as a single entity (ELLIS, 2005, p. 76). Table 8 shows the frequency of descriptions in the passive given the verb in Experiment 2:

TABLE 8 – Frequency of passive occurrence per verb (exp. 2)

| Verb | Passive Frequency | Verb | Passive Frequency |
|-------------|--------------------------|----------------|--------------------------|
| arrest | 0.35 | kick | 0.3 |
| baptize | 0.8 | kidnap | 0.26 |
| bite | 0 | kiss | 0 |
| breastfeed | 0.04 | lick | 0 |
| catch | 0 | lift | 0.13 |
| feed | 0.16 | measure | 0 |
| film | 0.16 | mug | 0.41 |
| fire | 0.7 | put make-up on | 0.24 |
| help | 0.11 | strangle | 0.1 |
| hug | 0.11 | weigh | 0.13 |

Source: produced by the author

The biases that first led us to conjecture chunking were the descriptions presenting the verbs “baptize” and “fire”, used in the passive 80% and 70% of the times, respectively. The substantially higher frequency of the passive given these verbs¹⁹ in a task where the

¹⁹ More than two standard deviations over the mean ($m = 0.2$, $sd = 0.2245$).

only manipulation (patient location) has proven ineffective supports the hypothesis that the chunks may have been activated, rather than the verb alone. However, the observation of a tendency for these verbs to occur more frequently in the passive than in the active construction in the written task is not enough to provide evidence of chunking. Given the planning and editing possibilities of this mode, this phenomenon could simply reflect the tendency of written language to present more passives than speech.

Let us then turn to the frequency of descriptions in the passive given the verb in Experiment 3. Table 9 shows the relative frequency of the construction for each of the experimental verbs, detailed by linguistic profile:

TABLE 9 – Frequency of passive occurrence per verb (exp. 3)

| Verb | Bilinguals | Monolinguals |
|-------------|-------------------|---------------------|
| arrest | 0.17 | 0.18 |
| bite | 0 | 0 |
| carry | 0.09 | 0.06 |
| dress | 0.1 | 0.05 |
| fan | 0.17 | 0.09 |
| film | 0.33 | 0.19 |
| help | 0 | 0.04 |
| kick | 0.08 | 0.1 |
| kidnap | 0.25 | 0.15 |
| kiss | 0.09 | 0.05 |
| lick | 0 | 0 |
| mug | 0.18 | 0.21 |
| noose | 0.09 | 0.05 |
| paint | 0.09 | 0.06 |
| pinch | 0.1 | 0.06 |
| spy on | 0.1 | 0.06 |

Source: Produced by the author

Only the verb “film” occurred in the passive with higher frequency than the overall tendency in bilinguals’ descriptions

($m = 0.12$, $sd = 0.089$). In monolinguals' descriptions, only the verb "mug" showed such tendency ($m = 0.08$, $sd = 0.065$). We understand that the decrease in the standard deviation in this sample, compared to that of the written task, reflects the impossibility of reanalysis imposed by the oral modality of the task. Although there have been hesitations (false starts) and reformulations in the oral descriptions (usually indicated by words such as "no" or "wait"), only the first choice of argument structure was considered for analysis. Further investigation is required to explore the question raised concerning chunked representations in L1 BP speakers.

Finally, our predictions about the response times did not find support in the data: descriptions presenting the passive construction did not result in higher RTs. In fact, there were no effects of either construction type, patient position, or the interaction between these factors in either bilinguals' or monolinguals' responses. The only significant difference was between bilinguals' and monolinguals' overall response times, with bilinguals starting their descriptions earlier than monolinguals. Although bilinguals have been observed to show lower response times in the literature in tasks demanding cognitive control (BIALYSTOK; CRAIK; LUK, 2012), they show higher RTs than monolinguals in production tasks, such as the one in Experiment 3, as a consequence of competition from L2 possibilities (KROLL; GOLLAM, 2014). A possible explanation to these contradicting results would be to attribute bilinguals' faster performance not to bilingualism effects per se, but to the socioeconomic status attributed to second language learning possibilities, which, in turn, correlates with better cognitive development (PETRILL *et al.*, 2004; WEISSHEIMER; FUJII; SOUZA, 2019). This, however, is a conjecture that needs further investigation.

6 General Discussion

This study investigated the relation between bilingualism and the behavior of the L1 BP speaker towards the passive construction. We departed from the representational sharing between a bilingual's languages, evidenced in many studies comprehending different language pairs, linguistic aspects and bilingualism types. More specifically, we intended to examine whether the distributional properties of the passive in L2 English, as reported by Guimarães and Souza (2016), affect its processing in L1 BP.

The results from our experiments allow us to make inferences concerning both comprehension and production aspects of the passive construction. From the acceptability judgment task, we can conclude that the passive construction is well established among BP speakers. Its acceptance levels among bilinguals and monolinguals showed that the passive is considered as acceptable as the active and significantly more so than the unlicensed descriptive with agent indication – with which the passive shares a morphosyntactic structure in L2 English. Additionally, the acceptance levels of the passive were statistically similar between bilinguals and monolinguals, as well as their judgments' RT. The similarity between the performances of the two groups in the task leads us to believe that the construction poses no processing difficulties for speakers of L1 BP. Thus, we argue that the acceptability judgment task could not possibly provide data on bilingualism effects because the apparent ease of comprehension and high levels of acceptance of the passive construction reflect the status of the construction in BP itself.

Experiment 2 was designed to shift the type of response from speakers from comprehension to production. We believe that the apparent absence of bilingualism effects was caused by the increased production of passives by monolinguals due to the affordances of the written mode. We argued in the discussion above that the features of written language – mainly the possibility of planning and editing – did not allow us to observe speakers' immediate expressions of the events apprehended. Therefore, their final responses were susceptible to revision and adjustment to the standard variant of BP and could not be trusted to reflect their first choices of descriptions. Experiment 2 further contributed to this research in that it also served as a pre-test to Experiment 3. We were able to observe what aspects of the images yielded relevant data, and which events were more accurately interpreted by the subjects.

Experiment 3 eliminated the aspect of the task we believed to be fogging our observations: as subjects provided oral descriptions, their responses were more spontaneous and reflected more accurately both the availability of their linguistic representations and the different productivity levels of the construction in English and BP. We were able to attest that the patient position in the image did not have an effect on subjects' choice of structure for the descriptions, suggesting that speakers did not necessarily choose the construction based on the salience of the participant – as proposed by (GRIFFIN; BOCK, 2000). Note that the

manipulation of patient location was based on the assumption that a language's reading patterns (left-to-right, in the case of BP) influence subjects' tendencies of interpreting the visual world; indeed, this was the motivation to include this experimental control in the tasks. Only data from an eye-tracking experiment can base any conclusions regarding language production being word- or structure-driven (BOCK; FERREIRA, 2014; GLEITMAN *et al.*, 2007; KUCHINSKY; BOCK; IRWIN, 2011).

The results from Experiment 3 suggest that bilingualism did influence choice of construction: bilinguals produced a significantly higher number of descriptions using the passive than did monolinguals. The main hypothesis of this study is that frequency distributions from the L2 cause adjustment to the frequency distributions of the linguistic system of the high-proficiency bilingual as a whole, not only for L2 processing. As the manipulation of patient location did not influence the production in either of the sentence elicitation tasks, the descriptions collected show that passive production is closely related to register and, ultimately, bilingualism. BP monolinguals hardly employed the passive in their oral descriptions (only in 0.04% of them), and the results from the acceptability judgment rules out the explanation of the construction's higher processing costs. Bilinguals, on the other hand, employed the construction in their written and oral descriptions at a statistically similar level in both tasks. Overall, 9.5% of descriptions by the subjects in Experiment 3 presented the passive construction, in line with the rate of 8% observed in C-Oral-Brasil I (GUIMARÃES; SOUZA, 2016; RASO; MELLO, 2012) and the rate of 10.5% observed in a similar production task (TEIXEIRA, 2016).

The model of bilingual sentence production proposed by Hartsuiker *et al.* (2004) and complemented by Bernolet *et al.* (2013) claims that lemma representations are available for both languages, more strongly so in high-proficiency bilinguals. We therefore interpret the results from Experiment 3 as a reflection of the strengthening of the combinatorial nodes of the passive representation in the bilingual's mind as a result of accumulated episodes of L2 processing. As the L1 BP speaker is increasingly exposed to the frequency distributions of the passive in L2, its node is more frequently activated than in the absence of the L2, resulting in the increase in the availability of the representation and, therefore, the increase in frequency of use.

Usage-based theories of language acquisition and processing such as the Construction Grammar (GOLDBERG, 2006; GOLDBERG; SUTTLE, 2010) and bilingual shared representations adopted in this study understand that language is shaped at each and every instance of use. Our results provide support to these accounts, having shown that high-proficiency bilinguals' processing of the passive construction is altered by their L2 experience without any of the facilitators the tasks provided, and in an entirely monolingual environment. In fact, the only occasion when the subjects were exposed to English was in the levelling test; all the other instances of interaction during data collection took place in BP.

This study contributes to the literature of psycholinguistics of bilingualism by providing evidence in favor of representational sharing and frequency-based accounts of language acquisition. It remains to be seen whether these results would be encountered in attention manipulation tasks or in the visual world paradigm (e.g. GLEITMAN *et al.*, 2007) for BP, which would shed light on matters of pre-syntactic processes and, ultimately, on the relation between mechanisms of L1 and L2 processing and acquisition.

Although we recognize the contribution to the theory, as in most bilingualism studies, we exert caution in terms of the generalizability of these results; specifically, concerning the number of subjects analyzed and the availability of verbs easily recognizable in images, and, generally, concerning the known differences in bilingualism effects involving types of constructions, bilingual profiles, task types, and linguistic pairs (HARTSUIKER; PICKERING; VELTKAMP, 2004). The choice of the passive construction to investigate bilingualism effects in speakers of L1 BP and L2 English was especially informative due to the morphosyntactic identity of the construction in the two languages. Indeed, the feature that is believed to have caused the difference in passive productivity between bilinguals and monolinguals is its L2 frequency distribution. Future directions lead us to investigate cross-linguistic influences of typologically distinct languages on L1 BP, as well as the addition of attention manipulation to the production experiments to compare results available from other language pairs.

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APPENDIX – Sentences for acceptability judgment task

Passive target sentences

1. Algumas perguntas foram feitas ao palestrante.
2. O vestido de noiva nunca mais foi usado.
3. As fantasias foram colocadas no porão.
4. A cidade foi construída sobre ruínas.
5. O adolescente foi preso por transportar drogas.
6. Muita informação foi gerada nas palestras.
7. O cabo foi promovido a soldado em abril.
8. Picasso foi considerado um grande pintor.
9. Tudo foi produzido na casa da fazenda.
10. A conversa entre as amigas foi gravada.
11. Eu fui chamado para terminar o trabalho.
12. A missão de receber doações foi dada à igreja.
13. O competidor foi inserido na corrida.
14. O réu e o advogado foram sentados à direita.
15. O cavalo foi aposentado no último outono.
16. As pessoas foram trazidas para a diretoria.

Active target sentences

1. O menino fez as comidas da festa.
2. A mulher usou seu cartão de crédito.
3. O homem colocou os livros na mala.
4. O pássaro construiu seu próprio ninho.
5. O policial prendeu o suspeito.
6. A fala do professor gerou dúvidas.
7. O gerente promoveu seu subordinado.
8. Considero minha irmã uma mãe.
9. A empresa produz sementes de trigo.
10. A pesquisadora gravou as conversas.
11. A menina chamou o pai para almoçar.
12. A sogra deu um fogão para o casal.

13. O homem inseriu os dados no sistema.
14. A avó sentou o neto no colo.
15. Os diretores aposentaram o presidente.
16. A cozinheira trouxe o caldo de feijão.

Ungrammatical descriptive sentences with agent indication

1. O homem estava apavorado pelo seu chefe.
2. As crianças estavam empolgadas pelos palhaços.
3. O cantor está envolvido com o show pelo empresário.
4. A mulher está casada com o marido pelo padre.
5. O paciente está acordado pela enfermeira.
6. Os amigos estavam embriagados pelo garçom.
7. O rapaz estava confuso pela sua namorada.
8. O motorista estava contrariado pelo motoqueiro.
9. A menina estava isolada dos amigos pelo pai.
10. O jogador está incluído na partida pelo juiz.
11. A menina está vestida com jeans pela mãe.
12. O pai estava cansado pela filha adolescente.
13. Os refêns estavam presos pelos sequestradores.
14. Os alunos estavam perdidos pelos professores.
15. O suspeito estava morto pelos investigadores.
16. A dona de casa está maquiada pela sua amiga.

Filler sentences: ungrammatical causativization of unergative verbs

1. O cientista apareceu seu artigo anos depois.
2. O diretor falou o artista sobre o espetáculo.
3. A mulher brincou as crianças até a hora de dormir.
4. O fazendeiro caiu o pêssigo da árvore.
5. O adolescente chegou seu amigo ao seu compromisso.
6. O jardineiro floriu o jardim antes do inverno.
7. O presidente renunciou o ministro depois do ocorrido.
8. O homem riu as meninas durante a festa.

Filler sentences: ungrammatical subject-verb agreement

1. O cachorro vieram para casa molhados.
2. O político voltaram a favor da nova medida.
3. O computador facilitaram os processos da empresa.
4. A secretária participaram da reunião de ontem.
5. A faxineira limparam todas as salas da escola.
6. A vendedora ofereceram seus produtos ao cliente.
7. O cientista descobriram uma nova cura para a doença.
8. A médica caminharam pelo novo hospital.

Filler ungrammatical induced movement sentences

1. O instrutor correu os meninos pelo parque.
2. A mulher andou seu pai na rua.
3. O homem nadou seu filho até o barco.
4. O treinador pulou o cavalo sobre a cerca.
5. A cientista voou seu balão pelo céu.
6. O capitão marchou a tropa para dentro da cidade.
7. A criança flutuou seus brinquedos na piscina.
8. A senhora dançou seu marido pelo salão.

Filler ungrammatical adjectival resultatives

1. O garçom arrumou a mesa e a esfregou limpa.
2. O menino pintou a unha e a soprou seca.
3. O artista cortou a madeira e a lixou lisa.
4. O bombeiro amarrou a corda e a puxou reta.
5. A artesã limpou o metal e o martelou plano.
6. O garoto conferiu a janela e a puxou fechada.
7. A frentista abriu o tanque e o abasteceu cheio.
8. O caseiro limpou a piscina e a drenou vazia.

Filler descriptive resultatives

1. O japonês fatiou o salmão e o comeu cru.
2. A velhinha perdeu o celular e o encontrou quebrado.
3. O jovem comprou a pizza e a comeu fria.
4. O atleta ensopou a camisa e a usou molhada.
5. A vizinha perdeu o cão e o encontrou morto.
6. A gata pegou o rato e o comeu vivo.
7. Rui descarregou a caixa e a trouxe vazia.
8. A moça preparou o café e o bebeu quente.

Filler adverbial resultatives

1. A jovem pintou o cabelo e o cortou curto.
2. A aluna colocou o sapato e o amarrou apertado.
3. A cozinheira pegou o queijo e o fatiou fino.
4. A cozinheira lavou a salsa e a picou fina.
5. A menina escovou o cabelo e o amarrou alto.
6. O vizinho assou a carne e a cortou grossa.
7. A criança pegou o papel e o cortou redondo.
8. O menino pegou o travesseiro e o bateu forte.