

The challenges imposed by L2 inflectional morphology: evidence from speeded acceptability judgment tasks with Brazilian Portuguese-English bilinguals

Os desafios impostos pela morfologia flexional da L2: evidências de tarefas de julgamento de aceitabilidade temporalizado com bilíngues do par linguístico português brasileiro e inglês

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RESUMO

O presente estudo tem como objetivo contribuir para o conhecimento atual sobre os desafios impostos pela morfologia flexional na aquisição de segunda língua. Conduzimos duas tarefas de julgamento de aceitabilidade temporalizado com bilíngues do par linguístico português brasileiro e inglês com diferentes perfis linguísticos. Analisamos o comportamento deles frente a sentenças gramaticais e agramaticais em língua inglesa envolvendo morfologia flexional. Nossos resultados sugerem que os falantes bilíngues se diferem dos falantes nativos do inglês apenas em relação às sentenças agramaticais com morfema flexional ausente, independentemente do nível de proficiência e status de imersão. Entendemos esses achados como uma indicação de que a dificuldade com a morfologia funcional envolve saliência perceptiva e, possivelmente, atenção aprendida para pistas linguísticas.

PALAVRAS-CHAVE:

Aquisição de Segunda Língua. Morfologia Flexional. Tarefa de Julgamento de Aceitabilidade.

ABSTRACT

The purpose of the present study was to contribute to current documented evidence of the challenges imposed by inflectional morphology in second language acquisition. We conducted two speeded acceptability judgment tasks with Brazilian Portuguese-English bilinguals with different linguistic profiles. We analyzed their behavior with respect to grammatical and ungrammatical sentences in English involving inflectional morphology. Our results suggested that the bilingual speakers differed from English native speakers only with respect to the sentences with missing inflectional morphemes regardless of proficiency level and immersion status. We understand these findings as an indication that difficulty with functional morphology involves perceptual salience and possibly learned attention to linguistic cues.

KEYWORDS:

Second Language Acquisition. Inflectional Morphology. Speeded Acceptability Judgment Task.

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1. Introduction

An important goal for second language acquisition research is finding out which aspects of a target language (L2) will pose learnability difficulties for the learner. It should be self-evident that this sort of information will be of relevance for applied purposes. For example, in language education, it can both guide pedagogical planning and bring awareness of L2 linguistic units that may take longer learning periods and/or broader learning experiences in order to emerge in learners' usage as convergent with commonly accepted norms. Also, in language contact situations that lead to language change, this type of finding may provide key information for analyses of constructions that may be especially prone to undergo alteration. Besides those applications, this specific goal of studies on Second Language Acquisition (SLA) may bring insights into the mechanisms that support L2 learning, thus having important theoretical consequences.

One linguistic unit that has long drawn linguists' attention due to the challenge it imposes in L2 acquisition at all levels of proficiency is functional morphology. As discussed by Carneiro (2017), there is a great deal of studies showing that morphological variability in bilingual's production is pervasive throughout the entire process of L2 acquisition. These studies include evidence from different types of functional morphemes, both bound and free, such as inflectional morphemes, auxiliaries and determiners. One of the main interests in this particular linguistic unit is that its challenge for L2 learners seem to be verified even when the target language's morphological structure is descriptively simpler than the learner's previously acquired language (typically her or his L1), as is the case, for instance, of the morphological marking for verb tense and aspect in English as compared to Portuguese.

In the present study, we aim at shedding further light on this issue by investigating the behavior of Brazilian Portuguese-English (BPE) bilinguals with different linguistic profiles (proficiency and immersion) with respect to grammatical and ungrammatical sentences in the L2 involving inflectional morphemes in a psycholinguistic offline comprehension task. By manipulating such profile variables, we aimed at specifically probing possible effects of length of learning (a factor for which attained proficiency is a substitute) and amount of L2 input exposure (a factor for which immersion in the L2 environment is a substitute) on the acquisition of L2 functional morphology.

In the next section, we will present an overview of studies on SLA involving inflectional morphemes. We then proceed with details of the methods for two experiments by way of which

we explored the profile differences of interest to the present investigation, and we report our empirical observations. We then conclude with a detailed discussion of our findings and the clues they provided us as to the most likely mechanisms behind the L2 acquisition of inflectional morphology.

2. Inflectional morphology: a core issue for Second Language Acquisition studies

Inquiry into the acquisition of L2 morphology has a well-established tradition in SLA studies. Although not a singled-out level of analysis in the early studies of L2 learning within the framework of the Contrastive Analysis Hypothesis, it was surely acknowledged in early efforts to describe interlanguages as systems of internalized linguistic representation. In Selinker's (1972) foundational paper, some of the examples of phenomena typical of English L2 interlanguage the author selected to justify his arguments involve overgeneralizations that lead to anomalous realization of inflectional morphology. The following are instances discussed in Selinker's (1972) paper:

(1) *What did he intended to say? (Op. cit., p. 218)

(2) *Don't worry, I'm hearing you? (Op. cit., p. 219)

The occurrence in (1) is analyzed by Selinker as the overgeneralization of the past tense formation rule to a constructional pattern (the interrogative sentence construction) in which tense marking will not be realized by main verb affixation, but rather by auxiliary verb insertion. Even though not specifically tense, but rather the closely related category of aspect, the occurrence in (2) is analyzed by Selinker as illustrating the reduction of L2 system complexities, a mechanism he refers to as a learning strategy that may shape up interlanguage competence. According to the rule simplification as a learning strategy viewpoint, the anomalous realization of the {~ing} affix might be the output of the shrinking down of verb classes and categories to either transitive or intransitive, leading to the blurring of lexically encoded distinctions of aspect, and thus to the over-marking of progressive aspect on all verbs.

Although Selinker's (1972) work still did not place any particular emphasis on morphology as a specifically challenging domain of interlanguage development, morpheme realization lied at the core of studies that started in the 1970s. Those were studies that explored the hypothesis of natural and universal orders of development in L2 grammars. As argued by Kwon (2005), the

natural order of L2 acquisition research of the 1970s was inspired by L1 acquisition studies of the same era that sought to identify orders of appearance of morphemes expressing functional grammatical categories in the development of infants' acquisition of their first language.

As reported in a review by Kwon (2005), the early natural order studies in L2 moved from a stage of research motivated by comparisons between orders found in both L1 and L2 acquisition into studies that sought to explain possible determinants for such orders of acquisition. Studies of the first generation type typically addressed the question of whether natural sequences could be found among L2 learners of English that could be comparable to the equivalent sequences that were reported in studies of L1 acquisition. Such studies were based on observation of higher than chance accurate occurrences of both bound and free morphs in what investigators defined as mandatory contexts for the appearance of such overt morphology.

With respect to six English morphemes that were among those investigated in both L1 and L2 order of acquisition studies of the 1970s, namely regular past tense {~ed}, non-past tense plus 3rd person singular agreement {~s}, the copula be, overt progressive aspect marking {~ing}, articles and auxiliaries, the orders of acquisition found among L2 learners of English can be generically summarized as approximately the following (based on Kwon, 2005, p. 6):

- 1- Progressive aspect marking {~ing}.
- 2- Copula be.
- 3- Articles and auxiliaries.
- 4- Regular past tense {~ed}.
- 5- 3rd person singular agreement {~s}.

What is noteworthy in the order described above is the late appearance of tense and agreement inflectional morphology, with regular past marking preceding present tense marking with agreement for 3rd person singular clausal subjects. If compared to the reported L1 acquisition studies of these same six functional morphemes, a comparable order was found in the 1970s studies. So, it is very clear that tense morphology seems to impose a learning challenge in both L1 and L2 acquisition.

As discussed in Kwon (2005), studies of L2 morpheme acquisition under the determinants umbrella explored the role of factors such as the following: (a)- the semantic complexity of overt morphemes; (b)- input frequency; and (c)- first language transfer. The hypothesized role of

semantic complexity suggested that polysemous morphemes such as the suffix {~s} of English would pose a learning challenge for L2 learners, as such ending maps both to the semantic categorization of number (plural) for nouns, and to the semantic cluster collapsing meanings of tense (non-past), number (singular) and person (3rd person or topic of discourse) for verbs. The role input frequency provided an attempt to explain the relative earlier acquisition of functional morphemes like articles, auxiliaries, the copula *be*, overt progressive aspect marking {~ing} and regular past as compared to the acquisition of non-past tense, person and number marking {~s}. It was proposed that the overall relative higher frequency of such markers could render them more salient for L2 learners' detection; therefore, making such forms more learnable. Both the semantic complexity and the input frequency claims are consistent with recent theoretical positions in SLA that emphasize the role of input salience and the role of learned attention to linguistic cues as mechanisms affecting the emergence of L2 grammatical forms in L2 learners' mental representations (Ellis, 2006). The first language transfer perspective proposed that morphemes that find overt expression both in an L2 learner's L1 and L2 are more likely to emerge in the internalized L2 system than morphemes which do not. Such interaction between L1 and L2 morphology in second language morphological learning is compatible with the empirical findings of a large-scale learner corpus-based study that compared the accuracy of realization of English L2 morphemes across proficiency levels among learners from five different L1 linguistic backgrounds (Murakami; Alexopoulou, 2016).

DeKeyser (2005) also provides some insights into this matter. When we think about the relationship of the form-meaning of a given morpheme, it may not be very transparent for a learner who is processing a language and trying to grasp the content from the input; especially if the learner has not had a thorough explanation of the rules of the form-meaning relationship. The transparency of a morpheme may be determined by the level of relevance that it contains in "a linguistic form for the meaning" (DeKeyser, 2005, p. 3). Furthermore, redundancy is also a factor at play when it comes to morphemes. Other elements in the sentence can express the same meaning of a morpheme; for instance, a noun phrase or a pronoun can make the verb ending information redundant as number and person can be marked by them. In addition, tense and aspect may be seen as redundant as adverbs, and other lexical items express the same information. Some morphemes, such as the third-person agreement {~s} in (3), can be considered redundant as their grammatical agreement marks some meaning that is also elsewhere in the sentence or in the discourse. In (3), the present tense is also marked by the frequency adverb "often", and the third-

person agreement is also expressed by the subject “the girl”. One could also note some level of redundancy in the past tense {~ed} morpheme in a simple past tense sentence where there is another element that indicates a specific point in the past. In (4), it is arguable that the {~ed} morpheme would be viewed as redundant because of the adverb “yesterday”, which marks a past event. This may be the reason why some learners do not see the missing morpheme as an unacceptable error since the past meaning can be retrieved from the adverb. Learners are primarily concerned about the meaning, and when they can infer it from elements in the sentence, morpheme marking may not be regarded:

(3) The girl often **plays** with her cat.

(4) The boys **watched** TV yesterday.

Although research in L2 acquisition of functional morphology has started long time ago, this is still a recurrent topic with open questions. While some attribute the variability in L2 verbal and nominal inflection to L2 error fossilization (Jiang, 2007), others claim that morphological acquisition depends on conceptual restructuring (Han, 2010; 2013). Slabakova (2014) proposes that it is one of the most difficult aspects to be mastered and, therefore, “the bottleneck of language acquisition”. This may be due to the fact that grammatical features are not only a challenge to production but also to comprehension. Moreover, inflectional morphology influences how an L2 learner acquires both syntax and semantics because it reveals syntactic and semantic differences (Slabakova, 2013).

Different grammatical features can vary in the pacing of acquisition; that is, some features will be acquired easily, meanwhile, others will be more troublesome. Besides, one may have been exposed to a grammatical feature and has yet to master it fully. This means that learners may have acquaintance with the syntactic meanings of an inflectional morpheme even though they do not know the rules of usage of it in the language (Slabakova, 2014). Learners may be familiar with the meaning of morphemes, but they face a whole new challenge when they have to choose the appropriate allomorph to express its meaning. Thus, when the past tense morpheme {~ed} is not produced by English learners, they may not have been able to retrieve its use (White, 2003).

Some studies attempted to display the high cognitive load that functional morphology may pose on L2 and L1 learners. McDonald (2006, 2008b) delved into working memory (WM) capacity through grammaticality judgment tasks (GJT) with memory load, and, in these studies, morpheme processing was examined. In the first study, L1 speakers and L2 English learners took part in the

experiments, and in the second, only L1 speakers were studied. Whereas the former tested different types of stressors besides WM – such as noise, response deadline, and compressed speech –, the latter contrasted the performance of participants that conducted the task with and without memory load. The results presented in McDonald (2006) indicate that L2 processing demands more memory resources and is slower than in the L1. McDonald (2008b) argues that some morphemes are more affected by memory load than others; for instance, the plural {~s} was only marginally affected while the third-person agreement {~s} was significantly affected. She also defends that the third-person agreement morpheme {~s} is one of the last acquired and least resistant devices. In McDonald's (2008a) study with L1 children and adults in GJT, she found evidence that third-person agreement {~s} as in (5) and past tense {~ed} morphemes as in (6) are the most difficult morphemes to be acquired by L1 English children. Being later acquired and less resistant, these morphemes demand higher WM and phonological ability from both children and adults.

(5) The boy **jump(ed)** whenever he is startled (Op. cit., p. 254).

(6) Last night my friend **walk(s)** home after dark (Op. cit., p. 254).

In our study, we will further explore the challenges imposed by L2 functional morphology analyzing the behavior of Brazilian Portuguese-English (BPE) bilinguals. Brazilian Portuguese (BP) is – like other romance languages – a heavily inflected language for verbs, with person, number and tense consistently marked on verb roots. Actually, with respect to verb morphology, Portuguese-English bilingualism could be described as a language pairing in which speakers depart from a descriptively more complex system to a descriptively less complex one. Learners that depart from an L1 morphology-poor language to an L2 morphology-rich language may disregard all the different morphological realizations without proper instruction. Nevertheless, it is not straightforward for learners to depart from a heavily inflected L1 to an L2 simpler inflectional system, once the learners would have to overgeneralize an abstract form that would have different allomorph realizations in their native language. Difficulties in the acquisition of English verb inflectional morphology by L2 learners from a Portuguese L1 background seem to represent a situation in which the target language comparative lack of linguistic complexity is mismatched with the psycholinguistic complexity imposed by the L2 learning process.

Two studies illustrate this complex and puzzling process. The study reported by Carneiro (2008) provides plenty of examples of variability among Brazilian learners of L2 English. The data

elicited by the author in a production task shows several instances of accurate tense morpheme realization and subsequent inaccurate omission of the same morpheme within a single speech turn. It must be emphasized that the L1 transfer account discussed above is not a fully satisfactory explanation for the facts observed in Carneiro (2008). Souza and Silva (2015) also conducted a study with Brazilian learners of L2 English. In their study, low proficiency participants were unable to detect grammatical violations compared to high proficiency participants. Furthermore, only participants with high proficiency presented a significant difference in acceptability ratings between grammatical and ungrammatical sentences. Participants with low proficiency tended to misjudge ungrammatical sentences and could not perceive verb agreement violations. In this study, proficiency was a decisive factor to explain the performance of L2 learners, but other factors, such as immersion, can also have an important role in language performance.

The apparently problematic nature of L2 functional morphology acquisition is undoubtedly an arena still in need for explanations in terms of the mechanisms involved. In the next section, we will report our study that aims to shed further light on the acquisition of L2 English inflectional morphology by bilinguals. We conducted two speeded acceptability judgment tasks to analyze the behavior of BPE bilinguals with different levels of proficiency and different immersion status towards grammatical sentences involving functional morphology and ungrammatical sentences with different types of violation of functional morphology. Our main aim was to identify what type of use or misuse of functional morphology in L2 English imposed the highest challenge for different groups of BPE bilinguals.

3. The experiments

3.1 Experiment one

We designed experiment one with the aim of examining whether bilinguals would notice the difference in acceptability between grammatical sentences with agreement morpheme and ungrammatical sentences with missing agreement morpheme in a speeded task. In Souza and Silva's (2015) study, only high proficient BPE bilinguals managed to perceive the aforementioned ungrammaticality. The assumption we had in mind was that the time pressure would lead bilinguals to focus on the semantic and syntactic content of the sentences to the detriment of the morphological information. Thus, our hypothesis was that the lack of attention to functional morphology would make bilinguals with lower levels of proficiency not distinguish these two types

of structures.

3.1.1 Participants

We gathered data from 39 BPE bilinguals living in the metropolitan area of Belo Horizonte/MG. Most of them were college students and the others had higher education levels, and their mean age was 26. Participants were divided into two groups according to their proficiency: higher or lower. The higher proficiency group had twenty-four participants and the lower proficiency group had fifteen. All of them performed the Vocabulary Levels Test (VLT) (Nation, 1990). Although the VLT is primarily a measure of vocabulary size, Souza and Silva's (2015) study show that the VLT scores distinguish not only L2 lexical recognition, but grammatical knowledge and comprehension skills in the L2 for BPE bilinguals.

3.1.2 Material

This task comprised forty sentences from which nine were the targets, and the others were distractors. From the total amount of target sentences, five of them were grammatical and four were ungrammatical. Target items were either grammatical sentences with either the past tense morpheme {~ed} and the third-person singular agreement morpheme {~s} (7) and sentences in which one of these morphemes were missing (8). Each sentence of the task had no more than 40 characters including spaces. Sentences were randomized so that there would not be an effect on the order of appearance. Previously to the experiment, participants performed a training section with six sentences:

(7) Grammatical morpheme: {~s} and {~ed}

- a. My uncle **eats** breakfast every morning.
- b. He usually **buys** food from the market.
- c. Robert **phoned** the police yesterday.
- d. The maid slowly **cleaned** the floor.
- e. The gardener **planted** some rose trees.

(8) Missing morpheme: {~s} and {~ed}

- a. He **love** getting up at 10 o'clock.
- b. Mary usually **play** with her dog.
- c. Man **land** on the moon in 1969.
- d. Mary **wash** her clothes yesterday.

3.1.3 Procedures

We adopted the same procedures reported in Souza and Silva (2015) as they carried out speeded acceptability judgment tasks (AJT) to test participants' sensitivity to grammatical and ungrammatical sentences. Therefore, the performance of higher and lower proficiency participants was contrasted for grammatical and ungrammatical sentences. For this task, participants had up to 6000 milliseconds (ms) to read each sentence and rank it according to the Likert scale. Participants were instructed on how to carry out the task. After completing the AJT, participants performed the VLT:

Table 1 – Likert Scale (adapted from Souza and Silva, 2015, p. 196)

Numeric keypad	Judgment levels
1	totally unacceptable
2	not well-formed, almost unacceptable
3	not well-formed, but maybe acceptable
4	slightly ill-formed, almost perfect
5	totally perfect

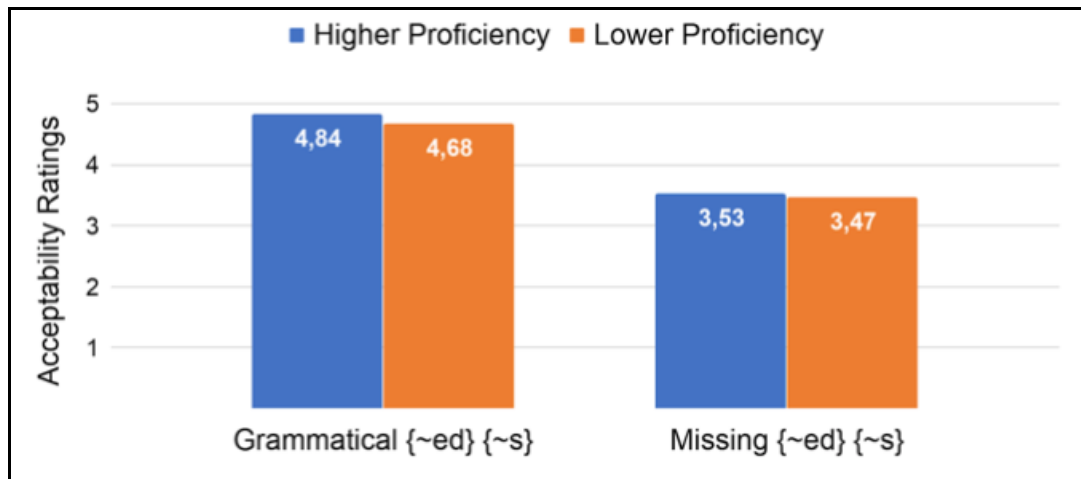
3.1.4 Results

We hypothesized that there was a significant difference between higher and lower proficiency participants' acceptability ratings and that lower proficiency participants would not be able to distinguish grammatical sentences from missing morpheme sentences. The Shapiro-Wilk test was run to test the acceptability ratings for normality. The higher proficiency participants' means were not normally distributed neither for the grammatical condition ($W=.321$, $p<.001$) nor for the missing morpheme condition ($W=.875$, $p<.001$). The lower proficient participants displayed similar results for the grammatical condition ($W=.469$, $p<.001$) and for the missing morpheme condition ($W=.888$, $p<.001$).

We ran the Mann-Whitney test to contrast the acceptability ratings of higher and lower proficiency participants. We did not find a statistically significant difference in acceptability ratings between higher and lower proficiency participants for the grammatical condition by subjects ($U=210.5$, $p=.330$) and by items ($U=4829.5$, $p=.092$). The same could be observed in relation to

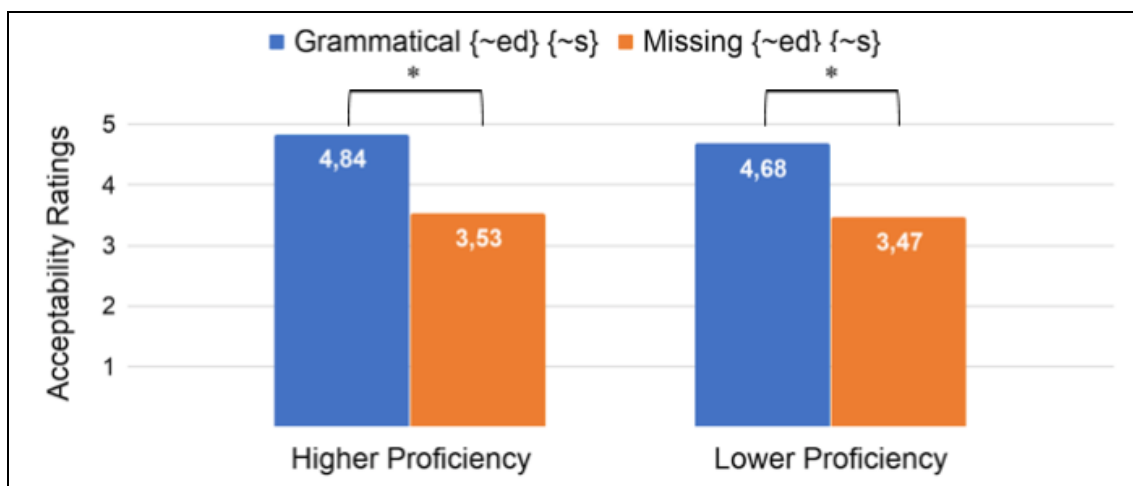
acceptability ratings for the missing morpheme condition by subjects ($U=176.5$, $p=.930$) and by items ($U=2874.5$, $p=.783$). GRAPH 1 depicts the participants' acceptability mean ratings for the two conditions.

Graph 1 – Higher proficiency participants' and lower proficiency participants' mean acceptability rating within each sentence type.



Afterwards, we compared the participants' ratings within each group; therefore, we contrasted grammatical and missing morpheme sentences for higher and for lower proficiency participants. We found that the difference in acceptability ratings within the higher proficiency group was statistically significant by subjects ($U=570.0$, $p<.001$) and by items ($U=9494.5$, $p<.001$). Additionally, the difference within the lower proficiency group had statistical significance by subjects ($U=206.0$, $p<.001$) and by items ($U=3501.5$, $p<.001$). GRAPH 2 illustrates the mean acceptability ratings within the two groups. Differently from what we expected, both groups exhibited significant differences in acceptability ratings for grammatical and missing morpheme sentences. Contrary to what we expected, the lower proficiency group displayed similar acceptability rating means to the higher proficiency participants and both groups distinguished the sentences with a grammatical morpheme from the sentences with a missing morpheme. Hence, proficiency was not a decisive factor in performance in our test.

Graph 2 – Grammatical {~s} and {~ed}'s and missing morpheme {~s} and {~ed}'s acceptability rating within each participant group (* $p<.05$).



At first sight, our results seem to indicate that both groups of proficiency were equally sensitive to the violations of functional morphology. However, the acceptability ratings for the missing morpheme sentences were in the upper half of the acceptability scale, which might indicate that they are still tolerant to these violations. In order to further explore this issue, we conducted another speeded acceptability judgment task, in which we included sentences with a more salient violation and a control group with native speakers of English.

3.2 Experiment two

The acceptability ratings for the sentences with a missing morpheme in experiment one were not clear in relation to bilinguals' tolerance to violations in functional morphology. In order to shed light on this issue, we designed another speeded acceptability judgment task. In experiment two we analyzed participants' behavior with respect to sentences with a missing morpheme and sentences with an oversupplied morpheme, which is a more salient violation. The assumption we had in mind was that the more salient violation would receive lower acceptability ratings, which would suggest that bilinguals are more tolerant to missing morphemes than to oversupplied morphemes. In addition, we included a group of native speakers of English to highlight the effects that are specific to bilinguals and we included a group of immersed bilinguals to observe the role of input quantity. Since proficiency did not play a major role in the previous experiment, we focused on participants with higher levels of proficiency.

3.2.1 Participants

We gathered data from 61 people in experiment two. As in experiment one, their mean age

was 26 and their minimal level of education was some college or post-secondary coursework. Our control group was formed by 23 native speakers of English who were residents of Madison/WI in the United States. The other participants were BPE bilinguals with high proficiency in the L2, who also achieved level 5 in the VLT. They were divided into groups according to the immersion status: 18 immersed bilinguals, who were residents of the Boston/MA metropolitan area in the United States for 10 years or more and 20 non-immersed bilinguals, who were residents of the Belo Horizonte/MG metropolitan area and had little (up to two one year) or none immersion in the L2.

3.2.2 Materials

Experiment two comprised a total of 111 sentences, 15 of which were used in the training session. 50% of the sentences were grammatical and 50% were ungrammatical. At this time, we focused on participants' behavior towards only one type of functional morpheme. The target items were divided into three groups: grammatical sentences with the third-person singular agreement morpheme {~s} (henceforth grammatical morpheme) (9), ungrammatical sentences with missing third-person singular agreement morpheme {~s} (henceforth missing morpheme) (10) and ungrammatical sentences with incorrect use of the third-person singular agreement morpheme {~s} (henceforth ungrammatical morpheme) (11). The target items were pseudo-randomized so that they tended not to be displayed in sequence. The target items again had no more than 40 characters including spaces, which is compatible to the 6000ms time ceiling per sentence we used.

(9) Grammatical morpheme:

- a. Jansen **likes** to play the guitar.
 - b. Jake **hates** math and history.
 - c. Alan **studies** Italian every day.
 - d. Hans **speaks** German very well.
 - e. The president **loves** his brother and his sister.
 - f. The kid **plays** video game every weekend.
 - g. The student **uses** the computer at night.
 - h. The pilot **drinks** coffee in the morning.
-

(10) Missing morpheme:

- a. The teacher **like** the school very much.
- b. The professor **receive** a lot of invitations.
- c. The politician **have** lunch at home every day.
- d. The mayor **practice** sports during the evening.
- e. Tony **drink** beer with his friends on weekends.
- f. Taylor **eat** pizza with his family on Sundays.
- g. Louis **see** his friends from school every August.
- h. Lucca **buy** coffee when he is sleepy at work.

(11) Ungrammatical morpheme:

- a. I **likes** dogs that don't bark.
- b. We **likes** to work in a bank.
- c. I **plays** football twice a week.
- d. We **plays** video game on my computer.
- e. I **has** no trouble with my enemies.
- f. We **has** no school tomorrow morning.
- g. I **eats** all my calories at dinner.
- h. We **eats** a lot of fish with vegetables.

3.2.3 Procedures

We utilized the same procedures from experiment one.

3.2.4 Results

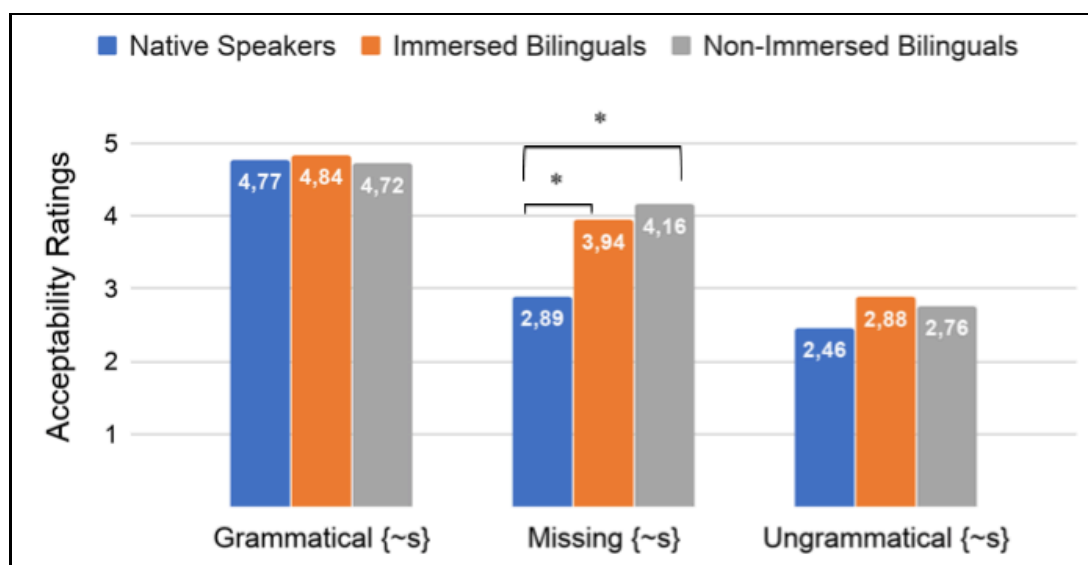
The main hypothesis that motivated experiment two was the possibility that BPE bilinguals were more accepting of sentences with missing inflected morphemes than native speakers of English. To verify this hypothesis, we compared native speakers', immersed bilinguals' and non-immersed bilinguals' acceptability ratings given to sentences with grammatical and ungrammatical sentences involving the third-person singular present agreement morpheme {~s}.

The Shapiro-Wilk test was run to test the acceptability ratings for normality. The native speakers' acceptability ratings for all sentence groups did not differ from the normal distribution.

However, immersed bilinguals' ($W=.757$, $p<.02$) and non-immersed bilinguals' ($W=.778$, $p<.02$) acceptability ratings for the grammatical sentences did differ from the normal distribution. Because the data did not have a normal distribution, we followed up on our analysis with non-parametric tests.

First, we compared each group of participants in relation to each type of sentence. As for the sentences with a grammatical morpheme, the Kruskal-Wallis test indicated that there was neither a significant difference by subjects ($\chi^2=3.268$, $p=.195$) nor by items ($\chi^2=5.758$, $p=.56$). The same results were observed in relation to the sentences with an ungrammatical morpheme both by subjects ($\chi^2=1.886$, $p=.389$) and by items ($\chi^2=4.157$, $p=.125$). In regard to the sentences with a missing morpheme, the test indicated a difference by subjects ($\chi^2=26.063$, $p<.001$) and by items ($\chi^2=14.699$, $p<.001$). The Mann-Whitney test adjusted with the Bonferroni correction for pairwise post hoc analyses indicated that the native speakers differed significantly from immersed bilinguals by subjects ($U=57.500$, $p<.001$) and by items ($U=3.000$, $p<.01$) and from non-immersed bilinguals by subjects ($U=47.500$, $p<.001$) and by items ($U=2.000$, $p<.01$). The difference between the two bilingual groups did not reach significance either by subjects ($U=227.500$, $p=.951$) or by items ($U=13.500$, $p=.06$). Thus, differences between native speakers and bilinguals with regard to the third-person singular present agreement morpheme {~s} were only observed in sentences with a missing morpheme. Immersed and non-immersed bilinguals did not differ from each other in any of the contexts we analyzed. Our findings indicate that native speakers had a higher sensitivity towards the sentences with missing a morpheme as compared to bilinguals and that immersion did not play a major role in the acceptability of the third-person singular present agreement morpheme {~s} in both grammatical and ungrammatical contexts. The results are illustrated in GRAPH 3.

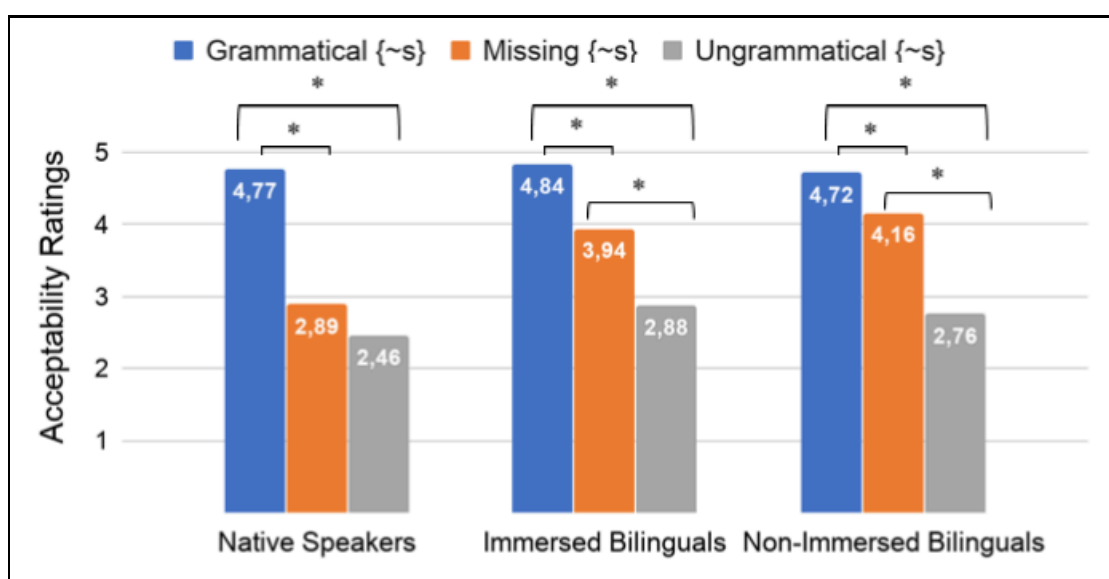
Graph 3 – Native speakers', immersed bilinguals' and non-immersed bilinguals' mean acceptability within each sentence type (* $p<.05$).



We also compared the differences between sentence types within each of the participants' groups. In the native speaker group, the Kruskal-Wallis test indicated that the acceptability ratings for the three structures yielded a significant difference by subjects ($\chi^2=45.052$, $p<.001$) and by items ($\chi^2=17.461$, $p<.001$). The Mann-Whitney test adjusted with the Bonferroni correction for pairwise post hoc analyses indicated that the difference between the two ungrammatical sentence types did not reach significance either by subjects ($U=162.000$, $p=.06$) or by items ($U=10.000$, $p<.03$). The sentences with a grammatical {~s} differed significantly from both the sentences with a missing morpheme by subjects ($U=.000$, $p<.001$) and by items ($U=1.000$, $p<.001$) and from the sentences with an ungrammatical morpheme both by subjects ($U=.000$, $p<.001$) and by items ($U=.000$, $p<.001$). As for the acceptability ratings given by the immersed bilingual group, there was also an overall significant difference by subjects ($\chi^2=36.944$, $p<.001$) and by items ($\chi^2=18.062$, $p<.001$). The two ungrammatical sentence types yielded a significant difference by subjects ($U=109.000$, $p<.001$) and by items ($U=3.000$, $p<.01$). The sentences with a grammatical morpheme differed significantly both from the sentences with missing morpheme by subjects ($U=67.000$, $p<.001$) and by items ($U=5.000$, $p<.01$) and from the sentences with an ungrammatical morpheme by subjects ($U=23.000$, $p<.001$) and by items ($U=1.500$, $p<.001$). In regard to the non-immersed group, the acceptability ratings for the three structures also yielded a significant difference by subjects ($\chi^2=41.789$, $p<.001$) and by items ($\chi^2=20.516$, $p<.001$). The two ungrammatical sentence types yielded a significant difference by subjects ($U=66.000$, $p<.001$) and by items ($U=.000$, $p<.001$). The sentences with a grammatical morpheme differed significantly both from the sentences with a missing morpheme by subjects ($U=23.500$, $p<.001$) and by items ($U=.000$, $p<.001$)

and from the sentences with an ungrammatical morpheme by subjects ($U=1.500$, $p<.001$) and by items ($U=.000$, $p<.001$). In sum, the only sentence types whose difference did not reach significance were the two ungrammatical structures within the native speaker group. As we expected, these results indicate that bilinguals considered the sentences with a missing morpheme more acceptable than the sentences with an ungrammatical morpheme, whereas native speakers perceived the two violation types in a similar manner. The results are illustrated in GRAPH 4.

Graph 4 – Grammatical morpheme's, missing morpheme's and ungrammatical morpheme's acceptability ratings within each participant group (* $p<.05$).



4. Discussion

The results from experiment one indicated that proficiency did not play a major role in the acceptability of sentences with grammatical functional morphemes and sentences with missing morphemes since the two bilingual groups we analyzed did not exhibit any significant difference. More specifically, both bilinguals with higher and lower levels of proficiency exhibited enough sensitivity to violations in functional morphology to distinguish the grammatical and ungrammatical tested items. We interpret these results as an indication that bilinguals do not have to be at the upper end of the proficiency continuum to be able to use morphology information during the processing of L2. However, the results were not clear as to how tolerant bilinguals were to the aforementioned violation.

Similar results were found in experiment two. Bilinguals distinguished grammatical and

ungrammatical uses of functional morphology. Furthermore, our results showed that non-immersed bilinguals and immersed bilinguals with the same levels of proficiency did not exhibit any significant difference towards the three types of sentences we tested. This suggests that the amount of input alone is not sufficient to explain the bilinguals' behavior regarding functional morphology.

Our findings in experiment two also suggested some similarities and differences between native speakers' and bilinguals' perception of functional morphology. First, the results indicated that bilinguals behaved similarly to native speakers as to their perception of grammatical and ungrammatical overt morphemes. However, native speakers were more sensitive than bilinguals to sentences in which this morpheme was missing. In fact, native speakers perceived the ungrammatical sentences with a missing morpheme and ungrammatical sentences with ungrammatical morpheme in a similar manner, whereas bilinguals were more tolerant to the former sentences. Therefore, our findings are in line with previous studies in second language acquisition that indicate that dropping functional morphemes is more common than oversupplying them (Jensen et al., 2019).

We understand these findings as an indication that difficulty with functional morphology involves perceptual salience, i.e., how acoustically/ visually clear is the linguistic phenomenon. As argued by Cintrón-Valentín and Ellis (2016), bilinguals tend to attend to physically more salient cues in the input. Whereas oversupplied morphemes have some physical salience, missing morphemes have none and, thus, bilinguals are more likely to perceive the former type of error than the latter. Moreover, it has been shown that bilinguals usually process lexical items before grammatical forms (Van Patten, 2006). Consequently, in the sentences with a missing morpheme, the third-person singular present semantic information could be processed simply in the combination of the pronoun and the non-past verb, which makes the absence of the morpheme hard to notice. In the sentences with an ungrammatical morpheme, on the other hand, the presence of this morpheme seems to draw bilingual's attention to grammatical form, which in turn makes the ungrammaticality of the sentence more noticeable. Native speakers, dissimilarly, seem to process both grammatical and lexical forms simultaneously, which makes them sensitive to both types of violation.

There is one study, nevertheless, that shows that both types of ungrammaticality can be equally problematic for bilinguals. Jensen et al. (2019) investigated the learnability differences between L2 morphological and syntactic knowledge in Norwegian-English (NE) bilinguals. More

specifically, the authors used an untimed acceptability judgment task to analyze the acquisition of subject-verb agreement ({~s}) and also the acquisition of the subject-verb-object (SVO) order. Norwegian, unlike English, is a language in which the verb always appears in the second position of a declarative sentence (V2) and which does not contain an overt agreement mark. The authors used grammatical and ungrammatical sentences instantiating the aforementioned rules. Some of the tested items bear a close resemblance to the sentences we used in our experiment two, as illustrated in (12) and (13). The results indicated a good performance of the participants at all levels of proficiency for grammatical sentences. As for the ungrammatical phrases, both the less proficient participants and the more proficient participants were less sensitive to both types of morphological violation than to syntactic violations. Thus, their findings, similar to ours, indicate difficulty with L2 functional morphology in terms of tolerance to incorrect uses of this linguistic unit, but only in their study bilinguals lacked sensitivity to both dropping and oversupplying the morpheme.

(12) Local agreement with plural subjects

- a. * The teachers gives their students a lot of homework.
- b. The teachers give their students a lot of homework.

(13) Local agreement with singular subjects

- a. * The brown dog play with the yellow football.
- b. The brown dog plays with the yellow football.

(Jensen et al.,2019, p. 14)

The differences between our findings and the ones reported by Jensen et al. (2019) can be explained by the use of time pressure in the acceptability judgment task in the former but not in the latter study. The longer the participants take to issue an acceptability rating, the higher the chances of them implementing different metalinguistic strategies and processing mechanisms, such as reanalysis, which could make the missing morpheme as noticeable as the oversupplied one. As argued by Souza et al. (2015), the speeded version of this task captures the activation of implicit knowledge and automatized processing routines, whereas the untimed version also includes effects of explicit knowledge and metalinguistic reflection. Thus, if this is the case, what the results from Jensen and et al. (op. cit.) show is that the missing morpheme was as noticeable as the oversupplied morpheme and not that the latter was as difficult to notice as the former. In

this case, a replication of their study with a timed acceptability judgment task would indicate an increased difficulty in NE bilinguals' perception of sentences with a missing morpheme and a replication of our study with an untimed acceptability judgment task would indicate BPE bilinguals' higher sensitivity to the ungrammaticality of sentences with a missing morpheme.

Another possible view to this difference between NE and BPE bilinguals is that difficulty with functional morphology can be influenced by the L1 or, more specifically, the L1 cue strengths (MacWhinney, 2018). As we have mentioned earlier, according to the L1 transfer perspective, morphemes that find overt expression in bilinguals' both languages are more likely to emerge in the internalized L2 system than morphemes which do not. Both Norwegian and Brazilian Portuguese lack overt morphemes specific to 3rd person singular present agreement, but the two languages have other differences that may influence how much attention is paid to functional morphology during sentence processing. The fact that Norwegian has no overt SV verbal agreement morphology (14) may be responsible for the overall lack of strength of this linguistic cue during language processing in that language. The results from Jensen et al. (2019) suggest that this cue is also weakened in the processing of the L2 since both missing and oversupplied agreement morphemes tend to have a lower impact on NE bilinguals' perception of sentences in English. BP does not dispose of a specific overt agreement suffix for 3rd person singular, but it does for other conjugations (15), including 1st person singular and 1st person plural, which were the focus of our sentences with ungrammatical {~s}. Accordingly, agreement morpheme is a weaker cue following 3rd person subject than following 1st person singular or 1st person plural. Our findings suggest that this pattern is also observed in the L2, in which bilinguals exhibit higher sensitivity to violations in agreement morpheme after 1st person singular and 1st person plural than after 3rd person subject. Therefore, it is possible that the cues strengths of functional morphology in the L1 influence the cue strengths of this linguistic unit in the L2, which in turn make bilinguals behave in a non-native-like manner.

(14) a. Lars og Mari snakker norsk.

Lars and Mari speak Norwegian

'Lars and Mari speak Norwegian.'

b. Lars snakker norsk.

Lars speaks Norwegian

‘Lars speaks Norwegian.’

(Jensen et al., 2019, p. 7)

(15) c. Lars e Mari falam norueguês.

Lars and Mari speak.PRES.3PL Norwegian

‘Lars and Mari speak Norwegian’

d. Lars fala norueguês.

Lars speak Norwegian

‘Lars speaks Norwegian.’

In sum, our study corroborates previous studies indicating that bilinguals are less sensitive than native speakers with respect to violations involving functional morphology. This difference between bilinguals and native speakers was observed in their acceptability ratings for sentences with a missing inflectional morpheme, but not for sentences with an oversupplied inflectional morpheme. We interpreted that the lack of salience of missing morphemes and possibly the cue weights from the L1 were responsible for the aforementioned behavior in our timed acceptability judgment task. Neither proficiency nor immersion played a significant role in our tasks.

5. Final Remarks

Our study aimed to shed light on current knowledge of cognitive processes that seem to be specific to bilingual speakers. More specifically, we analyzed the behavior of bilinguals with respect to correct and incorrect use of functional morphology in the L2. We conducted two acceptability judgment tasks with BPE bilinguals. In our first experiment, we observed that both participants with lower and higher levels of proficiency were capable of making such distinctions. However, the data from our second experiment indicated that bilinguals were not as sensitive as native speakers for the absence of functional morpheme, but they were sensitive to its incorrect use. This effect was observed in both immersed and non-immersed bilinguals, which made us discard the influence of input quantity. We interpreted that the incorrect use of morphemes is a more salient violation than the incorrect absence of morphemes, which in turn makes the former more noticeable for bilinguals. The comparison of our findings to other studies suggests that L1 cue weights and time pressure can also influence bilinguals’ difficulty with functional morphology in the L2.

We hope our study encourages future research, as our initial findings leave room for further questions. Investigating what is cognitively difficult to acquire in the L2 is important for understanding the functioning of the bilingual cognitive system and for optimizing the L2 learning process. Consequently, the more we understand what makes L2 functional morphology difficult to acquire in the L2, the more we understand the differences between L1 and L2 processing so as to propose pedagogical strategies for bilinguals to circumvent this linguistic challenge and reach very high levels of proficiency.

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