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**THE ROLE OF TYPOLOGY AND PROFICIENCY IN L2
PROCESSING OF BRAZILIAN PORTUGUESE AND ENGLISH
VERBAL MORPHOLOGY: AN EYE-MOVEMENT STUDY**

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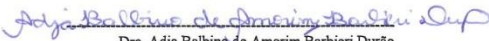
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"No doubt those who really founded modern science were usually those whose love of truth exceeded their love of power."

C.S. Lewis

The Abolition of Man

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¹Collins, F. S. (2006). The Language of God. Free Press.

ABSTRACT

The focus of this study is on the role of the first language (L1) typology and second language (L2) proficiency in the processing of regular past tense verbs in L2 Brazilian Portuguese (BP) and L2 English. The linguistic processing of intermediate and advanced L2 learners from typologically different L1 and L2 was assessed. Specifically, the verb morphological processing of L2 learners of BP (L1 speakers of English) and L2 learners of English (L1 speakers of BP) at intermediate and advanced proficiency levels in the L2 was compared by means of the eye-movement method. The predictions of two theories in the Second Language Acquisition literature — the Unified Competition Model (MacWhinney, 2005) and the Associative-Cognitive CREED (Ellis, 2006a) — were considered in order to explain the persistent problems of L2 learners with verbal inflection. Data were collected from a total of 16 participants – 4 advanced L2 learners of English, 4 intermediate L2 learners of English, 5 advanced L2 learners of BP and 3 intermediate L2 learners of BP. Participants were divided into two groups: (a) L2BP (L2 learners of BP) and (b) L2EN (L2 learners of English). The following materials were employed in this study: (a) a linguistic background questionnaire; (b) a proficiency assessment test based on the CELPE-Bras writing section for the L2 learners of BP; (c) a proficiency assessment test based on the TOEFL iBT writing section for the L2 learners of English; (d) a Sentence Comprehension Task in BP; (e) a Sentence Comprehension Task in English. The Sentence Comprehension Tasks consisted of grammatical sentences in which the target words were regular past tense verbs in BP and in English. The two groups of bilinguals were asked to perform the Sentence Comprehension Task in both their L1 and L2. Results show that there was no significant difference in language processing between the L2BP group and the L2EN group, which means that the cross-linguistic differences between L2 learners' L1 and L2 (i.e., L2 learners' L1 typology) did not affect the processing of L2 verbal inflection between the groups. However, the L1 typology might have had an effect on L2 morphological processing of the L2BP group. This influence may be attributed to the fact that English lacks morphosyntactic features existent in BP, resulting in extra processing cost in the Sentence Comprehension Task in BP. As regards the role of proficiency, results indicate that there was no statistically significant correlation between proficiency and the eye-tracking measures for either of the groups. Particularly, the results of the present study demonstrate that L2 learners can process their target language

almost indistinguishably from native speakers regardless of their proficiency level and L1 background. Nonetheless, the L2 learners of BP processed their L2 in qualitatively different ways than they processed their L1, indicating that the morphosyntactic differences between BP and English may have played a role in the L2 processing of English-speaking learners of a Romance Language.

Keywords: Verb morphological processing. L2 learners of BP. L2 learners of English. L1 typology. Proficiency.

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RESUMO

O foco desta pesquisa está no papel da tipologia da primeira língua (L1) e da proficiência da segunda língua (L2) no processamento de verbos regulares no passado em português brasileiro (PB) e inglês como L2. O processamento linguístico de aprendizes de L2 com diferentes níveis de proficiência, cujas L1 e L2 são tipologicamente diferentes, foi avaliado. Especificamente, o processamento da morfologia verbal em L2 de aprendizes com níveis intermediário e avançado em PB (falantes nativos de inglês) e em inglês (falantes nativos de português) foi comparado através do método de rastreamento ocular. As predições de duas teorias existentes na literatura de Aquisição de Segunda Língua — o Modelo Unificado de Competição (MacWhinney, 2005) e a Teoria Associativa-Cognitiva CREED (Ellis, 2006a) — foram consideradas para explicar os problemas persistentes de aprendizes de L2 com a flexão verbal. Dados foram coletados de um total de 16 participantes – 4 aprendizes avançados de inglês-L2, 4 aprendizes intermediários de inglês-L2, 5 aprendizes avançados de PB-L2 e 3 aprendizes intermediários de PB-L2. Os participantes foram divididos em dois grupos: (a) L2BP (aprendizes PB-L2) e (b) L2EN (aprendizes de inglês-L2). Os seguintes materiais foram utilizados neste estudo: (a) um questionário sobre o perfil linguístico dos participantes; (b) uma avaliação de proficiência baseada na seção de escrita do CELPE-Bras para os aprendizes de PB-L2; (c) uma avaliação de proficiência baseada na seção de escrita do TOEFL iBT para os aprendizes de inglês-L2; (d) uma tarefa de compreensão de sentenças em PB; (e) uma tarefa de compreensão de sentenças em inglês. As tarefas de compreensão de sentença consistiam de frases gramaticais em que as palavras-alvo eram verbos regulares no passado em PB e em inglês. Os dois grupos de bilíngues executaram a tarefa de compreensão de sentenças em sua língua nativa e em sua L2. Os resultados desta pesquisa demonstram que não houve diferença significativa no processamento das sentenças entre o grupo de L2BP e o grupo de L2EN, o que significa que as diferenças translinguísticas entre a L1 e a L2 dos participantes não tiveram efeito sobre o processamento da flexão verbal em L2 entre os grupos. Todavia, a tipologia da L1 pode ter tido um efeito sobre o processamento morfológico do grupo L2BP. Essa influência pode ser atribuída ao fato de que o inglês carece de recursos morfossintáticos existentes no PB, resultando em custo extra de processamento na tarefa de compreensão de sentenças em PB. Quanto ao papel da proficiência, os resultados indicam que não houve correlação estatisticamente significativa entre proficiência e as medidas

do rastreador ocular para nenhum dos grupos. Particularmente, os resultados do presente estudo demonstram que os aprendizes de L2 podem processar sua língua-alvo quase indistintamente de falantes nativos, independentemente do seu nível de proficiência e L1. No entanto, os aprendizes de PB-L2 processaram a sua L2 de forma qualitativamente diferente da forma em que eles processaram a sua L1, o que demonstra que as diferenças morfossintáticas entre o PB e o inglês podem ter exercido um efeito sobre o processamento de L2 de falantes nativos de inglês cuja L2 é uma língua românica.

Palavras-chave: Processamento da morfologia verbal. Aprendizes de PB-L2. Aprendizes de inglês-L2. Tipologia da L1. Proficiência.

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CHAPTER 1 INTRODUCTION

1.1 PRELIMINARIES

It is generally assumed that late L2 learners have a decline in their implicit language learning mechanisms because of the expansion of non-linguistic cognitive abilities (Newport, 1990; Portin, Lehtonen, Harrer, Wande, Niemi & Laine, 2008). Consequently, learning a second language (L2) in adulthood is a challenge for L2 learners since the decline in their linguistic abilities implicates difficulties to incorporate the grammar rules of the target language in order to perform within the native range (Hopp, 2007; Hopp, 2010; Jiang, 2004; Portin et al., 2008, Ullmann, 2005). In addition to cognitive factors, it has been observed that the structural similarities and differences between the native language (L1) and L2, as well as proficiency level may have an effect on the way late learners acquire and process their L2 (Ellis, 2006a; Ellis, 2006b; Gor, 2010; Hanson & Carlson, 2014; MacWhinney, 2005; Portin et al. 2008; Sagarra & Herschensohn, 2010).

It is noteworthy that one of the structural aspects on which languages differ considerably from each other is inflectional morphology (Portin et al., 2008). For instance, Brazilian Portuguese (BP) is a morphologically rich language (Ayoun & Salaberry, 2005) whereas languages like English have more limited inflectional morphology (Bennett & Partee, 1972; Dabrowska, 2010; Giorgi & Pianesi, 1997; Portin et al, 2008; Landman, 1992; Roberts, 1993; Slabakova, 2010; Slabakova, 2003; Zucchi, 1999). Hence, it has been suggested that the extent of problems with L2 grammar (i.e., inflectional morphology) differs according to L1 typology, which means that L2 learners with L1s that have similar morphosyntactic systems to their L2s have fewer difficulties with inflection than L2 learners whose L1s show impoverished morphology as compared to their L2s (e.g., Franceschina, 2005; Hawkins, 2001; Hopp, 2010; Portin et al., 2008; Sagarra & Herschensohn, 2010).

In view of the fact that cross-linguistic comparisons signal considerable differences among languages, it has been assumed that such differences exert an effect on the processing of inflectional morphology among languages that range in morphological richness (Gor, 2010; Portin et al., 2008). Thus, an interesting question is whether late L2 learners with typologically different L1s employ different morphological processing mechanisms in their L2s. Many studies have

focused on the factors that may hinder L2 processing of inflectional morphology (see Gor, 2010). However, to the best of my knowledge, no studies have investigated these factors in the case of BP and English as a pair of languages, that is, as a first and/or second language. Aiming at contributing to this gap in the literature, the present study explores the effects of the L1 typology on the online processing of L2 BP and L2 English past tense inflected regular verbs across different proficiency levels of L2 BP and L2 English, in order to gain a better understanding of the influence of L2 proficiency and L2 learners' L1 typology on the processing of verbal morphology (e.g., Hanson & Carlson, 2014; Hopp, 2010).

1.2 THE PRESENT STUDY

The objectives of the present study are: (1) to investigate the role of the L1 typology in L2 processing of BP and English past tense regular verbs, and (2) to investigate the role of proficiency in L2 processing of BP and English past tense regular verbs with the aim of extricating the influence of proficiency from that of the L2 learners' L1 typology.

In order to achieve the objectives stated, one online Sentence Comprehension Task in BP and one online Sentence Comprehension Task in English were used in order to assess participants' language processing both in their L1 and L2.

In the present study data was collected from a total of 16 participants, who were divided into 2 proficiency groups. The first experimental group consisted of 8 native speakers of English with advanced and intermediate proficiency in BP as L2, whereas the second experimental group consisted of 8 native speakers of BP with advanced and intermediate proficiency in English as L2. This study was carried out at the Laboratório da Linguagem e Processos Cognitivos (LabLing), situated in the room 511, at Centro de Comunicação e Expressão (CCE), at Universidade Federal de Santa Catarina (UFSC).

1.3 SIGNIFICANCE OF THE RESEARCH

It is generally assumed that L1 typology and proficiency may influence the way late L2 learners process inflectional morphology (Hanson & Carlson, 2014; Gor, 2010; Hopp, 2010). Consequently, it is important to include as many L1s and L2s across different proficiency levels as possible when investigating the processing of verbal inflection.

Most research in the area of inflectional morphology has focused on the processing of past tense inflected verbs in English as L1 (e.g. Joanisse & Seidenberg, 1999, 2005; Newman, Ullman, Pancheva, Waligura & Neville, 2007; Stockall & Marantz, 2006; Ullman, Corkin, Coppola, Hickok, Growdon, Koroshetz & Pinker, 1997), with few studies investigating the processing of past tense inflected verbs in English as L2 involving participants with morphologically complex native languages (e.g., Baltazar, 2012; Birdsong & Flege, 2001; Kahoul, 2014; Perrino, 2012), some studies investigating the morphological processing of English as L2 by learners from different L1 backgrounds focusing on functional categories other than past tense inflection (e.g., Jiang, 2004; Barto-Sisamout, Nicol, Witzel & Witzel, 2009), and other studies focusing on the morphological processing of highly inflected languages as L2 by native speakers of English and of other L1 backgrounds (e.g., Foucart & Frenck-Mestre, 2012, Hopp, 2010; Portin et al., 2008; Sagarra & Herschensohn, 2010). With the aim of overcoming the constraints imposed by English past tense inflection, a series of studies were devoted to L2 acquisition and processing of languages with rich inflectional morphology (Gor, 2010) (e.g., Bowden, Foucart & Frenck-Mestre, 2011; Gelfand Sanz & Ullman, 2010; Gor & Cook, 2010; Portin et al., 2008; Kempe, Brooks & Kharkhurin, 2010; Sagarra & Herschensohn, 2010; Hopp, 2010). To the best of my knowledge, there are no published studies focusing on a comparison between native speakers of English processing L2 BP verbal morphology and native speakers of BP processing L2 English verbal morphology. Thus, the primary significance of this study is that it provides new data on the processing of L2 English verbal morphology by native speakers of BP, as well as it provides data on the processing of L2 BP verbal morphology by native speakers of English. In other words, the rationale for choosing L2 learners of BP and L2 learners of English is the cross-linguistic similarities and dissimilarities these languages bear to each other, given the fact that BP is a highly inflected language as compared to English.

Additionally, this study adopts a cross-sectional design including L2 learners from two proficiency levels of BP and English as L2: advanced and intermediate. Therefore, the present study offers a broader view of what may exert an effect on L2 processing. Finally, this study adds to research on L2 processing of verbal morphology by providing data obtained with the eye movement method, which allows for the investigation of online linguistic processing without the influence of

participants' metalinguistic knowledge (Roberts & Siyanova-Chanturia, 2013).

1.4 ORGANIZATION OF THE THESIS

This thesis is divided into 5 Chapters. Chapter 1 provides an overview of the present study, including the significance of this research and the organizational structure of the thesis. Chapter 2 presents the review of literature and it is divided into 4 main Sections. These Sections discuss L2 morphological processing, including a review on theories and previous studies which focused on the effects of L1 transfer and proficiency on the target language. Chapter 3 describes in detail the method followed in order to conduct this study. First, it provides the objectives, research questions and hypotheses of the study, followed by a description of the participants and a description of the materials used. Then, it describes the data collection procedures and the procedures for data analysis. Chapter 3 ends with an account of the pilot study carried out prior to data collection. Chapter 4 reports the results and discussion for the results. It presents the descriptive and inferential statistical analyses, followed by the correlations and the answers to the research questions. Finally, Chapter 5 presents the conclusions regarding the roles of L1 typology and proficiency on L2 processing of past tense inflected regular verbs in BP and English. It also provides the limitations of the present study and offers suggestions for further research. It ends with the methodological and pedagogical implications of the present study.

CHAPTER 2 REVIEW OF THE LITERATURE

The aim of this chapter is to introduce the theoretical framework of the present study. This chapter is divided into five main sections and it starts with an overview of early studies on L2 inflectional morphology in Section 2.1. Section 2.2 presents a review of previous research on L2 processing of inflectional morphology and it is subdivided into four subsections that aim at outlining relevant studies on L2 processing in the context of which the present study should be situated. Section 2.3 reports the two theoretical predictions of the L2 processing of past tense verbal morphology. Section 2.4 presents the cross-linguistic differences between BP and English. Finally, Section 2.5 provides a brief account of the eye-movement method in L2 processing research.

2.1 EARLY STUDIES ON L2 INFLECTIONAL MORPHOLOGY

L2 learners' difficulty with inflectional morphology has motivated researchers to study it more thoroughly in order to shed light on what makes morphological acquisition and processing so elusive (Larsen-Freeman, 2010). It was in the 1970's, as we shall see, that studies on L2 inflectional morphology became a significant part of the Second Language Acquisition (SLA) research program.

The early studies carried out on the acquisition of L2 morphology, known as "The Morpheme Studies", were inspired by research on L1 acquisition, which aimed at investigating the order of acquisition of grammatical functors, such as articles and inflectional features (Ellis, 2008). By focusing on errors and omissions of morphological markers in L2 production in sentences, "The Morpheme Studies" tried to establish whether, as in L1 acquisition, there was an invariant order of acquisition in L2 (Ellis, 2008). Thus, a selection of the most relevant early studies on L2 inflectional morphology will be described in chronological order to show how research on this subject progressed throughout the years.

Dulay and Burt (1973) conducted a behavioral study that focused on "naturalistic" spoken data using the Bilingual Syntax Measure (BSM) with Spanish-speaking children. Their results showed evidence that children acquired certain L2 morphemes in a universal and natural order (Dulay & Burt, 1973). Dulay and Burt (1974) carried out a further study using the BSM with Spanish and Chinese speaking children. The results indicated that both groups of children acquired the same

morphemes in a similar order (Dulay & Burt, 1973). Another study that used the BSM was conducted by Bailey, Madden and Krashen (1974). Bailey et al. (1974) recruited Spanish and non-Spanish speaking adults, learners of English as L2 for their study. Their aim was to investigate oral accuracy of usage for eight English functors (Bailey et al., 1974). The results from Bailey et al.'s (1974) study suggested that there was a very consistent order of difficulty in the use of the functors by L2 learners from different L1 backgrounds (Bailey et al., 1974). Bailey et al. (1974) concluded that although adults use similar strategies to acquire L2 morphemes regardless of their L1 or L2, adult L2 acquisition orders are different from those of the L1 (Bailey et al., 1974). Their conclusion support the results presented in the study by Dulay and Burt (1973) (Bailey et al., 1974).

Following the studies afore mentioned, Larsen-Freeman (1976) carried out an investigation with adults from different L1 backgrounds (e.g., Arabic, Japanese, Persian and Spanish), all L2 learners of English (Larsen-Freeman, 1976). Participants had to perform five different reading, writing, listening, speaking and imitating tasks (Larsen-Freeman, 1976). The results from Larsen-Freeman's (1976) study demonstrated that participants' L1 did not affect their learning of morphemes (Larsen-Freeman, 1976).

In the 1990's, Dietrich, Klein and Noyau (1995) conducted a study which considered the role of instruction in past tense inflectional morphology (Dietrich et al., 1995). By examining learners of Dutch, French, German, Swedish and English, the researchers could demonstrate that learners' use of past tense goes through systematic stages, in which first, learners rely on pragmatics referring to the past tense through lexical expressions such as "yesterday" and "then" without showing evidence of verbal inflectional morphology, and then learners' verbal inflectional morphology appears, but they still rely on pragmatics and lexicon to convey the past tense (Dietrich et al., 1995). The results of this study showed that (1) the acquisition of past tense morphology only becomes stable along time, and (2) learners who receive instruction are more prone to applying the rules of past tense morphology correctly (Dietrich et al., 1995).

DeKeyser (2000) conducted a study that focused on the role of age of onset in L2 inflectional morphology with native speakers of Hungarian that resided in the United States for at least ten years (DeKeyser, 2000). A grammaticality judgment test was designed with a multiple-choice answer sheet in order to collect data from high and low proficiency L2 learners (DeKeyser, 2000). The data indicated that age of

arrival influenced the performance of L2 learners who started to learn the target language as adults. Consequently, the results from DeKeyser's (2000) study presented evidence for a correlation between age and aptitude (DeKeyser, 2000). DeKeyser (2000) concluded that adults could only reach native-like competence in L2 morphosyntax if they had been able to rely on explicit knowledge, suggesting that grammaticality judgment tests are seldom performed by advanced L2 learners in a native-like fashion (DeKeyser, 2000).

In sum, it is noteworthy that the early studies on L2 inflectional morphology have sought to explain the phenomenon of errors and omissions in L2 morphological markers. These studies obtained offline data from morpheme acquisition studies, which relied mainly on speech production tasks and other techniques that did not tap into non-native language processing. Hence, the following sections describe previous studies which tapped into L2 processing and contributed to the evolution of research in the field of L2 inflectional morphology. Figure 2.1 provides a brief timeline that synthesizes the theoretical framework of the present study.

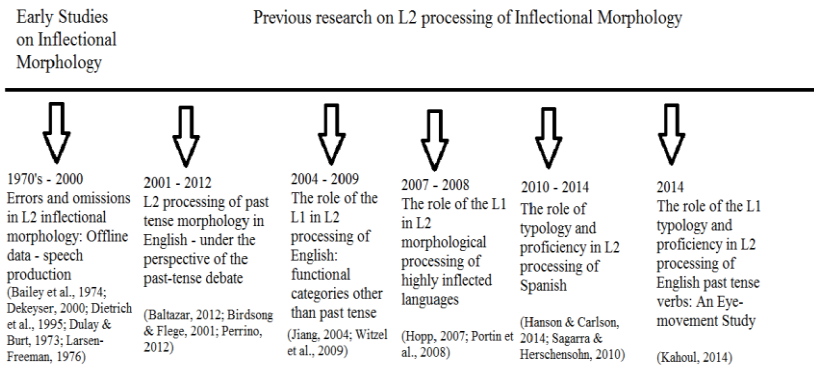


Figure 2.1 Timeline: synthesis of the theoretical framework of the present study.

2.2 PREVIOUS RESEARCH ON L2 PROCESSING OF INFLECTIONAL MORPHOLOGY

This section reports previous research that focused on L2 processing of inflectional morphology and aims at presenting an

overview on studies that are comparable to the focus of this investigation. This section is subdivided into four subsections. First, subsection 2.2.1 describes previous research on L2 processing of English past tense morphology. Second, subsection 2.2.2 presents previous research on English L2 processing which focused on functional categories other than past tense. Third, subsection 2.2.3 reviews relevant previous studies on L2 processing which focused on the role of the L1 in L2 morphological processing of highly inflected languages. Finally, subsection 2.2.4 reports previous studies on L2 processing which investigated the roles of the L1 typology and proficiency in L2 morphosyntactic processing of highly inflected languages.

2.2.1 Previous research on L2 processing of English past tense inflected verbs

Previous prominent studies on the processing of inflectional morphology primarily focused on distinct theories of English past tense as L1. These theories have opened the past-tense debate about dual and single mechanism systems (e.g., Joanisse and Seidenberg, 2005; Stockall and Marantz, 2006; Ullman et al., 1997) and have been supported by behavioral and neurofunctional evidence coming from L1 adults and children (Birdsong & Flege, 2001). The so called past-tense debate is one of the main reasons why inflectional morphology has become a relevant topic of investigation in language processing (Baltazar, 2012; Stockall & Marantz, 2006), including L2 inflectional morphology. Thus, this subsection aims at presenting four relevant studies on L2 processing of English verbal morphology. The experiments reported in this subsection will be described in chronological order.

Birdsong and Flege (2001) conducted a behavioral study that examined the processing of regular and irregular inflected forms in English by highly proficient Korean and Spanish L2 learners who had their age of arrival controlled (Baltazar, 2012; Birdsong & Flege, 2001). This study was carried out under the context of the past-tense debate. Participants were divided into two groups according to their native language. Stimuli consisted of 80-multiple choice items, from which 40 items tested English regular and irregular past tense (20 high frequency verbs and 20 low frequency verbs) and the other 40 items tested English regular and irregular noun plurals (20 high frequency verbs and 20 low frequency verbs). The stimuli were presented to each participant on a laptop computer screen. The data collected for this experiment

demonstrated main effects for age of arrival, regularity and frequency (Birdsong & Flege, 2001). The results from Birdsong and Flege's (2001) study indicated frequency effects in the processing of irregular verbs and nouns and showed a larger age of arrival effect over irregular verbs and nouns than over regular verbs and nouns. Thus, Birdsong and Flege (2001) concluded that their study show empirical evidence for the dual-mechanism view (e.g., Ullman et al., 1997).

Also under the perspective of the past-tense debate, Perrino (2012) investigated the effects of age, proficiency and individual differences on the processing of regular and irregular verbs in English by native speakers of BP. Participants were divided into three groups: (1) Advanced L2 learners of English, native speakers of BP, (2) Beginner L2 learners of English, native speakers of BP, and (3) native speakers of American English. A behavioral task was applied to participants in order to tackle frequency effects of regular and irregular English verbs. Participants' performance in the behavioral task was assessed by means of reaction time and accuracy. A Simon task was used in order to measure participants' attentional processes and executive control, whereas a letter-number ordering task was used to measure participants' working memory capacity. The results from Perrino's (2012) study presented evidence for the single mechanism view and indicated that proficiency and age, together, played a significant role in the processing of English past tense inflected verbs. No effects were found for inhibitory control or working memory capacity.

Baltazar (2012) carried out another study with bilinguals, native speakers of BP. Also under the perspective of the past-tense debate, Baltazar (2012) investigated the roles of proficiency and individual differences (working memory capacity and inhibitory control function) in the processing of regular and irregular past tense morphology of English as L1 and L2 (Baltazar, 2012). Participants were divided into three groups: (1) native speakers of BP, with low proficiency in L2 English, (2) native speakers of BP, with high proficiency in L2 English, and (3) native speakers of English (Baltazar, 2012). In order to assess participants' language processing, they were asked to perform 3 tasks: (1) the frequency effects task, (2) the Simon task, and (3) the letter-number ordering task. The results from Baltazar's (2012) study demonstrated that proficiency in the L2 had an effect on the processing of L2 English verbal morphology. Nonetheless, the results from the frequency effects task indicated that individual differences did not influence participants' processing of English past tense verbs, meaning

that only the linguistic nature (e.g., morphosyntactic features) of the English language affected the processing of English verbal morphology (Baltazar, 2012). Moreover, Baltazar's (2012) study showed evidence for the single mechanism view for language processing (Baltazar, 2012).

Kahoul (2014) investigated the roles of the L1 typology and proficiency in L2 processing through the phenomenon of variability (errors and omissions) in the use of English past tense and verbal agreement morphology by native speakers of Arabic and Mandarin Chinese. Three groups of participants were recruited for this study: (1) native speakers of Arabic, L2 learners of English, (2) native speakers of Chinese, L2 learners of English, and (3) native speakers of English (the control group). In order to assess the influence of proficiency on L2 processing, the study adopted a cross-sectional design which included L2 learners from a range of proficiency levels: Beginner, intermediate and advanced. To test the processing of past tense and verbal agreement, Kahoul (2014) used a computerized picture-choice task which was combined with reaction time and eye-movement measures (Kahoul, 2014).

Two eye-tracking measures were selected for analysis: (1) fixation time (the total length of time spent on a target word) and (2) sensitivity measure (the time a participant takes to initiate the first look on the target word). The results suggested that L2 learners' L1 typology plays a role in the acquisition and processing of past tense and verbal agreement in English. Interestingly, the L1 did not exert an effect at lower proficiency levels (both Arab and Chinese L2 learners performed similarly at low and intermediate levels of proficiency). However, the two groups of participants showed a significant difference from each other at the high proficiency level as the Arabic L2 learners of English outperformed the Chinese (Kahoul, 2014).

Since only Arabic marks verbs for past tense and verb agreement, Kahoul (2014) suggested that the Chinese group diverged from the Arabic group because Chinese does not have the relevant morphosyntactic features necessary to process L2 English similarly to native speakers. Kahoul (2014) argued that the source of variability in English past tense and verbal agreement is due to a temporary absence of relevant syntactic representations in L2 learners' L1, meaning that this might be the reason why L2 learners take longer to instantiate L2 morphological features. Thus, Kahoul (2014) concluded that the L1 typology plays a role in L2 acquisition and processing. Nevertheless, L2 learners can overcome L2 variability with rising proficiency.

Considering the studies reviewed in this subsection, it can be concluded that the L2 processing of English past tense inflected verbs has been well studied from the past-tense debate perspective. Nonetheless, studies such as Kahoul (2014) show that research on L2 morphological processing has been trying to explain why L2 learners have problems with inflectional morphology by shedding new light on some of the factors that may constrain L2 morphological processing (Gor, 2010; Hopp, 2010). Hence, the next subsection presents a review of two relevant studies which tried to explain the nature of morphological difficulty in adult L2 learners. These studies also investigated the morphological processing of English. However, they focused on functional categories other than past tense inflection.

2.2.2 Previous research on English L2 processing: the role of the L1 in L2 morphological processing- focusing on functional categories other than past tense

The problematic nature of L2 inflectional morphology in late L2 learners has been fairly acknowledged by a large body of SLA research which focused on the limits of L2 acquisition and processing (Hopp, 2010). Although problems with L2 inflection are most noticeable in L2 production, research has shown that they also surface in L2 comprehension and L2 processing (Clahsen & Felser, 2006; Hopp, 2010). Thus, this subsection aims at reporting two studies which focused on the role of the L1 typology in L2 morphological processing of English as L2 by learners from different L1 backgrounds. These studies are distinct from the studies described in subsection 2.2.1 due to the fact that, besides focusing on the role of the L1 typology on L2, they focused on English functional categories other than past tense inflection. The first experiment reported in this subsection was conducted by Jiang (2004), whereas the second experiment was carried out by Witzel et al. (2009). The two studies will be described in chronological order.

Jiang (2004) tested the potential effects of L1 transfer in highly proficient late L2 learners by examining their processing in reading comprehension tasks. Two groups of participants were recruited for Jiang's (2004) study: (1) L2 learners of English with Chinese as their native language, and (2) English native speakers (who served as the control group). Three experiments were assigned to the two groups of participants. The focus of the experiments was to determine whether native and non-native speakers of English displayed a difference in reading times between the sentence conditions in the stimuli.

In the first experiment, participants had to perform a three self-paced word by word reading comprehension task in English in which the stimuli consisted of grammatical sentences that were presented to each participant on a computer monitor (Jiang, 2004). While performing the task, participants' reading times were measured to determine if they were sensitive to idiosyncrasies in sentences that do and do not involve the number morpheme (i.e., inflectional bound morpheme for plurals in English). The results of this experiment demonstrated that non-native speakers took longer to read plural nouns and singular nouns, which resulted in a significant difference in processing time between L2 learners and native speakers.

The second experiment that Jiang (2004) assigned to participants was different from the first since sentences in experiment 2 were ungrammatical and presented subject-verb number disagreement. Participants' sensitivity to the morphological violations was tested. Results obtained from experiment 2 showed that non-native speakers' performance was significantly different from the native speakers', replicating the findings in experiment 1.

The third experiment aimed at replicating the second experiment with more test items. In the third experiment, two structures were under investigation: pronoun-verb agreement in number and subcategorization. Results from the third experiment also demonstrated that L2 learners had a significant difference in their performance as compared to native speakers. Thus, the results from Jiang's (2004) three experiments demonstrated that Chinese participants displayed insensitivity to the English plural morpheme, suggesting that their difficulty with this particular functional category in English may be due to the fact that grammatical number is rarely encoded in Chinese. Also, the results showed that practice in the target language seems to be insufficient to foster native-like L2 processing of inflectional morphology. Thus, the findings from Jiang's (2004) study indicated that pronoun-verb agreement and subcategorization can be integrated in L2 learners who are native speakers of Chinese, but inflectional morphemes such as the plural *-s* cannot due to the influence of learners' L1 typology. Jiang (2004) stated that further research is necessary in order to conclude whether the morphological insensitivity found in Chinese L2 learners of English is a universal phenomenon or is specific to L1 Chinese.

Witzel et al. (2009) investigated transfer effects in L2 sentence processing in English. Three groups of participants were recruited for this study: (1) Spanish L2 learners of English, (2) native speakers of English, and (3) Chinese L2 learners of English. The English native

speakers and the Chinese L2 learners of English were recruited in order to compare their performance with that of the Spanish L2 learners of English, so that it would be possible to identify a clearest sign of transfer effects (Witzel et al., 2009). Witzel et al.'s (2009) experiment consisted of two sentence types that were designed to assess the effects of the relationships between L1 and L2 on the processing of grammatical morphology during online L2 sentence comprehension. The sentence types under investigation included possessive pronouns and personal and non-personal direct objectives. Witzel et al. (2009) explained that the possessive pronouns in the stimuli allowed for a test of L2 sentence comprehension where a similar but different relationship existed between the morphosyntactic systems of participants' L1 and L2, whereas the personal and non-personal direct objectives allowed for a test of L2 sentence comprehension where participants' L1 system held that specific linguistic aspect but their L2 did not. Data was collected individually by means of a self-paced moving window task, which was presented, on a computer screen. Participants were asked to press the right button on a button box in order to see the first segment of the sentences. When each sentence finished, participants were either asked a comprehension question or a new item appeared on the screen. Two possible answers were provided for the comprehension questions and participants were instructed to answer the questions by pressing the left or the right button on the button box while DMDX software recorded their reading times and responses to the comprehension questions. Witzel et al. (2009) predicted that non-native participants would display processing difficulty due to transfer effects. However, their predictions related to transfer were not confirmed. Thus, the results obtained from this study indicated that all participant groups exhibited very similar processing patterns, meaning that the Spanish L2 learners of English did not show L1 interference effects during the online comprehension of the L2 items of interest. Overall, Witzel et al. (2009) concluded that their study failed to indicate transfer effects.

This subsection reviewed two important studies that focused on the potential influence of the L1 on the morphological processing of functional categories other than past tense inflection in English as L2. The following subsection will review studies that investigated the potential influence of the L1 typology on the morphological processing of highly inflected languages as L2.

2.2.3 Previous research on L2 processing: the role of the L1 in L2 morphological processing of highly inflected languages

This subsection aims at reporting two studies that focused on the role of the L1 typology in L2 morphological processing by learners from different L1 backgrounds. These studies are distinct from the studies described in subsection 2.2.2 because they focused on L2 processing of highly inflected languages (Swedish and German). The studies presented in this subsection will be summarized in chronological order.

Portin et al. (2008) investigated the effects of the L1 typology on the recognition of L2 Swedish inflected nouns. In their study, two groups of L2 learners with typologically different L1s (Hungarian and Chinese) took part in a visual lexical decision task. Chinese native speakers and Hungarian native speakers were recruited for the experiment. Participants self-evaluated their linguistic skills in speaking, writing, listening and reading comprehension. The self-evaluations showed that the skills in their native language, as well as in a third language (English) were equal in both groups. In regards to their L2 (Swedish), the Chinese participants evaluated their language skills to be rather lower when compared to the Hungarian group. Participants' evaluation of their L2 consisted of a test designed to assess their pronunciation, vocabulary and sentence structure in spoken Swedish where a linguistically trained Swedish speaker rated their performance in a scale from 1 to 8 points. The groups did not show significant differences in their evaluation of pronunciation or sentence structure. However, for vocabulary, the Chinese participants presented lower skills than the Hungarian participants did. Concerning the visual lexical decision task, participants had to decide as quickly as possible whether a letter string displayed at the center of the computer screen was a Swedish word or not. Participants' reaction times in milliseconds and the correctness of the responses were recorded by a reaction time program. It took about thirty minutes for participants to complete the experiment that had a total of 160 stimuli (lower and higher frequency inflected nouns in Swedish) which were presented to each participant individually. The results showed that the reaction time in L2 Swedish was different in the two groups. The Hungarian participants displayed a processing cost for the target words at the lower and medium frequency levels but not at the high frequency level, whereas the Chinese participants presented similar reaction times at all frequency levels. The results from Portin et al.'s (2008) study indicated that the Hungarian participants applied morphological decomposition in L2 Swedish low

and medium frequency inflected nouns, and full-form processing in L2 Swedish high frequency inflected nouns. On the other hand, the Chinese group showed a full-form processing pattern, probably due to the very impoverished inflectional system of their native language. Specifically, the reaction time analysis showed that morphological processing in L2 Swedish was different in the two groups of participants (Portin et al., 2008). Hence, Portin et al. (2008) concluded that the L1 typology plays an important role in L2 processing of inflected nouns in Swedish, suggesting that the results obtained within the group of Chinese learners of Swedish reflected a strategy transfer from their L1 to their L2. Moreover, the researchers highlighted the need for models on L2 learning that provide an account for transfer effects between L1 and L2 at different linguistic levels.

Hopp (2007) carried out a series of experiments which focused on off-line and online use of grammatical knowledge at L2 German ultimate attainment. Specifically, Hopp's (2007) study aimed at identifying convergences and non-convergences between native speakers and high-proficient L2 learners. Participants were native speakers of English, Dutch and Russian advanced to near-native speakers of German and native-speaker controls. The experiments presented tasks on German scrambling (a syntactic movement that permits reordering sentence constituents) (Hopp, 2007, Sagarra & Herschensohn, 2010). In this study, Hopp (2007) found that only the near-native L1 Russian group converged on native performance across all experiments applied to participants. Off-line and online data indicated L2 learners' computational limitations in accessing and mapping morphological information to syntax, meaning that non-convergence between native speakers and L2 learners was a consequence of an interaction of computational limitations and L1 effects.

Hopp (2007) draws his conclusions based on the Fundamental Identity Hypothesis (FIH) proposed in his study, which posits that non-native and native grammatical representation and processing architecture display no fundamental differences. However, if differences between native and non-native performance are found, they can be explained as the result of (1) computational resource limitations that affect non-native performance sooner than native performance and (2) L1 transfer in grammatical knowledge and processing.

This subsection described two relevant studies which focused on the potential influence of the L1 on the morphological processing of highly inflected languages. The following subsection will review two

studies which investigated the potential influence of the L1 typology and proficiency on the morphosyntactic processing of Spanish (a highly inflected language) as L2.

2.2.4 Previous research on L2 processing: the roles of the L1 typology and proficiency in L2 morphosyntactic processing of a highly inflected language

This subsection aims at reporting two studies that investigated the same factors that the present study seeks to examine: the role of the L1 typology and proficiency in L2 morphosyntactic processing. The SLA literature provides a myriad of studies that have shown evidence for the effects of proficiency on L2 learning (e.g. Hahne, 2001; Hahne & Friederici, 2001; Hanson & Carlson, 2014; Hopp, 2006; Kahoul, 2014; Ojima et al., 2005; Osterhout et al., 2006; Rossi et al., 2006; Sagarra & Herschensohn, 2010), as well as for the effects of the L1 typology on L2 learning (e.g., Bhela, 1999; Bliss, 2006; Foucart & Frenck-Mestre, 2011; Grüter & Cargo, 2010; Hanson & Carlson, 2014; Hawkins & Chan, 1997; Kahoul, 2014; Sagarra & Herschensohn, 2010). In an attempt to identify the differences between native speakers and L2 learners' linguistic performance, researchers have identified a number of factors that may hinder L2 learning and processing (e.g., Clahsen & Felser, 2006a; Hopp, 2010; Kahoul, 2014). The role of the L1 typology in L2 processing is of particular interest in this study due to the evident contrasts between the morphological system of BP and the morphological system of English. Moreover, the role of the L1 system in L2 learning and processing is one of the most researched and controversial topics in SLA (Kahoul, 2014). However, evidence that supports L1 transfer is still inconclusive (Clahsen & Felser, 2006b; Kahoul, 2014).

In regards to level of proficiency, research has shown that L2 learners with higher proficiency and longer exposure to the target language perform better than their counterparts with lower proficiency (Kahoul, 2014). Although there is a sound body of studies that focused on the effects of the L1 typology and proficiency on L2 learning, only two of these studies will be reported in this subsection since they are directly comparable to the focus of the present study. These studies will be summarized in chronological order.

The first study selected for this subsection was conducted by Sagarra and Herschensohn (2010). The researchers investigated the potential effects of the L1 typology and proficiency on the processing of

L2 gender concord and noun animacy in Spanish with both online and off-line techniques. The researchers wanted to know whether adult L2 learners of an ungendered L1 would be sensitive to gender concord (absent in L2 learners' L1) and noun animacy (present in L2 learners' L1) during L2 processing. Also, Sagarra and Herschensohn (2010) wanted to know whether L2 proficiency would determine such insensitivity. Participants were divided into three groups: (1) Spanish native speakers, (2) beginner L2 learners of Spanish, native speakers of English and (3) intermediate L2 learners of Spanish, native speakers of English. The three groups of participants were asked to perform a moving window task and a grammaticality judgment task (Sagarra & Herschensohn, 2010). The two tasks were written and self-paced experiments in which participants had to complete practice sentences containing grammatical and ungrammatical items individually. Sagarra and Herschensohn's (2010) predictions for gender concord was that Spanish native speakers and intermediate L2 learners would be sensitive to gender agreement violations, whereas beginner L2 learners would be insensitive to violations. As for noun animacy, Sagarra and Herschensohn (2010) predicted that Spanish native speakers and intermediate L2 learners would behave similarly in the tasks by showing longer reaction times and lower accuracy in the grammaticality judgment task.

The results revealed insensitivity to gender concord/discord and agreement with animate/inanimate nouns for beginner L2 learners of Spanish and showed evidence of native-like patterns in intermediate L2 learners both for gender congruency effects and noun animacy effects. Sagarra and Herschensohn (2010) concluded that L2 learners at higher proficiency levels (e.g., intermediate L2 learners) can show computational and representational patterns similar to those of native speakers, suggesting that late L2 learners can reach native-like processing for grammatical features absent in their L1 (Sagarra & Herschensohn, 2010).

The second study selected for this subsection was carried out by Hanson and Carlson (2014), who investigated the roles of the L1 typology and L2 proficiency in the processing of pre-verbal clitics and post-verbal subjects in L2 Spanish (Hanson & Carlson, 2014). The researchers compared the performance of native speakers of English and native speakers of Romanian from various L2 Spanish proficiency levels with an auditory sentence processing task. Participants were divided into three groups: (1) native speakers of Spanish, (2) L2 learners of Spanish, native speakers of Romanian and (3) L2 learners of Spanish, native

speakers of English. The stimuli for the auditory sentence-processing task consisted of prerecorded sentences by a native speaker of Spanish, which were simultaneously presented to participants with a four-picture display on a computer screen.

Participants were asked to choose the picture that best described the sentence they heard. Hanson and Carlson (2014) predicted that (1) the native speakers of Romanian would be more accurate at lower proficiency levels in the processing task than the native speakers of English due to the morphosyntactic system of Romanian and that (2) potential differences between the two L1 groups would be reduced at higher proficiency levels due to L2 learners' increased exposure to the target language (Hanson & Carlson, 2014). The results showed evidence for L1 typology and proficiency effects on L2 processing. The researchers concluded that L2 learners' L1 typology and their L2 proficiency played an important role in the processing of Spanish pre-verbal clitics and post-verbal subjects, suggesting that L2 learners who had experience in their L1 with pre-verbal clitics and post-verbal subjects were more successful in the processing of similar structures in L2 Spanish (Hanson & Carlson, 2014). As a final conclusion, Hanson and Carlson (2014) stated that the results obtained from their study support theories that take into account both language universals and experience over time (e.g., Ellis, 2006a; MacWhinney, 2005).

This subsection described two relevant studies which examined the nature of L2 learners' difficulty with L2 morphology by focusing on the effects of the L1 typology and proficiency on the morphological processing of a highly inflected language (Spanish) as L2. The following section will present a description of two theories that address the issue of the L1 typology and proficiency in L2 learning.

2.3 TWO THEORETICAL PREDICTIONS OF L2 PROCESSING OF PAST TENSE VERBAL MORPHOLOGY

Because the present study aims at investigating the problematic nature of inflection in late L2 learners (i.e., the potential effects of L1 typology and proficiency on L2 morphological processing), this section summarizes two theories in the SLA literature that address the locus of L2 learners' morphological difficulties. Hence, the theories reported in this section address L1 transfer and proficiency as important factors that may affect L2 learning and ultimately may affect L2 processing. This section is subdivided into two subsections. Subsection 2.3.1 presents the Unified Competition Model proposed by MacWhinney (2005), whereas

subsection 2.3.2 outlines the Associative-Cognitive CREED proposed by Ellis (2006a).

2.3.1 The Unified Competition Model (MacWhinney, 2005)

Coming from a connectionist perspective, MacWhinney (1987) proposed the Competition Model, which is currently known as the Unified Competition Model (e.g., MacWhinney, 2005, 2012). According to this model, learning an L2 is a deep process that involves storage, chunking and support to acquire new mappings (MacWhinney, 2005). MacWhinney (2005) argues that L2 learners are forced to map L2 structures onto neural areas that are already occupied by L1 (MacWhinney, 2005). Thus, the fact that L2 acquisition is greatly influenced by the L1 typology is an indication that a model for L2 learning should take into account the structure of the L1 (MacWhinney, 2005). Specifically, the Unified Competition Model posits that the microprocesses involved in L1 and L2 learning have the same core mechanisms. Therefore, it is possible to find a shared basis of learning mechanisms between L1 and L2 that are sufficiently large to justify a unified theory for language learning (MacWhinney, 2005).

At the core of the Unified Competition Model is the idea that linguistic signs are mappings between form and function, which means that languages have a variety of cues that help speakers mark function in a sentence on the basis of probability (Hanson & Carlson, 2010; MacWhinney, 2005). Thus, the Unified Competition Model postulates that cross-linguistic differences in form-function mappings may lead to variation depending on the strength and weight of the cues across languages (Hanson & Carlson, 2010; MacWhinney, 2005). Specifically, the cues that are most common and consistent in a particular language will have larger cue weights for the speakers of that language (Hanson & Carlson, 2010; MacWhinney, 2005).

Since local area maps are already committed to the L1 structures, transfer of L1 cues tends to be a powerful mechanism in L2 learning (MacWhinney, 2005). This means that the L2 system relies on the structures of L2 learners' L1, leading to a parasitic relationship between L2 learners' L1 and the target language due to the extensive amount of transfer from L1 to L2 (Hanson & Carlson, 2010; MacWhinney, 2005).

Taking the Unified Competition Model into account, the L2 learners in the present study are likely to rely heavily on the patterns of their L1 when processing the past tense inflected verbs in their L2. Since BP is a highly inflected language as compared to English, the prediction

is that L2 learners of BP will rely on morphosyntactic cues which are strong and reliable in English when they are processing past tense inflected verbs in BP. In contrast, the L2 learners of English are expected to transfer their reliance on verbal inflection cues in their L1 which may match the cue weightings of English verbal inflection. This suggests that there may be differences in how L2 learners of BP and L2 learners of English process the past tense inflected regular verbs in their target language. However, L2 learners with higher level of L2 proficiency are expected to have already internalized the cue weightings for their target language, converging on the processing behavior of native speakers.

2.3.2 The Associative-Cognitive CREED (Ellis, 2006a)

The Associative-Cognitive CREED proposed by Ellis (2006a) is the second theory selected for this review. As in the Unified Competition Model (MacWhinney, 2005), the Associative-Cognitive CREED postulates that language learning involves the acquisition of structures that map linguistic form and function (Ellis, 2006a). According to this model, competence and performance in the L2 are based on a dynamic system that is a frequency-tune conspiracy of memorized patterns, being competence in the L2 the integrated sum of prior usage, whereas performance is the dynamic contextualized activation (Ellis, 2006a). Therefore, the Associative-Cognitive CREED holds that the L2 reflects prior L1 usage, meaning that the L1 typology defines the ways in which L2 learners attend to their target language (Ellis, 2006a). However, L2 learners adapt their strategies over time and with increased exposure to the target language, they start to incorporate the new patterns of their L2. In other words, rising proficiency and learned attention to particular L2 cues allow L2 learners to align their processing with the L2 system (Ellis, 2006a). Hence, the Associative-Cognitive CREED suggests that L2 learners' limitations can be overcome as they get engaged in conscious interactions which provide them explicit form-focused feedback in order to allow them socially scaffolded development. Ellis (2006a) argues that a fundamental principle of the Associative-Cognitive CREED is that the cognitive processes involving L2 learning are the same as the rest of human cognition. Therefore, learning an L2 consists of associative types of learning and cognitive types of learning that involve conscious, explicit, deductive and tutored processes (Ellis, 2006a).

Although increased exposure to certain L2 structures may help L2 learners in their acquisition, less salient structures, such as bound inflectional morphemes and grammatical function words (which are difficult to perceive) may be obfuscated by more salient cues (Ellis, 2006a; Hanson & Carlson, 2014). Ellis (2006a) explains that most of the form-meaning mappings that are difficult for L2 learners to process display low salience (Ellis, 2006a; Hanson & Carlson, 2014). Past tense inflected verbs fit this description. Thus, in the present study, it is expected that the L2 learners of English (native speakers of BP) will exhibit more sensitivity to subtle cues in their target language than the L2 learners of BP (native speakers of English) will do in their target language, due to the highly inflected nature of BP. Also, by testing L2 learners across different proficiency levels, it will be possible to observe whether the higher proficiency L2 learners will display more native-like behavior than the L2 learners with lower proficiency.

Summing up, the two theories presented posit that L2 learners' L1 typology exert an effect on L2 acquisition. Furthermore, the theories suggest that L2 learners at higher levels of proficiency are expected to converge on the behavior of native speakers. The following section presents an outline of the morphosyntactic mismatches between BP and English.

2.4 CROSS-LINGUISTIC DIFFERENCES BETWEEN BP AND ENGLISH

BP and English have two different tense and aspectual systems. Since the functional category under scrutiny for the present study is past tense inflection, this section aims at outlining the morphosyntactic mismatches between BP and English past tense verbal morphology.

Many researchers have argued that English inflectional morphology is an impoverished and unrepresentative example of morphological development (e.g., Ayoun & Salaberry, 2005; Bennett and Partee, 1972; Dabrowska, 2010; Giorgi & Pianesi, 1997; Landman, 1992; Roberts, 1993; Slabakova, 2003; Zucchi, 1999). For instance, English verbs can convey several verbal values due to the fact that they are “naked” forms, such as the bare infinitive, which can also be the first and second person singular, and the first, second and third person plural (Giorgi & Pianesi, 1997; Slabakova, 2003). Furthermore, many English words can be categorically ambiguous since they can either represent an object or an action (e.g., *cry*, *play*, *drive*) (Giorgi & Pianesi, 1997; Slabakova, 2003). As a consequence, disambiguation in English verbs

happens when verbs are marked in the lexicon with the aspectual feature [+perf] (i.e., perfective), meaning that English eventive verbs become categorical features by being associated with the aspectual marker [+perf] (Giorgi & Pianesi, 1997; Slabakova, 2003). Table 2.1 provides an overview of the past tense regular verbal inflection in English.

Subject pronouns	<i>Love</i>	<i>Work</i>	<i>Visit</i>
I	LOVED	WORKED	VISITED
You	LOVED	WORKED	VISITED
He, She, It	LOVED	WORKED	VISITED
We	LOVED	WORKED	VISITED
You	LOVED	WORKED	VISITED
They	LOVED	WORKED	VISITED

As can be seen in Table 2.1, the English verbal paradigm for past tense inflection is impoverished in that it lacks many person-number-tense verb endings, showing no distinction between the persons of the singular and the plural persons (Ayoun & Salaberry, 2005; Slabakova, 2009). On the other hand, in Romance languages such as BP all verbal forms have to be inflected for person, number and tense (Slabakova, 2003). Moreover, in order to conjugate verbs in BP, one must classify them in one of the three morphological/conjugation classes. The morphological classes are identified by thematic vowels, which appear between the verb stem and the inflectional endings (Rodriguez-Fornells, Clahsen, Lleó, Zaake & Münte, 2001). Accordingly, the first conjugation in BP ends in *-ar* as in “*amar*” (love), the second conjugation ends in *-er* as in “*comer*” (eat) and the third conjugation ends in *-ir* as in “*dormir*” (sleep). Table 2.2 presents the three conjugations in BP. Also, it displays how BP verbs are conjugated in the regular perfective past tense.

Subject pronouns	<i>-ar</i> verb amar	<i>-er</i> verb comer	<i>-ir</i> verb dormir
Eu	AMEI	COMI	DORMI
Você, ele, ela	AMOU	COMEU	DORMIU
Nós	AMAMOS	COMEMOS	DORMIMOS
Vocês, eles, elas	AMARAM	COMERAM	DORMIRAM

Note. Adapted from Whitlam (2010, p. 111)

Table 2.2 shows that BP has a paradigm for verbal inflection richer than English. Stem-based inflection is an important property of all Romance languages, but in English, it is generally word-based (Rodríguez-Fornells et al., 2001). Regular verbs in English have just one single uninflected base form, e.g. *walk*, which cannot be further decomposable and is a word to which affixes are added in order to become forms such as *walked*. Nonetheless, as already stated, inflected verb forms in Romance languages such as BP have a more complex internal structure because a theme vowel, which indicates conjugation class membership, changes the stem-base, e.g. *caminhar-caminhei* (Ayoun & Salaberry, 2005; Rodríguez-Fornells et al., 2001). Thus, English native speakers L2 learners of Romance languages are expected to have difficulties to map surface morphology in their L2 due to its number, complexity and redundancy (Ayoun & Salaberry, 2005).

With reference to the morphosyntax-semantics mismatches between BP and English, it is noteworthy that the literature demonstrates that L2 learners can access semantic properties that are absent in their target language (Ayoun & Salaberry, 2005; Slabakova, 2009). However, it is open to question whether L2 learners can perform behavioral tasks in a native-like fashion even though they may process their L2 differently from the way they process their L1 or differently from native speakers (Ayoun & Salaberry, 2005).

It is important to address the fact that the morphosyntactic properties of a functional category (e.g., regular past tense) involve L2 learners' semantic knowledge (Ayoun & Salaberry, 2005; Slabakova, 2009). Hence, it is worth mentioning that while BP perfective past tense may be considered fairly equivalent to perfective forms in English (Ayoun & Salaberry, 2005), BP and English aspectual systems display a contrast in the past tense viewpoint aspect. For instance, the literature shows that the perfective past tense in English - represented by /-ed/- semantically denotes the completion of an event (Oliveira, Acordi & Haag, 2015; Slabakova, 2012). However, this aspectual characteristic has not been attested in BP since the perfective past tense in BP does not always entail the completion of an event (Oliveira et al., 2015). Table 2.3 displays a summary of aspectual distinctions between BP and English past tense.

	Tense	Event	Telos
Brazilian Portuguese	Perfective Past Tense	Finished event	Telos is neutral
English	Past Tense	Finished event	Telos is accomplished

Note. *Telos* means an ultimate end.

As can be seen in Table 2.3, in both BP and English the past tense form represents a syntactic constituent, but each morphosyntactic structure conveys a distinct meaning, indicating that tense distinctions are easier to be identified than less transparent aspectual distinctions (Ayoun & Salaberry, 2005; Oliveira et al., 2015). Therefore, the cross-linguistic differences between BP and English might be an example of what Slabakova (2012) defines as a learning situation type in which syntax is simple but semantics is complex (Oliveira et al., 2015; Slabakova, 2012). In order to verify whether this learning situation type applies to BP and English, Oliveira et al. (2015) conducted a pilot study in which L2 learners of BP native speakers of English had to perform a sentence conjunction task with perfective past tense verbs in BP. The results from this pilot study showed that L2 learners of BP native speakers of English behaved similarly to the control group of native speakers of BP. Since it was a pilot study, which recruited a small pool of participants, Oliveira et al. (2015) argued that further research is necessary in order to reach to conclusions regarding the morphosyntax-semantics mismatches between BP and English.

In sum, cross-linguistic differences between BP and English are substantial. The SLA literature shows that the impact of morphosyntactic mismatches between BP and English is likely to have an effect on the processing of BP and English as L2 (Ayoun & Salaberry, 2005). In addition to tense contrasts between the two languages, aspectual distinctions between BP and English are also expected to play a role in L2 learners' processing of past tense verbal inflection. The prediction is that English native speakers who are L2 learners of BP will display greater cognitive cost to process their L2 than L2 learners of English due to the tense and aspectual distinctions between their target language. Thus, although the analysis of semantic values of aspect in BP and English is not the primary focus of the present study, the potential psycholinguistics consequences of the morphosyntax-semantics mismatches between BP and English may also play an important role in L2 learners' processing. Moreover, it is

interesting to note that although the present study aims at investigating L2 learners' processing by means of online reading tasks (Section 2.5 of this Chapter), phonological information may also have a relevant effect on L2 morphological processing (e.g., Bliss, 2006; Rumelhart & McClelland, 1986).

2.5 ONLINE SENTENCE PROCESSING: USING EYE-TRACKING METHOD TO INVESTIGATE L2 PROCESSING

As will be detailed in Chapter 4, the present study explores L2 processing of regular past tense inflected verbs in BP and English. Therefore, the objective of this section is to provide a brief account on how the eye-tracking technique can be used to provide evidence for adult L2 learners' processing of inflectional morphology.

According to Kahoul (2014), a number of time-sensitive or online psycholinguistic methods have been used by researchers in order to obtain linguistic processing data from L2 learners (e.g., measurement of latencies in reading, event-related brain potentials (ERPs), reaction time or eye movements during real-time comprehension). Such data is significant to the field of SLA because it allows researchers to tap into grammatical representations that are formed during real-time processing (Kahoul, 2014). Although a variety of online techniques can be used in order to more fully assess L2 learners' knowledge of the target language, the eye-movement technique, also colloquially known as eye-tracking, is particularly a very useful tool for SLA research because it permits moment-by-moment processing decisions during uninterrupted comprehension, without the necessity to rely on participants' strategic or metalinguistic responses (Roberts & Siyanova-Chanturia, 2013).

The eye-tracking technique can be divided into two methods: (1) a method that taps into reading processes and (2) a method that tracks participants' eyes as they move over a visual scene during the processing of auditory input (Roberts & Siyanova-Chanturia, 2013). The reading method is the one that has been used in most L2 processing research (Roberts & Siyanova-Chanturia, 2013) and it is the method chosen for the present study. Rapid eye movements, which are called *saccades*, are made during reading (Roberts & Siyanova-Chanturia, 2013). It is between saccades that the eyes are able to stop and recognize a word (Roberts & Siyanova-Chanturia, 2013). Such stops are called *fixations* (Roberts & Siyanova-Chanturia, 2013). Fixations provide invaluable information for analysis regarding the features of the text that is being processed (Roberts & Siyanova-Chanturia, 2013). Eye-tracking

technique can indicate processing difficulty through *fixation time* and *fixation count* measures. *Fixation time* refers to the total time of all fixation durations made on an area of interest, whereas *fixation count* refers to the total number of all fixations made on an area of interest (Roberts & Siyanova-Chanturia, 2013). Specifically, Roberts and Siyanova-Chanturia (2013) state that *fixation time* includes all fixations made on an area of interest and it shows how much time the participant spent reading the target word. The researchers argue that *fixation time* is a measure of processing time which is sensitive to later processes associated with comprehension of texts that involve information reanalysis, discourse integration, and recovering from processing difficulties. On the other hand, Roberts and Siyanova-Chanturia (2013) state that *fixation count* is a measure that is often reported in eye-tracking studies. It indicates processing cost, although it is not a measure of processing time.

Other measures and effects can be analyzed by means of eye-tracking technique such as *spillover*, *first fixation duration*, *first pass reading time*, *regression path duration*, *rereading*, and *second pass reading time* (Roberts & Siyanova-Chanturia, 2013). Although these are all common practice in eye-tracking reading research (Roberts & Siyanova-Chanturia, 2013), only fixation time and fixation count measures will be analyzed in the present study due to their sensitivity to processes related to comprehension of a text (Roberts & Siyanova-Chanturia, 2013).

To conclude, eye-tracking reading method is excellent in order to obtain valuable accounts of real-time language processing since it offers reliable data regarding participants' cognitive difficulties because it can tell researchers what has been fixated or refixated (or for how long a word has been fixated), as well as it can tap into language processing during the uninterrupted presentation of the stimuli, allowing participants to perform the task entirely at their natural pace (Roberts & Siyanova-Chanturia, 2013).

In the next Chapter, the method designed and followed to conduct the present study will be presented in detail.

CHAPTER 3 METHOD

A description of the method adopted in the present study will be presented in this Chapter, which consists of six sections. Section 3.1 presents the objectives, research questions and hypotheses pursued by this study. Section 3.2 describes the participants and it is subdivided into two subsections. Subsection 3.2.1 describes the L2 learners of BP and subsection 3.2.2 describes the L2 learners of English. Section 3.3 introduces the instruments of data collection and it is subdivided into 7 subsections which bring: the assessment of proficiency, the biographical questionnaires which contain information about the participants' first and second language, and the Sentence Comprehension Tasks performed by the participants on the eye-tracker. Section 3.4 explains the data collection procedures. Section 3.5 reports the data analysis. Finally, section 3.6 presents the pilot study.

3.1 OBJECTIVES AND RESEARCH QUESTIONS

The overall objective of the current study is to investigate L2 processing of BP and English verbal morphology through the recording of eye-movements. The specific objectives of the present study are: (1) to investigate the role of the L1 typology in L2 processing of BP and English past tense regular verbs, and (2) to investigate the role of proficiency in L2 processing of BP and English past tense regular verbs with the aim of extricating the influence of proficiency from that of the L2 learners' L1 typology. Thus, this study aims at testing directly the language processing of L2 learners of English, native speakers of Brazilian Portuguese, as well as the language processing of L2 learners of BP, native speakers of English.

In order to accomplish the objectives posed above, the following research questions were pursued:

Research question 1: Does the L1 typology exert an effect on L2 processing of verbal morphology? If it does, do L2 learners of BP and L2 learners of English process L2 past tense verbal morphology differently?

Hypothesis 1: The L1 typology exerts an effect on L2 processing of verbal morphology. L2 learners of BP and L2 learners of English process L2 past tense verbal morphology differently due to the morphosyntactic mismatches between their L1 and L2. Thus, L2 learners of English are expected to process their L2 in a more native-like

pattern than L2 learners of BP. Also, L2 learners of BP are expected to exhibit greater L2 processing cost than L2 learners of English due to the impoverished verbal morphology system of their L1.

Hypothesis 1 is primarily based on the Unified Competition Model (Hanson et al., 2014; MacWhinney, 2005, MacWhinney, 2012) and on the Associative- Cognitive CREED (Ellis, 2006a; Ellis, 2006b). It is also in line with Hopp's (2007) Fundamental Identity Hypothesis and previous studies conducted in the field of SLA, which suggest that L1 has an effect on L2 morphological processing (e.g. Hanson et al., 2014; Hopp, 2006; Hopp, 2007; Hopp, 2010; Jiang 2004; Kahoul, 2014; Portin et al., 2008; Sagarra & Herschensohn, 2010).

Research question 2: Does level of proficiency play a role in L2 processing of verbal morphology?

Hypothesis 2: Increased L2 proficiency implicates more native-like processing of verbal morphology in the L2. Thus, L2 learners with higher level of proficiency will have a greater performance and show more native-like L2 processing than L2 learners with lower level of proficiency.

Hypothesis 2 is based on the theoretical predictions of the Unified Competition Model (MacWhinney, 2005) and the Associative-Cognitive CREED (Ellis, 2006a), which suggest that longer exposure to the target language and increased proficiency lead to more native-like patterns (Ellis, 2006a; MacWhinney, 2005). Hypothesis 2 is also based on results obtained from previous studies which indicate that proficiency is an important variable in the attainment of native-like processing (e.g. Hopp, 2006; Hanson et al., 2014; Sagarra & Herschensohn, 2011).

3.2 PARTICIPANTS

The present study was carried out with two groups of participants: (1) one group of learners of English as L2 with BP as their native language and (2) one group of learners of BP as L2 with English as their native language.

By having one group of BP L2 learners and one group of English L2 learners it was possible to examine differences in the processing of inflected verbs of languages with typologically different systems. Although there were no groups of monolinguals recruited to serve as the control group, the two groups of bilinguals were also recruited to perform the task in their native language in order to serve as the baseline for the study.

To be recruited for the present study, the participants who were L2 learners of English needed to be enrolled in the Letras-Inglês undergraduate program at UFSC and be at the intermediate or advanced levels of proficiency in the target language. The participants who were L2 learners of BP also needed to have intermediate to advanced levels of proficiency in the target language and needed to be enrolled in an immersion program in Brazil/Florianópolis. Furthermore, the L2 learners of BP needed to have had classroom instruction in BP, or use BP for academic purposes on a daily basis. In order to find the participants who were native speakers of English, I contacted USAC and the Latter-Day Saints (LDS) church missionaries in the city of Florianópolis. As for the participants who were native speakers of BP, I contacted the Letras- Inglês undergraduate students from UFSC. The participants were all volunteers and they could decide to withdraw from the research at any time. In the total, there were 20 participants in this study. However, since there was a proficiency cutoff point and some of the participants presented low calibration accuracy in the tasks on the eye-tracker, the data of only 16 participants was considered.

According to the information provided by the participants through the questionnaires they had to answer prior to the data collection (for details see subsection 3.3.1), it is known that they were aged between 19 and 27 years (mean age 19,6 years for the group of BP native speakers and 21,5 years for the group of English native speakers) and that their age of onset of L2 learning ranged across: 1-7, 7-14, 14-21 and over 21 years. Every participant signed a consent form in Portuguese (Appendix A), answered a background questionnaire (Appendices B and C), did a proficiency task in their L2 (for details see subsection 3.3.3 and subsection 3.3.4), and performed two Sentence Comprehension Tasks (for details see subsection 3.3.6 and subsection 3.3.7), which were displayed on the eye-tracker screen using a software developed for processing and recording eye-tracking data. Table 3.1 shows the language profile of the participants in the two experimental groups of the study. More information concerning these two groups is presented in subsections 3.2.1 and 3.2.2.

Table 3.1 Language profile of the participants in the two experimental groups of the study

Profile	L2BP	L2EN
Native language (L1)	English	Brazilian Portuguese (BP)
Second language	Brazilian Portuguese	English

(L2)	(BP)	
Age of onset of L2 learning	6 between 14 and 21 years old / 2 after 21 years old	6 between 7 and 14 years old/ 1 between 1 and 7 years old/ 1 between 14 and 21 years old

3.2.1 The L2 learners of BP

This subsection presents the participants of the L2BP group. This group was formed by 8 participants, 4 men and 4 women, who aged between 20 and 27 years (mean age 21,5 years). All participants belonging to the L2BP group were healthy individuals with either normal or corrected vision. These participants were all native speakers of English who were in a language and cultural immersion in Brazil in the city of Florianópolis, where the data collection took place. 6 of them were born in the United States of America and 2 of them were born in England. 6 participants were academic students and 2 participants were LDS church missionaries. 6 participants were undergraduate students, 1 was a graduate student and 1 was graduated from high school. 5 of them had had classroom instruction in BP and 1 of them used BP for academic purposes. Table 3.2 shows the demographic information of the L2BP group in comparison to the entire sample of participants regarding number, sex and mean age.

Demographic information	Entire sample	L2BP Group
N	16	8
Sex	8 M / 8 F	4 M / 4 F
Mean age	20,5	21,5

3.2.2 The L2 learners of English

This subsection presents information concerning the participants of the L2EN group. This group consisted of 8 participants, 4 men and 4 women, who aged between 19 and 23 years (mean of 19,6 years). These participants were native speakers of BP and all of them were Brazilian. At the time of the data collection, all the participants belonging to the L2EN group were living in Brazil in the city of Florianópolis, where the data were collected. According to their profession, they were 8 academic students. According to their level of education, 100% were university

students enrolled at the Letras-Ingês undergraduate course at UFSC. Table 3.3 presents the demographic information of the L2EN group in comparison to the entire sample of participants regarding number, sex and mean age.

Demographic information	Entire sample	L2EN Group
N	16	8
Sex	8 M / 8 F	4 M / 4 F
Mean age	20,5	19,6

3.3 INSTRUMENTS

This section describes all the materials used in this study and is divided into seven subsections. Subsection 3.3.1 describes the language background questionnaires (the one for the L2BP group and the one for the L2EN group). Subsection 3.3.2 describes the proficiency assessment. Subsection 3.3.3 describes the TOEFL iBT writing task. Subsection 3.3.4 describes the CELPE-Bras writing task. Subsection 3.3.5 describes the online tasks. Subsection 3.3.6 describes the Sentence Comprehension Task in BP. Subsection 3.3.7 describes the Sentence Comprehension Task in English.

3.3.1 The language background questionnaires

Based on Kramer (2010) and Toassi (2012), I adapted and applied a questionnaire eliciting the participants' personal and linguistic information. The main purpose of the questionnaire was to cover items about individual variables that may interact with the potential L1 transfer and proficiency effects. Some examples of individual variables that are relevant for the present study are the acquisitional aspect of the language and aspects of L2 proficiency and L2 input in the environment (Kramer, 2010; Toassi, 2012).

Since the two groups of participants had different first and second languages, the questionnaire was divided into questionnaire A and questionnaire B. The L2EN group was asked to fill out questionnaire A (Appendix B), whereas the L2BP group was asked to fill out questionnaire B (Appendix C). Both questionnaires were computer-

administered on Google Drive² and were divided in two sections. Section 1 was designed to collect general information about the participants, such as full name, age, sex, nationality, parents' nationality, level of education, profession, and contact information. Section 2 was designed to collect information about the participants' experience with their L2. Some examples of information collected are: (1) the age of onset of L2 learning, (2) if they had classroom instruction in their L2, (3) if they already had had contact with their L2 before enrolling in a language course, (4) a self evaluation of their L2 level, (5) their purpose for studying an L2, (6) the learning strategies which they adopted in order to keep contact with their L2, (7) the number of hours in the week that they dedicated to study their L2, (8) if they had contact with native speakers of their L2 on a regular basis.

3.3.2 The proficiency assessment

In order to assess the participants' level of proficiency, a sample of the TOEFL iBT writing section and a sample of the CELPE-Bras writing section were applied to the 2 groups of participants, according to their L2. TOEFL iBT and CELPE-Bras are internationally recognized tests which are suitable for learners of all nationalities. Both tests cover all four language skills – listening, speaking, reading and writing. However, since the online tasks proposed in the study did not require listening and speaking skills, only the writing tasks were obligatory to be performed by the participants. The writing tasks selected for eliciting participants' writing production were independent tasks in which learners were asked to write about a topic after reading a passage (both in the case of CELPE-Bras and in the case of TOEFL iBT writing sections), and listening to a lecture (only in the case of the TOEFL iBT writing section). The procedures for the writing tasks will be fully described in subsections 3.3.3 and 3.3.4.

3.3.3 The TOEFL iBT writing task

TOEFL stands for Test of English as a foreign language. The TOEFL iBT test is one of the most respected English-language tests in the world (<http://www.ets.org/toefl/>). In the present study, a writing test was administered as a separate test, therefore a sample task of the

²The questionnaires were stored and synchronized by Google via my personal Google Drive account.

TOEFL iBT Writing Section (Appendix D) was selected in order to elicit L2EN participants' writing production. The choice for the writing task was due to the fact that the TOEFL iBT writing section aims at measuring learners' ability to use and understand the English language as it is read and written in the university context (TOEFL iBT Quick Prep, 2011). The task was taken from the TOEFL iBT Quick Prep (2011) provided by Educational Testing Service,³ which contains a sample of a Writing Section with a writing task. The Writing Section version used in the present study was based on Integrated Writing, which means that participants had to write their texts based on reading and listening. Table 3.4 shows the Writing Practice guidelines that participants needed to follow in order to complete the writing task.

Guideline 1	Guideline 2	Guideline 3	Guideline 4
Read the passage.	Listen to the lecture.	Respond to a question that asks about the relationship between the reading passage and the lecture.	Try to answer the question as completely as possible using information from the reading passage and the lecture.

Note. Source: TOEFL iBT Quick Prep, 2011.

As can be seen in Table 3.4, participants from the L2EN group had to read a passage about an academic topic and listen to a lecture about the same topic. They had 3 minutes to read the passage at the first time; afterwards they had to listen to the lecture which had a time-length of 1 minute and 58 seconds. It is important to note that they were allowed to listen to the lecture only one time. They were also allowed to take notes while reading the passage and listening to the lecture. Then, they were asked a question regarding the relationship between the reading passage and the lecture. Each participant had 20 minutes to plan and write their response. As they were allowed to consult the reading passage again when they started writing, they had to try to answer the question as completely as possible. The criteria for scoring and rating participants' writing mirrored the criteria of the original test according to the parameters of assessment of the TOEFL iBT (<http://www.ets.org/toefl/ibt/scores/understand>). Hence, one external

³Available at https://www.ets.org/s/toefl/pdf/qp_v1_web.pdf

rater was asked to rate and score the TOEFL iBT writing tasks by taking into consideration the parameters of assessment observing features such as development, grammar, vocabulary, organization and comprehension. The rater was a native speaker of English who was also a private teacher of English with years of experience in teaching basic, intermediate and advanced level students. Additionally, the rater was a very experienced proofreading and grammar tutor/editor.

Following the original rubrics for the TOEFL iBT Writing Section, participants' writing samples were rated from 0 (no attempt from participants to respond to the question) to 5 (maximum score) (see Appendix E for the original TOEFL iBT Integrated Writing Rubrics). A mean rating score was calculated for each participant concerning the evaluation of (1) their development, (2) organization, (3) grammar, and (4) vocabulary. More specifically for the goals of the online tasks of the present study, the rater evaluated the learners' general understandability of their L2, their general grammar of essay, and the use of past tense. Following the criteria of the TOEFL iBT Integrated Writing Rubrics, learners who scored levels 5 and 4 were considered advanced L2 learners of English, learners who scored level 3 were considered intermediate L2 learners of English, whereas learners who scored levels 2, 1 and 0 were considered beginners. The resulting scores of Group 2 indicated that 4 participants were at the advanced level and 4 participants were at the intermediate level.

3.3.4 The CELPE-Bras writing task

CELPE-Bras is the Brazilian Certificate of Proficiency in Portuguese for foreigners. It is the only official certificate of proficiency in Portuguese as a foreign language recognized by the Brazilian government (<http://celpebras.inep.gov.br/inscricao/>). A sample task of the CELPE-Bras Writing Section (Appendix F) was selected in order to elicit L2BP participants' writing production. Table 3.5 shows the Writing Practice guidelines that participants needed to follow in order to complete the writing task.

Guideline 1	Guideline 2
Read a story that was published in a newspaper.	Write a text based on the story as a narrative, telling your personal version of the same story as if you were one of the characters.

Note. Source: CELPE-Bras Manual do Aplicador, 2006.

Following the same criteria for the TOEFL iBT writing task, the decision to apply a writing task was due to the fact that the CELPE-Bras Writing Section aims at determining L2 learners' level of comprehension in BP, as well as their grammar and lexical skills (CELPE-Bras Guia do Participante, 2013). The task was taken from the CELPE-Bras notebook of questions for writing production published in 2005, which was provided by Secretaria da Educação Superior and Ministério da Educação (see Appendix E for the writing task). As can be seen in Table 3.5, the main focus of the writing task was on comprehension and production in response to a reading passage. According to the CELPE-Bras 2010 examiner's manual, the parameters of assessment for the Writing Section include discursive adequacy: cohesion and coherence, and linguistic adequacy: lexicon and grammar. In order to perform the writing task participants from the L2BP group had 10 minutes to read a story that was published in a Brazilian newspaper. After reading the text, they had 20 minutes to use the information from the story to retell it through their point of view, as if they were one of the characters of the story. The amount of information and the relevance of the facts they selected to rewrite the story determined their level of comprehension.

According to the CELPE-Bras 2010 examiner's manual for the Writing Section, participants' writing samples must be rated according to the parameters of assessment previously mentioned. Thus, discursive adequacy and linguistic adequacy serve as a reference for a distinction between the intermediate and advanced levels. According to the criteria presented in the CELPE-Bras 2010 examiner's manual, a production that meets the writing and reading purposes of the task will be considered advanced level whereas a production that partially meets these purposes will be considered intermediate level. One external rater was asked to rate and score participants' performance in the CELPE-Bras writing tasks by taking into consideration the parameters of assessment such as development, grammar, vocabulary, organization and comprehension. The rater was a native speaker of BP who was also a PhD. student in Applied Linguistics. A mean rating score was calculated for each participant concerning the evaluation of (1) their development, (2) organization, (3) grammar, and (4) vocabulary. More specifically for the goals of the online tasks of the present study, the rater evaluated the learners' general understandability of their L2, their general grammar of essay, and the use of perfective past tense form.

Following the evaluation criteria presented in the CELPE-Bras 2010 examiner's manual, learners who scored levels 5 and 4 were considered advanced L2 learners of PB, participants who scored level 3 were considered intermediate L2 learners of PB, whereas participants who scored levels 2, 1 and 0 were considered beginners. The resulting scores of the L2BP group indicated that 5 participants were at the advanced level and 3 participants were at the intermediate level.

3.3.5 The online tasks

The online tasks were two Sentence Comprehension Tasks (SCTs) used to assess L2 learners' processing of English and BP verbal inflection. They aimed at investigating the time-course of sentence comprehension in order to detect native and non-native real-time language processing as well as subtle language processing differences between the two groups of participants (Keating, 2014). In these tasks, the critical words were regular past tense forms (e.g. *lived* in English and *comprou* in BP) and were presented in a sentence context on an eye-tracker screen while eye-movements were monitored. Because the present study had the goal of assessing the processing of verbal inflection in two distinctive languages, the experimental sentences were distributed in two different tasks. Each task was composed of 58 experimental sentences⁴ and 120 fillers. Subsection 3.3.6 describes the SCT in BP and subsection 3.3.7 describes the SCT in English.

3.3.6 The Sentence Comprehension Task in BP

In order to follow the principles which underlie the designing of critical regions for an eye-tracking study, I followed Jegerski (2014), Keating (2014), Rayner and Pollatsek (2006), Roberts and Siyanova-Chanturia (2013) and Teixeira (2013). According to Keating (2014) and Rayner and Pollatsek (2006), word length and word frequency are important variables that must be considered when creating the critical stimuli. Word length is an important variable because it pertains to word skipping (Keating, 2014). Because short words are expected to be skipped, they are processed parafoveally and may not extract sufficient data to conduct meaningful statistical analyses (Keating, 2014; Rayner & Pollatsek, 2006). Short words with three or fewer letters are very

⁴The number of critical stimuli was based on Jegerski (2014) and Keating (2014).

likely to be skipped, whereas six-letter words are usually fixated and eight letters or longer are rarely skipped (Rayner & Pollatsek, 2006). As a consequence, the critical regions for the SCT in BP consisted of 58 regular transitive verbs in the perfective regular past tense form, with mean word length of 7.1 letters (see Appendix G for the list of verbs in BP with their respective word-lengths). This decision was taken in order to ensure that any obtained effects were not due to trials that contained either very short or very long words (Keating, 2014). Figure 3.1 shows the histogram with the word length distribution of the critical regions selected for the SCT in BP.

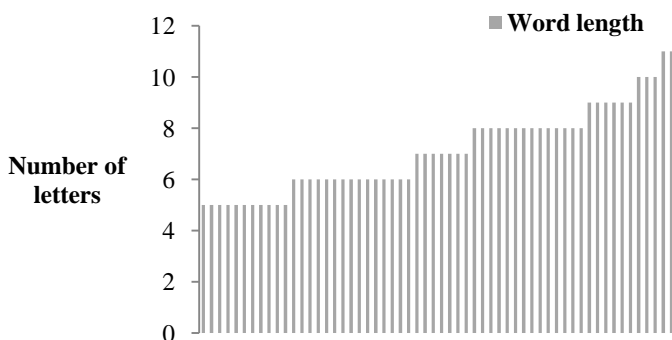


Figure 3.1 Histogram with the word length distribution of the critical regions selected for the SCT in BP. The word length distribution is ordered from the shortest to the longest verbs

As already stated, a second variable that deserves to be controlled for is word frequency (Keating, 2014; Rayner & Pollatsek, 2006). Although it was not possible to use only high-frequency verbs in all experimental sentences because of their scarce variability in the data base, the critical regions for the SCT in BP consisted of the top 58 regular past tense transitive verbs in the word frequency list of Corpus Brasileiro⁵ (see Appendix H for the list of verbs in BP according to the raw frequencies from Corpus Brasileiro). This decision was taken for two reasons: (1) verbs are psychologically more complex and more difficult to process than nouns (Jarema, 2008; Pickering & Frisson,

⁵Corpus Brasileiro is a Brazilian corpus which contained approximately one billion Brazilian Portuguese words (at the time of data collection). In order to gather the verbs in Brazilian Portuguese I consulted the website <http://corpusbrasileiro.pucsp.br/cb/Acesso.html>

2001). Therefore, although the critical regions were mostly high-frequency verbs, they were very unlikely to be skipped due to their high complexity. Moreover, participants needed to be familiar with the verbs presented in the task in order to ensure that they were not fixating longer on a critical region because of its low frequency (Keating, 2014). Figure 3.2 shows the histogram with the word frequency distribution of the verbs that were selected for the SCT in BP.

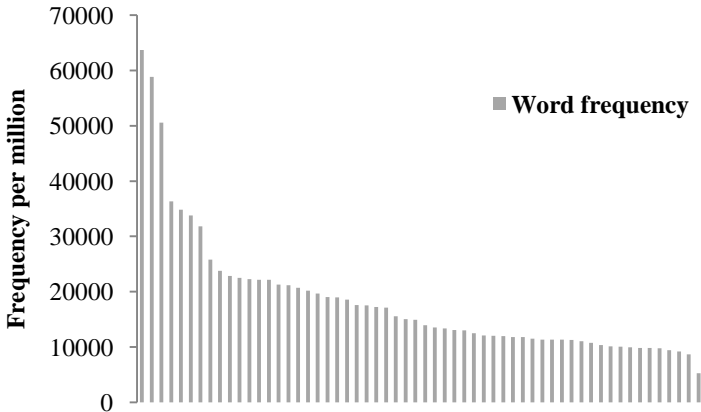


Figure 3.2 Histogram of the word frequency distribution of the verbs selected from Corpus Brasileiro for the SCT in BP. The word frequency distribution is ordered from the most frequent to the least frequent verbs

The experimental sentences had the critical and noncritical⁶ regions as close to identical as possible regarding their grammatical function (Keating, 2014). There was grammatical equivalency across experimental sentences, such that if Region 1 was a subject noun phrase (NP) in Sentence 1, it was also a subject NP in Sentence 2, Sentence 3 and all the other experimental sentences (Jegerski, 2014). All the experimental sentences contained third person singular subjects and regular past tense transitive verbs that were followed by a direct object. The total number of regions (i.e., words) for the experimental sentences ranged from 9 to 12 per sentence. The critical regions (the regular past tense transitive verbs) were preceded by 4 noncritical regions and succeeded by at least 4 other noncritical regions (Keating, 2014). The

⁶The noncritical regions are not manipulated by the researcher to produce language processing effects (Keating, 2014).

experimental sentences did not exceed one third of the total sentences read in the task (58 sentences) (Keating, 2014) (see Appendix I for the experimental sentences in BP). One fourth of the experimental sentences (15 sentences) were followed by comprehension questions⁷ of the yes/no variety in order to probe participants' attention to the task (Roberts & Siyanova-Chanturia, 2013), as well as their interpretations of the past tense forms in BP.

In order to ensure that the experimental sentences were both semantically and syntactically natural, one native speaker of BP was chosen to rate the naturalness of the entire set of experimental sentences through a Sentence Naturalness Judgment Task (see Appendix J for the instructions for the Sentence Naturalness Judgment Task in BP). Based on Resende (2015), the sentences were rated on a scale from 1 to 7, in which 1 was very awkward, 2 was awkward, 3 was a little awkward, 4 was acceptable, 5 was natural, 6 was very natural and 7 was excellent. The sentences that were rated below 4 were eliminated from the set of experimental sentences and substituted according to the rater's suggestions. Sentence (a) and sentence (b) illustrate the experimental sentences.

- (a) O time da Alemanha ganhou a Copa do Mundo no Brasil.
- (b) O bebê da Camila tomou um suco de laranja no almoço.

Two thirds of the stimuli (120 sentences) consisted of fillers that were syntactically different from the experimental sentences (see Appendix K for the fillers in BP) (Keating, 2014, Teixeira, 2013). One fourth of the fillers (30 sentences) were followed by comprehension questions of the yes/no variety (Keating, 2014). Sentence (c) and sentence (d) illustrate the fillers.

- (c) A Melissa e o George estão preparando um jantar especial para os seus amigos.
- (d) A casa está bem arrumada.

The total number of stimuli in the SCT in BP was 178 sentences. The experimental sentences and fillers were displayed horizontally in a simple line in Monaco font, monospaced (Teixeira, 2013). The sentences appeared individually at the center of the eye-tracker screen monitor because it is a position in which participants' gaze is more accurate (Teixeira, 2013). In order to ensure participants were going to

⁷All the 16 participants who performed the SCTs achieved more than 80% accuracy in the comprehension questions.

direct their gaze at the location of the first word of the stimulus before it appeared on the eye-tracker screen monitor, each sentence was preceded by a fixation target represented by a “+” which was displayed in isolation for 2 seconds in the equivalent screen monitor location where the first letter of the first word in the stimulus appeared (Jegerski, 2014, Teixeira, 2013). The entire set of experimental sentences and fillers were randomized in order to ensure that the experimental sentences would not appear all in a row. The following subsection describes the SCT in English.

3.3.7 The Sentence Comprehension Task in English

The SCT in English followed the same design and procedures adopted for the SCT in BP. Thus, Keating (2014), Rayner and Pollatsek (2006), Roberts and Siyanova-Chanturia (2013) and Teixeira (2013) also served as theoretical framework for the design of this task. As in the SCT in BP, word length and word frequency were important factors to be controlled for. The experimental sentences for the SCT in English consisted of 58 critical regions that were the top regular transitive verbs in the past tense form in the word frequency list of the Corpus of Contemporary American English (COCA)⁸ (see Appendix L for the list of verbs in English according to the raw frequencies from COCA). As in the SCT in BP, it was not possible to use only high-frequency words in the experimental sentences because of their scarce variability in the data base. Figure 3.3 shows the histogram with the word frequency of the verbs selected for the SCT in English.

⁸The Corpus of Contemporary American English (COCA) is the biggest online corpus of American English words available for free on the internet with over 450 million words (at the time of the data collection). Available at <http://corpus.byu.edu/coca/>

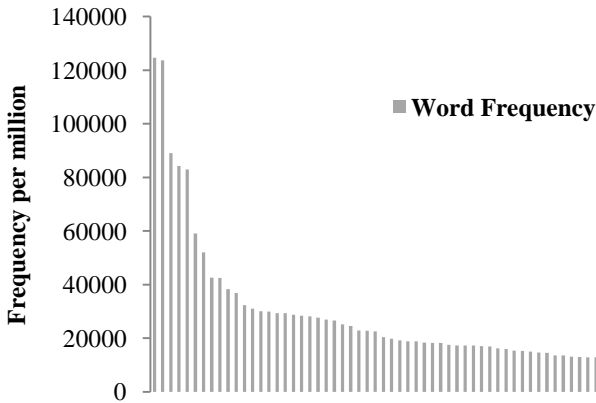


Figure 3.3 Histogram with the word frequency distribution of the critical regions that were selected for the SCT in English

As for word length, the mean word length for the critical regions in the SCT in English was 6.8 letters (see Appendix M for the list of verbs in English with their respective word-lengths). Figure 3.4 shows the histogram with the word length distribution of the verbs selected for the SCT in English.

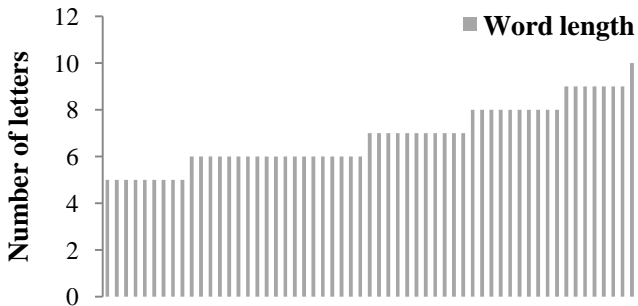


Figure 3.4 Histogram with the word length distribution of the verbs selected for the SCT in English. The word length distribution is ordered from the shortest to the longest verbs

As in the SCT in BP, the different versions of experimental sentences were grammatically equivalent. Specifically, the critical and noncritical regions were as close to identical as possible regarding their grammatical function (Jegerski, 2014; Keating, 2014). All the

experimental sentences contained third person singular subjects and regular past tense transitive verbs that were followed by a direct object. The total number of regions for the experimental sentences ranged from 10 to 15 per sentence. The critical regions were preceded by 4 noncritical regions and succeeded by at least 4 other noncritical regions (see Appendix N for the experimental sentences in English) (Keating, 2014). The experimental sentences did not exceed one third of the total sentences read in the task (58 sentences) (Keating, 2014).

In order to ensure that the experimental sentences were both semantically and syntactically natural, one native speaker of English was chosen to rate the naturalness of the entire set of experimental sentences through a Sentence Naturalness Judgment Task (see Appendix O for the instructions for the Sentence Naturalness Judgment Task in English). Also based on Resende (2015), the sentences were rated on a scale from 1 to 7, in which 1 was very awkward, 2 was awkward, 3 was a little awkward, 4 was acceptable, 5 was natural, 6 was very natural and 7 was excellent. The sentences that were rated below 4 were eliminated from the set of experimental sentences and substituted according to the rater's suggestions. Sentence (e) and sentence (f) illustrate the experimental sentences.

- (e) The leader of Cuba wanted an economic relationship with Brazil.
- (f) The exhibition of art seemed an ideal attraction for the foreign tourists.

Two thirds of the stimuli (120 sentences) consisted of fillers that were syntactically different from the experimental sentences (see Appendix P for the fillers of the SCT in English) (Keating, 2014, Teixeira, 2013). Sentence (g) and sentence (h) illustrate the fillers.

- (g) Elizabeth and Elliott never swim in the lake.
- (h) Lisa and Kevin never wake up before 7 a.m.

The total number of stimuli in the SCT in English was 178 sentences. The experimental sentences and fillers were displayed horizontally in a simple line in Monaco font, monospaced (Teixeira, 2013). The sentences appeared individually at the center of the eye-tracker screen because it is a position in which participants' gaze is more accurate (Teixeira, 2013). Each sentence was preceded by a fixation target represented by a "+" which was displayed in isolation for 2 seconds in the equivalent screen location where the first letter of the first word in the stimulus appeared (Jegerski, 2014, Keating, 2014; Teixeira,

2013). One fourth of the experimental sentences (15 sentences) and one fourth of the fillers (30 sentences) were followed by comprehension questions of the yes/no variety in order to probe participants' attention to the task as well as their interpretations of the past tense forms in English (Roberts & Siyanova-Chanturia, 2013). The entire set of experimental sentences and fillers were randomized in order to ensure that the experimental sentences would not appear all in a row.

3.4 DATA COLLECTION PROCEDURES

In the present study, data was collected with each participant at the Laboratório da Linguagem e Processos Cognitivos (LabLing), located in room 511, CCE (Centro de Comunicação e Expressão) at UFSC. The background questionnaires described in 3.3.1 were sent to both groups of participants via Google Drive. For this reason, the participants were able to fill out the background questionnaire prior to the day of data collection. For the data collection in the laboratory, all the tasks were performed individually and accompanied by the experimenter. Each participant took around two hours to complete the activities. The data collection for both groups consisted of four steps. First, the participant read and signed the consent form (Appendix A). Second, the participant performed the SCT in his/her L2 on the eye-tracker (described in subsections 3.3.6 and 3.3.7). Third, the participant performed the SCT in his/her native language on the eye-tracker (described in subsections 3.3.6 and 3.3.7). Lastly, the participant performed the proficiency task in his/her L2 (described in subsections 3.3.3 and 3.3.4). The decision to have the participant perform the proficiency task after performing the tasks on the eye-tracker was to prevent the participant from feeling fatigued while performing the online tasks. Table 3.6 shows the data collection in four steps according to each group of participants.

	Step 1	Step 2	Step 3	Step 4
L2BP Group	Consent form	SCT in BP (eye-tracker)	SCT in English (eye-tracker)	Proficiency task in BP
L2EN Group	Consent form	SCT in English (eye-tracker)	SCT in BP (eye-tracker)	Proficiency task in English

The eye-tracking system used for data collection at LabLing is a RED 500 by Sensor Motoric Instruments – SMI⁹ and consists of two stations, one for the participant and one for the experimenter. The participant's station contains a desktop computer monitor that shows the reading stimuli and an eye-tracking device with a video-based infrared camera that tracks pupil movements. The eye-tracking camera is placed on the desktop computer in front of the monitor and is angled up in the direction of the participant's eyes (Keating, 2014). As for the experimenter's station, a desktop computer with two monitors are synchronized with the participant's station in order to allow the experimenter to control the participant's eye-movements and the tasks through a remote control system offered by I-View-X and Experiment Center software.

For the experimental session on the eye-tracker, the procedures were the following. The participant was instructed to sit on a chair in front of the station with the desktop computer and the eye-tracking device. The participant was told that each of the SCTs was preceded by a block of practice sentences, which had the purpose to familiarize the participant with the procedure (Keating, 2014). The participant received instructions about the fixation target that would appear on the monitor before each stimulus. The participant was also told that s/he would need to use the mouse and the space bar of the keyboard to answer the comprehension questions and to change from one screen to the other. The experimenter emphasized that the sentences should be read carefully for comprehension at a normal speed (Pickering & Frisson, 2001). During the practice sentences, the participant was allowed to ask the experimenter questions about the tasks in order to clear any doubts. The average participant read the practice sentences in less than 10 minutes.

After the practice sentences, the experimenter checked the participant's station in order to ensure that the height of the participant's chair and the infrared camera in the eye-tracking device were well

⁹The RED 500 by Sensor Motoric Instruments – SMI is an eye-tracking system of 500Hz that features binocular gaze and pupil data, free head movement (40cmx20cm at 70cm distance) and high-speed sampling rate. Further information about the eye-tracking system used in the present study is available at <http://www.smivision.com/en/gaze-and-eye-tracking-systems/products/red-red250-red-500.html>

adjusted¹⁰. This procedure was taken for two reasons: (1) to ensure that the participant was in a comfortable seating position before starting the task, and (2) to minimize head movements that could result in track loss. When the setup was complete, the participant was told that the first SCT would start. After reading the instructions that appeared on the first screen, the participant took a brief calibration test¹¹. For calibration, the participant was asked to follow a target with his/her eyes as it moved arbitrarily to different locations on the eye-tracker screen, and took a momentary pause at each one (Keating, 2014). This was done in order to register the accuracy on the X and Y axis that represent the left and the right eye respectively. After that, the calibration test was repeated to validate adjustments made by the system in order to guarantee the most accurate tracking possible while recording the participant's eye movements. Calibration was repeated in order to assure that the values for X and Y would not exceed 0,50°¹². After validating the calibration, the first sentence of the SCT appeared on the screen. Each sentence was displayed at once on the screen monitor and the participant was able to control the reading time for each sentence. While reading the sentences, the eye-tracker recorded the participant's eye movements.

After reading the entire stimuli, a thank-you message appeared on the screen to indicate that the SCT was over. As stated before, the two groups of participants performed the SCT in their L2 and the SCT in their native language. Thus, as soon as the first online task finished, each participant was allowed to have a 10-minute break before starting the second online task. After that, the participant was instructed to start the SCT in his/her native language following the same procedures taken for the SCT in his/her L2. Table 3.7 presents the procedures taken for SCTs in 8 steps.

¹⁰The information about the participant's position was provided by I-view-X software in the experimenter's station, which pointed arrows on the experimenter's monitor indicating the ideal position of the participant for data collection. Further information about the eye-tracking device and the software used for analysis is available at <http://www.smivision.com/en/gaze-and-eye-tracking-systems/home.html>

¹¹The calibration test is important because it calculates the correspondence between the participant's point of gaze on the screen and pupil position on the eye-tracker camera image (Keating, 2014).

¹²Two participants exceeded 0,50° on one of the axis, although calibration was carefully repeated.

Table 3.7 Summary of the procedures followed for data collection of the SCTs in 8 steps

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
L2BP Group	Instructions: practice	Practice sentences	Setup	Instructions: SCT in BP	Calibration & validation	SCT in BP	Break	Repeat steps: SCT in EN
L2EN Group	Instructions: practice	Practice sentences	Setup	Instructions: SCT in EN	Calibration & validation	SCT in EN	Break	Repeat steps: SCT in BP

3.5 DATA ANALYSIS

The Statistical Package for Social Sciences 20 (SPSS 20) and the STATISTICA software package by StatSoft were used for the statistical analysis in this study. The analysis was divided into five main parts: (1) the initial data report in BeGaze software, (2) the descriptive report in Excel, (3) the outliers test in SPSS, (4) the descriptive statistics, and (5) the inferential statistics.

The initial data report was conducted by opening the video-based data file in the data viewing software and defining the areas of interest¹³ (critical regions). The areas of interest for the present study – the 58 regular transitive past tense verbs– were calculated and designed in the AOI editor on the basis of the software BeGaze. Once the areas of interest were calculated and designed, BeGaze was used to remove inaccurate trials by viewing the collected data stored in the software. This was possible to be done because the eye-tracking system recorded a video-movie of each stimulus that a participant read in the experiment (Keating, 2014). Each video-movie was displayed with a gaze cursor that showed every saccade and fixation that the participant made while reading the stimulus. The videos are useful to identify unusual fixation patterns due to poor tracking or head movements (Keating, 2014).

¹³The critical regions are considered the area of interest (AOI) on the Experiment Center and BeGaze software by SMI.

Figure 3.5 provides a sample of the fixation sequence that a participant made while reading one of the sentences in the SCT in BP.



Figure 3.5 Sample of fixation sequence made by a participant in the SCT in BP

After removing inaccurate trials and designing the areas of interest, BeGaze was used to select the eye-tracking measures from an array of menus. Then, BeGaze generated a report in the form of a .txt file that was opened in Excel. After that, the irrelevant rows of eye-tracking measures were excluded while the desired measures were selected. As stated in the review of the literature, two eye-movement measures were chosen based on the aims of the present study: (1) fixation time¹⁴ (the total time a participant has on the critical region in millisecond precision timing) and (2) fixation count (the total number of all fixations a participant has on the critical region). Finally, the descriptive report was designed in Excel with the purpose of displaying (1) the mean fixation time and the mean fixation count for each participant, (2) information obtained from the background questionnaires such as the number of the participant, sex, age, L2 learning age of onset, education and group, and (3) participants' L2 level of proficiency.

¹⁴Also known as *total reading time* (Roberts & Siyanova-Chanturia, 2013).

The descriptive statistics consisted of the presentation of (1) the descriptive report, (2) the outliers test run in SPSS and (3) the Kolmogorov-Smirnov and Shapiro-Wilk's tests in order to determine data normality distribution. The results from the descriptive statistical analysis demonstrated that there were two outliers in the sample of participants (one in the L2BP group and one in the L2EN group). Therefore, 14 participants (7 male and 7 female) were included in the statistical analysis. Regarding the Kolmogorov-Smirnov and Shapiro-Wilk's tests, the results showed that the data distribution was non-normal. Based on this result, a non-parametrical analysis was chosen for this study.

The inferential statistics consisted of the presentation of (1) the analysis of the correlation between the control variables (sex and age) and the L2 groups' performance in the SCTs, (2) the comparison of the results of the L2 groups' performance in the SCTs, which included the statistical analysis in order to verify the roles of the L1 typology and proficiency in L2 processing. The Mann-Whitney test was run to assess potential differences between male and female. The results showed that there was no sex difference demonstrated among participants. The Spearman correlation coefficient was run in order to verify correlation between age and the eye-tracking values for the L2BP group and the L2EN group. The results suggested that there was no correlation between age and participants' eye-tracking.

Finally, The General Linear Models was performed to compare the fixation count and the fixation time of both groups in the SCT in BP and in the SCT in English. The results showed that both the L2BP group and the L2EN group behaved similarly regarding the fixation count and fixation time in the two SCTs. This means that there was no difference in the factor group for fixation count and fixation time. However, the Tukey post-hoc test demonstrated significant difference in the fixation count and fixation time values within the L2BP group, which means that the L2BP processed their L1 in qualitatively different ways than they processed their L2. Also, the inferential statistics were calculated for both groups of participants (the L2BP group and the L2EN group) using the non-parametric Spearman correlation to investigate the potential correlation between the participants' L2 level of proficiency and the eye-tracking measures (fixation time and fixation count). Since the data of the present study are not normally distributed, the Spearman correlation was done in order to investigate the potential influence of L2 proficiency on the processing of verbal inflection. The results suggest

that there was no significant correlation between L2 level of proficiency and the eye-tracking measures.

3.6 PILOT STUDY

The pilot study presented in this section was conducted with the main goals of evaluating if the tasks with the eye-tracker were efficient and familiarizing the experimenter with the procedures for data collection. The study was carried out with two members of LabLing and one graduate student from Programa de Pós-Graduação em Inglês-Estudos Linguísticos e Literários (PPGI). All of the participants were proficient L2 speakers of English and had normal or corrected to normal vision. Even though this pilot study did not have L2 speakers of BP, the intention of the experiment was to test the entire lists of stimuli that were going to be used in the official study.

The experimental tasks were a sentence comprehension task in English and a sentence comprehension task in BP. Both tasks included a list of sentences in the past tense. The critical words of the sentences presented in the tasks were regular and irregular past tense verbs. The tasks contained 32 experimental sentences and 64 fillers, being 96 sentences in total for each task. The 32 experimental sentences included 16 regular past tense verbs and 16 irregular past tense verbs. There should be a minimum of 3 words before and after the critical word. However, the experimental sentences were not syntactically identical. In order to control participants' attention to the tasks, comprehension questions were included in the stimuli.

The verbs in BP were selected from the list of Corpus Brasileiro, whereas the verbs in English were selected from the list of COCA. The critical verbs selected for the task in BP were the 16 top regular past tense verbs and the 16 top irregular past tense verbs in Corpus Brasileiro. The critical verbs selected for the task in English followed the same criterion adopted for the task in BP, except for the fact that the critical verbs were selected from COCA. After building the stimuli, the sentences were presented to the participants on the basis of Experiment Center software at the center of the screen and in Time News Roman font while participants' eye movements were recorded.

For data collection, participants received some explanation about the tasks and their procedures. Once they were familiarized with the tasks, they had a session of practicing, which included 10 sentences with comprehension questions. After the practice session, they performed the task in English. Participants were able to read the sentences according to

their own reading speed while their eye-movements were being registered. Once they finished that part, they had a small break. Afterwards, they were instructed to start the task in BP. The participants took an average of 40 minutes to perform the two tasks.

After participants performed the tasks, they were able to provide their feedback. One of them gave suggestions regarding the fillers, the font and the position of the sentences on the screen. Thus, after the pilot study, changes were made in the tasks before the official data collection. The Times New Roman font was changed to Monaco font, the sentences were positioned on the left of the screen and a fixation target was inserted before each stimulus. Also, the number of stimuli increased from 96 to 178 and the experimental sentences were rebuilt into syntactically identical sentences including only regular transitive past tense critical verbs because it is believed that irregular past tense verbs are subject to form-frequency effects (Pliatsikas & Marinis, 2013).

The next Chapter will present the data analysis, results and discussion of the present study in further detail.

CHAPTER 4

RESULTS AND DISCUSSION

The objective of this chapter is to present and discuss the results obtained from the experiments carried out in order to answer the research questions introduced in Chapter 3. This chapter is divided into 3 main sections. First, Section 4.1 reports the descriptive statistical analysis and it is subdivided into three parts. Subsection 4.1.1 presents the descriptive report described in Chapter 3 (Section 3.5), subsection 4.1.2 provides the outliers test and subsection 4.1.3 presents the normality tests. Second, Section 4.2 reports the inferential statistical analysis and it is subdivided into 2 parts. Subsection 4.2.1 provides the tests for the control variables of this study (age and sex), whereas subsection 4.2.2 reports the comparison of the online tasks¹⁵ (SCTs) results between the two L2 groups. Finally, Section 4.3 presents the answers to the 2 research questions of the present study.

4.1 DESCRIPTIVE STATISTICAL ANALYSIS

This section is subdivided into 3 subsections. Subsection 4.1.1 consists of the presentation of the descriptive report. Subsection 4.1.2 displays the outliers test run in SPSS. Subsection 4.1.3 provides the Kolmogorov-Smirnov and Shapiro-Wilk's tests in order to determine data normality distribution.

4.1.1 The descriptive report

This subsection consists of the presentation of the descriptive report in order to display: (1) the online data extracted by means of BeGaze software, (2) participants' information collected by means of the background questionnaires, (3) participants' L2 level of proficiency.

First, Table 4.1 shows the mean fixation time and the mean fixation count of each participant for the critical regions¹⁶ in the SCTs. Second, Table 4.2 presents the mean fixation count and the mean fixation time of each group of participants without participants 6 and 11. Third, Table 4.3 reports the difference in the language processing

¹⁵Online tasks: Sentence Comprehension Tasks (SCTs) (See Chapter 3, subsection 3.3.5).

¹⁶Critical regions: Past tense inflected verbs (see Chapter 3, subsections 3.3.6 and 3.3.7).

between the L2BP group and the L2EN group in the SCTs. Finally, Table 4.4 presents the difference between L1 and L2 processing within each L2 group.

Table 4.1 Mean fixation times and mean fixation counts in milliseconds for the critical regions in the SCTs

Participant	Group	Fixation time (ms) SCT in BP	Fixation time (ms) SCT in EN	Fixation Count SCT in BP	Fixation Count SCT in EN
1	L2BP	353,3	330,66	1,77	1,7
2	L2BP	499,82	291,77	1,82	1,41
3	L2BP	810,7	415,08	2,56	1,46
4	L2EN	328,81	416,58	1,48	1,6
5	L2EN	476,65	602,52	1,91	1,91
6	L2EN	546,98	931,45	2,27	3,43
7	L2EN	610,92	690,24	2,29	2,24
8	L2EN	581,47	731,88	2,46	2,7
9	L2EN	498,6	759,81	2,17	2,79
10	L2BP	577,59	420,02	2,25	1,75
11	L2BP	998,98	433,91	3,24	1,82
12	L2EN	337,83	405,9	1,41	1,43
13	L2EN	491,12	432,19	2,34	2,25
14	L2BP	620,58	440,53	2,77	2,44
15	L2BP	776,45	534,72	2,32	1,94
16	L2BP	565,41	361,77	1,89	1,67

As can be seen in Table 4.1, participants' time-course of language processing in their L1 and L2 was very similar, except for participant 6 and participant 11 who, by means of visual inspection, displayed some distance from the other fixation time and fixation count values of the sample. With the aim of confirming the existence of outliers besides a visual inspection, a test for outliers was run in SPSS (the test will be presented in subsection 4.1.2). The following table reports the mean fixation time and mean fixation count of both L2 groups in the SCTs.

Table 4.2 Mean fixation time (ms) and mean fixation count of the L2BP group and the L2EN group in the SCTs

	Mean fixation time (ms) SCT in BP	Mean fixation time (ms) SCT in EN	Mean fixation count SCT in BP	Mean fixation count SCT in EN
L2BP group	600,55	399,2	2,19	1,76
L2EN group	475,05	577,01	2,0	2,13

Note. The values displayed on this table were calculated by subtracting one value from the other, which means that it was done through visual inspection as part of the descriptive statistical analysis. L2BP = L2 Brazilian Portuguese group. L2EN = L2 English group.

The raw data presented in Table 4.2 shows that there was a small difference in the fixation time values and the fixation count values between the L2BP group and the L2EN group in their respective L1 and L2. More specifically, as regards the processing of the past tense inflected verbs in their L2, the L2BP group processed the past tense inflected verbs at a mean speed of 600,55 ms in their L2, whereas the L2EN group processed the past tense inflected verbs at a mean speed of 577,01 ms in their L2. As for the fixation count measure in their L2, the L2BP group displayed a mean fixation count of 2,19 in their L2, whereas the L2EN group displayed a mean fixation count of 2,13 in their L2. Regarding the processing of the past tense inflected verbs in their native language, the L2BP group processed the past tense inflected verbs in their L1 at a mean speed of 399,2 ms, whereas the L2EN group processed the past tense inflected verbs in their L1 at a mean speed of 475,05 ms. Concerning the fixation count measure in their native language, the L2BP group displayed a mean fixation count of 1,76 and the L2EN group displayed a mean fixation count of 2,0. Consequently, Table 4.2 suggests that (1) the L2EN group processed their L2 very slightly faster than the L2BP group did in their L2, with a difference of 23,54 ms for the fixation time measure and 0,06 fewer fixations on the target words for the fixation count measure, and (2) the L2BP group processed the past tense inflected verbs in their L1 slightly faster than the L2EN group did in their L1, with a difference of 75,85 ms for the fixation time measure and 0,24 fewer fixations on the target words for the fixation count measure. The following tables illustrate the differences in language processing between and within the L2 groups by means of visual inspection. Table 4.3 shows the difference in language

processing between the L2BP group and the L2EN group, whereas Table 4.4 displays the difference between L1 and L2 processing within each L2 group¹⁷.

Table 4.3 Difference in language processing between the L2BP group and the L2EN group for fixation time (ms) and fixation count in the SCTs by means of visual inspection

	Fixation time (ms)	Fixation count
Difference between L2 processing	23,54 ms	0,06
Difference between L1 processing	75,85 ms	0,24

Note. The values displayed in this table were calculated by subtracting one value from the other, which means that it was done through visual inspection as part of the descriptive statistical analysis. The L2EN group processed their L2 very slightly faster than the L2BP group did in their L2 for both the fixation time and the fixation count measures. The L2BP group processed their L1 slightly faster than the L2EN group did in their L1 for both the fixation time and the fixation count measures.

Table 4.4 Difference between L1 and L2 processing within each L2 group for fixation time (ms) and fixation count in the SCTs

	L2BP group	L2EN group
Difference between L1 and L2 - Fixation time (ms)	201,05 ms	101,96 ms
Difference between L1 and L2 - Fixation count	0,46	0,13

Note. The values displayed in this table were calculated by subtracting one value from the other, which means that it was done through visual inspection as part of the descriptive statistical analysis. This table suggests that the L2BP group's L1 processing was significantly different from their L2 processing, whereas the L2EN group showed no significant difference between their L1 and L2 processing.

Although it was possible to detect an advantage for the L2EN group regarding L2 processing and an advantage for the L2BP group regarding L1 processing¹⁸, it is noteworthy that the raw data, presented

¹⁷The within-group comparison was possible because the methodological design of the present study required participants to perform the tasks in their native language to serve as the baseline (Chapter 3, Section 3.2).

¹⁸Although the advantage of the L2BP over the L2EN group regarding L1 processing was not significant, it is noteworthy that this slight difference in L1

in Table 4.2 and in Table 4.3, does not suggest language processing differences when comparing the two groups. In other words, the L2BP group processed their L2 with no evident difference from the way the L2EN group processed their L2, according to visual inspection. Also, it seems there was no relevant difference between the two groups when comparing their L1 processing. However, Table 4.4 suggests that the L2BP group displayed some difference from the L2EN group when comparing L1 processing with L2 processing within each group. Specifically, Table 4.4 reports that the L2BP group's L1 processing was different from their own L2 processing (a difference of 201,05 ms for fixation time between their L1 and L2, and a difference of 0,46 more fixations on the target words in their L2 for fixation count). On the other hand, the L2EN group displayed no relevant difference between their L1 and their L2 processing (a difference of 101,96 ms for fixation time between their L1 and L2, and a difference of 0,13 more fixations on the target words in their L2 for fixation count). This might be an indicator that BP past tense inflected verbs may entail a processing cost for English/BP bilinguals, whereas English may not incur a significant processing cost for native speakers of a more morphologically complex language such as BP. The results of inferential statistical tests on the differences between the two groups will be presented in Section 4.2 of this chapter.

4.1.2 The outliers test

This subsection consists of the presentation of the outliers test. After detecting the presence of outliers by visual inspection, an outliers test was run in SPSS in order to confirm their existence in the sample. Figure 4.1 displays the results for outliers.

processing can be attributed to the fact that inflectional morphology may be hard for some native speakers, too (Slabakova, 2010). This happens especially when L2 learners' native language has notably a lot of possible inflectional forms such as BP.

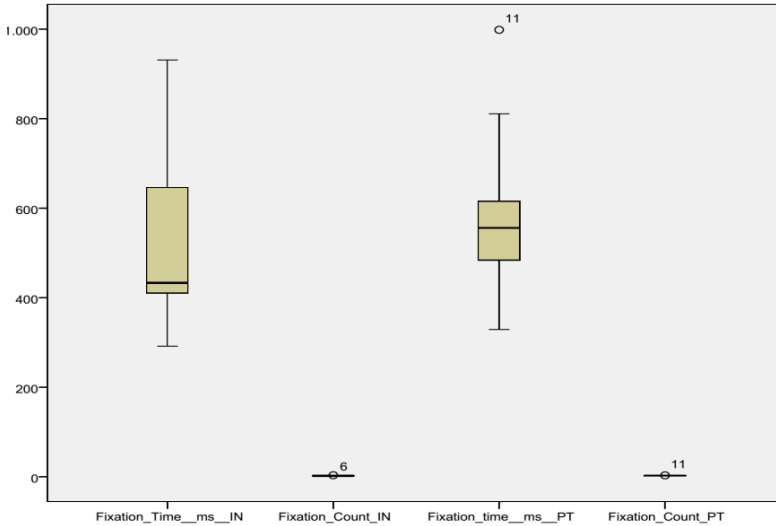


Figure 4.1 Results of outliers test

As can be seen in Figure 4.1, there were 2 outliers in the sample. Thus, in the total, 14 participants were included in the sample for the statistical analyses of this study.

4.1.3 Data normality distribution

This subsection presents Kolmogorov-Smirnov and Shapiro-Wilk's tests, which were performed in order to verify data normality distribution. The results are presented in Table 4.5.

Variables	Kolmogorov-Smirnov	Shapiro-Wilk
Age	d=0.279, p<0.20; Lilliefors p<0.01	W=0.715 p=0.0005
TOEFL iBT	d=0.225, p> 0.20; Lilliefors p> 0.20	W=0,889 p=0.271
CELPE-Bras	d=0,184, p> 0.20; Lilliefors p> 0.20	W=0,967 p=0,876
Fixation Time (ms) SCT in EN	d=0,266, p>0 .20; Lilliefors p<0,01	W=0,885 p=0,070
Fixation Count SCT in EN	d=0,166, p>0.20; Lilliefors p> 0.20	W=0,913 p=0,176

Fixation Time (ms) STC in BP	d=0,141, p> 0.20; Lilliefors p> 0.20	W=0,936 p=0,376
Fixation Count SCT in BP	d=0,143, p> 0.20; Lilliefors p> 0.20	W=0,964 p=0,793

As can be seen in Table 4.5, the results show that the data of the present study follows a non-normal distribution. Since the data are not normally distributed and the number of participants was below 30, all further analyses were conducted with non-parametric statistical tests. The following section reports the inferential statistical analysis of the present study.

4.2 INFERENTIAL STATISTICAL ANALYSIS

This section reports the inferential statistical analysis and it consists of 2 subsections. Subsection 4.2.1 presents the analysis of the correlation between the control variables (sex and age) and the L2 groups' performance in the SCTs. Subsection 4.2.2 provides the comparison of the results of the L2 groups' performance in the SCTs, including the statistical analysis in order to verify the roles of the L1 typology and proficiency in L2 processing.

4.2.1 Sex and age

This subsection presents the analysis of the relationship between the control variables (sex and age) and the L2 groups' eye-tracking values for the SCTs. The correlation between the control variables and the eye-tracking values was performed in order to verify if sex and age have a statistically significant effect on participants' language processing. Table 4.6 displays the Mann-Whitney test which was performed in order to show sex differences. Table 4.7 presents the Spearman correlation coefficient¹⁹ (ρ) between age and the eye-tracking values for the L2BP group, whereas Table 4.8 shows the results of the Spearman correlation between age and the eye-tracking values for the L2EN group.

Table 4.6 Test values of Mann-Whitney test comparing sex (Male and Female)

¹⁹In order to meet the statistical prerequisites, the non-parametric Spearman correlation was performed.

Variables	U	Z	p-level
Age	19,00	0,702	0,482
Fixation Time (ms) - SCT in EN	23,00	-0,191	0,848
Fixation Count - SCT in EN	22,00	-0,319	0,749
Fixation Time (ms) - SCT in BP	24,00	0,063	0,949
Fixation Count - SCT in BP	23,00	0,191	0,848

As seen in Table 4.6, sex did not have a statistically significant effect on the fixation time or fixation count values of the sample, as suggested by the results of the Mann-Whitney test. Accordingly, all analyses and correlations were performed considering all participants as one group regarding their sex.

Table 4.7 Spearman correlation between age and the eye-tracking measures within the L2BP group

Age x Variables	Spearman R	p-level
Fixation Time (ms) SCT in EN	-0,039	0,935
Fixation Count SCT in EN	0,231	0,618
Fixation Time (ms) SCT in BP	-0,116	0,805
Fixation Count SCT in BP	0,000	1,000

As can be seen in Table 4.7, there was no significant correlation for age *versus* the eye-tracking measures within the L2BP group ($p > 0,05$).

Table 4.8 Spearman correlation between age and the eye-tracking measures for the L2EN group

Age x Variables	Spearman R	p-level
Fixation Time (ms) SCT in EN	-0,668	0,101
Fixation Count SCT in EN	-0,401	0,373
Fixation Time (ms) SCT in BP	-0,356	0,433
Fixation Count - SCT in BP	-0,267	0,562

As can be seen in Table 4.8, there was no significant correlation between age and the eye-tracking measures for the L2EN group ($p > 0,05$). Thus, together, the results presented in Table 4.7 and in Table 4.8 suggest that age is not related to L2 processing of verbal morphology.

4.2.2 L1 typology and proficiency

This section presents the results from the statistical analysis run to verify the correlation of L1 typology, as well as the correlation of proficiency with the eye-tracking measures. As for the analysis of the eye-tracking measures (fixation count and fixation time) regarding L1 typology, a comparison between the two groups of participants in the SCTs was carried out.

The following figures illustrate how the comparison between the two groups of participants was made in order to perform the statistical analysis for the eye-tracking measures. Figure 4.2 illustrates how the comparison between the L2BP group and the L2EN group was made regarding the fixation count values obtained through the SCTs, whereas Figure 4.3 illustrates how the comparison between the L2EN group and the L2BP group was made regarding the fixation time values obtained through the SCTs.

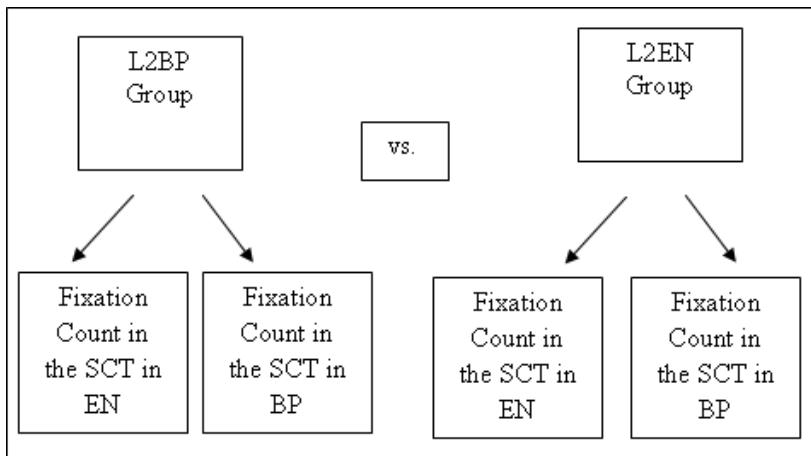


Figure 4.2 Illustrative comparison between the L2BP group and the L2EN group in the SCTs for the fixation count measure.

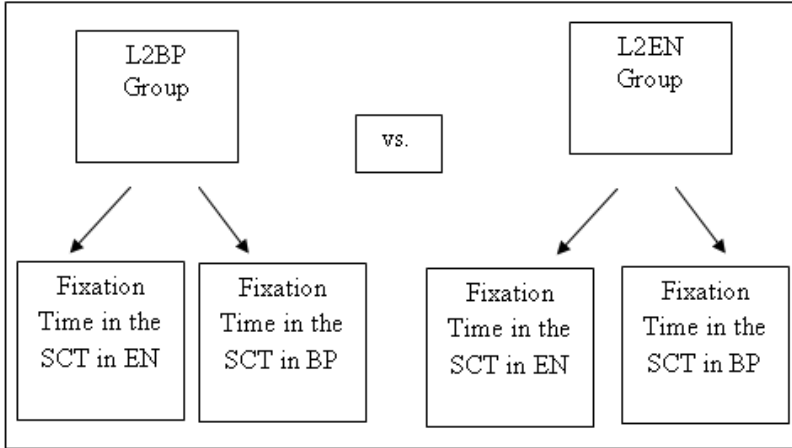


Figure 4.3 Illustrative comparison between the L2EN group and the L2BP group in the SCTs for the fixation time measure

The General Linear Model (GLM) was performed in order to determine whether the means of the two groups differed. In other words, the GLM was performed to verify the role of the L1 typology in L2 processing by comparing the L2BP group with the L2EN group for the fixation count and the fixation time values, which were obtained through the SCTs. Figure 4.4 displays a histogram that illustrates the results for the fixation count values comparing the performance of both groups of participants, whereas Figure 4.5 displays a histogram that illustrates the results for the fixation time values comparing the performance of both groups of participants.

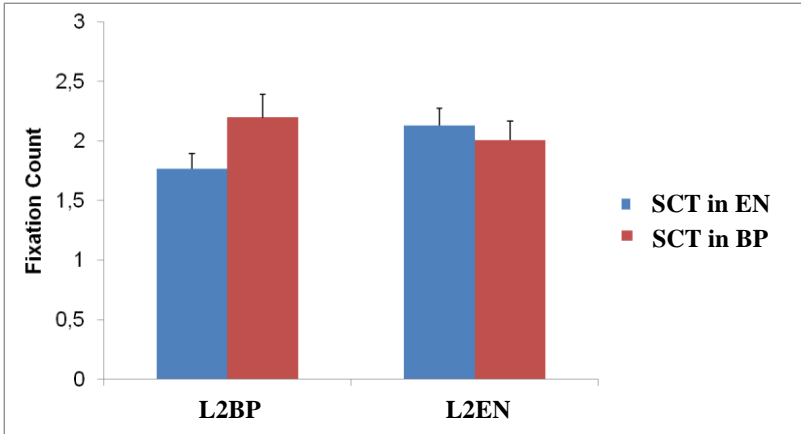


Figure 4.4 Results of the General Linear Model test comparing the L2EN group with the L2BP group for the fixation count measure

The results of the GLM for the fixation count measure, as illustrated in Figure 4.4, suggest that there was no statistically significant difference in the factor group [$F_{(1, 12)}=0,171$, $p=0,686$ Power = 0,066] and fixation count [$F_{(1, 12)}=3,953$, $p=0,07$, Power = 0,447]. However, there was an interaction between the L2BP group's L1 and L2 fixation count values [$F_{(1, 12)}=12,810$, $p=0,0037$, Power= 0,906]. The Tukey post-hoc test showed a statistically significant difference in the fixation count values within the L2BP group when comparing their fixation count values in the SCT in BP with their fixation count values in the SCT in English ($p<0,05$)*.

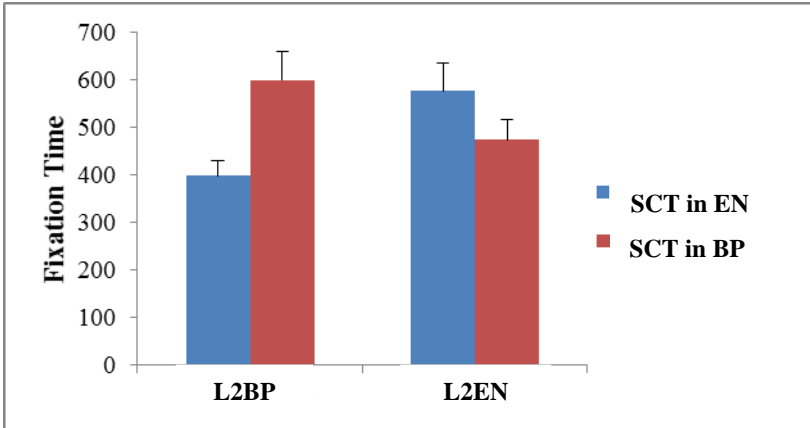


Figure 4.5 Results of the General Linear Model test for the comparison between L2EN group and the L2BP group for the fixation time measure

The results for the fixation time measure, as illustrated in Figure 4.5, suggest that there was no statistically significant difference in the factor group [$F(1, 12)=0,169, p=0,688, \text{Power} = 0,066$] and fixation time [$F(1, 12)=3,196, p=0,099, \text{Power} = 0,376$]. However, there was an interaction between the L2BP group's L1 and L2 fixation time values [$F(1, 12)=29,774, p=0,0001, \text{Power}= 0,998$]. The Tukey post-hoc demonstrated that there might be significant difference in the fixation time values within the L2BP group when comparing their fixation time values in the SCT in BP with their fixation time values in the SCT in English ($p<0,05$)*.

As seen in Chapter 3, my hypotheses focused on the roles of L1 typology and proficiency²⁰ in L2 processing of verbal inflection. Specifically, I wanted to know whether L1 typology and proficiency can hinder native-likeness in L2 verb morphological processing. Regarding the role of L1 typology, it was expected that the L2BP group would fixate for a longer time, and more times, on the critical regions in their L2 than the L2EN group would, in their L2. This may be evidence for language processing costs on the part of the L2BP group as compared to the L2EN group.

Contrary to my expectations, however, the statistical results displayed in Figure 4.4 and in Figure 4.5 suggest that there were no statistically significant differences in language processing between the

²⁰The role of proficiency in L2 processing will be discussed further in this subsection.

two groups. The L2BP group and the L2EN group displayed no statistically significant differences in the factor group ($p=0,686$) and fixation count ($p=0,07$), or in the factor group ($p=0,688$) and fixation time ($p=0,099$), which means that the results reported in Figure 4.4 and in Figure 4.5 might demonstrate that: (1) the L1 typology did not exert an effect on L2 processing in a between-group comparison, meaning that L2 learners of BP (native speakers of English) and L2 learners of English (native speakers of BP) do not process verbal inflection differently in their respective L2s, (2) L2 learners of BP and L2 learners of English process verbal inflection in their L1s with no significant difference, and (3) L2 learners of BP and L2 learners of English process their L2s in a native-like fashion (there was no significant difference in language processing between L2 learners and native speakers). It is nonetheless interesting that, in a within-group comparison²¹, the statistical results reveal that the L2BP group presented a clear difference in language processing between the SCTs. Specifically, the L2BP group displayed significantly extra processing cost (i.e., increased reading time and increased number of fixations on the target words ($p<0,05$ *) associated with the SCT in BP (i.e., their L2). Hence, the statistical results within the L2BP group (1) confirm the results predicted by visual inspection (Table 4.4) and (2) provide evidence in favor of my expectation regarding the effects of the L1 on the L2 by demonstrating that the morphosyntactic differences between L1 (in the case of this group, English) and L2 (Brazilian Portuguese) may play an important role in the processing of L2 verbal inflection.

The phenomenon which occurred between the L2BP group and the L2EN group – i.e., no statistically significant differences between the two groups suggesting no language processing advantages or disadvantages for any of the groups – means that the L1 typology had no effects on native-like L2 processing in a between-group comparison. This phenomenon can be accounted for by Hopp's (2007) Fundamental Identity Hypothesis (FIH), which suggests that although L2 learners' L1 may cause non-native-like L2 inflection, late L2 learners can gain grammatical representation and processing that is qualitatively similar to that of native speakers (Hopp, 2007; Hopp, 2010; Sagarra & Herschensohn, 2011). As seen in the review of literature, Hopp (2007) states that non-native and native grammatical representation and

²¹As stated earlier in this chapter, the within-group comparison was possible because the methodological design of the present study required that participants perform the tasks in their native language to serve as the baseline.

processing architecture display no fundamental differences. However, if differences between native and nonnative processing are found, they may be attributed to L1 transfer or performance factors, such as computational limitations (Hopp, 2007; Hopp, 2010; Sagarra & Herschensohn, 2011). Furthermore, the results revealed in Figure 4.4 and in Figure 4.5 contradict theories that reject native-like processing in the L2 (e.g., Clahsen & Felser, 2006a/2006b; Silva & Clahsen, 2008). Thus, the results shown in the aforementioned figures are in line with previous studies conducted by a number of other researchers that have attested native-like morphosyntax for L2 learners (e.g. Birdsong, 1992; Birdsong & Molis, 2001; Hopp, 2010; Montrul & Slabakova, 2003; White & Genesee, 1996).

On the other hand, the phenomenon which occurred within the L2BP group – i.e., the L2BP group’s statistically significant extra processing cost associated with their L2, meaning that the L1 typology exerted an effect on L2 processing in a within-group comparison – is in line with evidence from previous studies (e.g. Hanson et al., 2014; Hopp, 2007; Hopp, 2010; Jiang 2004; Portin et al., 2008), which suggest that the L1 has an influence on the morphological processing in L2 due to the differences in the typology of the L2 learners’ L1 and L2 (Hopp, 2010; Portin et al., 2008) and/or due to insensitiveness, on the part of the learner, to morphological marking that represents grammatical features in the L2, but not in the L1 (Jiang, 2004), leading to reduced L2 processing efficiency. Additionally, the results obtained within the L2BP group are in line with theories that take into account the properties of learners’ L1s, such as the Unified Competition Model (Hanson et al., 2014; MacWhinney, 2005, MacWhinney, 2012) and the Associative Cognitive CREED framework (Ellis, 2006a). These theories claim that “the L1 tunes the ways in which learners attend to language” (Ellis, 2006a, p. 100) and that the learning of an L2 in adulthood involves substantial amount of transfer of L1 patterns to L2 since local area maps are already committed to the L2 learners’ L1 framework (MacWhinney, 2005, MacWhinney, 2012). In view of that, the results obtained within the L2BP group may be associated with these theories (as well with evidence provided from the studies afore mentioned) and may be further evidence in favor of the argument that morphological representations of the English system for verbal inflection are a familiar, highly impoverished and unrepresentative example of morphological development as compared to Romance languages (e.g., Bennett & Partee, 1972; Dabrowska, 2001; Giorgi & Pianesi, 1997; Portin et al, 2008; Landman,1992; Roberts, 1993; Slabakova, 2010; Slabakova,

2003; Zucchi, 1999). As a result, the phenomenon which occurred within the L2BP group is line with the argument that English-speaking L2 learners of a Romance language are expected to have difficulties to map surface morphology in their L2 due to the morphological richness and complexity of the language (Ayoun & Salaberry, 2005).

After establishing that the L1 typology had a statistical effect on L2 processing of the L2BP group, let me now turn to the impact that semantics might have had on this particular finding. As seen in the review of literature, although there is a morphosyntax-semantics mismatch between BP and English, experienced L2 learners are aware of the semantics consequences of such mismatch, especially because L2 learners' knowledge of morphology tends to precede knowledge of semantics (Slabakova, 2003). Hence, once inflectional morphology is learned, morphosyntax-semantics mismatches consequently become learnable to a native-like level (Slabakova, 2009). Nonetheless, it is known that grammatical information is not the only relevant factor in the process of inflection, which means that semantics may play an important role in the processing of verbal inflection (Ramscar, 2001). To the best of my knowledge, studies in the area of morphosyntax-semantics interface which focus on the complex inflectional morphology of BP as an L2 are still scarce²². Thus, the fact that the L1 typology may have exerted an effect on the L2BP group's L2 processing in a within-group comparison, but not in a between-group comparison, leaves open the possibility that the morphosyntax-semantics mismatches between BP and English might have contributed to the L2 extra processing cost on the part of the native speakers of English (i.e., the L2BP group). Furthermore, in spite of the fact that the present study investigated L2 learners' processing by means of reading tasks, phonological information might have been another relevant factor in the present results (e.g., Bliss, 2006; Rumelhart & McClelland, 1986).

Finally, the results presented in Figure 4.4 and in Figure 4.5 showed no statistically significant differences in language processing between the L2BP group and the L2EN group but showed a statistically significant difference in language processing within the L2BP group. These results suggest that there was no morphological processing cost for verbal inflection between the two groups due to cross language

²²As seen in the review of the literature, Oliveira et al. (2015) conducted a pilot study in order to assess the mismatch between English (L1) and BP (L2) aspectual tenses. The results show that further research on the topic is necessary.

differences. In other words, the typology of participants' L1 did not affect the processing of L2 verbal inflection when the L2BP group and the L2EN group are compared. Nevertheless, the L1 seems to have had an influence in the morphological processing of the L2 within the L2BP group. This influence may be attributed to the fact that English lacks inflectional features existent in BP, resulting in extra L2 processing costs on the part of the L2BP group.

Regarding the correlation between participants' proficiency and the eye-tracking measures for the SCTs, the non-parametric Spearman correlation was performed. Table 4.9 presents the Spearman correlation coefficient (ρ) between proficiency and the eye-tracking measures for the L2BP group, whereas Table 4.10 displays the Spearman's rank correlation coefficient (ρ) between proficiency and the eye-tracking measures for the L2EN group.

Table 4.9 Spearman correlation between proficiency (CELPE-Bras) and the eye-tracking measures within the L2BP group		
CELPE-Bras x Variables	Spearman R	p-level
Fixation Time (ms) SCT in EN	-0,432	0,333
Fixation Count SCT in EN	-0,577	0,175
Fixation Time (ms) SCT in BP	-0,036	0,939
Fixation Count SCT in BP	-0,324	0,478
Table 4.10 Spearman correlation between proficiency (TOEFL iBT) and the eye-tracking measures within the L2EN group		
TOEFL iBT x Variables	Spearman R	p-level
Fixation Time (ms) SCT in EN	-0,036	0,939
Fixation Count SCT in EN	0,107	0,819
Fixation Time (ms) SCT in BP	0,143	0,760
Fixation Count SCT in BP	0,321	0,482

According to the results reported in Table 4.9 and in Table 4.10, there was no statistically significant correlation between L2 proficiency and the eye-tracking measures for the L2BP group ($p > 0,05$) and for the

L2EN group ($p > 0,05$), which suggests that the proficiency variable did not play a role in producing native-like L2 processing.

As stated earlier, hypothesis 2 focused on the role of proficiency in L2 processing of verbal inflection. Thus, it was expected that proficiency would be strongly related to performance in both L2 groups and that L2 learners with lower proficiency would show less native-like processing than those with high proficiency (Ellis, 2006a; Ellis, 2006b; Hanson et al, 2014; Hopp, 2006; Hopp, 2010; MacWhinney, 2005,2012; Sagarra & Herschensohn, 2011).

The results, however, do not support my predictions. As seen in Table 4.9 and in Table 4.10, the findings concerning proficiency appear to be inconsistent with Ellis's (2006a) Associative Cognitive framework and MacWhinney's (2005) Unified Competition Model, which are theories that highlight the importance of proficiency in conjunction with the patterns of the learner's L1s (Hanson et al., 2014). Moreover, the results tend to contradict evidence provided from a series studies (e.g. Hahne, 2001; Hahne & Friederici, 2001; Hanson et al. (2014); Hopp, 2006; Ojima et al., 2005; Osterhout et al., 2006; Rossi et al., 2006; Sagarra and Herschensohn, 2011) which indicate that late L2 learners with higher L2 proficiency display more native-likeness in second language processing than those who exhibit less developed L2 proficiency.

One possible alternative interpretation of these results might be that the advanced L2 learners did not show an advantage over the intermediate L2 learners because the significant impact of proficiency on L2 processing is more clearly detectable between advanced/intermediate and low-proficiency levels. Since participants' proficiency cutoff level for the present study did not include low-proficiency L2 learners, it might be possible that L2 processing-cost effects have not been found between advanced and intermediate L2 learners because learners tend to perform similarly at higher levels of proficiency (advanced and intermediate levels) (Hanson et al., 2014). A second possible interpretation of these results, although more improbable, might be that the proficiency assessment applied to measure participants' level of proficiency for the present study was not sufficient to provide an overall account of participants' mastery of their L2s. At last, a third possible explanation of these results might be Hopp's (2010) argument that past tense marking, though being extremely complex, is subject to a lower degree of variability in L2 acquisition (i.e., past tense marking is acquired earlier than other types of inflection), meaning that intermediate L2 learners may be advanced enough in order to have

already consolidated such structure and, thus, may be prevented from reduced L2 processing efficiency as compared to the advanced L2 learners. Consequently, L2 proficiency, as measured by samples of the TOEFL iBT and the CELPE-Bras writing sections, does not correlate with the processing of inflectional morphology in the L2, as assessed by the eye-tracking measures such as fixation time and fixation count.

To sum up, in the present study, the processing of BP and English verbal inflection by L2 learners was affected by cross-linguistic influence (i.e., L2 learners' L1 typology), only. Although both L2 groups were able to process their L2s in a native-like fashion, the morphological patterns of the L1 may have influenced the processing of verbal inflection in the L2 within the L2BP group (as discussed in this Section).

4.3 READDRESSING THE RESEARCH QUESTIONS

The purpose of this section is to readdress the two hypotheses and the two research questions pursued in the present study. The answers to the research questions are based on the data presented in this Chapter and, therefore, summarize the results obtained.

Research question 1: Does the L1 typology exert an effect on L2 processing of verbal morphology? If it does, do L2 learners of BP and L2 learners of English process L2 past tense verbal morphology differently?

Hypothesis 1: The L1 typology exerts an effect on L2 processing of verbal morphology. L2 learners of BP and L2 learners of English process L2 past tense verbal morphology differently due to the morphosyntactic mismatches between their L1 and L2. Thus, L2 learners of English are expected to process their L2 in a more native-like pattern than L2 learners of BP. Also, L2 learners of BP are expected to exhibit greater L2 processing cost than L2 learners of English due to the impoverished verbal morphology system of their L1.

Hypothesis 1 was partially supported by the results of the present study. There was no significant difference in language processing between the L2BP group and the L2EN group. Hence, the results presented in Figure 4.4 and Figure 4.5 suggest that the morphosyntactic differences between L2 learners' L1 and L2 (i.e., L2 learners' L1 typology) did not affect the processing of L2 verbal inflection between the groups. Additionally, the results shown in Figure 4.4 and Figure 4.5 indicate that L2 learners of BP and L2 learners of English can process past tense verbal inflection in their L2s in a native-like fashion despite

their L1 typology. As stated earlier in this chapter, this result supports Hopp's (2007) Fundamental Identity Hypothesis (FIH), which argues that late L2 learners can attain grammatical representation and processing to native-like levels (Hopp, 2007; Hopp, 2010; Sagarra & Herschensohn, 2011). However, due to the methodological design of the present study (i.e. the participants recruited for the present study performed the tasks in their L1), it was possible to compare L1 processing with L2 processing in a within-group framework (Table 4.4). Thus, the results provided in Figure 4.4 and in Figure 4.5 were also able to demonstrate that the L1 typology might have had an effect on L2 morphological processing of the L2BP group ($p < 0,05$)* for fixation count and fixation time measures). This influence may be attributed to the fact that English lacks grammatical features existent in BP, resulting in extra processing cost in the SCT in BP.

To conclude, the interesting finding obtained within the L2BP group can be taken as partial evidence in favor of hypothesis 1 since it is in line with theories that take into account the properties of learners' L1s, such as the Unified Competition Model (Hanson et al., 2014; MacWhinney, 2005, MacWhinney, 2012) and the Associative Cognitive framework (Ellis, 2006a). The finding is also in line with previous studies that show that the L1 typology has an influence on L2 processing (e.g. Hanson et al., 2014; Hopp, 2007; Hopp, 2010; Jiang 2004; Portin et al., 2008).

Research question 2: Does level of proficiency play a role in L2 processing of verbal morphology?

Hypothesis 2: Increased L2 proficiency will implicate more native-like processing of verbal morphology in the L2. Thus, L2 learners with higher level of proficiency will have a greater performance and show more native-like L2 processing than L2 learners with lower level of proficiency.

Hypothesis 2 was not supported by the results found in the present study. There was no statistically significant correlation between proficiency and the eye-tracking measures for either of the groups ($p > 0,05$, see Table 4.9 and Table 4.10). This finding indicates that all participants from this study, regardless of their level of proficiency, processed L2 past tense verbal inflection in a native like-fashion. Thus, the advanced L2 learners did not display a greater performance in L2 processing as compared to the intermediate L2 learners.

The results regarding proficiency are inconsistent with the theories and previous studies which indicate that L2 learners with higher L2 proficiency display more native-like processing than L2 learners

with lower proficiency. Nevertheless, three possible interpretations are given for the present finding: (1) proficiency did not play a role in L2 processing because the significant impact of proficiency on L2 processing is more evident between advanced/intermediate and low proficiency L2 learners (Hanson et al., 2014) than it is for advanced and intermediate L2 learners, (2) the instruments adopted to assess participants' level of proficiency were not adequate to provide a thorough account of participants' mastery of their L2s, and (3) L2 learners with intermediate level of proficiency might have been prevented from reduced processing efficiency because past tense marking is a type of inflection that may have been already consolidated in the mental apparatus of intermediate L2 learners, meaning that past tense marking tend to be acquired earlier and is less variable than other structures (Hopp, 2010).

The final remarks, conclusions, as well as the limitations and pedagogical implications of this study will be presented in the next Chapter.

CHAPTER 5

FINAL REMARKS

The objective of this Chapter is to reconsider and summarize the results and discussion presented in Chapter 4 to reach to conclusions regarding the main aspects addressed in this investigation. This Chapter is divided into 3 sections. Section 5.1 contains the main conclusions of the present study and it is subdivided into 2 subsections. Subsection 5.1.1 presents the conclusions on the role of the L1 typology in L2 processing of verbal morphology, whereas subsection 5.1.2 reports the conclusions on the role of proficiency in L2 processing of verbal morphology. Section 5.2 describes the limitations of this study and includes suggestions for further research. Finally, Section 5.3 presents the methodological and pedagogical implications of this study.

5.1 CONCLUSIONS

This section is subdivided into 2 subsections. On the basis of the results obtained from data collection, each subsection presents conclusions on the 2 main topics of this investigation: (1) the role of the L1 typology in L2 processing of BP and English past tense verbal morphology, and (2) the role of proficiency in L2 processing of BP and English past tense verbal morphology.

5.1.1 The role of the L1 typology in L2 processing of BP and English past tense verbal morphology

This subsection restates the primary results which were explained in detail in Section 4.2 of Chapter 4. Specifically, the conclusions described in this subsection refer to the GLM test, by means of which participants' eye-tracking values were found in the processing of past tense verbal inflection. Hence, the final conclusions are:

1. The morphosyntactic differences between L2 learners' L1 and L2 seem not to have affected the processing of L2 past tense verbal morphology between the L2BP group and the L2EN group. Specifically, the results show that, in a between-group comparison, the L2 learners' L1 typology did not hinder L2 morphological processing. This conclusion is based on the results presented from the GLM test (Subsection 4.2.2, Figure 4.4 and Figure 4.5), which show that the L2BP group and the L2EN group displayed no statistically significant

differences in the factor group ($p=0,686$) and fixation count ($p=0,07$), or in the factor group ($p=0,688$) and fixation time ($p=0,099$) for the SCTs.

2. In a within-group comparison, the inferential statistical analysis indicates that the L1 typology influenced the L2BP group's L2 morphological processing. This conclusion is based on the results from the GLM test (Figure 4.4 and Figure 4.5), which show that there was a statistically significant difference between their L1 and L2 processing (i.e., there was a correlation between the L2BP groups' eye-tracking values and the SCT in their L2 ($p<0,05$)*), whereas the L2EN group showed no significant difference between their L1 and L2 processing ($p>0,05$). Hence, the results obtained within the L2BP group are further evidence in favor of the argument that English-speaking L2 learners of a Romance language have difficulties to map surface morphology in their L2 due to the morphological richness and complexity of Romance languages (Ayoun & Salaberry, 2005) as compared to the impoverished morphological representations of English (Bennett & Partee, 1972; Dabrowska, 2001; Giorgi & Pianesi, 1997; Landman, 1992; Roberts, 1993; Slabakova, 2010; Slabakova, 2003; Zucchi, 1999).

3. The results regarding the role of the L1 typology in L2 processing are in line with evidence from previous studies (e.g. Hanson et al., 2014; Hopp, 2007; Hopp, 2010; Jiang 2004; Portin et al., 2008). Also, the results are in line with theories which claim that there is substantial amount of transfer of L1 patterns to the L2, such as the Unified Competition Model (Hanson et al., 2014; MacWhinney, 2005, MacWhinney, 2012) and the Associative Cognitive CREED framework (Ellis, 2006a).

4. Overall, the results concerning the role of the L1 typology are related to the two theoretical predictions of L2 processing of past tense verbal morphology presented in this study. The Associative Cognitive CREED framework (Ellis, 2006a) and the Unified Competition Model (MacWhinney, 2005, MacWhinney, 2012) are in line with the results regarding L1 typology in that they are both theories which address L1 transfer as an important factor that may have an effect on L2 learning and L2 processing (see Chapter 2, Section 2.3).

5. L2 learners of BP and L2 learners of English can process past tense verbal inflection in their L2s in a native-like fashion. In view of that, it is noteworthy that L2 learners of BP can process verbal inflection in their L2 in a native-like fashion despite the potential influence of their L1 typology. This conclusion comes from the suggestion that the L1 typology influenced L2 morphological processing within the L2BP

group (as described above), even though they were able to process their L2 in a native-like fashion (Subsection 4.2.2, Figure 4.4 and Figure 4.5).

6. The results regarding native-like L2 processing are in line with Hopp's (2007) Fundamental Identity Hypothesis (FIH) and previous studies conducted by other researchers that have demonstrated native-like morphosyntax for L2 learners (e.g. Birdsong, 1992; Birdsong and Molis, 2001; Hopp, 2010; Montrul and Slabakova, 2003; White and Genesee, 1996). Additionally, the results of the present study attest that late L2 learners can gain grammatical representation and processing that is qualitatively similar to that of native speakers despite morphological mismatches between L2 learners' L1 and L2 (Hopp, 2007; Hopp, 2010; Sagarra & Herschensohn, 2011).

7. A very crucial finding of the present study is that participants who are native speakers of typologically different languages can process their L2s similarly to each other and in a native-like fashion. However, the results show that similar L2 processing and native-likeness do not always indicate the absence of L1 effects on the L2 (Subsection 4.2.2, Figure 4.4 and Figure 4.5) since L1 effects on L2 processing are not necessarily found through a between-group comparison methodological framework.

It is notable that most studies that have tried to shine light on the effects of the L1 typology on L2 processing recruited learners of the same L2 with different L1 backgrounds (e.g., Hanson & Carlson, 2014; Hopp, 2010; Kahoul, 2014; Portin et al., 2008; Sagarra & Herschensohn, 2011). Such studies did not take into account L2 learners' processing cost in their own L1 in order to verify whether they display a significant difference in language processing between their L1 and their L2 due to the L1 typology. At a more general level, I hope that the present study highlights the need to consider more comprehensive methodological frameworks in order to investigate the effects of the L1 typology on L2 morphological processing.

8. Although the present study is outside the scope of Semantics, the results regarding the influence of the L1 typology in L2 morphological processing might indicate that morphosyntax-semantics mismatches may have played a role in the L2BP group's L2 morphological processing. This conclusion is based on the results provided by the GLM test (Figure 4.4 and Figure 4.5), which shows that the L2BP group displayed increased processing time in their L2 as compared to their L1, whereas the L2EN group did not show significant statistical differences between their L1 processing and L2 processing (as stated in 2). It is noteworthy that research has shown that L2 learners of

English have access to semantic features of functional categories not available in their L1 (Slabakova, 2003). However, this evidence is restricted to English as L2. Thus, further research on the aspectual competence of L2 learners of BP is recommended in order to scrutinize the potential role of semantic properties in BP L2 past tense verbal inflection. Also, it would be interesting to conduct further research on BP and English verbal morphology taking into consideration phonology as a relevant factor in the inflection process since phonology has a strong interface with inflectional morphology (Cohen-Goldberg, Cholin, Miozzo & Rapp, 2013).

5.1.2 The role of proficiency in L2 processing of BP and English past tense verbal morphology

The conclusions drawn regarding the role of proficiency in L2 processing of past tense inflected verbs are presented in this subsection. Thus, this subsection reiterates the conclusions regarding the correlation between proficiency and participants' eye-tracking values obtained by means of the SCTs. The final conclusions are:

1. There was no correlation between L2 proficiency and the eye-tracking measures for the L2BP group ($p > 0,05$) and the L2EN group ($p > 0,05$). The results suggest that higher proficiency in the L2 does not lead to more efficient L2 processing. Thus, proficiency did not play a role in producing native-like L2 processing. This conclusion is based on the Spearman correlation coefficient (ρ) between proficiency (CELPE-Bras/TOEFL iBT) and the eye-tracking measures within each L2 group (Table 4.9 and Table 4.10).

2. Three possible interpretations to the results described above are offered: (1) (1) the significant impact of proficiency on L2 processing is more evident between advanced/intermediate and low proficiency L2 learners (Hanson et al., 2014) than it is for advanced and intermediate L2 learners, (2) the instruments adopted to assess participants' level of proficiency did not provide a thorough account of participants' mastery of their L2s, and (3) L2 learners with intermediate level of proficiency might have been prevented from reduced processing efficiency because past tense marking is a type of inflection that may have been already consolidated in the mental apparatus of intermediate L2 learners (Hopp, 2010).

3. The results regarding the role of proficiency in L2 processing do not relate to the two theories addressed in the present study as predictions of the L2 processing of past tense verbal inflection.

Specifically, the Associative Cognitive CREED (Ellis, 2006a) and the Unified Competition Model (MacWhinney, 2005, MacWhinney, 2012) postulate that L2 learners with higher levels of proficiency are expected to converge on the processing behavior of native speakers (see Chapter 2, Section 2.3). The results of the present study, however, indicate that higher level of proficiency did not play a role in the participants' L2 verb morphological processing.

5.2 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

The present study represents an attempt to investigate the roles of the L1 typology and proficiency in L2 verb morphological processing of BP and English L2 learners. Although this study followed strict methodological procedures, it suffered from a few limitations that must be acknowledged so that its data is treated with some caution.

First, the present study is limited in the number of participants in each L2 group. The fact that this investigation was carried out in Brazil influenced the recruitment of participants who were represented by the native speakers of English, especially because it was extremely difficult to find native speakers of English who were advanced and intermediate L2 learners of BP. Thus, the online data collected for this investigation represents a small sample of bilinguals, and this means no generalizations can be made. Additionally, the reduced number of participants per group led to non-normal data distribution. A more representative sample would be necessary to alleviate these limitations.

Second, the stimuli of the present study consisted of regular past tense verbs in BP and English. Further research considering irregular past tense forms in these two languages would contribute to the results of the present study.

Third, because of time constraints, the present study assessed participants' level of proficiency through a sample of the TOEFL iBT and the CELPE-Bras writing sections. A more thorough and rigorous account of participants' mastery of their L2s would be interesting in order to eliminate any potential bias about proficiency assessment on the part of the researcher. Moreover, the TOEFL iBT and the CELPE-Bras writing sections were rated and scored by only 1 native speaker as external rater (1 rater for each L2 group). A larger number of external raters would be necessary in order to grant more consistency to the proficiency assessment applied in this kind of study.

Fourth, only 1 native speaker of BP and 1 native speaker of English were chosen in order to rate the naturalness of the experimental sentences (see Appendix J and Appendix O for the instructions for the Sentence Naturalness Judgment Tasks). A larger number of external raters would be able to better minimize any potential linguistic mistakes in the experimental sentences.

Fifth, due to the difficulty to find native speakers of English willing to take part in the experiment, the present study did not recruit monolinguals to serve as control group. Thus, although the methodological design of this study allowed a statistical analysis that took into account L2 learners' processing cost in their own L1, a group of monolinguals to serve as a control group would be interesting.

Finally, the present study, which investigated the role of the L1 typology and proficiency in L2 verb morphological processing, has brought some evidence to the fact that cross-linguistic influence (i.e., the L1 typology) is a factor that may produce extra L2 processing cost on the part of L2 learners whose L1 and L2 display consistent difference in their morphological systems. However, taking into account the Brazilian context, this type of research is still in its infancy and further empirical studies are necessary in order to fully understand the role of the L1 typology in L2 processing of morphologically rich languages such as BP. In the case of this study, in which a within-group comparison showed evidence that the L1 typology exerted an effect on the L2 processing of native speakers of English, the results made me wonder whether extra L2 processing cost in BP would also be found across native speakers of languages other than English, such as German and Chinese. Also, it would be interesting to investigate whether there are L1 typology effects on the processing of L2 learners of BP who are native speakers of other Romance Languages, such as Spanish and French. Moreover, in order to provide further evidence regarding the locus of L2 learners' morphological difficulties, it would be interesting to replicate this study focusing on: (1) L2 processing of irregular and regular past tense verbs and (2) other eye-tracking measures that were not analyzed in this study, such as *spillover* and *first fixation duration*.

5.3 METHODOLOGICAL AND PEDAGOGICAL IMPLICATIONS

In this section some pedagogical and methodological implications of the present study will be addressed.

One significant methodological implication of this study is the design and the online technique applied in order to provide tasks that

were able to measure real-time online language processing. The SCTs combined with questionnaires of the yes/no variety (Chapter 3, Subsection 3.3.6 and 3.3.7) allowed a more accurate assessment of L2 learners' knowledge of the target language (see Roberts & Siyanova-Chanturia, 2013). Furthermore, the L2 processing literature suggests that tasks which employ questionnaires force participants to concentrate on the grammatical details of the stimuli where learners' processing is more native-like or where factors such as proficiency and processing speed may come into play (see Roberts & Siyanova-Chanturia, 2013).

Another possibly important contribution regarding method is related to the data collection. The proficiency assessment and the SCTs were applied in a quiet room with appropriate lighting for participants to perform the tasks on the eye-tracker. Moreover, participants were allowed a 10-minute break between the SCTs (Chapter 3, Section 3.4). During the break participants received a snack and a cup of coffee or juice. I suppose that these aspects provided participants more comfort and confidence to perform the tasks.

Possible pedagogical implications based on the findings of the present study apply to the way verbal inflection should be taught and presented in textbooks. The results obtained from the present study indicate that the Associative-Cognitive CREED proposed by Ellis (2006a) offers substantial methodological and theoretical contributions to SLA Pedagogy. Slabakova (2009) affirms that inflectional morphology is the bottleneck of second language acquisition and argues that inflectional morphology should be practiced by focusing on both context and form. Interestingly, Slabakova's (2009) conclusions seem to support a cognitive approach for SLA (such as the Associative-Cognitive CREED).

Thus, if the L1 typology exerts extra L2 processing cost on the part of L2 learners whose native language is morphologically impoverished, contrastive explorations as well as usage-frequency based materials should be adopted (Ellis, 2006a). In fact, pedagogical materials and language tutors should be aware of the particular interface between implicit and explicit learning and the role of consciousness in SLA (Ellis, 2006a). This means that explicit knowledge of form-meaning associations should be combined with implicit language learning. Therefore, consciously guided practice, which results in unconscious automatized skill, seems to be the most effective type of instruction when it comes to the learning of inflectional morphology (Ellis, 2006a; Slabakova, 2009).

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APPENDIX A
Consent Form

Termo de Consentimento Livre e Esclarecido (TCLE) baseado na Resolução 466/2012 de acordo com o CNS (Conselho Nacional de Saúde).

Universidade Federal de Santa Catarina
Centro de Comunicação e Expressão
Departamento de Língua e Literatura Estrangeiras
Programa de Pós Graduação em Inglês: Estudos Linguísticos e Literários
LabLing – Laboratório da Linguagem e Processos Cognitivos

PROJETO DE PESQUISA: O PROCESSAMENTO DA MORFOLOGIA DE FLEXÃO VERBAL EM PORTUGUÊS BRASILEIRO E EM INGLÊS COMO L2

Caro (a) Senhor (a),

Eu, Luana Alves Bandeira Haag, CPF: 827.780.860-72, RG: 7.264.321, aluna de mestrado do Programa de Pós-Graduação em Inglês: Estudos Linguísticos e Literários, sob orientação da professora Dra. Mailce Borges Mota na Universidade Federal de Santa Catarina, tenho como objetivo desenvolver um estudo sobre a aprendizagem do português brasileiro e o inglês como línguas estrangeiras, por falantes nativos do português brasileiro e do inglês, requisito parcial para a obtenção do título de mestre em Inglês – Estudos linguísticos.

Gostaria de convidá-lo (a) a participar do meu estudo que busca investigar a aprendizagem do inglês por falantes nativos de português e a aprendizagem do português brasileiro por falantes nativos do inglês. Os estudos nessa área visam não só compreender os processos envolvidos na aquisição e no processamento de uma ou mais línguas estrangeiras, mas também desenvolver meios de aperfeiçoar o processo de ensino/ aprendizagem da língua estrangeira. Peço que você leia este formulário de consentimento e tire todas as dúvidas que possam surgir antes de concordar em participar no estudo.

Objetivo do estudo

O objetivo geral deste estudo é analisar a influência das propriedades do sistema morfológico da língua nativa sobre o processamento da flexão verbal na língua estrangeira.

Procedimentos

Se você concordar em participar deste estudo, você será solicitado (a) primeiramente a certificar o seu nível de conhecimento da língua estrangeira. Você será solicitado (a) a realizar um teste de proficiência em sua segunda língua em versão resumida. Você também será solicitado (a) a realizar duas tarefas:

Tarefa de processamento de sentença em português brasileiro: Você lerá frases em português na tela do computador e responderá a perguntas de compreensão, com o auxílio do mouse. Durante esta tarefa de leitura, o movimento dos seus olhos será monitorado através do equipamento do rastreamento ocular. Esta tarefa terá duração de 15 minutos.

Tarefa de processamento de sentença em inglês: Você lerá frases em inglês na tela do computador e responderá a perguntas de compreensão, com o auxílio do mouse. Durante esta tarefa de leitura, o movimento dos olhos será monitorado através do equipamento do rastreamento ocular. Esta tarefa terá duração de 15 minutos.

Benefícios

A sua participação nos experimentos será voluntária e contribuirá para a pesquisa sobre a aquisição de línguas estrangeiras. Durante a pesquisa, você terá a oportunidade de praticar a sua língua estrangeira e também terá uma avaliação do seu conhecimento da língua.

Riscos

Nenhuma tarefa oferece risco físico ou moral para você.

Desconforto

Durante as tarefas de leitura, você não deve executar movimentos bruscos, o que pode lhe acarretar um certo desconforto. Portanto, nos certificaremos de que o ambiente do laboratório LabLing ofereça condições satisfatórias para a execução das tarefas, referentes à iluminação, temperatura e posicionamento adequado do monitor do computador de acordo com a sua altura e cadeiras confortáveis. As demais tarefas não acarretarão desconforto a você.

Direitos dos participantes

Você é livre para decidir se deseja participar ou não desse estudo. Como a participação é voluntária, você pode desistir a qualquer momento sem nenhum prejuízo para você.

Contatos

Tendo qualquer dúvida sobre a pesquisa, você pode entrar em contato com Luana Alves Bandeira Haag, pelo e-mail luana-ab@hotmail.com ou pelo telefone (48) 9155.6768, ou com a professora Dra. Mailce Borges Mota através do e-mail mailcemota54@gmail.com, telefone (48) 3721-9288, ou com o Comitê de Ética em Pesquisa com Seres Humanos que se localiza na Biblioteca Universitária Central da UFSC- Setor de Periódicos (térreo) - atrás dos arquivos deslizantes, através do e-mail cep.propesq@contato.ufsc.br, telefone (48) 3721-9206, ou no prédio do Centro de Comunicação e Expressão – CCE, bloco B, sala 111, Universidade Federal de Santa Catarina, UFSC.

Compensação financeira

Não existirão despesas pessoais ou compensações financeiras relacionadas à participação no estudo. Qualquer despesa adicional será absorvida pelo orçamento da pesquisa.

Utilização dos dados:

Os dados coletados nesse estudo serão acessados apenas pela pesquisadora e orientadora da pesquisa. Mesmo após os resultados se tornarem públicos, a sua identidade será totalmente preservada. Não haverá nenhuma informação que leve a sua identificação.

Termo de consentimento livre e esclarecido

Declaro que li as informações do **Termo de Consentimento Livre e Esclarecido** e esclareci quaisquer dúvidas. Eu compreendo meus direitos como voluntário da pesquisa e concordo em participar deste estudo e em ceder meus dados para a pesquisa. Compreendo o objetivo do estudo bem como os procedimentos que serão realizados. Receberei uma cópia assinada deste formulário de consentimento.

Nome: _____

Assinatura do Participante: _____

Assinatura da Pesquisadora Responsável: _____

Data: ____/____/____/

APPENDIX B

Questionnaire applied to the L2EN group

UNIVERSIDADE FEDERAL DE SANTA CATARINA
 CENTRO DE COMUNICAÇÃO E EXPRESSÃO
 DEPARTAMENTO DE LÍNGUA E LITERATURA ESTRANGEIRAS
 Programa de Pós Graduação em Inglês: Estudos Linguísticos e
 Literários

Questionário A**SEÇÃO 1: Informações gerais do participante:**

1. Data da entrevista: ____/____/____
2. Horário: ____h. ____min.
3. Nome do participante: _____
4. Data de nascimento: ____/____/____
5. Idade: ____ anos.
6. Sexo: () M () F
7. Nacionalidade: _____
8. Local de Nascimento: _____
9. Nacionalidade dos pais: _____
10. Grau de escolaridade
 Nenhuma escolaridade
 Ensino Fundamental: de 1º à 4º série
 Ensino Fundamental: de 5º à 8º série
 Ensino Médio completo Ensino Médio incompleto
 Superior completo Superior incompleto
11. Formação: _____
12. Ocupação atual: _____
13. Informações para contato:
 Telefones: _____
 E-mail: _____
14. Você fala quantas línguas? Quais são?

SEÇÃO 2: Informações sobre o aprendizado do inglês:

- 1) Com que idade você começou a ter contato com o inglês?
 Entre 1 e 7 anos
 Entre 7 e 14 anos
 Entre 14 e 21 anos

Após 21 anos

2) Em quais situações você teve contato com o inglês até obter fluência no idioma?

Através de filmes, músicas, jogos, internet, TV e rádio.

Através de conversa com pessoa fluente em inglês ou nativo de inglês

Através de escola ou curso de idioma.

Leituras

Outro _____.

3) Responda esta questão apenas se você já fez algum curso regular de inglês. Com que idade você iniciou o curso regular de inglês?

Entre 1 e 7 anos

Entre 7 e 14 anos

Entre 14 e 21 anos

Após 21 anos

4) Responda esta questão apenas se você já fez algum curso regular de inglês. Você continua tendo aulas de inglês?

Sim

Não

6) Como você avalia o seu nível de conhecimento no inglês?

Básico

Intermediário

Avançado

7) Para qual propósito o conhecimento do inglês é importante para você? Assinale tantas alternativas quanto necessário:

Para viajar

Por motivo pessoal

Para aperfeiçoamento nos estudos

Por motivo de lazer

Outro _____.

8) Você dedica quanto do seu tempo para o estudo do inglês?

Nenhum

Até 1h por semana

Até 2h por semana

Mais de 2h por semana

9) Você tem contato com falantes nativos do inglês?

- sim
- não

10) Você já esteve em algum país de língua inglesa?

- Sim
- Não

11) Se sim, por quanto tempo?

- Menos de 2 meses
- Até 6 meses
- De 6 meses a 2 anos
- Mais de 2 anos

12) Em quais situações você tem contato com o inglês atualmente?

Assinale tantas alternativas quanto necessário.

- Através de filmes, músicas, jogos, internet, TV e rádio
- Através de conversa com pessoa fluente no inglês ou nativo de inglês
- Através de uma escola ou um curso de idioma
- Leituras
- Não tenho contato com o inglês atualmente
- Outro _____.

APPENDIX C

Questionnaire applied to the L2BP group

UNIVERSIDADE FEDERAL DE SANTA CATARINA
CENTRO DE COMUNICAÇÃO E EXPRESSÃO
DEPARTAMENTO DE LÍNGUA E LITERATURA ESTRANGEIRAS
Programa de Pós Graduação em Inglês: Estudos Linguísticos e
Literários

Questionário B

SEÇÃO 1: Informações gerais do participante:

1. Data da entrevista: ____/____/____
2. Horário: ____h. ____min.
3. Nome do participante: _____
4. Data de nascimento: ____/____/____
5. Idade: ____ anos.
6. Sexo: () M () F
7. Nacionalidade: _____
8. Local de Nascimento: _____
9. Nacionalidade dos pais: _____

10. Grau de escolaridade
 - () No Education
 - () Incomplete Primary Education
 - () Complete Primary Education
 - () Incomplete Secondary Education
 - () Complete Secondary Education
 - () Incomplete Graduate (postgraduate) Education
 - () Complete Graduate (postgraduate) Education

11. Formação: _____
12. Ocupação atual: _____
13. Informações para contato:
Telefones: _____
E-mail: _____
14. Você fala quantas línguas? Quais são?

SEÇÃO 2: Informações sobre o aprendizado do português:

1) Com que idade você começou a ter contato com o português?

- Entre 1 e 7 anos
- Entre 7 e 14 anos
- Entre 14 e 21 anos
- Após 21 anos

2) Em quais situações você teve contato com o inglês até obter fluência no idioma?

- Através de filmes, músicas, jogos, internet, TV e rádio.
- Através de conversa com pessoa fluente em inglês ou nativo de inglês
- Através de escola ou curso de idioma.
- Leituras
- Outro _____.

3) Responda esta questão apenas se você já fez algum curso regular de português. Com que idade você iniciou o curso regular de português?

- Entre 1 e 7 anos
- Entre 7 e 14 anos
- Entre 14 e 21 anos
- Após 21 anos

4) Responda esta questão apenas se você já fez algum curso regular de português. Você continua tendo aulas de português?

- Sim
- Não

6) Como você avalia o seu nível de conhecimento no português?

- Básico
- Intermediário
- Avançado

7) Para qual propósito o conhecimento do português é importante para você? Assinale tantas alternativas quanto necessário:

- Para viajar
- Por motivo pessoal
- Para aperfeiçoamento nos estudos
- Por motivo de lazer
- Outro _____.

8) Você dedica quanto do seu tempo para o estudo do português?

- Nenhum
- Até 1h por semana
- Até 2h por semana
- Mais de 2h por semana

9) Você tem contato com falantes nativos do português?

- sim
- não

10) Você já esteve em algum país de língua portuguesa antes da sua visita ao Brasil?

- Sim
- Não

11) Se sim, por quanto tempo?

- Menos de 2 meses
- Até 6 meses
- De 6 meses a 2 anos
- Mais de 2 anos

12) Em quais situações você tem contato com o português atualmente?
Assinale tantas alternativas quanto necessário.

- Através de filmes, músicas, jogos, internet, TV e rádio
- Através de conversa com pessoa fluente em português ou nativo de português
- Através de uma escola ou um curso de idioma
- Leituras
- Não tenho contato com o português atualmente
- Outro _____.

APPENDIX D

The TOEFL iBT writing task

Assessment of proficiency: The TOEFL iBT writing task extracted from TOEFL iBT prep volume 3. 2011, p.19-21. Educational Testing Service.

TOEFL iBT® Quick Prep

WRITING PRACTICE SET 1

Writing Practice Set 1: Passage, Lecture, and Question

Directions: Give yourself 3 minutes to read the passage.

READING TIME: 3 minutes

Toward the end of his life, the Chevalier de Seingalt (1725–1798) wrote a long memoir recounting his life and adventures. The Chevalier was a somewhat controversial figure, but since he met many famous people, including kings and writers, his memoir has become a valuable historical source about European society in the eighteenth century. However, some critics have raised doubts about the accuracy of the memoir. They claim that the Chevalier distorted or invented many events in the memoir to make his life seem more exciting and glamorous than it really was.

For example, in his memoir the Chevalier claims that while living in Switzerland, he was very wealthy, and it is known that he spent a great deal of money there on parties and gambling. However, evidence has recently surfaced that the Chevalier borrowed considerable sums of money from a Swiss merchant. Critics thus argue that if the Chevalier had really been very rich, he would not have needed to borrow money.

Critics are also skeptical about the accuracy of the conversations that the Chevalier records in the memoir between himself and the famous writer Voltaire. No one doubts that the Chevalier and Voltaire met and conversed. However, critics complain that the memoir cannot possibly capture these conversations accurately, because it was written many years after the conversations occurred. Critics point out that it is impossible to remember exact phrases from extended conversations held many years earlier.

Critics have also questioned the memoir's account of the Chevalier's escape from a notorious prison in Venice, Italy. He claims to have escaped the Venetian prison by using a piece of metal to make a hole in the ceiling and climbing through the roof. Critics claim that while such a daring escape makes for enjoyable reading, it is more likely that the Chevalier's jailers were bribed to free him. They point out that the Chevalier had a number of politically well-connected friends in Venice who could have offered a bribe.

Directions: Listen to Track 11.



Directions: You have 20 minutes to plan and write your response. Your response will be judged on the basis of the quality of your writing and on how well your response presents the points in the lecture and their relationship to the reading passage. Typically, an effective response will be 150 to 225 words.

RESPONSE TIME: 20 minutes

35. Summarize the points made in the lecture, being sure to explain how they respond to the specific points made in the reading passage.

APPENDIX E

TOEFL iBT test Integrated Writing Rubrics

TOEFL iBT® Test

Integrated **WRITING** Rubrics

SCORE	TASK DESCRIPTION
5	<p>A response at this level successfully selects the important information from the lecture and coherently and accurately presents this information in relation to the relevant information presented in the reading. The response is well organized, and occasional language errors that are present do not result in inaccurate or imprecise presentation of content or connections.</p>
4	<p>A response at this level is generally good in selecting the important information from the lecture and in coherently and accurately presenting this information in relation to the relevant information in the reading, but it may have minor omission, inaccuracy, vagueness, or imprecision of some content from the lecture or in connection to points made in the reading. A response is also scored at this level if it has more frequent or noticeable minor language errors, as long as such usage and grammatical structures do not result in anything more than an occasional lapse of clarity or in the connection of ideas.</p>
3	<p>A response at this level contains some important information from the lecture and conveys some relevant connection to the reading, but it is marked by one or more of the following:</p> <ul style="list-style-type: none"> ■ Although the overall response is definitely oriented to the task, it conveys only vague, global, unclear, or somewhat imprecise connection of the points made in the lecture to points made in the reading. ■ The response may omit one major key point made in the lecture. ■ Some key points made in the lecture or the reading, or connections between the two, may be incomplete, inaccurate, or imprecise. ■ Errors of usage and/or grammar may be more frequent or may result in noticeably vague expressions or obscured meanings in conveying ideas and connections.
2	<p>A response at this level contains some relevant information from the lecture, but is marked by significant language difficulties or by significant omission or inaccuracy of important ideas from the lecture or in the connections between the lecture and the reading; a response at this level is marked by one or more of the following:</p> <ul style="list-style-type: none"> ■ The response significantly misrepresents or completely omits the overall connection between the lecture and the reading. ■ The response significantly omits or significantly misrepresents important points made in the lecture. ■ The response contains language errors or expressions that largely obscure connections or meaning at key junctures or that would likely obscure understanding of key ideas for a reader not already familiar with the reading and the lecture.
1	<p>A response at this level is marked by one or more of the following:</p> <ul style="list-style-type: none"> ■ The response provides little or no meaningful or relevant coherent content from the lecture. ■ The language level of the response is so low that it is difficult to derive meaning.
0	<p>A response at this level merely copies sentences from the reading, rejects the topic or is otherwise not connected to the topic, is written in a foreign language, consists of keystroke characters, or is blank.</p>

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APPENDIX F

The Celpe-Bras writing task

Assessment of proficiency: The Celpe-Bras writing task extracted from Certificado de Proficiência em Língua Portuguesa para Estrangeiros. Parte Coletiva/Cadernos de Questões. 2005, p 6-7.

PARTE COLETIVA

Celpe  Bras

Tarefa IV

MAIS HISTÓRIAS DE VERÃO

Imagine que você seja um dos personagens da crônica a seguir, publicada no caderno *Domna* do jornal *Zero Hora*. Escreva um outro **texto** para ser publicado no mesmo caderno, **narrando** a sua versão dos acontecimentos e **posicionando-se** a respeito deles.

Tarefa IV

Verissimo

Não era um casamento. Nada, na verdade, iria mudar. Assinariam um papel, só isso. Seria um contrato com o qualquer outro

Mais histórias de verão

Já estavam vivendo juntos há alguns anos e decidiram regularizar, de alguma maneira, a situação. Uma formalidade, apenas. Um amigo advogado, um tabelião, duas assinaturas e pronto. Se ela quisesse, poderiam ter algum tipo de cerimônia. Parentes, champanha, talvez uns canapés? Não, que bobagem. Não era um casamento. Nada, na verdade, iria mudar. Assinariam um papel, só isso. Seria um contrato como qualquer outro, como um contrato para dedetizar a casa. Para que sua união significasse um pouco mais do que apenas viverem juntos.

Mas no caminho do escritório do advogado ela confessou que estava nervosa. Por que nervosa?

- Sei lá - disse ela.

E disse:

- Isto está ficando muito sério.

Ele parou o carro e disse:

- Se você não quer, a gente não faz. Esquece a idéia.

- Não, não. É que... - diz ela.

Ela não sabia o que era. Saiu do carro. Ele também saiu e a abraçou. Estavam na beira de um terreno vazio. Um areal. Ele disse:

- Seria apenas uma formalidade. Mas se você não quer...

Ela:

- Você acha que precisa?

- Claro que não precisa!

Ele olhou em volta. A poucos passos deles, um cano enferrujado com uma torneira em cima saía de dentro da terra. O chão em torno do cano estava seco.

- Vamos fazer o seguinte - disse ele.

- Vamos ver se sai água dessa torneira. Se sair...

- Milagre. Saia água da torneira. Ele propôs que os dois molhassem as mãos na água, depois juntassem suas mãos molhadas e jurassem que se amariam para sempre. Pra que advogado, tabelião, contrato?

Sua união não precisaria de mais significado do que aquilo. Estaria abençoada por aquela água milagrosa vinda ninguém sabia de onde, por aquela solenidade secreta que os dois nunca esqueceriam.

- Venha - disse ele - molhe as suas mãos.

Mas ela estava de olhos arregalados, paralisada. Aquela água jorrando daquele cano esquisito, vinda ninguém sabia de onde. Aquele areal no meio da cidade. Por que tinham parado logo ali? E era impressão dela ou todo o ruído do trânsito em volta cessara, como se o mundo inteiro esperasse para ouvir seu juramento? Fosse qual fosse o significado de tudo aquilo, era significado demais.

- Eu, hein? - disse ela.

E depois:

- Agora é que ficou sério!

Não adiantou ele insistir. Ela pediu um tempo sozinha para pensar na relação e não tem atendido o telefone.

ZERO HORA, 9 de janeiro de 2005

APPENDIX G

List of verbs in BP with their respective word-lengths, ordered from the shortest to the longest words

CRITICAL REGION (VERB)	WORD LENGTH	CRITICAL REGION (VERB)	WORD LENGTH	CRITICAL REGION (VERB)	WORD LENGTH
tomou	5	lançou	6	aumentou	8
viveu	5	fechou	6	declarou	8
criou	5	venceu	6	concluiu	8
negou	5	perdeu	6	promoveu	8
gerou	5	reuniu	6	explicou	8
levou	5	ganhou	6	entendeu	8
subiu	5	iniciou	7	utilizou	8
jogou	5	estudou	7	descobriu	9
mudou	5	assumiu	7	confirmou	9
matou	5	comprou	7	conseguiu	9
abriu	5	começou	7	constatou	9
causou	6	indicou	7	verificou	9
ajudou	6	recebeu	7	encontrou	9
marcou	6	alcançou	8	considerou	10
enviou	6	provocou	8	demonstrou	10
apurou	6	diminuiu	8	conquistou	10
seguiu	6	divulgou	8	estabeleceu	11
contou	6	publicou	8	representou	11
variou	6	realizou	8		

APPENDIX H

List of verbs reorganized according to the raw frequencies from Corpus Brasileiro, ordered from the most frequent to the least frequent

WORD FREQUENCY	CRITICAL REGION	WORD FREQUENCY	CRITICAL REGION	WORD FREQUENCY	CRITICAL REGION
63702	recebeu	18552	observou	11351	seguiu
58813	conseguiu	17589	variou	11315	utilizou
50540	levou	17510	provocou	11256	comprou
36308	perdeu	17257	subiu	11074	conquistou
34844	ganhou	17106	lançou	10782	divulgou
33814	aumentou	15550	publicou	10372	indicou
31809	criou	15065	confirmou	10104	promoveu
25783	encontrou	14942	negou	10083	verificou
23758	declarou	13938	considerou	9946	descobriu
22853	venceu	13528	causou	9849	constatou
22503	demonstrou	13383	estabeleceu	9845	explicou
22260	assumiu	13067	gerou	9778	jogou
22185	fechou	12991	concluiu	9440	alcançou
22133	mudou	12524	matou	9170	estudou
21268	iniciou	12087	diminuiu	8658	entendeu
21186	tomou	12022	representou	5250	começou
20712	realizou	12003	ajudou		
20194	tentou	11818	viveu		
19654	contou	11811	reuniu		
19025	abriu	11494	apurou		
18980	marcou	11353	enviou		

APPENDIX I

List of experimental sentences used in the SCT in BP

1. A cozinheira da Polônia recebeu o prêmio de gastronomia na Itália.
2. O filho do Pedro conseguiu a medalha de prata na escola.
3. O caminhão de mudança levou os móveis de madeira da casa.
4. A poetisa da Inglaterra perdeu o relógio de ouro da família.
5. O time da Alemanha ganhou a Copa do Mundo no Brasil.
6. O governo do Brasil aumentou a concentração de renda no país.
7. A professora de piano criou a música de entrada do festival.
8. O sogro do vizinho começou o curso de francês no Québec.
9. O coelho da Amanda encontrou um pedaço de cenoura na cozinha.
10. O dono da imobiliária declarou um patrimônio de imóveis na rádio.
11. O atleta da Itália venceu a Maratona de Berlin na sexta-feira.
12. O ladrão de carros demonstrou um sentimento de culpa no tribunal.
13. A amiga do Carlos assumiu um cargo de liderança na empresa.
14. O cozinheiro da França fechou as portas do restaurante na segunda-feira.
15. A polícia da comunidade mudou a vida dos moradores no interior.
16. O primo da Mariana iniciou um curso de japonês no Japão.
17. O bebê da Camila tomou um suco de laranja no almoço.
18. A atendente da loja realizou a troca do produto na terça-feira.
19. O cantor de pagode tentou uma vaga de deputado estadual na Bahia.
20. O professor de cinema contou a história do Titanic na aula.
21. O padre do Paraná abriu as portas da igreja no domingo.
22. O jogador de futebol marcou um gol de cabeça no campeonato.
23. O rei da Inglaterra observou os soldados da Irlanda no acampamento.
24. A estilista da marca variou as roupas de verão no desfile.
25. O lutador de karatê provocou o lutador de judô na rua.
26. O instrutor de idiomas subiu as escadas do prédio no intervalo.
27. O músico da Califórnia lançou uma música de jazz na internet.
28. A jornalista da televisão publicou um artigo de moda na revista.
29. O site de cosméticos enviou os produtos de beleza na sábado.
30. O governador do estado seguiu o exemplo do prefeito nas eleições.
31. A apresentadora do programa utilizou o microfone na entrevista.
32. A neta do Francisco comprou um livro de linguística na livraria.
33. O aluno de física conquistou o título de mestre em Harvard.
34. O fotógrafo da Escócia divulgou as fotos da África no blog.
35. O serviço de emergência indicou o número de feridos na Palestina.
36. A universidade do Paraná promoveu a feira do livro em Curitiba.

37. O médico do hospital verificou a pressão do paciente no consultório.
38. O detetive de Londres descobriu a identidade do assassino na França.
39. O delegado do caso constatou a existência de fraudes no relatório.
40. A indústria de gás explicou as diminuições das exportações na Bélgica.
41. O adversário do Afonso alcançou uma vitória de honra no torneio.
42. A pesquisadora de arqueologia estudou a origem do mundo em Israel.
43. A neta do Paulo entendeu a importância do esporte na adolescência.
44. A atriz de Hollywood confirmou a gravidez de gêmeos no jornal.
Comprehension question: A atriz de Hollywood confirmou a gravidez de gêmeos?
45. A tenista da Rússia jogou as partidas do campeonato na Austrália.
A tenista da Rússia jogou as partidas do campeonato na África do Sul?
46. A sentença do juiz negou a liberação da máquina na alfândega.
Comprehension question: A sentença do juiz negou a liberação da máquina na alfândega?
47. O advogado da empresa considerou a situação dos empregados na reunião.
Comprehension question: O advogado da empresa considerou a situação dos empregados?
48. A corrupção no partido causou uma confusão de sentimentos no Brasil.
Comprehension question: A corrupção no partido causou uma confusão de sentimentos no Brasil?
49. O prefeito de Goiania estabeleceu um padrão de gastos para obras.
Comprehension question: O prefeito de Goiânia estabeleceu um padrão de gastos para obras?
50. O presidente da república gerou um milhão de empregos no país.
Comprehension question: O presidente da república gerou dois milhões de empregos no país?
51. A equipe de vendas concluiu o curso de inglês no Canadá.
Comprehension question: A equipe de vendas concluiu o curso de inglês na Venezuela?
52. O avô da Filomena matou uma barata de esgoto no banheiro.
Comprehension question: O avô da Filomena matou uma aranha no banheiro?
53. O produtor de alimentos diminuiu a produção de café no México.
Comprehension question: O produtor de alimentos diminuiu a produção de açúcar no México?

54. O secretário da agricultura representou os agricultores de Goiás Em Brasília.

Comprehension question: O secretário da agricultura representou os agricultores de Goiás em Brasília?

55. O treinador do time ajudou o jogador de basquete na partida.

Comprehension question: O treinador do time ajudou o jogador de hockey na partida?

56. A população de Lisboa viveu o regime de Salazar em Portugal.

Comprehension question: A população de Lisboa viveu o regime de Salazar em Portugal?

57. A gerente da firma reuniu os peritos em engenharia no prédio.

Comprehension question: A gerente da firma reuniu os peritos em fisioterapia na clínica?

58. O Núcleo de perícias apurou as causas do acidente na rodovia.

Comprehension question: O núcleo de perícias apurou as causas do acidente na rodovia?

APPENDIX J

Instructions for the Sentence Naturalness Judgment Task in BP (Julgamento de naturalidade de sentenças em português)

Caro avaliador

Peço que leia as frases abaixo relacionadas e julgue-as como naturais ou não, tanto do ponto de vista semântico como do ponto de vista sintático. Em relação ao aspecto semântico, peço que observe se o significado da sentença está claro ou há alguma dificuldade de compreensão. Quanto ao aspecto sintático, peço que observe se há algum erro que torne a frase agramatical ou que cause dificuldade de compreensão.

A naturalidade das sentenças deve ser avaliada em uma escala de:

1	Muito estranha
2	Estranha
3	Um pouco estranha
4	Aceitável
5	Natural
6	Muito natural
7	Excelente

Se possível, forneça alguma alternativa para melhorar a sentença na coluna de sugestão da correção.

Muito obrigada pela sua ajuda! A sua contribuição é muito importante para a pesquisa!

Caso tenha dúvidas, contate Luana no e-mail: luana-ab@hotmail.com

SENTENÇAS	JULGAMENTO	SUGESTÃO

APPENDIX K

List of fillers used in the SCT in BP

1. A Joana vai ao cinema com seus amigos amanhã.
2. O Carlos não foi para a festa de formatura da colega de trabalho dele.
3. As enfermeiras estão trabalhando no turno da tarde no hospital.
4. O carro do Marcos está muito velho.
5. A mãe do Lucas está fazendo um bolo de cenoura delicioso.
6. As creches não funcionarão na véspera de Natal.
7. O centro de cultura em Florianópolis terá apresentações teatrais todas as semanas.
8. As crianças querem ir ao circo que está na cidade há uma semana.
9. Os torcedores do time local não assistirão ao jogo no estádio.
10. O garçom está vestindo uma camisa branca e calças pretas.
11. O horário de verão muda a rotina dos brasileiros para melhor.
12. No litoral Catarinense é possível praticar muitas atividades turísticas.
13. Um estudo realizado Europa revela que os cavalos são capazes de reconhecer as vozes dos humanos.
14. Os vegetarianos dizem que não comer carne faz bem para a saúde.
15. O Manuel diz que planeja inaugurar sua farmácia até 2016.
16. A ditadura militar teve a duração de 21 anos.
17. O cantor e compositor Chico Buarque irá gravar uma bela canção para o seu novo álbum.
18. O pintor Michelangelo era aprendiz dos irmãos Davide e Dominico Ghirlandaio em Florença.
19. Miguel Nicolelis é um cientista brasileiro que tem dois prêmios nos Estados Unidos.
20. Alberto Santos Dumont foi um aeronauta e inventor.
21. Uma pesquisa aponta que pessoas que viajam tendem a ser mais bem-sucedidas.
22. O gato que é guia de um cão cego prova a verdadeira amizade entre os animais.
23. A Isabela não costuma comer frutas e verduras no almoço.
24. Os pássaros alegam a vida dos seres humanos com seus cantos.
25. Ninguém esteve presente na apresentação dos novos ministros.
26. A Oceania é o continente mais isolado do mundo e foi o último continente a ser descoberto pelos europeus.
27. A Ásia é o maior dos continentes, tanto em área como em população.
28. A Claudia e o Ângelo não comem doces porque os pais deles não deixam.
29. A América do Sul é uma das quatro partes do continente americano.
30. O Diego não vai dar um novo carro para o irmão dele.

31. Nós não fomos ao show da banda de rock porque nós preferimos outro estilo musical.
32. O trânsito na cidade de São Paulo é um grande problema para a população.
33. As minhas sobrinhas não vão viajar para a Lituânia, elas vão viajar para a Croácia.
34. A galeria de arte mostrará um novo material artístico no mês que vem.
35. O dia das mães é sempre comemorado no mês de maio.
36. A moça de óculos não está ensinando matemática.
37. A minha irmã vai para a praia somente nas férias de verão.
38. Os profissionais da saúde estão se unindo para combater o vírus ebola.
39. A Melissa e o George estão preparando um jantar especial para os seus amigos.
40. As campanhas políticas são financiadas através de dinheiro público.
41. Alguns nutricionistas dizem que a culinária mediterrânea faz as pessoas emagrecerem.
42. O Miguel e o Tiago nunca trouxeram presentes dos Estados Unidos para os amigos deles.
43. O Pedro quer agendar uma seção com um psicólogo.
44. Os animais encantam crianças e adultos.
45. O pai do José não gostava de comer macarrão com molho de tomate.
46. O Mateus não queria comer presunto na casa dos avós dele.
47. Animais também podem ser terapeutas e auxiliar no tratamento de doenças.
48. Os profissionais da educação desempenham um papel muito importante na sociedade.
49. O repórter não fez muitas perguntas durante a entrevista.
50. O aniversário da Rebeca não foi celebrado ainda.
51. A Rute sempre faz arroz e feijão na fazenda da tia dela.
52. Os alimentos transgênicos não fazem bem para a saúde.
53. Muitos trabalhadores gostariam de ir para seus trabalhos a pé ou de bicicleta.
54. Um novo tratamento desenvolvido pelo laboratório Novartis promete a cura do câncer.
55. As pessoas otimistas veem oportunidades em cada obstáculo.
56. Houve muitos problemas com a instalação do novo sistema de computadores.
57. Não há novas vagas para bailarinos na Escola Bolshoi.
58. A prima da Thais não fica em casa sozinha.
59. Os historiadores têm discutido se Cabral veio até o Brasil de forma acidental ou intencional.
60. Uma agência de empregos em Santa Catarina paga um bom aos seus funcionários.

61. O transporte público necessita de melhorias.
62. Os livros estão na estante do Paulinho.
63. De acordo com a meteorologia, a chuva deve parar em poucos dias.
64. Os lápis de cor da Melina foram fabricados na Dinamarca.
65. A babá do Vinícius é muito cuidadosa e dedicada.
66. O executivo desconfiava da secretária que estava trabalhando para ele há muitos anos.
67. A esposa do militar sentia falta da família dela quando ela tinha que viajar com o marido.
68. Quando a Maria era criança ela andava de bicicleta na praça.
69. O homem careca andava rapidamente.
70. O pedreiro queria consertar a calçada para melhorar o deslocamento de pessoas deficientes na rua.
71. As águas das praias catarinenses são cristalinas.
72. A tia Carlota gostava de conversar sobre a infância dela nos Açores.
73. O vento estava muito forte e a chuva ainda não tinha parado.
74. O Samuel estava chorando porque ele estava com medo do morcego.
75. As toalhas feitas pela sogra da Angelina estavam em cima da mesa.
76. A recepcionista não podia resolver os problemas de todos.
77. O jardineiro cantava enquanto podava as plantas.
78. A Patrícia ri muito alto.
79. As crianças pulavam de alegria depois de terem ido ao circo.
80. Todos queriam arrumar a casa para agradar as visitas.
81. O cão latia durante toda a madrugada porque queria comida.
82. As canetas da Julia não eram importadas.
83. Temos que lutar contra o preconceito de gênero e o preconceito racial.
84. O quadro estava manchado e a sala de aula estava uma bagunça.
85. O elevador não estava funcionando normalmente.
86. A natureza merece respeito e cuidado.
87. A sobremesa da dona Alice estava muito gostosa.
88. Os tênis de corrida do Afonso não são vermelhos.
89. Eles não estariam comendo carne se eles se importassem com os animais.
90. A fofoca é um dos males que tem alto poder de destruir uma relação.
91. O Mário foi o único que soube dar a resposta certa na prova.
Comprehension question: O Mário foi o único que soube dar a resposta certa na prova?
92. Os garotos estavam felizes.
Comprehension question: Os garotos estavam tristes?
93. Os irmãos da Lorena são parecidos com ela.
Comprehension question: Os irmãos da Lorena são parecidos com ela?
94. O patrão da Kelly não sabe falar francês.
Comprehension question: O patrão da Kelly sabe falar francês?

95. O homem rico não queria dar brinquedos novos para os filhos dele.
Comprehension question: O homem rico queria dar brinquedos novos para os filhos dele?
96. O Valdir gostaria de ter a oportunidade de fazer intercâmbio em Madrid.
Comprehension question: O Valdir gostaria ter a oportunidade de fazer intercâmbio em Barcelona?
97. O avô do William costuma se exercitar na praia.
Comprehension question: O avô do William costuma se exercitar no parque?
98. A abelha estava fazendo um barulho estranho na janela.
Comprehension question: A abelha estava fazendo um barulho estranho no telhado?
99. A Aline queria dizer a verdade para a Joaquina.
Comprehension question: A Aline queria dizer a verdade para a Joaquina?
100. Os sapatos novos do Henrique apertavam os dedos dele.
Comprehension question: Os sapatos novos do Henrique eram confortáveis?
101. O armário da cozinha tinha que ser organizado.
Comprehension question: O armário da cozinha tinha que ser organizado?
102. A loja de roupas estava cheia de clientes.
Comprehension question: A loja de roupas estava vazia?
103. A Páscoa é uma das datas comemorativas mais importantes da cultura ocidental.
Comprehension question: A Páscoa é uma das datas comemorativas mais importantes da cultural oridental?
104. A garagem estava ocupada pelo carro da vizinha.
Comprehension question: A garagem estava ocupada pelo carro da vizinha?
105. O apartamento estava sendo reformado no ano passado.
Comprehension question: O apartamento estava sendo reformado no ano passado?
106. O controle remoto não funcionava porque estava sem pilhas.
Comprehension question: O controle remoto estava funcionando?
107. A Liz tinha feito uma pizza antes dos convidados chegarem.
Comprehension question: A Liz tinha feito uma pizza antes dos convidados chegarem?
108. As passagens de avião estão mais baratas.
Comprehension question: As passagens de avião estão mais caras?
109. Os filhotes de leão são muito bonitos.
Comprehension question: Os filhotes de leão são muito bonitos?
110. A casa está bem arrumada.
Comprehension question: A casa está bem arrumada?
111. A biblioteca é um ambiente saudável para crianças.
Comprehension question: A biblioteca é um ambiente confuso para crianças?

112. O garoto queria fugir do policial.

Comprehension question: O garoto queria fugir do policial?

113. A garota pobre não tinha roupas para ir trabalhar.

Comprehension question: A garota pobre tinha roupas para ir trabalhar?

114. O veterinário do bairro é muito bom.

Comprehension question: O veterinário do bairro é muito bom?

115. O Gabriel fez um desenho muito criativo.

Comprehension question: O Gabriel fez um desenho muito feio?

116. A Letícia não come sushi.

Comprehension question: A Letícia come sushi?

117. A Helen parecia cansada.

Comprehension question: A Helen parecia feliz?

118. O palestrante de Montreal discutirá sobre um assunto interessante para toda a sociedade.

Comprehension question: O palestrante de Montreal discutirá sobre um assunto interessante para as crianças?

119. O assistente social tem como objetivo auxiliar pessoas que não têm total acesso à cidadania.

Comprehension question: O assistente social tem como objetivo auxiliar pessoas que não têm acesso total à cidadania?

120. O teclado do computador havia parado de funcionar.

Comprehension question: O teclado do computador estava funcionando bem?

APPENDIX L

List of verbs reorganized according to the raw frequencies from COCA,
ordered from the most frequent to the least frequent

WORD FREQUENCY	CRITICAL REGION	WORD FREQUENCY	CRITICAL REGION	WORD FREQUENCY	CRITICAL REGION
124624	wanted	27029	reached	16280	failed
123647	asked	26605	learned	16037	served
88992	started	25213	loved	15406	indicated
84264	turned	24530	followed	15253	noted
82954	seemed	22948	believed	15059	described
59095	tried	22823	noticed	14733	pushed
52030	called	22536	liked	14542	carried
42551	needed	20382	picked	13651	refused
42446	walked	19842	ended	13648	mentioned
38279	moved	19168	suggested	13156	involved
36904	opened	18900	closed	13030	signed
32386	reported	18841	raised	12898	finished
31051	played	18389	announced	12897	answered
30094	pulled	18288	discovered	12475	revealed
30011	watched	18249	named	12406	considered
29397	continued	17551	created	12140	produced
29382	received	17337	explained		
28726	lived	17328	joined		
28395	stopped	17292	killed		
28178	helped	17021	dropped		
27727	included	16976	changed		

APPENDIX M

List of verbs in English with their respective word-lengths, ordered from the shortest to the longest words

CRITICAL REGION (VERB)	WORD LENGTH	CRITICAL REGION (VERB)	WORD LENGTH	CRITICAL REGION (VERB)	WORD LENGTH
noted	5	picked	6	received	8
tried	5	failed	6	reported	8
lived	5	played	6	revealed	8
loved	5	served	6	believed	8
ended	5	needed	6	followed	8
asked	5	helped	6	involved	8
named	5	called	6	answered	8
moved	5	created	7	indicated	9
liked	5	noticed	7	described	9
pulled	6	started	7	suggested	9
closed	6	refused	7	continued	9
walked	6	learned	7	announced	9
wanted	6	stopped	7	mentioned	9
pushed	6	dropped	7	explained	9
seemed	6	reached	7	considered	10
joined	6	changed	7	discovered	10
turned	6	watched	7		
killed	6	carried	7		
raised	6	included	8		
opened	6	produced	8		
signed	6	finished	8		

APPENDIX N

List of experimental sentences used in the SCT in English

1. The leader of Cuba wanted an economic relationship with Brazil.
2. A student from Spain asked the first question in the crowded class.
3. The teacher of Literature started an interesting lesson about the romance novel.
4. The man from Ireland turned the narrow corner of the dark avenue.
5. The exhibition of art seemed an ideal attraction for the foreign tourists.
6. The cook from Paris tried a new recipe for the chocolate pies.
7. The director of theater needed a young actor for his new play.
8. The veterinarian from Minnesota walked the little dog through a beautiful park.
9. An angel of God moved the heavy stone of the big tomb.
10. The College of Wooster opened a medical center on the old campus.
11. The nurse from India called the British doctor in the emergency room.
12. The institute of education produced a trustworthy report on a national project.
13. The visitor from Australia reported a shocking crime at the police station.
14. The politician from Virginia played a major role in the American Revolution.
15. A child from China pulled a lady's hair at the bus stop.
16. The fan from California watched the soccer match at the Brazilian stadium.
17. The Minister of Labor continued his annoying speech at the Labor forum.
18. The dentist from Chicago received an expensive gift from a rich patient.
19. The poet from Brazil lived a great life in a peaceful town.
20. The driver from Argentina stopped the wrecked car on an empty street.
21. The physician from Denmark helped the sick kid in the filthy hallway.
22. The priest from Rome included a special prayer in the long sermon.
23. The rate of inflation reached a high level under the old government.
24. The musician from Austria learned a new note in the piano recital.
25. The professor from Oxford loved the first performance at the classical concert.

26. A couple of bees followed the little boy in the summer house.
27. The lawyer from Scotland believed the English thief in court.
28. The judge from Finland liked the big changes in the current laws.
29. The daughter of George picked a white daisy from the flower bed.
30. The businessman from Mexico ended the intense conversation of the administrative meeting.
31. The department of commerce suggested a slight alteration in the product policy.
32. The gardener of Versailles closed the garden door during the inclement winter.
33. The congress of authorities raised the debt ceiling in the budget.
34. The committee of electricity announced a landmark investment in the energy sector.
35. An archeologist from Barcelona discovered an ancient artifact in a religious temple.
36. A nun from Italy named the poor child in the new orphanage.
37. The advertisers from Holland created an impressive ad for a famous newspaper.
38. A group of physicists explained the theory of relativity at the physics seminar.
39. A bunch of youngsters joined the local army in the small town.
40. A terrorist from Pakistan killed a Jewish gentleman in a metropolitan city
41. The painter of buildings dropped a dirty brush on the clean floor.
42. A decorator of prestige changed the furniture layout of the cozy cottage.
43. The learner of English failed an easy test before the proficiency exam.
44. The restaurant of seafood served a delicious soup on the glass table.
Comprehension question: Did the restaurant of seafood serve a delicious soup?
45. A tourist from Russia indicated the best hotels in a romantic village.
Comprehension question: Did a tourist from Russia indicate the worst hotels in a romantic village?
46. The designer of clothes noted the huge decline in shirt sales.
Comprehension question: Did the designer of clothes note a huge decline in shirt sales?
47. The witness of crime described the serial killer in the police interview.
Comprehension question: Did the witness of crime describe the victim in the police interview?

48. The guard of honor pushed the golden door of the British palace.
Comprehension question: Did the guard of honor push the golden door of the British palace?
49. The aunt of Emily carried a delicious watermelon in the fruit cart.
Comprehension question: Did the aunt of Emily carry a delicious watermelon in the fruit cart?
50. A student of engineering noticed a white cat on the snowy roof.
Comprehension question: Did a student of engineering notice a brown cat on the snowy roof?
51. The artisan from Egypt refused a formal invitation for a fancy dinner.
Comprehension question: Did the artisan from Egypt refuse a formal invitation for a fancy dinner?
52. The writer from Nepal mentioned a ghost story in the book synopsis.
Comprehension question: Did the writer from Nepal mention a fairy tale in the book synopsis?
53. The Journal of photography involved the photographers' works in the photo fair.
Comprehension question: Did the Journal of photography involve the photographers' works in the photo fair?
54. The citizens of Europe signed the climate petition on the campaign's website.
Comprehension question: Did the citizens of Europe sign the climate petition?
55. The pupil from Norway finished a successful term at the Industrial School.
Comprehension question: Did the pupil from Norway finish a successful term at the Medicine School?
56. The mayor of London answered a difficult question at the candidates' debate.
Comprehension question: Did the mayor of London answer an easy question at the candidates' debate?
57. The association of colleges revealed the best universities in the international rankings.
Comprehension question: Did the association of colleges reveal the worst universities in the international rankings?
58. The board of principals considered a new strategic plan for the immersion program.
Comprehension question: Did the board of principals consider a new strategic plan for the immersion program?

APPENDIX O

Instructions for the Sentence Naturalness Judgment Task in English

Dear reviewer

Read the sentences listed below and rate them for both semantic and syntactic naturalness. Regarding the semantic aspects check whether the meaning of the sentences is clear or unclear for you. As for the syntactic aspects, check if there are any ungrammatical elements in the sentences. The naturalness of the sentences must be rated on a scale of:

1	Very awkward
2	Awkward
3	A little awkward
4	Acceptable
5	Natural
6	Very natural
7	Excellent

If possible, provide an alternative to improve the sentences that are compromised in the suggestions column.

Thank you very much for your help!

Your participation will contribute a lot to Second Language Acquisition research.

In case of questions please contact: luana-ab@hotmail.com

SENTENCES	RATING	SUGGESTION

APPENDIX P

List of fillers used in the SCT in English

1. Janet's mother bought her a new notebook.
2. Molly doesn't know how many classmates she has.
3. Henry likes to teach adults and teenagers.
4. Sally always wears strange socks.
5. There are many bedrooms in their apartment.
6. There were only three guests sitting around the table.
7. Ann and Cathy are having a great time at the party.
8. Brenda never argues with her husband.
9. The couch is yellow.
10. Their neighbors always have their TV on very loud.
11. Linda is living on the third floor.
12. The Beatles wrote a song about Penny Lane in Liverpool.
13. Andrew and his family are very happy.
14. Layla usually reads in German.
15. The Atacama Desert in Chile is a spectacular place.
16. The biggest observatory in the world is being built on top of a mountain.
17. At night the sky is incredibly clear.
18. Nicolas never drinks whisky when he goes to the pub.
19. Catherine doesn't know what she is going to do after school.
20. The young lady was wearing a white shirt and black pants.
21. Allie can't go to the mountains next summer.
22. Rob has never been to Barcelona.
23. We sat down in Charlotte's living room to see the travel brochures.
24. Martin's girlfriend flew to Tokyo to see him.
25. Good books usually make good films.
26. Liane enjoys going to the gym.
27. They didn't buy the tickets at a travel agency.
28. Cars in Britain are more expensive than in the USA.
29. Mayonnaise is worse for health than butter.
30. Gregory and Angelica are siblings.
31. We got up at 6 a.m.
32. Water cleans our body, controls our temperature and keeps us healthy.
33. We went on a boat trip last week.
34. Sue is going to Iowa on business.
35. A careful person hardly ever has accidents.
36. Tom will meet Donald at the station.

37. Kate didn't wear her new jacket yesterday.
38. Adam's grandfather wasn't a pilot.
39. I think they're going to win the competition.
40. There aren't any chairs in the room.
41. Richard doesn't sing very well, but his dream is to become a well-known singer.
42. I remember seeing Dead Poets' Society with my father when I was about ten.
43. Pop songs often use rhyming words at the end of lines.
44. Some people hate going shopping.
45. Jude can dance very well.
46. Heather speaks four languages.
47. They catch the bus together every morning.
48. Carrie put the baby in the bathtub.
49. Alex broke his arm.
50. Edward never gets up before 8 a.m.
51. Rupert Grint has been afraid of spiders since he was 5 years old.
52. Hitchcock was a very intelligent boy, but he had difficulties with reading and writing.
53. They've known each other for a long time.
54. Bill doesn't do enough exercise.
55. Haile Gebreselassie is one of the greatest athletes of all time.
56. Blanche wasn't brought up in a poor family.
57. Using jokes and humor is always a good way to get the audience on your side.
58. Nowadays there is more job stability than there was a generation ago.
59. Carlene is going to hire a new babysitter.
60. The training staff was given a job satisfaction questionnaire to complete anonymously.
61. Chad has a very stressful job.
62. By the year of 2050 there will be more people in the world over the age of 60.
63. Cindy and Clark were looking all the way up to the tallest building in New York.
64. The management in an organization should be responsible for coming up with good ideas.
65. When online customers see a stylish website they are more willing to make purchases.
66. Smaller businesses focus more on customer satisfaction.
67. A good project manager must be the most senior person on the team.

68. Joseph knows how to motivate people.
69. Elizabeth and Elliott never swim in the lake.
70. Ernest is building a house near the shopping mall.
71. Farrah is writing an e-mail to her boyfriend.
72. They aren't flying to Santiago tomorrow.
73. Philip has driven all the way to Colorado.
74. Jordan and Taylor have done a great job in Michigan.
75. He didn't go to Kentucky.
76. Jacob was held responsible for Jena's negligence.
77. They are throwing away money on a product that is harmful to human health.
78. Phoebe is setting the table.
79. Kevin isn't doing his homework.
80. She is seeking a loan to increase her working capital.
81. Carmen will sew a dress for her baby girl.
82. Lisa and Kevin never wake up before 7 a.m.
83. He doesn't know how to ride a horse.
84. Marianne wasn't lying about her finances.
85. They might hit the road again in February.
86. Matilda didn't feel safe in sharing her emotions with her friends.
87. The renters didn't keep their word and didn't honor the contract.
88. The refugees were hiding from the Japanese soldiers.
89. A number of technological advances were made in the 19th century.
90. They could swim when they were only 5 years old.
91. Lourdes has breakfast at 8 a.m. every day.
Comprehension question: Does Lourdes have breakfast at 8 a.m. every day?
92. Charles goes to the movies every weekend.
Comprehension question: Does Charles go to the movies every weekend?
93. Princess Diana gave birth to William in 1982.
Comprehension question: Did Princess Diana give birth to William in 1985?
94. Leonardo da Vinci was born in 1452.
Comprehension question: Was Leonardo da Vinci born in 1452?
95. Lucy doesn't take her children to the playground every day.
Comprehension question: Does Lucy take her children to the playground every day?
96. Mike took care of his sister in the evening.
Comprehension question: Did Mike take his sister in the evening?
97. Susan's car is red and small.

Comprehension question: Is Susan's car red and brown?

98. Lucille was reading a book about animals.

Comprehension question: Was Lucille reading a book about animals?

99. Lauren's son was born last year.

Comprehension question: Was Lauren's son born last year?

100. Paul McCartney has been a vegetarian for many years.

Comprehension question: Has Paul McCartney been a vegetarian for many years?

101. Celine Dion sings beautiful songs in French.

Comprehension question: Does Celine Dion sing beautiful songs in Spanish?

102. The course of Architecture aims at educating and training good professionals.

Comprehension question: Does the course of Architecture aim at educating and training good professionals?

103. Mike took care of his sister in the evening.

Comprehension question: Did Mike take care of his sister in the evening?

104. Michele has taught Portuguese for a long time.

Comprehension question: Has Michele taught math for a long time?

105. Luke and Bob have been to the USA twice.

Comprehension question: Have Luke and Bob ever been to the USA?

106. Carl Marx was a philosopher.

Comprehension question: Was Carl Marx a poet?

107. About 2 million Argentinean tourists went to New Zealand in 2010.

Comprehension question: Did 2 million Argentinean students go to New Zealand in 2012?

108. The publishers are sending many books to over one hundred bookstores.

Comprehension question: Are the publishers sending many magazines to over one hundred bookstores?

109. The boss gave a gift to his employee.

Comprehension question: Did the boss give a gift to his employee?

110. Snow White is not Mel's favorite princess.

Comprehension question: Is Snow White Mel's favorite princess?

111. Mia hasn't seen her brother since last year.

Comprehension question: Does Mia see her brother on a daily basis?

112. Maggie's dog never eats meat.

Comprehension question: Does Maggie's dog eat meat?

113. Frozen is an American film.

Comprehension question: Is Frozen a Brazilian film?

114. The worst foods for health are those high in starch and sugars.

Comprehension question: Are the worst foods for health high in starch and sugars?

115. Audrey Hepburn wasn't an Irish celebrity.

Comprehension question: Was Audrey Hepburn an Irish celebrity?

116. Leonard and Paola have never been to Asia.

Comprehension question: Have Leonard and Paola ever been to Asia?

117. The American boy band won't go to Africa this year.

Comprehension question: Will the American boy band go to Africa this year?

118. Exercising is a great way to maintain a healthy life.

Comprehension question: Is exercising a great way to maintain a healthy life?

119. Pets are living longer than ever thanks to their owners' love.

Comprehension question: Are pets living shorter lives?

120. Michael Jackson was born in 1958.

Comprehension question: Was Michael Jackson born in 1948?