

Linguistic Approaches to Portuguese as an Additional Language

Edited by
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John Benjamins Publishing Company

Linguistic Approaches to Portuguese as an Additional Language

Issues in Hispanic and Lusophone Linguistics (IHLL)

ISSN 2213-3887

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Volume 24

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Amsterdam / Philadelphia



The paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences – Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

DOI 10.1075/ihtl.24

**Cataloging-in-Publication Data available from Library of Congress:
LCCN 2019058036**

ISBN 978 90 272 0500 1 (HB)

ISBN 978 90 272 6150 2 (E-BOOK)

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Acknowledgements

We would like to thank everyone who has contributed to this volume, either directly or indirectly. Some of the papers included in this volume were first presented at the 14th International Pragmatics Conference, held in Antwerp, Belgium in 2015. The research group *Uso e Processamento de Língua Adicional* (UPLA, “Use and Processing of Additional Languages”), founded by Cristina Becker Lopes Perna and Karina Veronica Molsing in 2013 at the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), organized a panel at this conference with a focus on the Portuguese language. This panel and its contributors were supported by grants from CAPES (Coordination for the Improvement of Higher Education Personnel) and FAPERGS (Research Support Foundation of Rio Grande do Sul). We would like to thank the participants at this conference who enriched the discussion with their insights and experiences.

Furthermore, we are grateful to the contributors, who have chosen this volume to showcase their research and who have promptly responded to all of our requests during the manuscript production process. We thank the linguistic experts who kindly agreed to act as reviewers for the chapters included in this volume. In alphabetical order, they are: Mailce Borges Mota, Leda Maria Braga Tomitch, Ana Rita Carrilho, Michael Child, Sérgio Duarte Julião da Silva, Jaydene Elvin, Onici Claro Flores, David Giancaspro, Eneida de Goés Leal, Lilian Cristine Hubner, Tiffany Judy, Ubiratã Kickhöfel Alves, Jared Linck, Ana Luiza Pires de Freitas, Ana Lúcia Santos, Lauren Schmidt, Maity Siqueira, and Bruna Sommer-Farias.

Finally, we are very thankful to the series editors Jennifer Cabrelli and Kimberly Geeslin (Issues in Hispanic and Lusophone Linguistics, John Benjamins) and to editor Kees Vaes (John Benjamins, Amsterdam) for their valuable feedback.

Foreword

Even though there are more than 200 million native speakers of Portuguese living on five continents, the field of Portuguese as an additional language (PAL) has drawn little attention in the fields of applied linguistics and second language acquisition, which usually focus on languages with more international prominence, such as English and Spanish. On both sides of the Atlantic, enrollment in Portuguese languages courses has oscillated throughout the years, with implications for levels of institutional support and research interest among linguists. Molsing, Lopes Perna, and Ibaños elevate the status of Portuguese in this volume by highlighting an array of significant scholarly contributions aimed at better understanding theoretical and applied issues in the process of acquiring not only Portuguese but additional languages in general. Not surprisingly, the editors are scholars from southern Brazil, home of important academic centers producing cutting-edge research on the teaching of additional languages. This research tradition is responsible for the well-established “Brazilian educational model,” a genre-based approach that underlies CELPE-BRAS, a certificate of proficiency in Brazilian Portuguese as a second language that is officially recognized worldwide.

Such a volume that gathers a solid and long-term corpus of scholarship on the teaching of PAL in Brazil and around the world is overdue. Institutions of higher education in Brazil and Portugal are increasingly offering PAL classes to meet the needs of a plethora of language learners with multiple contexts of acquisition. In the last decade, many of these institutions have adopted *Português como língua de acolhimento* (Portuguese as a host language), a social justice-based pedagogy for teaching Portuguese to migrants and refugees. In the rest of Europe and the United States, the teaching of Portuguese as a heritage language has matured, slowing language shift among the children of Portuguese-speaking immigrants. Interest in the acquisition of Portuguese as a third language has also evolved substantially in the last decade, as data on L3 acquisition among bilingual English-Spanish learners of Portuguese have prompted inquiries on how previously acquired languages influence the process of learning additional languages. This book gathers some of the leaders of all these important upturns.

As Portuguese-speaking countries assume greater economic and political influence in the globalized world, Portuguese is emerging as a world language,

as reflected in the fact that the chapters in this book were contributed by top-notch scholars from Brazil, Portugal, the United States, Australia, and Macao. This volume establishes PAL as an important topic by exploring important pedagogical and acquisitional issues from experimental, theoretical, and ethnographic perspectives. It addresses current debates and scholarship surrounding immersion contexts of acquisition as well as the learning of Portuguese as a heritage, foreign, second, and third language. I applaud the editors for moving PAL from the periphery to the center of discussions around language acquisition.

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Introduction

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Ana Maria Tramunt Ibaños

Pontifícia Universidade Católica do Rio Grande do Sul

This book presents a collection of applied approaches to the acquisition of Portuguese as an Additional Language (PAL) from a variety of linguistic perspectives, representing the first of its kind in the academic sphere. The global interest in PAL has been revealed in the noticeable increase in incoming student exchanges in Brazilian and Portuguese higher education as well as an increased offer of Portuguese language courses in educational institutions around the world. However, while the number of foreign students and professors at these institutions has been increasing rapidly, the institutional, educational and research initiatives have only recently been able to adequately attend to these needs. Moreover, the increased interest in studying and working in Portuguese-speaking countries is frequently greater than the respective proficiency in the language, which leads to difficulties in daily routines. Higher education institutions in these countries have reacted by increasing the number of courses provided at both undergraduate and graduate levels, while in-house professors have been dedicating efforts towards improving the teaching and learning processes of the Portuguese language.

In the case of Brazil, the Brazilian Ministry of Education had developed the Languages without Borders Program (LwB), which prepared outgoing and incoming students participating in the Science without Borders Program (SwB) for the purposes of improving the quality of higher education and research programs in Brazil. LwB included the offer of courses of Portuguese for Foreigners. During its course from 2011 to 2017, the SwB program supported around 100,000 undergraduate and graduate students in Brazil and abroad, which had motivated marked increases in scientific and academic mobility as well as international agreements between Brazilian and foreign institutions.

Another initiative by the Brazilian government is the *Rede Brasil Cultural*, launched in its current form in 2013, which promotes the Portuguese language and Brazilian culture abroad, similar to the *Instituto Camões* (Camões Institute) for Portugal. Centers for these organizations offer courses in the Portuguese

language, as well as cultural activities, including dance, music, gastronomy and arts, among others. Lecturers work in foreign higher education institutions as university professors, promoting the language and culture. They have also highlighted the importance of advancing the study of Portuguese as a heritage language.

This continued interest has been confirmed in recent reports issued by the Modern Language Association (MLA, 2015 & 2016), which is based on surveys of up to 2,669 American colleges and universities that offer programs in languages other than English. The report includes data on foreign language enrollment in two and four-year institutions, as well as graduate programs, from 2009 to 2016. Overall, language enrollments in higher education have decreased by 9.2% in the period studied. Despite this, Portuguese continues to be one of the few languages with a solid ratio of introductory to advanced undergraduate enrollments (3:1). This means that students who enroll in introductory Portuguese classes at the undergraduate level are more likely to continue studying up to the advanced level, in comparison to other languages such as French, German, Japanese, Korean, and Spanish, among others.

Considering the trends outlined above, teachers, researchers and academic institutions alike have been shifting their focus accordingly to accommodate the changing demands of language learners. More specifically, this means that teacher training, linguistic and educational research as well as institutional support for language learning must place greater emphasis on the unique characteristics of the Portuguese language and the Portuguese language learner. In line with this, associations such as The American Association of Teachers of Spanish and Portuguese, The American Portuguese Studies Association and the *Instituto de Investigação e Desenvolvimento em Política Linguística* (Institute for Research and Development in Linguistic Policy) have acted as vehicles for the growing body of work on PAL, though from primarily a pedagogical or language policy perspective, through conferences, programs and publications, among other activities.

In addition to institutional and educational actions, there has also been greater focus on the Portuguese language as an object of scientific study, involving a broad range of research objects and theoretical backgrounds. While linguistic research may or may not have the ultimate intention of informing teaching strategies, it is fundamentally focused on how the peculiarities of Portuguese can contribute to our general knowledge of language from social, formal or biological perspectives. In this sense, we perceive a gap in the broad field of language studies for a publication that addresses PAL from a linguistic standpoint. This is an opportune moment to propose this collection, highlighting the ways in which PAL can be cast as an object of linguistic inquiry. This volume intends to showcase the breadth of research being carried out on topics ranging from the acquisition of aspects from the main language modules, such as syntax and phonology, to psycholinguistic and

cognitive linguistic perspectives. Moreover, we have included studies addressing a variety of learning contexts and a variety of learner types. This book may appeal to researching scholars with a background in second language acquisition (SLA) studies interested in learning more about the acquisition of PAL from linguistic perspectives. We present the contributions below.

Part 1. Linguistic components of language transfer in PAL research

The rise in third language (L3) studies is a reflection of the awareness of the reality of many multilingual speakers as well as the complex nature of the roles of the previously acquired languages on the acquisition process of each additional language. Moreover, Portuguese is a prime language for L3 status, with many learners commonly having English and Spanish as previously acquired languages. We start with a study addressing the acquisition of Portuguese from a generative background, which generally focuses on parametric variations between first and additional languages.

The first chapter, “The roles of L1 Spanish versus L2 Spanish in L3 Portuguese morphosyntactic development”, by Jennifer Cabrelli, Michael Iverson, David Giancaspro and Becky Halloran González, takes on third language (L3) acquisition and the extent to which transfer can be understood by considering morphosyntactic domains that are variably present across languages. More specifically, this study investigates whether the order in which Spanish is learned, as an L1 or L2 with respect to English, may have an effect regarding the rate at which Brazilian Portuguese (BP), the L3, is acquired. In this case, the researchers choose differential object marking as the morphosyntactic variable in question. Moreover, learners were tested cross-sectionally at initial and advanced stages of the acquisition process. Their results suggest that, while both groups transferred their Spanish system to the L3, transferring a feature not present in the L3 can be “corrected” in early stages if the L2 Spanish system is transferred, while the L1 Spanish speakers continue to transfer the feature in advanced stages. This research further contributes to our understanding of how speakers with at least two previous language systems acquire a third language and the dynamics of which systems are transferred over the course of the L3 acquisition process.

Definitions attributed to bilinguals and bilingualism have ranged from the very narrow, wherein a so-called “true” bilingual would be the equivalent of two native speakers in one, to the very broad, wherein a speaker who is merely exposed to additional languages is bilingual on some level. Researchers, including the authors of the second chapter, have tended towards a more inclusive definition, such that a speaker with more than one language is bilingual, or multilingual. This has

enabled a richer terrain upon which research can be developed, thus acknowledging the reality of so many speakers in this increasingly multilingual world. In the second chapter, Tammer Castro, Jason Rothman and Marit Westergaard investigate “Syntactic contrasts in early and late Brazilian Portuguese-European Portuguese bidialectal bilinguals: Data from production”. This study addresses the notion of heritage language bilinguals with an experiment aimed at their production of null subjects and objects, for which previous studies have shown differences between the dialects in question. Their results suggest that differences found in children and adult heritage BP speakers exposed to European Portuguese (EP) are due to differences in the interface to which the particular phenomenon in question is attributed. However, this did not appear to prevent the learners from ultimately attaining the target form.

It is a commonplace observation that L2 learners often have “foreign accents”, which describes the transferring of sound patterns from a person’s L1 when speaking the target language. These accents may even persist after the speaker has been immersed in a context of the target language for many years. Authors Jaydene Elvin, Daniel Williams and Paola Escudero address this topic in their chapter entitled “Learning to perceive, produce and recognise words in a non-native language: Australian English vs. European Spanish learners of Brazilian Portuguese”. The three skills mentioned in the title are elements of acquiring the phonological system of an additional language and considered by the authors to be critical when attempting to successfully produce native-like sounds in the L2. They present a two-part, in-depth literature review on the topics and languages in question, from which they conclude that the three speech abilities are inter-related, although perception appears to be the driver in the successful acquisition of the other two.

In the chapter, “Multi-Directionality in language transfer: Development of the vowel system of Brazilian Portuguese as a second (L2) or third language (L3)”, authors Leticia Pereyron and Ubiratã K. Alves move beyond the unidirectional nature in which transfer is often understood by examining the possibility of multidirectional language transfer in the acquisition of the BP vowel system as an L2 or L3. As the term suggests, not only could there be transfer, in this case of the vowel system, from the L1 to any subsequent languages, but that the L2 or L3 may affect previously acquired languages as well. With English and Spanish as prior languages, the authors found in their study that multi-directional transfer appears to occur, particularly in immersion contexts.

Part 2. Linguistic insights into the PAL acquisition process

The chapters in this section investigate different aspects of the acquisition process revealing the diverse range of perspectives possible in addressing PAL acquisition in contexts around the world.

In a language pair that has been increasingly receiving attention, authors Custódio Martins and Mário Pinharanda Nunes present a study on “The Lexical Aspect Hypothesis – Off-Line evidence from Chinese learners of European Portuguese as an L2”. The acquisition of tense and aspect structures is always a source of difficulties for learners of additional languages, especially if the languages are as typologically distant as Chinese and Portuguese. The authors approach this topic by testing the Lexical Aspect Hypothesis, a traditional topic in first and second language acquisition that has been applied to dozens of languages over the past few decades. The authors of this chapter take a different tack by assuming a variationist approach involving variables of a semantic, contextual and discursive nature. This enabled the researchers to investigate the significance of several types of factors involved in the phenomena in question. Consequently, while they found partial evidence supporting the importance of lexical semantics in acquiring grammatical aspect, they were also able to shed light on the contributions of other factors in the acquisition process.

Luciane Corrêa Ferreira and Desirée Oliveira investigate “How learners of Portuguese as an additional language talk about their experience from a Cognitive Linguistics perspective”. Assuming an interface between Cognitive Linguistics and Applied Linguistics, the researchers explore how language learners use metaphors and other figurative language in their discourse on their own learning processes. From this perspective, the authors were able to gain insight into what the learners found to be important elements in acquiring BP. In particular, the learners used multiple metaphors related to different aspects of the culture and its role in the various stages of their learning.

Part 3. Linguistic results informing PAL instruction

Most language teachers are aware of the limitations of traditional teaching materials and traditional instructional settings. As these teachers increasingly look to linguistics for professional development, results from linguistic studies are now starting to shape a new profile of teaching materials.

The first chapter in this section represents a major trend in SLA, that of corpus-based approaches. Researchers and language teachers alike have long lamented the rigid, prescriptive language used in many language teaching

manuals and textbooks, which, in today's student-centered, communicative and interactive language classrooms, would have to be constantly complemented in parallel by proactive teachers about how the target language is "actually" used in "real" contexts. To fill this void, linguistic researchers around the world have taken advantage of the advancing technology that has enabled and facilitated the collection and processing of corpora based on real language used by speakers in natural contexts.

In the chapter, "Implementing the concept of "Pedagogic Mediation" with the use of language corpora for the teaching of Portuguese as an L2 or L3", Jonathan Fleck, M. Rafael Salaberry and H elade Scutti Santos present a study using data from the C-ORAL project, an oral corpus of spontaneous speech in BP. The authors provide a detailed explanation of how they used excerpts of the corpus to inform teaching materials for a lesson on the syntactic structure of the verb *gostar* ("to like"), something quite rare to find in the literature on corpus-informed teaching materials, regardless of the target language. Furthermore, interactional functions are suggested for use in the classroom based on authentic conversational data.

In the chapter entitled "Leveraging Spanish knowledge and cognitive aptitude in Portuguese learning", authors Carrie Bonilla, Ewa Golonka, Nick B. Pand a, Jared Linck, Erica B. Michael, Martyn Clark, Alia Lancaster and Dorna Richardson contribute to L3 studies by investigating how existing linguistic knowledge acquired from learning previous languages can be used to aid in teaching a new additional language. Whereas the previous chapters in this book have investigated L3 phenomena from the acquisition/learning standpoint, this chapter and the next focus on L3 instruction. In this chapter, the authors examine the potential for glosses as an effective instructional technique. The researchers found that L3 Portuguese reading comprehension and vocabulary learning were improved by using L1/L2 glosses, particularly among those learners with increased cognitive aptitude.

With a similar view on L3 instruction, Jared A. Linck, Catherine J. Doughty, TaraLee Mecham, Carrie Bonilla, Martyn Clark, Ewa Golonka and William Burns present a pilot study on "Autonomous Portuguese L3 learning through an innovative adaptive language learning platform". This study investigates native English speakers highly proficient in Spanish learning Portuguese in a technological environment without any other human intervention. With the advancement of technology and the increase of L3 learners looking for self-directed learning options, this pilot details a promising alternative, particularly considering that it is informed by SLA principles and cognitive science. This is another example of how the use of corpora can inform a wide range of instructional activities and contexts. The learning goals focused on lexical items, thematic language, as well as grammatical concepts presented in sequences of activities, during which error feedback is also provided.

In the chapter entitled “Exploring second language acquisition: The role of implicit and explicit knowledge in native and target languages”, Rita Ferraro uses the action research approach, in which the study is conducted by the educator within their own specific educational context in order to develop tailored solutions for the instructional issues at hand. In this case, the author investigates the interaction between students’ implicit versus explicit knowledge and the teacher’s implicit versus explicit instruction. She found that her students’ learning was most successful when the type of knowledge was targeted with the corresponding type of instruction. In other words, students with good explicit knowledge learned more effectively with explicit instruction, while students with implicit knowledge learned best with implicit instruction. The author also found that increasing levels of explicit knowledge facilitated the language learning process.

In the final chapter of this section, “The linguistic and anthropological dimensions within enunciation in additional languages: A look at a Portuguese language instructional setting”, Bruna Sommer-Farias presents a discursive perspective on learning Portuguese, within the enunciative tradition, complemented by views of culture and anthropology. In this study, the author takes into consideration the discourses produced by both teachers and students in their negotiations of meanings in the L2 classroom. These negotiations take place through mechanisms of the teacher’s history of utterances and the student’s inquiries, which can enrich the linguistic awareness of both parties in their roles and speakers and language analysts.

To conclude, we believe the range of studies on the acquisition of Portuguese as an additional language included in this volume will contribute to the state of the art in a variety of ways. In addition to advancing the body of work within the broader area of additional language acquisition (including L2, L3, Ln, among others), the focus on the Portuguese language provides a greater understanding of the emerging lines of research that take into consideration regional varieties and migratory influences within our evolving multilingual realities. Moreover, the new findings and insights presented in these studies can in turn promote reflections on existing theories, methods and approaches in the acquisition of additional languages, thus provoking new questions to stimulate further research.

PART 1

Linguistic components of language transfer in PAL research

The roles of L1 Spanish versus L2 Spanish in L3 Portuguese morphosyntactic development

Jennifer Cabrelli, Michael Iverson, David Giancaspro and
Becky Halloran González

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This study explores the rate of L3 development among learners that transfer their L1 versus L2, via examination of differential object marking (DOM) by English/Spanish bilingual learners of L3 Brazilian Portuguese (BP). At the L3 initial stages, L1 English/L2 Spanish and L1 Spanish/L1 English speakers transfer non-facilitative DOM from Spanish (Giancaspro et al., 2015). We compare these groups with advanced L3 BP learners to test the hypothesis that L2 transfer is overcome faster than L1 transfer. Data from advanced L3 BP groups show that the L1 Spanish group patterns with both initial stages Spanish groups. However, the L2 Spanish group patterns with BP controls, suggesting that the L2 Spanish group has overcome non-facilitative transfer, while the L1 Spanish group has not.

Keywords: third language (L3) acquisition, multilingualism, transfer, differential object marking (DOM), morphosyntax, Portuguese, Spanish

1. Introduction

A growing interest in the investigation of generative third language (L3) acquisition has been attributed to the acceptance that its study makes a unique contribution to our understanding of language acquisition and linguistic theory more generally. One of these contributions is the understanding of how previous linguistic knowledge constrains successive acquisition when this previous knowledge consists of two or more systems. Most of this work has focused on the variable(s) that drive transfer of one (part of a) system or another in the early stages of acquisition. Although a number of distinct variables have been proposed to be deterministic in initial stages transfer (see García-Mayo & Rothman, 2012, for a review), a body

of work examining English/Spanish bilinguals acquiring Brazilian Portuguese (BP) as a third language provides robust evidence of Spanish transfer during the initial stages of L3 BP acquisition. Spanish transfer has been found with native (L1) Spanish speakers, adult second language (L2) Spanish speakers, and early English/Spanish bilinguals for a number of morphosyntactic properties. These include adjective placement (Rothman, 2011), raising phenomena (Cabrelli Amaro, Amaro, & Rothman, 2015), word order and relative clause attachment preferences (Rothman, 2010), noun drop (Cabrelli Amaro, Iverson, & Judy, 2009; Iverson, 2009), mood distinction (Child, 2014, *in press*), and object expression (Giancaspro, Halloran, & Iverson, 2015; Montrul, Dias, & Santos, 2011), the last of which is the focus of the current study.^{1,2}

Because of their considerable similarity, the transfer of Spanish when acquiring BP facilitates acquisition extensively. This claim has been substantiated in studies comparing English monolinguals and Spanish speakers (bilingual or monolingual) acquiring Portuguese (e.g., Cabrelli Amaro et al., 2009). In fact, Wiedemann (2009) estimates that English monolinguals will require twice as many hours to acquire Portuguese compared to Spanish speakers. However, these two languages do indeed diverge in various respects. These differences are exploited in the aforementioned studies such that the domains that are examined pattern differently in Spanish and Portuguese. Therefore, in each case of Spanish transfer, transfer is non-facilitative. The task of Spanish-speaking learners of BP in these cases is thus to overcome the non-facilitative influence of Spanish. For L3 learners of BP, we follow the assumption that probabilistic parsing in the L3 will eventually drive the learner to converge on the target configuration, either via access to the featural configuration in the learner's English grammar or via UG access (see Section 6 for further discussion). While studies of intermediate proficiency L3 Portuguese speakers have shown that non-facilitative Spanish transfer can be persistent in the domain of morphosyntax (Carvalho & da Silva, 2006; Montrul et al., 2011), others have shown that transfer of prior linguistic knowledge (particularly an

1. The results from these studies support the notion that structural similarity drives transfer, at least for this language triad. This idea is the core tenet of the Typological Primacy Model (TPM; Rothman, 2010, 2011, 2013, 2015), which predicts full transfer as conceptualized in Schwartz and Sprouse (1996) (see e.g., Rothman, 2015, for discussion) of the existing grammar that is deemed by the linguistic parser to be more similar to the L3.

2. While we follow the assumption that full transfer occurs, it should be noted that two recent initial stages models of property-by-property transfer (the Scalpel Model, Slabakova, 2016, and the Linguistic Proximity Model, Westergaard, Mitrofanova, Mikhaylyk, & Rodina, 2016) could also potentially explain initial non-facilitative transfer from the more similar background language. To test the hypothesis that drives our study, however, whether full transfer occurs is inconsequential as long as transfer is non-facilitative for the domain under investigation.

L2) attenuates over time (Hammarberg, 2001), and that non-facilitative transfer can ultimately be overcome in L3 acquisition (Slabakova & García-Mayo, 2015), with some evidence that suggests that convergence might be more likely when the relevant features are available in the existing language that was not transferred (Hermas, 2014). With that said, we know very little about how the rate of acquisition and developmental path compares for different learner profiles. If L1 Spanish speakers and L2 Spanish speakers both transfer Spanish at the onset of L3 acquisition, and both groups are assumed to have the same grammar (at least for the domain under investigation), the null hypothesis is that both groups' path and rate of L3 development will look the same. However, is it possible that variables associated with age of acquisition yield differences in L3 development? Specifically, how do sequential L1 English/L2 Spanish learners compare with a mirror-image L1 Spanish/L2 English group? Does the L1 or L2 status of the transferred language affect the rate of L3 acquisition?

In a case study of two early English/Spanish bilinguals and two sequential L1 English/L2 Spanish learners of L3 BP, Cabrelli Amaro and Rothman (2010) first suggested that learners with less experience with the transferred language (i.e., L2 Spanish) might overcome non-facilitative transfer more quickly. They posited that, in the case of L1 Spanish transfer to L3 Portuguese, the length of experience with Spanish might (at least temporarily) hamper the mechanisms that propel development. Cabrelli Amaro (2015a) found evidence for this hypothesis in reaction time data for phonological processing, and this question has recently been considered for morphosyntactic representations. Cabrelli Amaro (2015b) compares acceptance of raising across a dative experiencer (RExp) in initial stages learners (using data from Cabrelli Amaro et al., 2015) versus advanced L3 BP learners. The L1 English/L2 Spanish and L1 Spanish/L2 English groups both show evidence of Spanish transfer at the initial stages. That is, they reject RExp structures, which are illicit in Spanish but acceptable in English and BP. However, the advanced data indicate divergence between the two groups. While both advanced groups show higher acceptance of RExp structures than their initial stages counterparts, demonstrating evidence of L3 development, the ratings of the L1 Spanish group are still significantly different than the BP controls while those of the L2 Spanish group are not. These results point to differential rates of acquisition which are posited to stem from factors related to transfer of a (domain of a) language acquired in childhood versus adulthood, and can include critical period effects, dominance, exposure, domain of use, and effects on executive control (including activation/inhibition), among others.

The purpose of the current study is to determine whether similar results obtain while investigating differential object marking (DOM) in the L3 development of BP. Specifically, we investigate whether L1 Spanish speakers are slower

than L2 Spanish speakers to converge on the BP featural configuration that will yield rejection of DOM, a property of Spanish but not English or BP. We compare L1 English/L2 Spanish and L1 Spanish/L2 English speakers across two levels of proficiency: initial stages and advanced learners. The data from the advanced learners suggest that non-facilitative transfer can be overcome, at least if the L2 (and not the L1) transfers at the L3 initial stages. The advanced speakers' data corroborate those of Cabrelli Amaro (2015b): The L2 Spanish group patterns with the BP control group while the L1 Spanish group continues to accept DOM with objects that require marking in Spanish. These findings inform our understanding of the variables that condition adult language acquisition beyond initial transfer when learners have two previously existing systems. Specifically, by comparing L3 development in learners that transfer their L1 versus their L2, we are able to show that previous language experience (specifically, whether you transfer your first or second language) modulates the rate at which a learner overcomes an entrenched routine copied to the L3 from that language. While our study design does not allow us to isolate the deterministic variable responsible for this impurity (see Section 6), this study is a first step in identifying potential age-related effects in L3 development. Observation of L3 development thus has the capacity to further elucidate our understanding of differences in systems that are acquired in childhood versus adulthood.

2. Differential object marking

In the present study, we examine DOM, a property of Spanish (and other languages, see Aissen, 2003) that has received considerable interest from language acquisition researchers in recent years (e.g., Montrul, 2004; Montrul, Bhatt, & Ghirju, 2015). DOM is an ideal testing ground for the study of L3 morphosyntactic development in this linguistic triad for two reasons. First, DOM exists in Spanish, but not in English or BP. Therefore, if Spanish/English bilinguals transfer Spanish at the initial stages of L3 acquisition of BP (or at least Spanish DOM), they will face the task of overcoming this transfer and learning that BP lacks DOM. Second, the results of Giancaspro et al. (2015) suggest that both L1 Spanish/L2 English and L1 English/L2 Spanish bilinguals do transfer DOM to BP at the initial stages of L3 BP. Consequently, we assume that both groups of successive Spanish/English bilinguals, irrespective of their ages of acquisition of Spanish, make the same initial-stages hypotheses about DOM in BP and start the L3 developmental process without any apparent advantage over one another, i.e., they both use Spanish as the initial hypothesis for the BP grammar.

2.1 DOM in Spanish

DOM, as its name suggests, is the morphological marking of some, but not all direct objects in a given language. Of the three languages in the present study, only Spanish has DOM, which is overtly realized with *a*, as in (1). While many factors govern the appearance of DOM in Spanish, the most important are animacy and specificity (Aissen, 2003; Leonetti, 2004; Rodríguez-Mondoñedo, 2007; Torrego, 1998; Zagona, 2002), which together trigger most uses of Spanish DOM.

The most unambiguous use of Spanish DOM is with direct objects that are both animate and specific, as in (1), where the animate, specific direct object *María* makes DOM obligatory. In other cases, however, the presence or absence of DOM impacts the interpretation of animate and seemingly non-specific direct objects, as in (2). Without DOM (2a), the animate direct object, *una secretaria*, is interpreted as non-specific, meaning that the speaker does not have a specific secretary in mind. With DOM (2b), however, the direct object is interpreted as specific (i.e., the speaker is looking for a particular secretary). Crucially, this interpretive contrast emerges despite the fact that the direct object in both cases is preceded by the same indefinite article, *una* ('a').

- (1) *Juan besó *(a) María* [+animate, +specific]
 Juan kissed DOM María
 'Juan kissed María' (Rodríguez-Mondoñedo, 2007, p. 91)
- (2) a. *Busco una secretaria* [+an, -sp]
 I am looking for a secretary
 'I am looking for a [non-specific] secretary'
- b. *Busco a una secretaria* [+an, +sp]
 I am looking for DOM a secretary
 'I am looking for a [specific] secretary' (Zagona, 2002, p. 13)

However, Leonetti (2004) points out that not all animate, DOM-marked objects are specific: DOM is also possible with *non-specific*, animate direct objects, calling into question the transparency of the relationship between DOM and specificity. In (3), DOM is grammatical, although the direct object is a non-specific, negative quantifier, *nadie* ('nobody'). In (4), DOM is optional before the bare plural indefinite object, *trabajadores* ('workers') even when the object is non-specific in nature.

- (3) *Raúl no ayuda *(a) nadie* [+an, -sp]
 Raúl does not help DOM nobody
 'Raúl does not help anybody'

- (4) *La empresa ha contratado (a) trabajadores con experiencia*
 The company has hired (DOM) workers with experience [+an, -sp]

‘The company has hired experienced workers’ (Leonetti, 2004, p. 83)

DOM is not used with inanimate direct objects, such as *juguete* (‘toy’) in (5) and *hueso* (‘bone’) in (6), regardless of specificity.³

- (5) *Bucky agarra (*a) el juguete.* [-animate, +specific]
 Bucky grabs (*DOM) the toy.
 ‘Bucky grabs the toy’

- (6) *Chico entierra (*a) un hueso.* [-animate, -specific]
 Chico buries (*DOM) a bone
 ‘Chico buries a bone’

Following others, we assume that DOM in Spanish is an example of non-structural case marking, perhaps in addition to structural case (Hopp & León Arriaga, 2016; Nediger, Pires, & Guijarro-Fuentes, 2016a, 2016b; Torrego, 1998, 2002). An *a*-marked object raises out of VP to check and delete the associated (uninterpretable) semantic features of animacy and specificity encoded in a higher structural position (e.g. vP or a dedicated functional category). Unmarked objects in Spanish, objects in English and BP remain in VP and receive only structural (accusative) case.⁴

3. One notable, if also very infrequent, exception to this generalization is sentences with inanimate subjects and objects, as in (7), where DOM is used to disambiguate two potential interpretations, e.g., ‘the calm comes before the storm’ or ‘the storm comes before the calm’ (Rodríguez-Mondoñedo, 2008).

- (7) *La calma precede a la tormenta* [-animate, -specific]
 The calm comes before DOM the storm
 ‘The calm comes before the storm’

Other factors which can influence the presence or absence of DOM include agentivity of the subject, affectedness of the object, and aspectual class of the predicate (Guijarro-Fuentes & Marinis, 2007), all of which were taken into account in the design of the experimental task and, consequently, are not discussed further here.

4. As pointed out by Schwenter (2014), there are two exceptions in BP: Perini (2002, p. 444) reports that DOM occurs before a direct object when the object is a) Deus ‘God’ or another religious noun or in written BP when the direct object is modified or emphasized, such as in *Ronaldo não te odeia, ele odeia a mim* ‘Ronaldo does not hate you, he hates DOM me’. Ramos (1989) found this marking in .7% of the cases he analyzed in a corpus of written BP from the twentieth century. Neither of these exceptions is represented in the test items in the current study.

2.2 Acquisition of DOM in Spanish

The focus of this paper is not the acquisition of Spanish DOM, which we assume has been acquired by all participants (see Giancaspro et al., 2015). Nonetheless, it is worth reviewing what we know about the acquisition of DOM in L1 and L2 Spanish contexts since we will ultimately compare differences in L3 development between Spanish-English bilinguals who acquired their knowledge of Spanish DOM in either an L1 or an L2.

Monolingual Spanish-speaking children acquire DOM quite early, reaching 98% accuracy in the production of obligatory DOM (i.e., animate and specific objects) as early as 2;9 (Rodríguez-Mondoñedo, 2008). Not surprisingly, Montrul and Sánchez-Walker (2013) found that 20 older monolingual Mexican children (ages 6 to 17) were also very accurate (97.9%) in the production of DOM with animate, specific direct objects. Monolingual children do not master all subtleties of DOM early (Guijarro-Fuentes, Pires, & Nediger, 2015), but they do learn to mark animate, specific objects from a young age.

Second language learners, on the other hand, struggle to acquire DOM even with animate, specific direct objects (e.g., Guijarro-Fuentes & Marinis, 2007; Bowles & Montrul, 2008). However, L2 learners at advanced levels can develop sensitivity to the roles of animacy and specificity in Spanish DOM, as shown by Guijarro-Fuentes (2012), who tested learners' judgments of sentences – with and without DOM – which included animate and inanimate as well as specific and non-specific direct objects. In a judgment task, advanced L2 learners performed above 70% accuracy with (a) +animate, +specific, (b) –animate, +specific, and (c) +animate, –specific direct objects.

2.3 Transfer of DOM at the initial stages: Giancaspro et al. (2015)

Giancaspro et al. (2015) tested three groups of Spanish/English bilinguals' (L1 Spanish/L2 English, L1 English/L2 Spanish, and early English/Spanish bilinguals) acceptance of sentences with and without DOM in L3 BP, which lacks DOM. All participants were in the initial stages (i.e., the first semester) of acquisition of L3 BP and were required to demonstrate target knowledge of DOM (or its absence) in Spanish and English to be included.

Each of the L3 groups demonstrated robust transfer from Spanish. In both +animate object conditions, the L3 groups showed a higher acceptance of +DOM sentences and a lower rejection of –DOM sentences than the BP controls, who rejected +DOM sentences across the board. In the –animate object conditions, however, the L3 groups rated –DOM sentences higher than +DOM sentences, patterning with the BP controls. These results provide evidence that the L3 BP

learners have transferred their Spanish grammatical systems at the initial stages of L3 acquisition, supporting the predictions of the TPM.

In light of the findings of Giancaspro et al. (2015), we follow the assumption that learners will transfer DOM from Spanish, including the animacy and specificity requirements and the association of these features with vP. Since this transfer is non-facilitative for the acquisition of BP, the learning task will be to revise the featural configuration in BP such that learners reject DOM across the board.

3. Research question and predictions

Our research questions are as follows:

- i. Are acceptability judgments in native and non-native Brazilian Portuguese conditioned by the presence of the preposition *a*, which is the differential object marker in Spanish?
- ii. Is the rate of L3 development conditioned by the status (L1 versus L2) of the language that is transferred at the L3 initial stages?

In light of the evidence that L3 BP learners accept DOM at the initial stages, we are interested in the shape that morphosyntactic development takes over the course of L3 acquisition for learners who acquired Spanish in childhood versus adulthood. Based on Cabrelli Amaro and Rothman (2010) and Cabrelli Amaro (2015b), we posit that the rate of L3 acquisition depends on the source of transfer, and that non-facilitative transfer will be more quickly overcome when the source of transfer is the L2 as opposed to the L1. Speculation as to why this might be is left for the discussion section.

4. Methodology

4.1 Participants

In order to assess the aforementioned predictions, we tested four experimental groups: L1 English/L2 Spanish ($n = 16$) and L1 Spanish/L2 English ($n = 13$) learners at the initial stages of acquisition of BP⁵ and L1 English/L2 Spanish ($n = 19$) and L1 Spanish/L2 English ($n = 16$) advanced learners of BP. The data from these groups were also compared to those from a control group of native speakers of BP. Group placement was determined by participants' completion of university-level

5. These groups are the participants from Giancaspro et al. (2015).

BP courses for Spanish speakers as well as a 100-point BP proficiency test implemented as a placement exam by the Brazil-United States Cultural Association (ACBEU); this assessment has been used in Cabrelli Amaro, (2016) and Rothman and Iverson (2009, 2011). In order to qualify as having an advanced level of L3 BP, participants completed *at least* one semester of university-level BP and scored above 80 points on the proficiency test. Those that had completed at least one semester and did not score at least 80 points were excluded from the data set. The initial stages groups were composed of participants that were enrolled in a first-semester university-level BP course at the time of testing.

The control group ($n = 22$) was comprised of native speakers of Brazilian Portuguese (mean age 24.39, range 19–35) who participated in the study either in Brazil or in the US. All of these BP speakers spoke English to some degree and most also spoke Spanish to some degree. As such, their linguistic composition was relatively comparable to that of the experimental groups. The L1 English/L2 Spanish/initial stages BP group was comprised of native speakers of English from the United States who had acquired Spanish at or after the age of 12 and began studying BP at or after the age of 18. The L1 Spanish/L2 English/initial stages BP group was comprised of native Spanish speakers from Spain or Spanish-speaking countries in Latin America who had acquired English at or after the age of 9 and began studying BP at or after the age of 18. As reported in Giancaspro et al. (2015), both groups of initial stages learners tested within the native range for DOM in their L2.

The L1 English/L2 Spanish/advanced BP group was comprised of native speakers of English from the United States with Spanish as an L2 who qualified as having an advanced level of BP as an L3 (see Table 1 for the experimental groups' age and age of acquisition of the L2 and L3). Participants had to have scored a minimum of 40 out of 50 on a written Spanish proficiency measurement composed of portions of the Diploma of Spanish as a Foreign Language (DELE) and Modern Language Association (MLA) Spanish proficiency exams, following e.g., Cabrelli Amaro (2017) and Giancaspro (2015). While all participants in this group had completed at least one semester of BP, most had completed more, with some participants having completed up to four semesters. Several participants in this group had experience in Brazil; 10 of the participants participated in the study while abroad (during their fourth or sixth week of study abroad), while the remaining eight participants completed it while in the US. The L1 Spanish/L2 English/Advanced BP group was comprised of native speakers of Spanish from various Spanish-speaking countries with English as an L2 who met the advanced L3 proficiency requirements. Most participants in this group had also completed more than one semester of BP, with one participant having completed at least five semesters. All of the participants in this group completed the study in the US; only

one participant reported having previous experience studying abroad in Brazil and this was the same participant who had completed at least five semesters of study. Table 1 provides further information regarding the experimental groups.

Table 1. Experimental groups

L3 BP	Group	N=	Age (yrs)		Age of initial exposure to L2 (yrs)		Age of initial exposure to BP (yrs)		Mean L3 AoA-L2 AoA
			Mean	Range	Mean	Range	Mean	Range	
Initial Stages	L1 Eng/L2 Span	16	21.06	19–25	13.88	12–18	20.94	19–25	7.06
	L1 Span/L2 Eng	13	24.54	18–34	12.69	9–19	23.39	18–31	10.69
Advanced	L1 Eng/L2 Span	19	23.12	19–32	12.74	5–18	20.90	15–32	8.16
	L1 Span/L2 Eng	16	27.80	18–40	13.06	10–21	24.46	15–37	11.40

Note. The information provided for the Adv L3 BP L1 Span/L2 Eng group represents 16 of the 17 participants, as information was not available for one of the participants.

4.2 Judgment task

The task employed to investigate the acceptability of DOM was a scalar acceptability judgment task (see Giancaspro et al., 2015). All experimental and control group participants completed the judgment task, which was presented via surveygizmo.com. The task contained 120 BP sentences⁶ which participants were instructed to rank on a scale of 1 to 4, with a rating of 1 indicating complete confidence that the sentence was bad, 2 indicating that the sentence was likely bad, 3 indicating that the sentence was likely good, and 4 indicating complete confidence that the sentence was good. Of these 120 sentences, there were 64 target sentences, 16 DOM-related fillers, and 40 unrelated filler sentences. The 64 target sentences consisted of a subject DP followed by a transitive verb and a direct object of one of four types: (i) [+animate, +specific] (ii) [–animate, +specific] (iii) [–animate, –specific] and (iv) [+animate, –specific]. For each object type, half of the sentences included DOM and half did not. The fillers consisted of sentences containing a definite article used with [+animate, +specific] direct objects (+DOM $n = 8$, –DOM, $n = 8$), since BP allows for the optional use of the definite article before proper nouns, which could possibly be interpreted as DOM by L3 learners. Given that our data analysis did not yield any significant differences between the items with and without definite articles for any of the experimental groups or BP control (all

6. The items were presented to participants on a single page, which, as an anonymous reviewer points out, could allow participants to compare grammatical and ungrammatical sentences.

Bonferroni-adjusted $ps > .126$), we limit our results to the items without a definite article. Table 2 contains examples from the task.

Table 2. Sample sentences by object type

Object type	Brazilian Portuguese
[+animate, +specific] w/definite article (FILLER)	<i>A gente ouve o Pedrinho.</i> (The people hear Peter.) * <i>A gente ouve ao Pedrinho.</i> (The people hear DOM Peter.)
[+animate, +specific] w/o definite article	<i>A gente ouve Pedrinho.</i> (The people hear Peter.) * <i>A gente ouve a Pedrinho.</i> (The people hear DOM Peter.)
[+animate, -specific]	<i>Laura observa um menino.</i> (Laura observes a boy.) * <i>Laura observa a um menino.</i> (Laura observes DOM a boy.)
[-animate, +specific]	<i>Julia ama os filmes.</i> (Julia loves movies.) * <i>Julia ama aos filmes.</i> (Julia loves DOM movies.)
[-animate, -specific]	<i>Juliana conhece um parque.</i> (Juliana knows a park.) * <i>Juliana conhece a um parque.</i> (Juliana knows DOM a park.)

For the purposes of the present study, the crucial object type is [+animate, +specific]. In Spanish, [+animate, +specific] objects are obligatorily marked with DOM, while in BP (and English) DOM is ungrammatical. Although in this case transfer from English would be facilitative, Giancaspro et al. (2015) show that Spanish/English bilinguals at the initial stages of L3 BP accept DOM with [+animate, +specific] objects in BP, despite its ungrammaticality. It is hypothesized that this acceptance is due to transfer from Spanish. Consequently, this object type provides an ideal test case to examine morphosyntactic development in L3 BP, particularly the ability to recover from non-facilitative L1/L2 transfer. If learners are able to overcome non-facilitative transfer, we expect them to reject DOM with [+animate, +specific] objects in BP. If they are not able to overcome this transfer, we expect them to continue to accept DOM with [+animate, +specific] objects.

5. Results

The total number of ratings, from 1 to 4, that each group assigned to each item type are given in Table 3 below.

For analysis, the ratings were converted to a dichotomous response variable (accept or reject). Ratings of 1 or 2 were recoded as rejected, and ratings of 3 or 4 were recoded as accepted. This both facilitates the statistical analysis and interpretation, and, perhaps more importantly, avoids the comparative fallacy (in the sense of Bley-Vroman, 1989): We are interested in whether acceptability is conditioned by the presence of DOM, but not necessarily how extreme the distinction is or how

Table 3. Group 1–4 ratings by item type, raw count

Group	Rating	[+anim, +spec]		[+anim, -spec]		[-anim, +spec]		[-anim, -spec]	
		-DOM	+DOM	-DOM	+DOM	-DOM	+DOM	-DOM	+DOM
BP	4	134	20	150	11	138	9	123	5
	3	26	27	17	32	21	19	29	22
	2	10	39	7	62	14	44	17	41
	1	6	90	2	71	3	104	7	108
Adv L1-E	4	88	23	111	14	115	21	96	11
	3	31	27	24	19	26	10	30	17
	2	19	31	13	40	10	29	17	28
	1	14	71	4	79	1	92	9	96
In. St. L1-E	4	43	41	68	31	92	15	70	10
	3	48	39	45	42	28	30	42	30
	2	23	27	11	27	8	42	10	37
	1	14	21	4	28	0	41	6	51
Adv L1-S	4	47	46	84	40	109	15	100	7
	3	31	13	17	19	9	23	18	12
	2	22	33	18	26	6	27	8	30
	1	29	35	9	31	3	62	2	79
In. St. L1-S	4	39	44	74	33	85	36	79	11
	3	34	21	20	29	12	27	15	25
	2	14	11	7	14	4	16	4	16
	1	17	28	3	28	3	25	6	52

it compares across groups.⁷ The flexibility of a four-point scale when coupled with explicit instructions that ratings of 1 and 2 are “bad” and 3 and 4 are “good” helps mitigate any effect of a given speaker’s internal rating criteria that might be problematic with a binary judgment task. For example, in a multi-point task a speaker may classify a sentence as acceptable even when not 100% certain (i.e., rate the

7. In response to questioning of the decision to collapse the 4-point scale by an anonymous reviewer, we ran a linear mixed model with the scalar data as a continuous dependent variable and the model yielded the same outcome (a significant Group*Item Type effect with the same significant pairwise contrasts). Specifically, only the BP control group and the L1 English/L2 Spanish/L3 Advanced BP group rate sentences from the [+animate, +specific] condition *without* DOM higher than sentences *with* DOM ($p < .001$). For the remaining conditions, all within-groups comparisons were significant, which is the same outcome we report with the binary dependent variable.

sentence as a 3). In a binary task, the same speaker could rate that same sentence as unacceptable because of the lack of certainty. This is particularly relevant for non-native speakers, who have been found to be hesitant to use the extremes of a Likert scale (see e.g., Schmid, 2011, p. 166 for discussion). The percentage of binary ratings (accept or reject) that each group assigned to each item type are given in Table 4.

Table 4. Group binary acceptance by Item type, estimated marginal means (standard error)

Group	[+anim, +spec] A		[+anim, -spec] D		[-anim, -spec] B		[-anim, -spec] C	
	-DOM	+DOM	-DOM	+DOM	-DOM	+DOM	-DOM	+DOM
	95.0	20.8	96.8	16.1	94.0	9.7	90.9	16.1
BP	(2.4)	(7.5)	(1.7)	(6.4)	(2.8)	(4.2)	(3.9)	(6.4)
Adv L1	84.2	27.5	92.5	15.0	95.6	14.6	87.9	11.0
English	(6.4)	(9.4)	(3.6)	(6.3)	(2.4)	(6.1)	(5.3)	(5.0)
Init. L1	77.3	66.7	91.8	60.8	96.0	28.7	91.2	23.1
English	(8.9)	(11.2)	(4.2)	(12.1)	(2.4)	(10.5)	(4.4)	(9.3)
Adv L1	62.8	44.6	83.4	43.4	94.1	22.7	94.4	9.6
Spanish	(11.5)	(12.4)	(7.2)	(12.2)	(3.2)	(9.0)	(3.1)	(4.8)
Init. L1	75.0	67.5	94.5	62.2	96.3	64.3	94.0	27.8
Spanish	(10.4)	(12.2)	(3.4)	(13.1)	(2.5)	(12.6)	(3.7)	(11.2)

The data were entered into a mixed-effects logistic regression model using the GENLINUX procedure in SPSS 23, with variables of Group (BP, L1 English/L2 Spanish/Advanced L3 BP, L1 Spanish/L2 English/Advanced L3 BP, L1 English/L2 Spanish/Initial Stages L3 BP, and L1 Spanish/L2 English/Initial Stages L3 BP) and Item Type (all 8 combinations of [\pm animate, \pm specific, \pm DOM]). The random effects structure was the maximal structure supported by the data (see e.g. Barr, Levy, Scheepers, & Tily, 2013), and included random by-subjects intercepts and slopes, and random by-item intercepts. The model returned a non-significant effect of Group ($F(4, 70) = 1.957$; $p = .111$), and significant effects of Item Type ($F(7, 132) = 51.293$; $p < .001$), and the interaction of Group*Item Type ($F(28, 531) = 2.736$; $p < .001$).

Although the significant interaction of Group*Type indicated that it would be appropriate to proceed with all pairwise comparisons, we limit the analysis to preplanned contrasts that are relevant to our research questions regarding within-group distinctions. Within each group, we examined acceptance of sentences with and without DOM for each combination of [\pm animate, \pm specific] features, for a total of 20 comparisons (5 groups \times 4 [\pm animate, \pm specific] combinations). Accounting

for multiple comparisons, the resulting p values of the pre-planned contrasts were adjusted with the False Discovery Rate adjustment (Benjamini & Yekutieli, 2001), with the rate set at .05. This approach limits the number of false positives to a predetermined proportion; in this study, this proportion is .05 or 5%. So, we could expect at most one of every 20 significant comparisons to be a false positive. The corrected significance level was .043.

For [+animate, +specific] items, the planned contrasts showed that both the BP and L1 English/L2 Spanish/Advanced L3 BP groups made a significant distinction between these items with DOM and without DOM, accepting those items without DOM and rejecting those with DOM (BP group: odds ratio = 72.34,⁸ $p < .001$; L1 English/L2 Spanish/Advanced L3 BP group: odds ratio = 14.05, $p < .001$). All other groups did not significantly distinguish between these items with and without DOM (odds ratio = 2.10, $p = .210$ for L1 Spanish/L2 English/Advanced L3 BP; odds ratio = 1.70, $p = .388$ for L1 English/L2 Spanish/Initial stages L3 BP; odds ratio = 1.44, $p = .586$ for L1 Spanish/L2 English/Initial Stages L3 BP). For those items which were [+animate, -specific], [-animate, +specific], and [-animate, -specific], each group made a significant distinction based on the presence (or not) of DOM, accepting items without DOM more readily than items with DOM (odds ratios > 6.55 , $ps < .013$ for all groups).

6. Discussion

The goal of this experiment was to examine how L3 development is affected (if at all) when a native versus a non-native (i.e. L2) language forms the initial linguistic hypotheses for the L3. Conclusions drawn from research on the initial stages of L3 acquisition have been at times contradictory, but in the case of DOM, L1 English/L2 Spanish and L1 Spanish/L2 English learners transfer Spanish. Given that initial transfer has resulted in symmetrical behavior for these two groups, it is not unreasonable to expect that this symmetry will extend to L3 development, in the sense that mirror-image language groups will show a similar path and rate of L3 acquisition. However, this is not the only possibility. Non-native speakers of a given language, even at the highest of proficiencies, typically differ from natives in some respect; if not in linguistic criteria (e.g., phonology), then in extra-linguistic criteria (e.g., amount of input over a lifespan). If some learners transfer a native language and others transfer a (same) non-native language, then the asymmetries

8. Odds ratios serve as effect size in logistic regression. The odds ratio of 72.3 here can be interpreted as meaning that with [+animate, +specific] objects the BP group's odds of acceptance are 72.3 times higher for items without DOM compared to items with DOM.

in these variables might lead to a reasonable expectation of asymmetry in L3 development; in this case, we refer specifically to a difference in L3 BP input thresholds yielded by differences in Spanish input. We now return to our data and research questions to see if this is the case.

Our research question asked whether development in L3 BP would be conditioned by the status (i.e. L1 or L2) of the language transferred at the initial stages. The data suggest that yes, this is the case. Recall that DOM is required with [+animate, +specific] objects in Spanish, and ungrammatical with (most) other object types. Also, DOM of the Spanish type is almost never grammatical in BP (see footnote 4 for exceptions), which is reflected in the BP control group's 20.8% acceptance of DOM in the [+animate, +specific] condition.⁹ A successful learner of BP, therefore, should be more likely to accept items without DOM than items with DOM. A learner of BP who has transferred Spanish should already perform this way with all but [+animate, +specific] objects, and must come to know that DOM with objects of this type is ungrammatical. The results revealed two patterns across groups. Both the BP control and L1 English/L2 Spanish/Advanced L3 BP groups accepted items without DOM significantly more than items with DOM, for all object types. On the other hand, both of the L1 Spanish/L2 English groups and the L1 English/L2 Spanish/L3 initial stages BP group did not significantly distinguish between those items with and those without DOM for [+animate, +specific] objects. For the other object types, they accepted items without DOM significantly more than items with DOM, like the BP control and L1 English/L2 Spanish/Advanced L3 BP groups. While these distinctions are indeed target like, they also align with both English and Spanish grammars, and are consistent with transfer of either one. As such, only the critical condition with [+animate, +specific] objects can show us the effects of transfer and any subsequent recovery from non-facilitative effects.

There are two observations of interest here. One is that the groups that do not make the same distinctions as the BP control group differ in the same way; namely, they are not sensitive to DOM for [+animate, +specific] objects. This result is consistent with transfer of Spanish. Although these groups do not perform in a

9. An anonymous reviewer inquired as to whether the proportion of acceptance was a reflection of item or participant variability. While we note that any variability across items (and subjects) is accounted for via the inclusion of by-item and by-subject random intercepts in the statistical model, there do not appear to be specific items that attracted a particularly higher rate of acceptance. Most items had a rate of acceptance < 20%. If we consider the items without a definite article, only one item reached 40% acceptance (*Os cachorros atacam a Thiago* 'The dogs attack DOM Thiago'). Looking at individual participants, four of 22 BP controls accepted DOM in the [+anim, +spec] condition at a rate > 50% (two of whom have a rate of acceptance > 70%). Without their data, the acceptance rate in this condition falls to 15%. It is possible that the proportion of acceptance is a reflection of the cases in which DOM occurs in BP (see footnote 4).

strictly Spanish-like manner (i.e., rejecting these items without DOM), the fact that they make no significant DOM-conditioned distinction points to the continued influence of Spanish in the face of BP input. The input may lead them to accept sentences in BP without DOM that would require it in Spanish, but they have failed to firmly reject BP sentences with DOM in these instances. In other words, they have transferred Spanish and developed to the point where they exhibit optionality in allowing sentences with DOM and without DOM. If, on the other hand, English served as the source of transfer, this is an unexpected result, since DOM is ungrammatical in English, and should straightforwardly lead to a BP-like pattern of performance.

The second observation of note, and that which is most relevant to the research question that drives this study, is the asymmetrical development of the advanced L3 proficiency groups. While the L1 English group patterns with the BP control group, the L1 Spanish group fails to do so, and importantly does not differ from the initial stages groups. Considering the performances of all groups, it appears that although the status of the transferred language (Spanish) as an L1 or L2 is not a factor at the initial stages of L3 acquisition, it *becomes* a factor at later stages of development. For this property, using the L1 as the source of transfer hinders development as compared to a transferred L2. This finding aligns with Cabrelli Amaro's examination of raising across a dative experiencer (2015b) and phonological processing (2015a).

Why might this be? As stated earlier, the purely structural/linguistic variables may not be the answer. All groups of L3 learners were highly proficient in both their L1 and L2, had acquired the property in question (DOM), and transferred Spanish at the initial stages of L3 acquisition. Despite making similar mistakes at the outset, over time only L2 speakers of Spanish were able to make the necessary adjustments to expunge DOM from their BP grammar. In line with models of language development that account for cumulative input (e.g., Yang, 2016) we envision that making these linguistic adjustments is a probabilistic process in which incoming L3 data are compared with the structures of the developing L3 grammar (transferred from the L1 or L2). As L3 input forms a sufficient proportion of the learner's linguistic experience, there will be a decrease in the plausibility of the (incorrect) initial hypothesis. This will drive reanalysis, eventually leading to convergence on the L3 target. Here, language experience should play a role. The cumulative experience that the learner has with the L1 (opposed to the L2) will be greater, and more L3 input will be required to reach the same proportional threshold and override non-facilitative transfer from the L1 than from the L2. It is thus predicted (and borne out in the data here) that an L1 Spanish/L2 English speaker acquiring L3 BP will require more input/experience in the L3 to override the L1 Spanish system than an L1 English/L2 Spanish speaker will. As a result,

re-configuration will take longer for the L1 Spanish/L2 English speaker. In contrast to the L1 Spanish group, the L1 English/L2 Spanish group is predicted to converge on the L3 target earlier. We posit that, since they have less cumulative experience with Spanish, less L3 exposure will be needed to reach the proportional threshold and trigger grammatical reanalysis, leading to earlier target convergence.

In a sense, frequency and the relative proportion of linguistic input matters. What remains to be determined is whether convergence on the L3 target obtains by re-using existing linguistic resources from English, which, like BP, does not have DOM, or whether learners rely on UG access. For reasons of economy, it would make sense that learners would adapt or re-use existing hypotheses; when an initial hypothesis is deemed untenable in L3 acquisition, the learner could resort to another, already-formed hypothesis from the L1 or L2 (whichever language from which DOM was not transferred) rather than formulating a completely novel hypothesis (see Kiyono & Tsujii, 1993, for a proposal for a procedure used for re-using existing resources for new application domains). However, the current study's design does not allow us to adjudicate between re-use of existing hypotheses and formation of novel hypotheses. To determine the source of convergence, we plan to examine a domain in which each of the three languages patterns differently (specifically, object drop) and follow learners longitudinally to capture development. If learners transfer Spanish at the initial stages and are later found to (incorrectly) exhibit an English-like pattern before converging on the BP target, we will take that as evidence for re-use of existing hypotheses.

We recognize that amount of input is not the only possible explanation for the observed asymmetry; it could also be that the entrenched processing routines of the L1 system must be overcome for convergence on the L3 target. In other words, inhibiting a native language may cause difficulties that persist longer in L3 development than inhibiting a non-native language. While we maintain that this potential explanation as well as the explanation of differential input thresholds are both logical accounts with empirical backing (e.g., Linck, Kroll, & Sunderman, 2009), independent measures of relative inhibitory control as well as processing data in the form of reaction and reading times will further inform the role of language experience and use in L3 development.

There are two additional differences between the L1 and L2 Spanish groups that need to be addressed, both of which are related to context of acquisition. In Section 4.1, we noted that 10 of the 19 L1 English/L2 Spanish/Advanced L3 BP group were tested in an immersion context, while all 17 of the L1 Spanish/L2 English/Advanced L3 BP group were tested in the US. It is therefore possible that the increased quantity of input could have contributed to the comparably faster rejection of DOM in L3 BP by the L2 Spanish group. This is an artifact of the populations we are working with; most of the learners that participate in study

abroad programs tend to be L1 English/L2 Spanish speakers or early English/Spanish bilinguals. For example, in Cabrelli Amaro (2016), only two of the 25 participants that were tested while enrolled in study abroad programs in Brazil were L1 Spanish/L2 English speakers. Going forward, it will be beneficial to control for context of acquisition to disentangle its effect in conjunction with language status (L1 vs. L2), although we recognize the inherent logistical challenges involved.

Another possible context-related distinction between the L1 and L2 Spanish speakers in this case is metalinguistic knowledge. All of the L2 Spanish speakers acquired Spanish in a classroom context (as opposed to naturalistically), and DOM is explicitly taught in Spanish classrooms (typically in the first year of instruction). It is therefore possible that L2 Spanish speakers notice the presence or absence of DOM more readily than L1 Spanish speakers; there is evidence that L2 speakers are more metalinguistically aware than L1 speakers, (e.g., Bialystok, 1987, 1988; Bialystok & Hakuta, 1994; Cook, 1997). However, while we acknowledge that there is a possible metalinguistic advantage is responsible for our findings, Cabrelli Amaro (2015b) presents similar findings to those in the present study, and does so with a property that is not explicitly taught and infrequent in the input (raising across a dative experiencer). While a future study with naturalistic L2 learners could rule out any effects of instruction/metalinguistic awareness, these groups would be a challenge to find.

One criticism that tends to arise with cross-sectional studies in L3 development is the lack of a baseline measurement of the advanced learners' L2. In a case such as this one in which the non-facilitative language and the L3 pattern alike, if the L1 speakers of the non-facilitative language (in this case, English) pattern with the native speakers of the L3 (in this case, BP), it is possible that the group of learners had never acquired the property in the facilitative language (in this case, Spanish). However, as we report in Section 3, L2 research shows that advanced learners do develop sensitivity to the animacy and specificity requirements on Spanish DOM. Moreover, the initial stages data from the L2 Spanish group (taken from Giancaspro et al., 2015) indicate that these learners also demonstrate this sensitivity. Given that our advanced learners share the same profile as the initial stages learners, we contend that the learners made the same distinctions as these other advanced L2 Spanish learners, at least at the initial stages.

One immediate direction for future research is to test simultaneous bilinguals. In contrast to adult L2 learners, this population would be more similar with respect age of acquisition, mode of acquisition (i.e. naturalistic learning), and relative linguistic exposure. Controlling for these variables may allow a more precise examination of the effects of language dominance and L3 exposure. The exact nature of the L1 effect in L3 development seen might become clearer. If L3 development is delayed until the proportion of L3 input relative to previously acquired languages

meets a certain threshold, then we might expect that simultaneous bilinguals develop more quickly than their L1 Spanish/L2 English counterparts since the early bilinguals' English input relative to Spanish is greater. If, however, the difficulty lies in inhibiting a native language, then their performance should be comparable.

Another possible direction involves exploring other language groupings. The English/Spanish/Portuguese triad offers certain benefits to researchers because these learners are relatively easy to find in the US, and because of the similarity between Spanish and Portuguese, L3 learners have enough lexical knowledge to be tested quite early. However, this apparent advantage might also lead to observations and conclusions that are not representative of the general nature of third language learning. In cases where the L3 is not easily accessed or parsed via the L1 or L2, initial hypotheses, learning strategies, and the path of development may be different or more variable. Testing other language triads will shed additional light on the generalities of L3 acquisition.

7. Conclusion

In this study, we have examined the role of language status in L3 development, and presented evidence that in the face of non-facilitative transfer, learners who transfer their L2 converge on an L3 target faster than learners that transfer their L1. We posit that this asymmetry is driven by the linguistic experience with the L1 versus the L2 and outline the next steps needed to confirm whether language status is the sole deterministic variable in L3 rate of development.

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Syntactic contrasts in early and late Brazilian Portuguese-European Portuguese bidialectal bilinguals

Data from production

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This study explores the production of subject and object pronouns in the case of Brazilian Portuguese (BP) and European Portuguese (EP) early and late bidialectal bilinguals. The distribution of empty categories in the two systems differs in terms of syntactic and semantic constraints. In this light, we test the extent to which Brazilians acquiring EP naturalistically in Portugal display cross-linguistic effects. Our results indicate that cross-linguistic effects are found both in BP and EP for late learners, but only in BP for early learners. We believe that the high degree of typological proximity between BP and EP and the structural differences between subjects and objects can better explain these learners' outcomes.

Keywords: empty categories, Portuguese, bilingualism, cross-linguistic effects, interface

1. Introduction

Irrespective of the particular definition applied to the construct *bilingual*, the most obvious qualifying characteristic is knowledge of more than one language. This means that there are many types of bilinguals, subdivided into groups based on a myriad of factors which include, to name just a few, age of acquisition (e.g., child versus adult), issues related to quantities and qualities of input (e.g. naturalistic vs. classroom), proficiency (e.g. beginner vs. advanced), and literacy (formally educated in a standard variety or not). The above (and other) factors are interactive, the overlapping of which results in dozens of subtypes of bilinguals.

Let us consider the case of adult second language (L2) acquisition to exemplify how such a label really refers to several distinguishable subtypes of bilinguals.

Even when the first language (L1) and target L2 are held constant, one cannot claim *a priori* that all adult L2 learners are the same simply because they have all surpassed a particular age at the onset of acquiring an L2. Although most will likely be classroom L2 learners, some will be naturalistic ones, acquiring the L2 without conscious effort, explicit metalinguistic instruction, L2 literacy training and/or guaranteed exposure to a standard. One cannot take for granted that all naturalistic L2 learners are the same either, because environments differ considerably and matter significantly. For example, an English native speaker acquiring Spanish naturalistically in Argentina compared to one in Spain and especially one in a Hispanic neighborhood in Los Angeles, California will have vastly different experiences with specific monolingual and even bilingual dialects of Spanish. Often research does not control these above dynamic factors, either because particular research questions do not require such control thus allowing for heterogeneous groups or, more commonly, because the populations used are for particular key factors homogeneous (e.g. always classroom L2 learners with the same L1 and roughly the same experience with the L2).

Recent research has explored the subfield of heritage language bilingualism – child naturalistic acquisition of an L1 in the home, i.e. the heritage language (HL) in an environment where this L1 is not the language of the majority society (see Benmamoun, Montrul, & Polinsky, 2013; Montrul, 2008, 2016; Rothman, 2009). The general consensus when it comes to HL acquisition is that exposure to the majority language has a direct effect on the HL. For instance, when a language is acquired in early childhood as an L1, but a shift in dominance takes place around the time of schooling towards the majority societal language (the L2), the adult outcomes can differ considerably from monolingual norms and in many ways similar to that of typical adult L2 acquisition (see Montrul, 2012). At face value, the fact that early L1 acquisition in HSs can result in such stark differences to monolinguals of the same language calls into question the veracity of the critical period hypothesis (CPH). Under the logic that if HL acquisition can differ as dramatically from monolingual acquisition as adult L2 acquisition does, then age and all that age entails (e.g. CPH's claims of loss of neuro-plasticity affecting language acquisition potential) cannot be the (sole) factor explaining differences between the former two groups. However, one could ponder if the comparison is really a fair one. Can meaningful conclusions really be drawn if the variables that potentially explain similarities and differences between L2 learners and HSs cannot be isolated? In most cases, studies examining adult L2 acquisition involve classroom learners, whereas HS studies by definition involve naturalistic learners who most often lack metalinguistic and literacy training in the heritage language, but also learners exposed to the HL in remedial college classes. Any number of the many variables that differentiate typical L2 learners from HSs could, in

principle, be equally explanatory for their similar (and different) outcomes; that is, arriving at what on the surface seems to be the same end point but potentially having taken extremely different paths. In the present study, we bring together two types of adult bilinguals, namely naturalistic child and adult L2 learners. Keeping the two languages and the environment of acquisition constant, among other variables, we attempt to isolate the variable of age of exposure whereby the group comparison seems fairer. Moreover, we offer a truly unique language pairing to this general endeavor, namely a case of bidialectalism involving Brazilian and European Portuguese (BP and EP, respectively), where other questions of important relevance can be investigated in tandem. We examine two syntactic domains of verbal arguments, null subjects and objects, where the differences between BP and EP are clearly seen. Our participants are EP-BP bidialectal-bilinguals of two types: (i) adult heritage speakers (HS) of BP who acquired EP as an L2 as children in Portugal and (ii) BP natives who have acquired EP as an L2 in Portugal as adults. We investigate their performances in an elicited production task in order to compare the distribution of null vs. overt subjects and objects across the different populations. Both target groups are tested in BP and EP, which yields a unique data set that serves as the basis for our discussion. The main goal of the study is to test the extent to which: (a) cross-linguistic effects are found for the distribution of null subjects or objects in this language pairing, and (b) age determines acquisition potential and/or directionality of influence between BP and EP.

2. Cross-linguistic effects in L2 and HL acquisition

In order to account for cases of non-convergence and optionality in near-native L2 speakers, Sorace and colleagues developed the Interface Hypothesis (IH) (Sorace, 2000, 2003; Tsimpli, Sorace, Heycock, & Filiaci, 2004; Sorace & Filiaci, 2006). According to the most recent version of the IH (Sorace, 2011), external interfaces (e.g. syntax-discourse) are more prone to optionality in non-native grammars than internal interfaces (e.g. syntax-semantics) or structures that involve purely syntactic computations. This optionality could surface as *residual* in L2 near-native speakers or *emerging* in L1 attriters. For instance, a native speaker of a non-null-subject language, such as English, who has reached near-native fluency in a null-subject language, such as Spanish, could reach target-like Spanish null subject structures while still producing more overt subjects than Spanish natives. Conversely, Spanish natives who are near-native speakers of L1 English might show an overuse of overt pronouns compared to monolingual Spanish speakers, as a result of contact with English. Since Spanish has both null and overt subjects, but English only allows overt subjects, the expected directionality of influence is from

English to Spanish. The optionality is linked to underspecification of discourse conditions, since speakers must make a parametric choice between the L1 and the L2 grammars (Sorace, 2011). In other words, if the L2 allows for two possible syntactic structures, but the L1 only accepts one of them, then the predicted pattern of influence is L1->L2, as long as the structure involves the syntax-pragmatics interface. If, however, the L1 contains two possible structures, out of which only one is allowed in the L2, it is expected that the directionality of cross-linguistic effects should be L2->L1.

In light of the IH, this selective optionality is a result of processing limitations arising as a by-product of bilingualism (Sorace, 2011). Wilson, Sorace, and Keller (2008) have shown that competing constraints in the two languages causes bilinguals to experience problems with processing. In a study testing whether typological proximity had an effect on the difficulty associated with the use of pronominal subjects, Sorace, Serratrice, Filiaci, and Baldo (2009) showed that both Italian-English and Italian-Spanish bilinguals had a significantly higher acceptance of overt subjects referring to topic antecedents than Italian monolinguals, since Italian typically prefers null subjects in these contexts (Carminati, 2002). While the IH would predict influence from English in the first group, the overextension of overt pronouns in the second group was not expected, since both Italian and Spanish share a default null subject.¹ Sorace (2011) argues that this overextension of overt pronouns can be either a consequence of obstacles in computing information in real time or a result of processing problems experienced by bilinguals when differentiating the two languages. In production, this behavior would be seen as a default strategy to compensate for possible failure in mapping pragmatic conditions and the choice of null vs. overt pronoun.

Recently, the IH has been extended to investigate heritage language (HL) acquisition. Heritage speakers (HSs) are defined in the literature as second- or third-generation immigrants who first have exposure to the HL at home, via naturalistic input, and are later exposed to the majority language of the larger society (Potowski, Jegerski, & Morgan-Short, 2009; Montrul, 2011). Montrul (2009) argues that, in HL acquisition, structures at an interface, such as subjunctive mood in Spanish, are more difficult to acquire than purely syntactic structures, such as tense-aspect differences. The author claims that HSs typically do not fully acquire the HL as a consequence of a switch in dominance to the majority language, and in light of the IH, interface structures are even more likely to not be fully acquired.

1. Recent studies by Filiaci (2010) and Filiaci, Sorace, & Carreiras (2014) have argued that, despite being NSLs, Spanish and Italian have structural differences with respect to the scope of the overt pronoun, which could have an effect in anaphora resolution preferences in Spanish-Italian bilinguals.

Sorace (2005) points out that HSs are generally exposed to qualitatively different or quantitatively impoverished HL input, since their parents' L1 most likely has undergone some degree of L2 interference. Thus, extending the IH to HL acquisition could lead to misinterpretations, because of differences with respect to how learning takes place in these two populations (Sorace, 2011). However, Montrul & Polinsky (2011) defend that the IH can also be used for HL acquisition, because the changes that take place in advanced stages of L2 acquisition are also expected to take place in HL acquisition. Thus, comparing HL to L2 acquisition could in fact provide evidence in favor of the IH, in spite of the overall distinctions between these two subfields of language acquisition.

Crucial distinctions between adult L2 learners and HSs seem to explain why studies investigating these two types of bilinguals generally target different variables. Adult L2 acquisition takes place after the offset of puberty, whereas HL acquisition begins early on and by definition with naturalistic exposure. However, both subsets of learners also seem to show a pattern of acquisition that differs from that of monolinguals. The present study tests production data from Brazilian native adult L2 learners of EP and heritage BP speakers who were child L2 learners of EP. Each set of participants is tested in both BP- and EP-modes and then compared to native BP/EP counterparts. A comparative analysis of these data involving L1, L2 and HSs sheds light on key discussions for each subfield of bilingualism independently and where they intersect.

3. Morpho-syntactic distinctions

Despite their many lexical and phonological differences, EP and BP also appear to diverge in significant ways morpho-syntactically. In this study, we have chosen to investigate three domains in which the morpho-syntactic differences between the two varieties are clear and robust. We present these fine distinctions below.

3.1 Null subject distribution

3.1.1 *European Portuguese*

EP is a classic null-subject language (NSL) of the Italian type (cf. Rizzi, 1982; Jaeggli, 1984; Roberts & Holmberg, 2010). As shown in Barbosa, Duarte and Kato (2005), EP, like Italian, can have phonologically null subjects, as in (1a), subject-verb order alternations as shown in (2a) and displays a lack of *that*-trace effects, as by comparing grammaticality across (3a–3d):

- (1)
 - a. Chegaram.
 - b. Eles chegaram.
 - c. *Arrived.
 - d. They arrived.

- (2)
 - a. Chegou o João.
 - b. O João chegou.
 - c. *Arrived John.
 - d. John arrived

- (3)
 - a. Que candidato disseste que ganhou as eleições?
 - b. *Que candidato disseste ___ ganhou as eleições?
 - c. *Which candidate did you say that won the elections?
 - d. Which candidate did you say ___ won the elections?

In addition to the above, Barbosa, Duarte, and Kato (2005) claim that NSLs, such as EP, have yet another property that distinguishes them from non-NSLs. In these languages, co-reference between overt embedded subjects and matrix subjects is generally not preferred, particularly in indicative complement clauses. Overt embedded subjects are typically used to mark pragmatic effects such as emphasis or topic shift. The null embedded subject is the first choice to establish co-reference higher up in the clause, as is the case with other Romance NSLs, and using an overt embedded subject for this purpose is not ruled out in NSLs, but it is a highly marked processing strategy as argued in Carminati's (2002, 2005) Position of Antecedent Hypothesis. This is illustrated in (4):

- (4)
 - a. O João_i disse que ele_{#i/k} comprou um carro.
The John said that he bought a car
 - b. O João_i disse que Ø_i comprou um carro.
The John said that Ø bought a car
 - c. John_i said that he_{i/k}/*Ø bought a car.

The overt embedded subject in sentence (4a) is most likely to be interpreted as co-referential with a subject outside the clause, and while possible, co-reference between *ele* and *João* would only be justified by pragmatic effects. The null embedded subject in (4b) establishes direct co-reference with the matrix subject *João*, and could not be interpreted as co-referential with any external referent. In contrast, the English sentence in (4c) illustrates that the overt embedded subject can be co-referential with the matrix subject *John* or with an external referent, as the language does not allow for the possibility of null embedded subjects.

3.1.2 Brazilian Portuguese

Throughout the past century, BP has gone through a series of changes with respect to subject pro-drop, particularly in 3rd person contexts. Duarte (1993, 1995) argues that BP is a language in transition from NSL to non-NSL, due to the fact that the person-verb paradigm has been losing its morphological distinctions over the last decades. For example, for most BP speakers, the 2nd person pronoun *tu* (you, singular) has been replaced by *ocê*, a third person form morphologically that has a second person semantic reference (i.e. *tu*). The 1st person plural *nós* has also been largely replaced by the 3rd person lexical form *a gente* “the people” that has become pronominalized to mean “we” (i.e. *nós*) in many regions of Brazil. These new forms require agreement with the verb in the 3rd person, despite being used to address the hearer interlocutor. Moreover, in most parts of Brazil where pronoun *tu* has remained, there is a mixed-agreement system where *tu* takes the 3rd person morphological form. This mixed pattern is argued in the literature as the source of BP’s synchronic shift towards a non-NSL and has resulted in BP being labeled a partial NSL (Holmberg, Nayudu, & Sheehan, 2009; Holmberg & Sheehan, 2010). As a result of these changes, some originally obligatory null subject pronouns have become optional in BP. Contexts with embedded subjects co-referential with the subject of the matrix clause and left-dislocation of the subject as illustrated in (5a) and (5b) are good examples of this contemporary shift:

- (5) a. Ela_i ficou solteira porque Ø / ela_i quis. (Duarte, 1995, p. 43)
 ‘She remained single because she wanted to.’
 b. A Clarinha_p Ø / ela_i cozinha que é uma maravilha. (Duarte, 1995, p. 108)
 ‘Clarinha she can cook wonderfully.’

The Avoid Pronoun Principle (Chomsky, 1981, p. 65) suggests that a lexical pronoun should be avoided whenever possible in favor of pro or PRO”. The optionality shown in (5a) and (5b) indicates that, in this language, lexical pronouns are not avoided in favor of pro, but in some cases, might even be preferred. Sentence (6) shows that overt embedded pronouns can be used in BP with no focus reading or other pragmatic effect, as would be the case in EP, or in other Romance NSLs (Carminati, 2002, 2005). The overt pronouns in bold seem to occur in free variation with possible null counterparts (from Duarte, 1995, p. 64).

- (6) Porque **eu** não ‘tava certo se **eu** ia querer fazer escola técnica ou se **eu** queria continuar fazendo o científico.
 “Because I was not sure whether I wanted to go to technical school or if I wanted to continue high school.”

Kato (1999) points out that the BP system cannot be considered a non-NSL, despite having lost its preference for null referential subjects. This is because BP has

retained important features which are typical of Romance NSLs, such as obligatory null expletives (7a), arbitrary *pro* (7b), null bound pronouns (7c) and “anaphoric” *pro* (7d). The examples below illustrate these occurrences, respectively (from Kato, 1999, p. 5):

- (7) a. Tá chovendo.
‘It’s raining.’
b. Aqui pode fumar.
‘You/one can smoke here.’
c. Ninguém acha que é estúpido.
‘Nobody_i thinks that he_i is stupid.’
d. O João_i disse que Ø_i comprou um carro.
‘John_i said that he_i has bought a car.’

To sum up the differences between the two languages regarding null/overt subject distribution, BP has been shown to differ from EP with respect to the following: (a) weaker agreement in the person-verb paradigm yielding more frequent occurrence of overt pronouns; (b) embedded subjects co-referential with the main subject of the matrix clause are not required to be dropped; (c) left-dislocation of the subject entails optionality of the overt pronoun; (d) when there is optionality, no focus reading or pragmatic effects are present.

3.2 Null object distribution

3.2.1 *European Portuguese*

In EP, unrealized objects are restricted to 3rd person accusative objects (Costa, Lobo & Silva, 2009). The syntax of null objects in EP, however, is not a licensing of *pro*, but rather a topic operator variable structure, which seems to disallow their occurrence within strong islands (Raposo, 1986; Maia, 1997). It has also been shown that in EP, animacy does not limit the occurrence of null objects in otherwise possible syntactic environments (Costa, Lobo & Silva, 2009; Costa & Duarte, 2003). Sentences B in contexts (8a) and (8b) are both grammatical in EP, even though they differ with respect to the animacy of the null argument. The object dropped in (8a) is [–animate], whereas (8b) illustrates object drop with an [+animate] argument (Costa & Duarte, 2003, p. 5).

- (8) a. A: E este carro?
‘What about this car?’
B: O Zé quer saber quem comprou *ec*.
‘Zé wants to know who bought (it)’
b. A: E a Maria?
‘What about Maria?’

- B: O Zé quer saber quem beijou *ec.*
 ‘Zé wants to know who kissed (her)’

3.2.2 Brazilian Portuguese

Phonetically null objects in BP are arguably true null objects, that is, they are an instantiation of the empty category *pro* (Farrell, 1990; Rothman & Iverson, 2013). The best evidence for a *pro* analysis relates to its ability to freely appear in weak and strong islands alike. As can be seen in (9) and (10) below, BP allows null objects in strong islands, such as the adjunct island in (9) and in weak islands, such as the *wh*-island in (13b).

- (9) Eu guardei o livro depois de ler Ø.
 ‘I put the book away after I read (it).’
- (10) a. “– E o carro?”
 “What about the car?”
 b. “– A Maria quer saber quem comprou Ø.”
 ‘Maria wants to know who bought it.’

However, it is not the case that BP has a completely free distribution of null objects and overtly expressed objects (DPs or clitic pronouns). Not only are phonetically null objects in BP and EP not possible with 1st and 2nd person pronouns or in non-accusative contexts (Schwenter & Silva, 2002), they are also constrained by semantic features and pragmatic felicitousness conditions that restrict the BP null object distribution. In order for an object to be null, its referent must be either [–animate] or [–specific]; an object that is [–animate, +specific] [+animate, –specific] or [–animate, –specific] are all possible candidates to be null (see Farrell, 1990; Schwenter & Silva, 2002; Cyrino, 2004; Schwenter, 2006 for discussion). However, if an object is [+animate, +specific], a DP or overt accusative pronoun seems to be obligatory. This makes BP unique among other Romance languages, as it freely allows null anaphoric accusative objects with inanimate referents that are definite or specific, but rules out null animate objects if their antecedents are specific. This is illustrated in the Examples (11) and (12) below (from Lopes & Cyrino, 2005, p. 3) and the animacy constraint is depicted in Examples (13) and (14) from Schwenter and Silva (2002, p. 579):

- (11) [+animate, +specific]
 O policial insultou o preso antes de torturar * ___/ele.
 ‘The policeman insulted the prisoner before torturing (him).’
- (12) [+animate, –specific]
 O policial insulta presos antes de torturar ___/eles.
 ‘The policeman insults prisoners before torturing (them).’

(13) [-animate, +specific]

Sabe a árvore grande que tinha na minha rua? A prefeitura derrubou Ø/?ela.
 ‘You know the big tree that was on my street? City Hall knocked (it) down.’

(14) [+animate, +specific]

O cachorro da Ana adora ir na rua. Ela sempre leva ?*Ø/ele para passear.
 ‘Ana’s dog loves to go out in the street. She always takes him for walks.’

The relevant comparative facts regarding null object distribution in BP and EP can be summarized in the following ways:

- i. In both BP and EP, phonetically null objects are limited to 3rd person accusative arguments;
- ii. Null objects in both BP and EP are always identifiable in the discourse;
- iii. The underlying syntax of null objects in BP and EP is different giving rise to a partial overlap in surface distribution;
- iv. The main difference between the distribution of null objects in EP and BP lies at the syntax-semantics interface.

Hence, BP shows optionality between null and overt subject pronouns with no pragmatic effects, while in EP, overt subject pronouns are at the syntax-pragmatics interface. Conversely, null objects in BP are at the syntax-semantics interface, since their distribution is delimited by animacy constraints, whereas in EP, they arguably occur in free variation with overt pronominal objects.

4. Research questions and hypotheses

Taking the Interface Hypothesis (IH) and its predictions regarding cross-linguistic effects as our point of departure, we pose the following fundamental research questions:

- a. In the language scenario tested here, are cross-linguistic effects predicted? If so, in what direction: unidirectional (L1->L2 or L2->L1) or bidirectional (L1<->L2)?
- b. If cross-linguistic effects are found, should HSs and L2ers display similar behavior, or will there be differences between the two groups that might be explained by age of L2 onset, dominance etc.?

We derive the following hypotheses (a’-b’) for each of the questions above:

- a’. In light of the IH, optionality should be expected at the syntax-pragmatics interface, but not at the syntax-semantics interface. Thus, we hypothesize

that: (i) the domain of subjects will be affected in the direction L1->L2 (BP->EP), since these are pragmatically constrained in EP but not in BP; (ii) the domain of objects will not be affected in either direction. This means that both groups of bilinguals should produce more overt subject pronouns than EP controls in EP-mode, while still performing BP-like in BP-mode. Their object distribution should reflect the patterns of both monolingual control groups in each respective mode.

- b'. HSs and L2ers should not differ with respect to their performance in EP-mode. Since HSs are child acquirers of EP, and thus have native or near-native EP proficiency, the IH predicts that, like advanced L2ers, they will produce more overt pronominal subjects than EP monolinguals. In BP-mode, neither L2ers nor HSs should have emerging optionality, since the directionality of influence should be, in this case, from BP to EP (always). This is because BP is the language with the flexible null/overt subject pattern, not delimited by pragmatic effects, and EP has a mostly rigid dichotomy (either null or overt), where the null vs. overt subject distinction clearly lies at the syntax-pragmatics interface.

5. Methodological approach

5.1 Participants

The participants in this study were divided into four groups, as follows:

- HS group – Heritage Speakers of BP: At the time of testing, these participants ($n = 17$) had a mean age of 29.1 (range = 18–52). All of them were born in Brazil but moved to Portugal at an early age (mean = 5.6; range = 1–8). The mean length of exposure to EP at the time of testing was 23.5 (range = 14–45);
- L2 group – Adult L2 Acquirers: These participants ($n = 20$) were born in Brazil and moved to Portugal after age 16. Their mean age was 37.9 years old (range = 25–58) at the time of testing. They only started receiving exposure to EP upon arrival to Portugal. The mean age of arrival for the group was 27.8 (range = 19–43), and the mean length of exposure to EP was approximately 10 years (range = 6–30 years);
- BPC – BP control group: This group ($n = 20$) is composed by native BP speakers tested in Brazil. Their mean age is 31 (range = 18–54). These participants had virtually no exposure to EP aside from access to multimedia shared across the countries;

- EPC – EP control group: This group ($n = 20$) consists of native EP speakers with as little exposure to BP as possible, i.e., no direct, daily contact with BP speakers. Their mean age at the time of testing was 30.5 (range = 20–52).

The groups of participants recruited in Portugal (L2ers, HSs and EPCs) were tested in and around the city of Braga, in the Minho region of northern Portugal. The data from the BPC group were collected in the city of Fortaleza, in the northeast of Brazil. All of the participants were asked to complete a language background questionnaire, where they also provided information about their level of formal instruction, so as to increase intragroup comparability across the members of each group. All participants had a completed High School degree, and most had received some college education. In addition, L2ers and HSs were asked to indicate the frequency with which they use each variant, out of 100% (e.g., BP: 40%, EP: 60%). The average for each of the target groups was the following: L2ers – BP: 58%, EP: 42%; HSs – BP 20.59%, EP: 79.41%. This shows that all target participants understood the distinctions between the two languages in spite of their mutual intelligibility and typological similarity.

5.2 Mode trigger

The idea that bilinguals display different language modes has been widely discussed in the literature (see Grosjean, 1998, 2008 for discussion). This suggests that bilinguals adjust their speech, switching from one language mode to another, according to their interlocutor. As a result, both L1 and L2 may suffer some immediate interference. Bilinguals often use language mixing such as code-switching and lexical borrowing, when the two languages are also spoken by the interlocutor (Grosjean, 1998). In order to check whether the target groups performed differently in BP vs. EP mode, it was thus necessary to conduct one testing session entirely in BP, and another entirely in EP. Thus, the bilingual groups performed the task twice; the testing sessions were counterbalanced so that half the participants were tested first in BP then in EP, and the other half were tested in the reverse order. Between sessions, there was a minimum interval of one week to ensure that there would be no priming. The sessions were conducted by native speakers of BP and EP, in each respective mode. The investigators began the testing sessions with a 5-minute mode-trigger conversation in the target language, in order to make sure that they were aware of the differences between the BP and EP settings.

5.3 Elicited production task

The task chosen to elicit null vs. overt subjects and objects is adapted from Gagarina et al. (2012), from an instrument named MAIN (Multilingual Assessment Instrument for Narratives). The original purpose of MAIN is to assess narrative skills in monolingual and multilingual children between the ages of 3 and 10. It consists of four stories built in sets of six pictures each. The stories are fully independent of one another and were expected to generate about a minute and a half of spontaneous adult speech, as seen in the pilot trials. The motivation for choosing to use MAIN as the Elicited Production Task in this study stems from the fact that the stories are built to encourage the production of all the syntactic constructions investigated here. The presence of both animate and inanimate entities allows us to analyze possible animacy constraints in case of object drop. When referring to DPs previously mentioned, participants can make use of null or overt pronouns, both in matrix and embedded clauses, according to their grammar preferences.

Each story was placed in a white envelope marked with a letter (A, B, C or D). Participants were asked to first place the envelopes in a random order. They would then retell each story in this order, picking up and opening one envelope at a time. The participants were given as much time as needed to look over each story before they began retelling it. They were then instructed to retell the story to the investigator, assuming that the investigator had no access to the images, either to a native speaker of BP (one of the authors) in BP mode, or to a native EP-speaking assistant in EP mode. The stories are presented in three slides: the first two pictures, then the first four, then the whole story, and this is to prevent them from skipping ahead and missing out on some important elements in the storytelling process. Below, in Figure 1, is a screenshot of story D, presented as a whole:

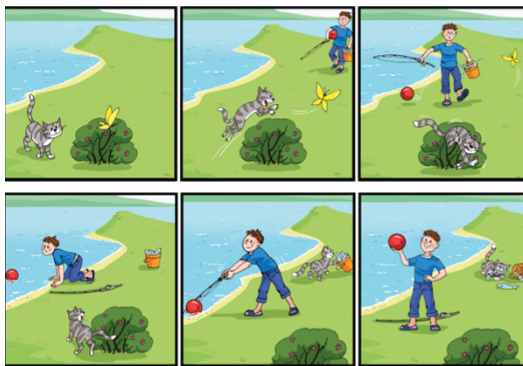


Figure 1. Screenshot of story D – the stories contained animate and inanimate entities, providing room for various contexts where subjects and objects could potentially be dropped

Once finished with a story, they were asked to look over the next story and repeat the process, until all four stories were told. Their speech was recorded using a conventional Olympus VN-713PC voice recorder, and their data coded and analyzed taking into account our research questions in light of the key differences between the two languages.

6. Results

The analysis of the results of this task focuses on the various morpho-syntactic differences between the BP and EP grammars illustrated in Section 3. In this section, we present a descriptive account of the data and the results of the statistical models used. We ran various linear mixed models with Group and Language Mode as fixed effects, and Participant as a random factor, fit by maximum likelihood, and we adjusted the baselines for the appropriate comparisons. We measured the frequency of null vs. overt occurrences across the groups. We will first present the overall frequency of null vs. overt subjects, followed by the overall frequency of null vs. overt objects for each of the control groups and the target groups.

6.1 Null vs. overt pronominal subjects

The grammatical differences between BP and EP shown in Section 3 are confirmed by the control data. The data show a much higher overall occurrence of overt pronominal subjects in BP, especially in embedded contexts, while the EP control data indicates a preference for null subjects. The performance of all groups is shown in Figure 2, for production of overt pronominal subjects in relation to the total number of pronominal subjects.

The distribution of pronominal subjects in the control groups is illustrated in Table 1. BPCs produce significantly more overt pronominal subjects than EPCs ($\beta = 13.8$, $t = 3.4$, $p = 0.000$).

When tested in BP-mode, HSs produced significantly fewer overt pronouns than BPCs ($\beta = 27.4$, $t = 3.6$, $p = 0.000$). In EP-mode, they produce overt subject pronouns to the same extent as EP monolinguals ($\beta = -8.4$, $t = -1.1$, $p = 0.274$). The results show that these speakers make a significant distinction between the two modes ($\beta = -19.0$, $t = -2.7$, $p = 0.008$), and thus choose BP or EP mode accordingly when primed. To sum up, while their EP is very similar to that of monolingual EP speakers, their BP does not reflect the production of monolingual BP speakers. These data are summarized in Table 2.

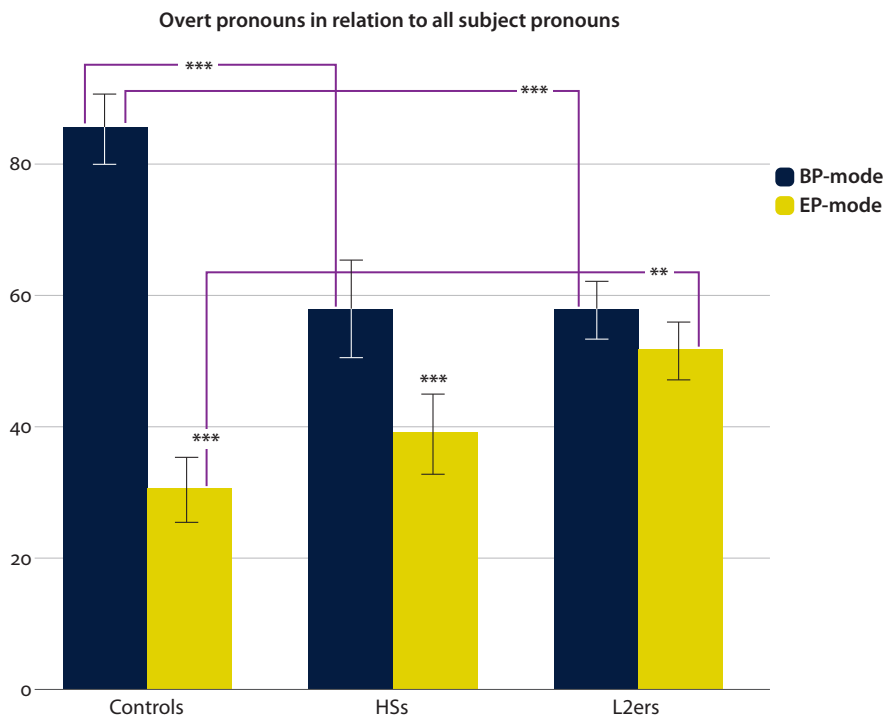


Figure 2. Distribution of overt pronominal subjects across all groups, in relation to the total number of pronominal subjects

Table 1. Distribution of pronominal subjects: Control groups

	BPC	EPC
Overt Pronominals	86.92% (226/260)	26.18% (50/191)
Null Pronominals	13.08% (34/260)	73.82% (141/191)
All Pronominals	260	191
Overt Matrix Pronouns	82.18% (143/174)	22.96% (31/135)
Null Matrix Pronouns	17.82% (31/174)	77.04% (104/135)
All Matrix Pronouns	174	135
Overt Embedded Pronouns	96.51% (83/86)	33.93% (19/56)
Null Embedded Pronouns	3.49% (3/86)	66.07% (37/56)
All Embedded Pronouns	86	56

Table 2. Distribution of pronominal subjects: HS group

	HS-BP mode	HS-EP mode
Overt Pronominals	60.39% (122/202)	38.89% (49/126)
Null Pronominals	39.61% (80/202)	61.11% (77/126)
All Pronominals	202	126
Overt Matrix Pronouns	61.38% (89/145)	27.03% (20/74)
Null Matrix Pronouns	38.62% (56/145)	72.97% (54/74)
All Matrix Pronouns	145	74
Overt Embedded Pronouns	57.89% (33/57)	55.77% (29/52)
Null Embedded Pronouns	42.11% (24/57)	44.23% (23/52)
All Embedded Pronouns	57	52

The behavior shown by the L2ers is detailed in Table 3. The occurrence of overt pronominal subjects in their production when in BP-mode is significantly lower than that of monolingual BP controls ($\beta = -27.5$, $t = -3.8$, $p = 0.000$). In EP-mode, they produce proportionally more overt pronouns than EP monolinguals ($\beta = -21.2$, $t = -2.8$, $p = 0.004$). L2ers do not differ across the two modes with respect to the production of overt subject pronouns ($\beta = -6.0$, $t = -0.9$, $p = 0.344$).

Table 3. Distribution of pronominal subjects: L2 group

	L2ers-BP mode	L2ers-EP mode
Overt Pronominals	59.34% (181/305)	53.85% (112/208)
Null Pronominals	40.66% (124/305)	46.15% (96/208)
All Pronominals	305	208
Overt Matrix Pronouns	53.3% (113/212)	49.67% (75/151)
Null Matrix Pronouns	46.7% (99/212)	50.33% (76/151)
All Matrix Pronouns	212	151
Overt Embedded Pronouns	73.12% (68/93)	64.91% (37/57)
Null Embedded Pronouns	26.88% (25/93)	35.09% (20/57)
All Embedded Pronouns	93	57

A separate model comparing the target groups to one another was run, with the the comparison between the controls as the baseline. The model shows no statistical difference between HSs and L2ers regarding the production of overt pronominal subjects ($\beta = 12.6$, $t = 1.0$, $p = 0.304$).

6.2 Null vs. overt pronominal objects

As for null vs. overt pronominal objects, we ran similar linear models as the ones we ran for subjects. The pattern seen is that pronominal objects can surface as null or overt in BP almost to the same extent, whereas in EP, they were more likely to be overt. The performance across all groups, for the production of overt pronominal objects, is illustrated in Figure 3:

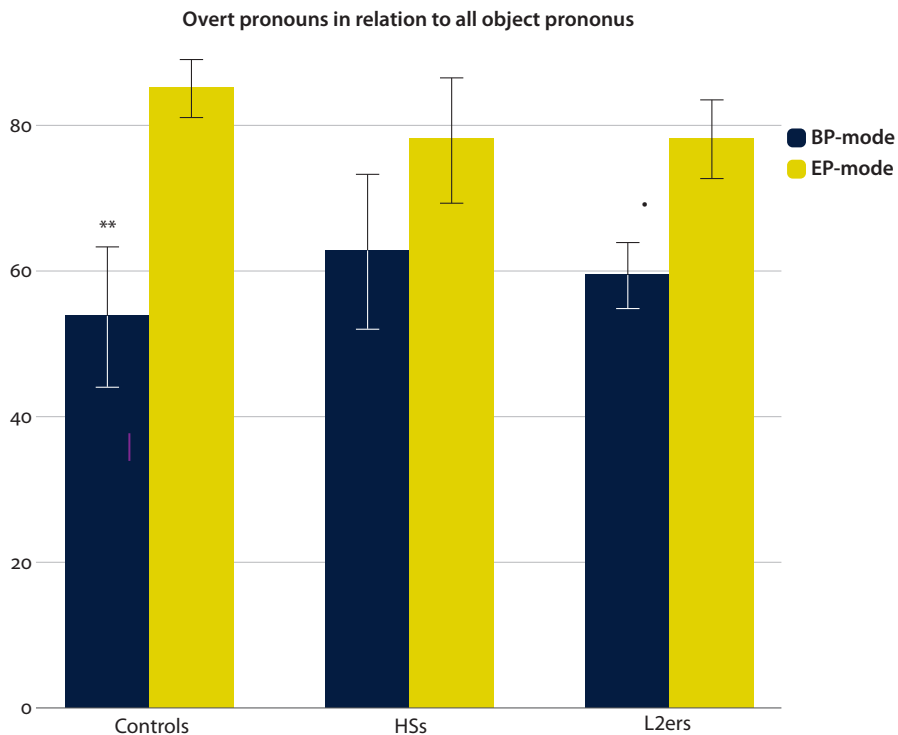


Figure 3. Distribution of overt pronominal objects across all groups, in relation to the total number of pronominal objects

As was the case with subjects, the distribution of pronominal objects is visibly different across the two control groups. BPCs produce significantly fewer overt pronominal objects than EPC ($\beta = 31.4$, $t = 3.1$, $p = 0.002$). Table 4 summarizes the distribution of pronominal objects in the control data.

HSs produce slightly more overt pronominal objects in BP-mode than BP controls, but this difference is not significant ($\beta = -9.0$, $t = -0.8$, $p = 0.388$). In EP-mode, the pattern shown reflects the behavior of the EP controls ($\beta = -24.2$, $t = 0.7$, $p = 0.481$). This group does not show a different pattern across the two

Table 4. Distribution of pronominal objects: Control groups

	BPC	EPC
Overt Pronominals	49.09% (27/55)	86.42% (70/81)
Null Pronominals	50.91% (28/55)	13.58% (11/81)
All Pronominals	55	81
Overt Pronouns [+anim]	61.9% (26/42)	88.31% (68/77)
Null Pronouns [+anim]	38.1% (16/42)	11.69% (9/77)
All Pronouns [+anim]	42	77
Overt Pronouns [-anim]	7.69% (1/13)	50 (2/4)
Null Pronouns [-anim]	92.31% (12/13)	50 (2/4)
All Pronouns [-anim]	13	4

modes in the production of overt pronominal objects ($\beta = 15.2$, $t = 1.6$, $p = 0.112$). These data are illustrated in Table 5:

Table 5. Distribution of pronominal objects: HS group

	HS-BP mode	HS-EP mode
Overt Pronominals	61.29% (19/31)	82.61(38/46)
Null Pronominals	38.71% (12/31)	17.39% (8/46)
All Pronominals	31	46
Overt Pronouns [+anim]	70.37% (19/27)	80.65% (25/31)
Null Pronouns [+anim]	29.63% (8/27)	19.35% (6/31)
All Pronouns [+anim]	27	31
Overt Pronouns [-anim]	0 (0/4)	86.67(13/15)
Null Pronouns [-anim]	100 (4/4)	13.33% (2/15)
All Pronouns [-anim]	4	15

As for the L2 group, the data reveal that their production of overt pronominal objects is not statistically different from those of the monolingual groups in each respective mode (BP-mode, $\beta = -7.0$, $t = -0.6$, $p = 0.491$; EP-mode, $\beta = -6.9$, $t = 0.7$, $p = 0.468$). Across the two modes, L2ers do not show significant differences with respect to the production of overt pronominal objects, possibly due to a low number of observations ($\beta = 17.3$, $t = 1.9$, $p = 0.055$). These data are summarized in Table 6:

Table 6. Distribution of pronominal objects: L2 group

	L2ers-BP mode	L2ers-EP mode
Overt Pronominals	54.55% (36/66)	79.49% (62/78)
Null Pronominals	45.45% (30/66)	20.51% (16/78)
All Pronominals	66	78
Overt Pronouns [+anim]	69.77% (30/43)	93.65% (59/63)
Null Pronouns [+anim]	30.23% (13/43)	6.35% (4/63)
All Pronouns [+anim]	43	63
Overt Pronouns [-anim]	26.09% (6/23)	20% (3/15)
Null Pronouns [-anim]	73.91% (17/23)	80% (12/15)
All Pronouns [-anim]	23	15

As was the case for subjects, the statistical models found no significant differences between the target groups with respect to the production of overt pronominal objects ($\beta = -1.8$, $t = -0.1$, $p = 0.909$). Table 7 shows a summary of what the results indicate. The comparisons between the target groups and the control groups are made in the corresponding mode:

Table 7. Summary of results as shown by the production of null subjects and objects in both target groups

	HSs	L2ers
<i>Overt subjects</i>	Produced fewer than BPCs ($p = 0.000$)	Produced fewer than BPCs ($p = 0.000$)
	Produced as many as EPCs ($p = 0.274$)	Produced more than EPCs ($p = 0.004$)
	Different across the two modes ($p = 0.008$)	Not different across the two modes ($p = 0.344$)
	HSs show no significant differences from L2ers ($p = 0.304$)	
<i>Overt objects</i>	Produced as many as BPCs ($p = 0.388$)	Produced as many as BPCs ($p = 0.491$)
	Produced as many as EPCs ($p = 0.481$)	Produced as many as EPCs ($p = 0.468$)
	Not different across the two modes ($p = 0.112$)	Not different across the two modes ($p = 0.055$)
	HSs show no significant differences from L2ers ($p = 0.909$)	

7. Discussion

We now proceed to a general discussion of the data in terms of the research questions we posed and the hypotheses we suggested in Section 4.

Research question (a): In the language scenario tested here, are cross-linguistic effects predicted? If so, in what direction: unidirectional (L1->L2 or L2->L1) or bidirectional (L1<->L2)?

Based on the Interface Hypothesis (IH), we hypothesized that bilinguals would show residual optionality in EP-mode with respect to the production of null and overt subjects, as they are structurally at the syntax-pragmatics interface. Null objects, on the other hand, are at the syntax-semantics interface in BP, but not in EP, as they are arguably not geared by animacy constraints. In light of the IH, internal interfaces such as syntax-semantics are less prone to optionality than external interfaces such as syntax-pragmatics. Thus, the predicted directionality of influence was from BP to EP, and for the domain of subjects only. Indeed, neither group shows cross-linguistic effects in their L1 or their L2 with respect to the production of null or overt objects, as predicted by the IH. The results show that both L2ers and HSs show target-like null vs. overt object distribution in both modes.

With respect to the distribution of null vs. overt subjects, we find that L2ers produce more overt pronouns in EP-mode than EP controls, which was also predicted by the IH. The HS group, on the other hand, showed EP-like behavior in EP-mode, which means that the cross-linguistic effects expected did not surface in this group. Surprisingly, their BP data indicates that, in fact, both bilingual groups produced fewer overt subject pronouns than what is shown in monolingual BP production – and consequently, more null pronouns. Our data show that, with respect to pronominal subjects, which in EP are at the syntax-pragmatics interface, residual optionality was only found for L2ers, but not for HSs. Even more surprising is the fact that both groups showed emerging optionality in BP, even though overt subjects are not always produced with pragmatic effects in this language. Interestingly, this optionality surfaced in the form of more null subject pronouns, as opposed to the expected overuse of overt pronouns predicted by the IH. Our prediction is thus not confirmed, as HSs show cross-linguistic effects in the reverse direction (L2->L1), and L2ers show bidirectional influence (L1<->L2) for subjects.

The overuse of null pronouns, while not predicted by the IH, has also been observed in L2 acquisition. In a study testing the acquisition of discourse-pragmatic properties in Spanish by three groups of L1 English speakers, divided by level of proficiency, Montrul and Rodriguez-Louro (2006) reported that advanced and near-native learners produce null subjects in illicit contexts, i.e. not pragmatically

licensed in Spanish. Similar results are presented by Rothman (2009), where L1 English intermediate learners of L2 Spanish accepted and produced both overt and null subjects in pragmatically infelicitous contexts. The overuse of null pronouns shown in our data is consistent with the data sets of both studies, and not consistent with the IH predictions. In our study, bilinguals produced more null subjects than BP monolinguals, though, as discussed, their occurrence is not linked to pragmatic effects, and thus they were all licit. As Rothman (2009) suggests, it could be argued that the syntax-discourse interface is highly vulnerable in L2 learners, and as such, the distribution of both null and overt subject pronouns would be affected. However, the fact that, in our data, this behavior was not shown for L2 acquisition, but only for L1 attrition, is intriguing, since, as previously mentioned, null and overt subjects are not at the syntax-discourse interface in BP. In other words, any evidence of optionality at the interface, whether it is an overuse or underuse – or both, as in Rothman (2009) – of overt pronouns can be justified by its vulnerability. Given that the alternation null vs. overt subject is not at an interface in BP, we cannot explain our results in light of an interface vulnerability account.

Research question (b): If cross-linguistic effects are found, should HSs and L2ers display similar behavior, or will there be performance differences linked to crucial distinctions between the two groups (e.g. age of L2 onset, dominance etc.)?

We predicted that HSs and L2ers would not differ with respect to their performance in EP-mode. For this comparison to be valid, one must remember that the HSs in this study are also child L2 learners of EP tested in adulthood. In light of the IH, both groups in EP-mode would produce more overt pronominal subjects than monolingual EP speakers, since they are advanced speakers of EP. As we have already discussed, this turned out not to be the case. However, it is the case that HSs and L2ers are not statistically different from one another in the production of both null and overt subjects and objects. Even though this behavior was not predicted, their performance indicates that, with respect to production, factors such as age of L2 onset or dominance did not seem to play a role. In other words, both groups performed similarly, but not for the reasons we expected.

Extensive research has been conducted on maturational constraints in L2 acquisition, whereby the general consensus is that child L2ers have an advantage over adult L2ers with respect to ultimate attainment (Long, 2005, 2007; DeKeyser, 2012; Granena & Long, 2013, among others). It has been shown, however, that a small subset of adult L2ers do reach nativelike proficiency levels (see Bongaerts, 1999; Moyer, 1999), and that not all child L2ers reach nativelike proficiency in adulthood (see Hytlenstam & Abrahamsson, 2003 for discussion). Bylund (2009) claims that both in L2 acquisition and L1 attrition, maturational effects can have

an effect on different linguistic domains. Our data show that child L2 acquirers of EP perform nativelike in both domains tested. The lack of statistical difference between the two target groups suggests that typological proximity may be yet another factor that contributes to ultimate attainment in L2 acquisition, as has been shown both in the morphosyntactic (Kellerman, 1995) and phonological domains (Bongaerts, Mennen, & van der Slik, 2000).

8. Conclusion

In this paper, we have analyzed production data from two groups of Brazilian Portuguese (BP) and European Portuguese (EP) bidialectal bilinguals, divided according to age of onset of exposure to EP, i.e. child and adult L2 acquirers. The results shown in this study suggest that heritage speakers of BP growing up in Portugal and Brazilians first exposed to EP as adults display signs of EP influence on the null subject distribution in their BP production, while their null object distribution is still monolingual BP-like. These results do not support an account of cross-linguistic effects at the syntax-discourse interface, since the effects shown by the bilinguals tested here only surfaced where the contexts were not at this interface. In addition, child and adult L2 learners did not differ statistically, which could indicate a link between typological proximity and ultimate attainment in L2 acquisition, regardless of age of L2 onset.

Similar studies exploring language contact among speakers of other mutually intelligible languages – e.g., Norwegian and Swedish – could also shed light on the issues raised here. Future research should address whether these results are also confirmed in comprehension tasks. Considering other domains of the grammar where the two languages display strong distinctions will also help us understand whether successful acquisition or L2->L1 interference can take place in some domains but not others, and whether production and comprehension are dealt with the same way by these speakers.

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Learning to perceive, produce and recognise words in a non-native language

Australian English vs. European Spanish learners of Brazilian Portuguese

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This chapter investigates three important skills that facilitate L2 communication: (1) perception (listening), (2) spoken word recognition (understanding) and (3) production (speaking) and their interrelation. In Part One, we present a review of the literature pertaining to L2 acquisition in Portuguese, with a particular focus on phonological acquisition. In Part Two, we review a series of recent studies that investigated the acquisition of Brazilian Portuguese vowels by naïve Australian English (AusE) and European Spanish (ES) listeners at the initial stage of learning. Each study targets one of the aforementioned skills and we will discuss the interrelation between them at the initial stage of L2 acquisition. We conclude the chapter by discussing the implications of this research for second-language learners and teachers of Portuguese.

Keywords: non-native speech perception, speech production, spoken word recognition, Brazilian Portuguese, Australian English, European Spanish

Introduction

The ultimate goal for many second-language (L2) learners is to be able to speak, listen, read and write effectively in the target language. Although learners are often successful in acquiring various aspects of the L2 (e.g., grammar and syntax), many learners continue to speak with a foreign accent – even after spending a significant amount of time in an L2 environment. Learners are often unaware that in addition to certain articulatory constraints, their ability to produce native-like sounds in the L2 is also affected by their ability to perceive those sounds, i.e., to recognise

and discern L2 speech sounds as being distinct from one another. In the field of L2 acquisition, research pertaining to the acquisition of English is abundant. Much less is known about the acquisition of other languages, for instance, Portuguese. The purpose of this chapter is to provide a review of the available literature pertaining to L2 Portuguese speech acquisition, focusing primarily on L2 speech perception, spoken word recognition and speech production.

In *Part One* of this chapter, we will provide a general review of the studies that address the acquisition of Portuguese as a second or additional language (L2), followed by a review of the limited number of studies that investigate the perception and production of Portuguese speech by L2 learners. In *Part Two*, we introduce a theoretical framework – the Second Language Linguistic Perception (L2LP) model (Escudero, 2005; van Leussen & Escudero, 2015), which was designed to model an individual's L2 speech acquisition, from the onset of learning until ultimate attainment. We will then provide an in-depth review of a recent body of work that our team has conducted that tests the L2LP model claims by investigating Australian English and European Spanish monolinguals' acquisition of Brazilian Portuguese in terms of speech perception, spoken word recognition and production. We will conclude with a summary of the implications of these studies for the instruction of Portuguese as an additional language.

1. Part one

1.1 Portuguese as a second or additional language

The demand for Portuguese language study has steadily increased over the past few years, particularly in the United States (Carvalho et al., 2010). As mentioned in the introduction of this book, according to a recent report by the MLA (2015), there has been a 10.1% increase in enrolments in Portuguese language courses in universities across the United States. This increase is perhaps motivated by recent major sporting events held in Brazil, namely the Soccer World Cup in 2014, and the 2016 Olympics in Rio. For most, Portuguese is acquired as a second language, but it is not uncommon to acquire it as a third (L3) or additional language (particularly in the US). In fact, given the typological similarity between the two languages, some suggest that Portuguese might be easier to learn if Spanish is already in place (Henriques, 2000; Jensen, 1989). Consequently, much of the research to date investigates the acquisition of Portuguese by English-Spanish or Spanish-English bilinguals (e.g., Carvalho et al., 2010; Carvalho & Baclear da Silva, 2006; among others).

For example, Carvalho and Bacelar da Silva (2006) investigated the effect of typological distance and order of acquisition (i.e., the order in which each language

was learned) for bilinguals learning Portuguese as an L3. In particular, the authors investigated Spanish-English bilinguals whose L1 is English or Spanish and were learning Portuguese as an L3. The authors found that both groups relied heavily on Spanish to perform the pedagogical tasks that involved the present and future subjunctive in Portuguese, which suggests linguistic (dis)similarity between the languages overrides the order in which each language was acquired. The authors acknowledge that these findings are consistent with earlier studies (e.g., Henriques, 2000; Jensen, 1989) that show that Portuguese may be easier to acquire for learners who already speak Spanish. Specifically, Jensen (1989) found that native Spanish speakers with no knowledge of Portuguese were able to understand more than half of what was being said, with their written comprehension being even higher. Likewise, Henriques (2000) found that Spanish listeners (with no knowledge of Portuguese) were able to understand up to 94% of a Portuguese academic text that they were required to read. Interestingly, Carvalho and Bacelar da Silva (2006) further found that the Spanish transfer allowed native English speakers to arrive at target-like forms more so than the native Spanish speakers. The authors claim that this finding may be due to the fact that they are processing a higher degree of metalinguistic awareness than the native Spanish speakers, which stems from the fact that native English speakers may pay more attention to the Spanish structure which was applied in their learning strategies when previously acquiring Spanish.

There are a number of other studies that investigate the effect of the transfer of Spanish on L2 or L3 acquisition. For example, Giancaspro, Halloran and Iverson (2014) investigated syntactic transfer in different groups of bilinguals (e.g., L1 English/L2 Spanish, L1 Spanish/L2 English, heritage Spanish/English and Spanish/English bilinguals who learned both languages as a first language). The authors found that knowledge of Spanish is transferred in L3 acquisition of Brazilian Portuguese for all bilingual groups. They further claim that these findings are in line with Rothman's (2010) Typological Primacy Model, which states that bilinguals will transfer knowledge from the language that is most structurally and typologically similar. Montrul, Dias and Santos (2010) also found transfer effects from the typologically similar Spanish language in Spanish-English and English-Spanish bilinguals' object expression in their acquisition of Brazilian Portuguese as an L3.

Although these studies have shown the positive transfer of Spanish (regardless of the L1) to the learning of Portuguese, much less is known about the acquisition of the Portuguese phonological system, particularly by monolingual individuals, i.e., beginning learners, or those who do not speak a typologically similar language. Given the fact that sounds are the building blocks of words in language, it is important to understand the challenges a learner will face when listening, comprehending and speaking in the second language. The studies that we will

review below are those that focus specifically on the perception and production of Brazilian Portuguese vowels. As a component of speech, vowels are particularly difficult to acquire compared to consonants given the lack of sharp boundaries between one vowel and another and they are distinguished in a more continuous manner (Ladefoged & Johnson, 2011). Below, we provide a review of the few studies that investigate the perception and production of Brazilian Portuguese because to our knowledge there is no available literature in this area for European Portuguese.

1.2 The acquisition of L2 Brazilian Portuguese speech perception and production

The Portuguese vowel inventory consists of seven oral vowels (/i, e, ε, a, o, ɔ, u/) and five nasal vowels (/ĩ, ê, ã, õ, ã/) (Barbosa & Albano, 2004). Although there are a number of studies that describe the Brazilian Portuguese vowel inventory impressionistically (e.g., Barbosa & Albano, 2004) and acoustically (Escudero, Boersma, Rauber, & Bion, 2009), research pertaining to a learner's ability to perceive and produce these vowels is rather scarce. This is possibly due to the assumption that, given the smaller number of oral vowels in Portuguese, learning Portuguese vowels should not cause many difficulties for learners, such as native English or German speakers, whose L1 vowel inventories contain more oral vowels. There are, however, a few studies that investigate L2 speech perception and/or speech production by English learners of Portuguese.

For instance, Kendall (2004) investigated the perception and production of the Brazilian Portuguese mid-vowel contrasts, /e/-/ε/ and /o/-/ɔ/, by both beginner and advanced North American English learners of Portuguese. He found that both groups were able to perceive these contrasts, with the advanced learners outperforming the beginners, as expected. Interestingly, he found that both groups had great difficulties in accurately producing these contrasts. He further found that despite the fact that beginners performed very low in their production of the open-mid vowels /ε/ and /ɔ/, they did outperform the advanced learners in their production of the close-mid vowels /e/ and /o/. The author claims that a possible explanation for this finding is hypercorrection, whereby upon learning that an open vowel exists in Portuguese, advanced learners begin to use these vowels sporadically in their speech. That is, they often produced an incorrect open-mid vowel, i.e., /ε/ or /ɔ/, when they should in fact have produced a close-mid vowel, i.e., /e/ or /o/. On the other hand, beginners rarely used any open-mid vowels in their speech. Thus, the study shows that despite the fact that English speakers have a larger vowel inventory that could facilitate their perception and production of Brazilian Portuguese, the mid-vowel contrasts may still pose some challenges, particularly when learning to produce these vowels.

Diaz-Granado (2011) investigated L2 and L3 acquisition of Brazilian Portuguese by American English speakers. The study is perhaps one of the most comprehensive of L2 and L3 production studies as the author implemented cross-linguistic acoustic comparisons to predict English learners' production patterns, although these predictions were only partially fulfilled. The author did find that a greater amount of experience with a particular sound, whether it is in their L1, L2 or L3, increased the likelihood a learner would exhibit a native-like pronunciation of the target sound. That is, if a learner has been exposed to a target sound in Portuguese that is very similar to an L1 or L2 sound, the easier it will be to acquire. The author was further prompted to examine American English listeners' ability to perceive the Brazilian Portuguese /e/-/ɛ/ contrast after uncovering that the L2 and L3 learners in the production study created one single category for this contrast that did not correspond acoustically to their separate native English /e/ and /ɛ/ categories or the target BP /e/ and /ɛ/ vowels. The author therefore investigated whether difficulty in producing these vowels had a perceptual basis. Participants completed a category assimilation task in which they had to decide whether the BP vowels /e/ and /ɛ/ were more similar to either the English "bait" or "bet", corresponding to American English /e/ and /ɛ/, respectively, and then they rated their chosen response. They also completed an oddity discrimination task across Portuguese, English and Spanish, where they indicated which vowel is different out of a set of vowel sounds from the BP /e/-/ɛ/ contrast. The results showed that although participants could assimilate the two mid-vowels to separate native categories, Portuguese /ɛ/ was a better fit to English /ɛ/ than Portuguese /e/ was to the English /e/. Furthermore, in the oddity-discrimination task, the trials that consisted of the best fitting mid-front vowel pairs were the hardest to discriminate, which suggests that the discriminability of the vowel contrast decreased as perceptual similarity increased.

While the aforementioned studies focused predominately on the L2 and L3 acquisition of Brazilian Portuguese mid-vowel contrasts, Vasilev (2013) considered non-native listeners' perception of all seven vowels in the Brazilian Portuguese stressed oral vowel inventory in order to make predictions about the initial perception of the vowels when beginning to learn BP as an L2. Her findings indicate that, contrary to the aforementioned studies, naïve Californian English listeners had the most difficulties perceiving BP /i/-/e/ and /o/-/u/. These findings were predicted because these contrasts were assimilated to the same multiple native categories. Thus, the author concluded that discrimination difficulty is dependent on the similarity between the native and target language. Specifically, those contrasts in which a perceptual overlap (i.e., when members of the BP contrast are assimilated to the same native categories) is apparent are those which will be the most difficult to perceive. Elvin, Escudero and Vasiliev (2014) tested Australian

English (AusE) and European Spanish (ES)¹ monolingual listeners of the same Brazilian Portuguese vowels and found a similar pattern. Specifically, both ES and AusE listeners found the same BP contrasts equally easy/difficult to discriminate, a finding that was predicted by comprehensive analyses of the acoustic similarities between the native and target languages' vowels. Furthermore, they found that the ES listeners performed better overall. The authors attribute this finding to the fact that (a) Spanish has fewer vowels than English and therefore these listeners have fewer competing categories to choose from, and (b) Spanish vowels are more acoustically similar to Portuguese than English vowels, which may be a sign of a positive transfer effect of Spanish on Portuguese. Importantly, the authors found that in line with Vasiliev (2013), AusE and ES listeners had most difficulty with the BP vowel contrasts /i/-/e/ and /o/-/u/. In both of these BP contrasts, the acoustic similarity between vowels in the native and target language(s) suggested that the members of each BP contrast were acoustically similar to the same single native category (or multiple categories in the case of the acoustic similarity between AusE and BP for the contrast /i/-/e/).

In this section, we have reviewed several studies that investigate non-native, L2 and L3 acquisition of Portuguese. Specifically, we have reviewed those studies that investigate the transfer of L2 Spanish on L3 Portuguese as well as those studies focusing specifically on the acquisition of Portuguese vowel sounds. It can be observed that there are very few studies that investigate non-native and L2 perception and production of Portuguese vowels and to our knowledge there are no studies that investigate the recognition of spoken Portuguese words. For this reason, in the next section we will review a series of studies that we have conducted that investigate Australian English and European Spanish listeners' perception, spoken word recognition and production of Brazilian Portuguese at the onset of learning. The findings from these studies will have important practical and theoretical implications for teachers and learners in relation to phonological development in the perception, comprehension and production of Brazilian Portuguese as an L2.

1. Although Elvin et al. (2014) refer to Iberian Spanish participants in their study, in order to be consistent with the other studies we review in Part Two, we will use the term "European Spanish".

2. Part two

2.1 Perceiving, understanding and producing Brazilian Portuguese

Difficulties in L2 speech are often attributed to the influence of the native language on the acquisition of the L2. That is, the first language (L1) influences how a learner will perceive, understand and ultimately produce sounds and words in the L2 (Best, 1995; Escudero, 2005, 2009; Flege, 1995). Many studies that investigate L2 learning do so based on groups of learners who are either beginner, intermediate or advanced learners of that particular language with a general assumption that difficulties are ameliorated with greater L2 experience. Nevertheless, difficulties may still persist even after many years of L2 learning and teachers should therefore be very aware of the cross-linguistic influences that will affect their students' L2 development.

Typically, differences in the type and number of phonemes in the native and target language and/or dialect may affect a learner's ability to acquire the sounds, especially vowels. Some researchers have posited that individuals whose L1 phonemic inventory is larger than that of the L2 will have greater success at learning the new L2 sounds than those with a smaller L1 inventory because they are able to use a subset of their own native vowels. For example, Iverson and Evans (2007, 2009) show that listeners with a larger vowel inventory (e.g., German and Norwegian) than the L2 (e.g., English) were more accurate and had higher levels of improvement post training when perceiving L2 vowels than those with a smaller vowel inventory (e.g., Spanish). The findings suggest that having a larger and more complex vowel system may facilitate new vowel learning. However, Elvin et al. (2014) found that a larger vowel inventory is not always a guarantee for success as Australian English and European Spanish listeners had the same difficulties in the discrimination of Brazilian Portuguese vowel contrasts and Spanish listeners, whose L1 vowel inventory is smaller than the target language, actually performed better overall. In fact, Elvin et al. (2014) predicted these findings by conducting a comprehensive analysis of the acoustic similarity between the native and target vowels. Therefore, in addition to the type and number of phonemes in the native and target languages, it is worth taking into consideration the acoustic similarity between native and non-native vowels when predicting L2 difficulty.

2.2 The Second Language Linguistic Perception model: A comprehensive theoretical and computational framework of L2 development

Many L2 acquisition studies focus on group performance rather than on each learner as an individual. However, it is also important to examine speech abilities

at the onset of learning on an individual level, so that language teaching can be tailored toward learner-specific needs. For this reason, in this section we will provide a detailed summary of the Second Language Linguistic Perception model² (L2LP; Escudero, 2005, 2009; van Leussen & Escudero, 2015), a comprehensive theoretical and computational framework that models the entire process of L2 speech learning and focuses on the individual learner. At its core, the L2LP model claims that accurate predictions of L2 success should be based on an *individual's* native production and perception. It considers individuals at all stages of learning (from the onset of learning until ultimate attainment) and across all speech abilities, including speech perception, word learning and recognition and speech production.

According to the L2LP model, L2 learners will learn to categorise new target language sounds through distributional learning, a type of human learning mechanism whereby perception is affected by the phonetic distribution of speech sounds along an acoustic continuum that encompasses sound categories (Escudero, Benders, & Wanrooij, 2011; Maye, Werker, & Gerken, 2002). The L2LP model assumes that individuals detect phonetic information (in both the L1 and L2), such as length, plosive voicing or vowel quality by paying attention to acoustic cues (e.g., duration, voice onset time and formant frequencies) in the speech signal. An individual's perception grammar is the system responsible for mapping acoustic information onto phonological categories, which are in turn associated with possible meanings at the lexical (word) level. At the onset of learning, the L2LP model posits a direct link between perception and production in that learners will first perceive and produce the sounds of the L2 in the same way that they perceive and produce the sounds of their own native language. This is because L2 learners are thought to begin their learning process by using a duplicate or copy of their L1 perception grammar (Escudero, 2005; van Leussen & Escudero, 2015). The L2LP also links perception with spoken word recognition because it is only after exposure to the new language that learners will adjust their perceptual mappings to match those of the target L2, guided by lexical (word) representations (Escudero, 2005). The model thus proposes that the similarity between the acoustic properties of the native and target vowels will determine how new sounds are perceived, which has been demonstrated in a number of studies (e.g., Escudero & Boersma, 2004; Escudero & Chládková, 2010; Escudero, Simon, & Mitterer, 2012; Escudero, Sisinni, & Grimaldi, 2014; Escudero & Williams, 2012; Escudero, 2005), shaping a learner's development in the perception, recognition and ultimately production of L2 sounds and words.

2. In this section, we provide a condensed description of the L2LP model. For a more in-depth description of the model, refer to Elvin & Escudero (2019).

At the onset of learning, the L2LP model predicts three “learning scenarios” that will influence a learner’s individual L2 developmental trajectory. The first learning scenario, known as the NEW scenario occurs when two non-native sounds are initially perceived and categorised as a single native sound. The L2LP model predicts that this scenario will pose great difficulty for learners as they must either create a new L2 category or split an existing L1 category. When two non-native sounds are perceived and categorised as two separate native categories, L2LP refers to this as the SIMILAR scenario, which should be less challenging for learners as they will be able to replicate their L1 categories and adjust their perceptual boundaries if needed (van Leussen & Escudero, 2015). The third learning scenario in the L2LP theoretical framework is known as the SUBSET scenario and occurs when the two sounds in an L2 contrast are perceived and categorised as two or more native L1 categories. While some studies suggest that this learning scenario is not problematic for L2 learners (e.g., Gordon, 2008; Morrison, 2009; Morrison, 2003), Escudero and Boersma (2002) suggest that this pattern may be challenging. The subset problem occurs when a learner must realise that certain features or sounds in the target language do not exist and that they cannot process them in the same manner as in their L1 – a task that may pose considerable difficulty.

According to the L2LP model, L2 learning is message-driven (or meaning-driven in the revised L2LP; van Leussen & Escudero, 2015). That is, learners have no direct access to the phonological categories that native speakers of the L2 possess, therefore they infer these categories based on how well they are able to understand the meaning intended by the speaker and then attempt to improve recognition by updating their lexical representations. Furthermore, it accounts for two processing strategies for recognising L2 categories: it may be either strictly bottom-up (sequential) or it may allow lexical feedback to perception (interactive). Both strategies ultimately lead to correct L2 recognition, but different predictions are made regarding phonetic representations and, consequently, the amount of exposure to L2 words required for acquiring the L2 contrast. According to computational simulations of the processing strategies using L2LP, sequential learners need a larger amount of input data (exposure to L2 words) to achieve the same level of success with the L2 contrast as interactive learners (van Leussen & Escudero, 2015). Van Leussen and Escudero (2015) acknowledge that either strategy may occur in real L2 learners and would be identifiable in individual differences between learners.

In this section, we have presented a review of the L2LP theoretical framework which suggests that the acoustic distributions of L1 vowels ultimately shape L2 speech perception, spoken word recognition (word understanding) and speech production and the subsequent developmental trajectory. Although there are many studies that have tested non-native and/or L2 perception and found their results to

be in line with the L2LP, fewer studies (e.g., Escudero & Wanrooij, 2010; Escudero, Broersma, & Simon, 2013; Escudero, Hayes-Harb, & Mitterer, 2008; Escudero, Simon, & Mulak, 2014; Escudero, 2006) have tested the L2LP proposal for the link between perception and spoken word recognition. Even fewer studies have tested the L2LP claims for the interrelation between perception and production (e.g., Rauber, Escudero, Bion, & Baptista, 2005). For this reason, we present a review of a body of work that specifically tests the L2LP proposal for the link between speech perception, spoken word recognition and production at the initial state of learning. We will first review Elvin (2016) – a thesis which reports both a non-native perception and spoken word recognition study. The perception study shows that acoustic and perceptual similarity is predictive of discrimination accuracy when perceiving L2 vowel contrasts. The spoken word recognition study in Elvin (2016) investigates whether or not discrimination difficulties are also evident in spoken word recognition patterns. Lastly, we will review two small scale studies that investigate a subset of eight European Spanish (Elvin, Williams, & Escudero, 2016) and six Australian English (Elvin, Escudero, Williams, & Best, 2016) listeners' non-native production of words containing BP vowels. Together, these studies provide a comprehensive account of how the L2LP model can be used to explain the learning process behind the acquisition of Brazilian Portuguese vowels by two very different groups of L2 learners.

2.3 Non-native perception of Brazilian Portuguese vowels

2.3.1 *Overview of Elvin (2016)'s non-native perception study*

Elvin (2016) sought to investigate whether the differences in how Australian English (AusE) and European Spanish (ES) individuals produce their own native vowel categories is predictive of their non-native categorisation and discrimination of 7 Brazilian Portuguese oral vowels, namely, /i, e, ε, a, o, ɔ, u/. The work builds on the aforementioned previous work by Elvin et al. (2014), who found that despite their differing vowel inventory sizes, AusE and ES listeners found the same Brazilian Portuguese vowel contrasts easy/difficult to discriminate and that the ES participants performed better overall. Although the findings in Elvin et al. (2014) were in line with their predictions based on acoustic similarity, the predictions for Australian English were based on acoustic means reported in Cox (2006) from vowels produced by a different group of speakers. Also, non-native perceptual categorisation data were not available at the time and were instead inferred from acoustic measurements of Euclidean Distances between non-native and native vowels. Thus, the non-native perception study in Elvin (2016) improves on the earlier study as native vowel production and non-native categorisation data were collected in addition to non-native discrimination data sampled from the

same participants. The participants' own native production and the target stimuli for the categorisation and discrimination tasks were used in the comprehensive acoustic analysis to determine the acoustic similarity between AusE and ES and Brazilian Portuguese (BP). The study investigates whether acoustic and perceptual similarity between the native and target dialect is predictive of performance in non-native discrimination. The authors also investigated individual variation from the perspective that within-category variation in the native language may predict non-native categorisation and discrimination.

2.3.2 Methodology

2.3.2.1 Participants. The participants in the study were 20 Australian English (AusE) monolinguals from Western Sydney and 20 European Spanish (ES) functional monolinguals from Madrid. All participants were aged between 18 and 30 and raised in Western Sydney or Madrid by native Australian or Spanish parents. All of the AusE participants reported little to no knowledge of any language other than English and the ES participants reported little to intermediate knowledge of English, but did not use the language in their daily lives and little to no knowledge of any other foreign language, including Portuguese.

2.3.2.2 Stimuli and procedure. The study consisted of three tasks. In the first task participants were asked to read pseudo-words containing one of the 13 Australian English vowels /i:, ɪ, ɪə, e, e:, ɜ:, ɐ, ɛ:, æ, ɔ:, ɔ, ʊ, ɜ:/ in the /fVf/ context or one of 5 European Spanish vowels /i, e, a, o, u/ in the /fVfo/ context. First, second and third formant (F1, F2 and F3) measurements for each target vowel were extracted at 25%, 50% and 75% of the vowel. To predict non-native categorisation patterns and discrimination difficulty, the authors conducted a cross-language discriminant analysis using F1, F2, F3, formant trajectory and duration as input parameters. The cross-language discriminant analysis determines how likely a given BP token would be categorised as one of the native AusE or ES tokens. The native and non-native tokens are considered to be acoustically similar if there is a high predicted probability that the non-native (in this case BP) token would be categorised as a native AusE or ES vowel category.

After the native production task, participants completed an XAB categorical discrimination task followed by a non-native categorisation task. The stimuli for both tasks were 70 BP pseudo-words in the /fVfe/ context produced by five male and five female BP speakers from São Paulo, selected from the Escudero et al. (2009) corpus. The target vowel was one of the seven Portuguese vowels /i, e, ɛ, a, o, ɔ, u/ produced in the first syllable of the pseudo-word.

In the categorical discrimination task, participants listened to three words via headphones and were required to make a judgement as to whether the first word (X) they heard sounded more like the second (A) or the third (B). There were six blocks of categorical discrimination tasks containing 40 trials, with each trial containing one of the six BP contrasts, namely /a/-/ɔ/, /a/-/ɛ/, /i/-/e/, /o/-/u/, /e/-/ɛ/ and /o/-/ɔ/, which were previously used in Elvin et al. (2014) and Vasiliev (2013). In the non-native categorisation task, participants were asked to identify the stressed vowel sound of each target BP word (i.e., the target vowel) as one of their own 13 AusE or 5 ES vowel categories. Although the Spanish listeners saw the 5 vowel categories *i*, *e*, *a*, *o* and *u* on the screen, the AusE vowels were presented in one of the 13 keywords, *heed*, *hid*, *head*, *heared*, *haired*, *heard*, *hud*, *hard*, *had*, *hoard*, *hod*, *hood* and *who'd*, which correspond to the AusE phonemes /i:, ɪ, ɪə, e, e:, ɜ, ɐ, ɛ:, æ ɔ:, ɔ, ʊ, ʌ:/ as English is not as orthographically transparent.

2.3.3 Main findings

The results from Elvin (2016) suggest that the acoustic properties of the native language indeed influence the non-native categorisation and discrimination of Brazilian Portuguese vowels. In particular, the results from the comprehensive acoustic analyses for AusE and ES show that despite the fact that the two languages differ in terms of vowel inventory size, the vowels of both languages fall in and around the same locations within the acoustic space and the predictions for L2 discrimination difficulty in BP would be similar across both languages. The results of the non-native categorisation task were largely predicted by acoustic similarity at both the group and individual levels. The results also showed a larger degree of individual variation for AusE listeners than for ES listeners, which was unsurprising considering that the ES vowel inventory is far less complex and has fewer opportunities for variation than the AusE vowel inventory. The author ran Spearman's rank correlations on the group data and identified a positive correlation between discrimination and acoustic similarity (AusE: $r_s = .771, p = .036$; ES: $r_s = .714, p = .055$; both groups together: $r_s = .713, p = .005$). A strong positive correlation between discrimination and non-native categorisation (i.e., perceptual similarity) was also identified for the ES listeners ($r_s = .870, p = .012$), but less reliable for AusE listeners ($r_s = .714, p = .055$). The correlation was significant when both groups were analysed together ($r_s = .760, p = .002$) (Elvin, 2016, p. 120–121).

As predicted, both groups found the same BP contrasts equally easy/difficult to discriminate despite the fact that AusE has many more vowels than ES (see Figure 2). In particular, the BP /a/-/ɛ/ and /a/-/ɔ/ contrasts were the easiest to discriminate, followed by /e/-/ɛ/, with the results indicating that /o/-/ɔ/, /i/-/e/ and /o/-/u/ were the most difficult to discriminate. Importantly, these discrimination patterns were in line with the L2LP learning scenario identified for each contrast,

which were similar across the two languages. That is, the BP contrasts which were identified as cases of L2LP's NEW or SUBSET scenarios (which also contained an acoustic or perceptual overlap where the two vowels in a given BP contrast are acoustically similar or categorised to two or more of the same native categories) were more difficult to discriminate than those contrasts which were identified as examples of the SIMILAR scenario in L2LP.

2.4 Spoken word recognition

2.4.1 *Overview of the non-native spoken word recognition study in Elvin (2016)*

The non-native spoken word recognition study reported in Elvin (2016) follows on from the non-native perception study as it investigates the same listeners' ability to learn and recognise novel BP words containing the target BP vowels. In particular, it investigates the role of non-native perception in spoken word recognition. Recall that according to the L2LP model, vowel contrasts that are difficult to discriminate should also be confused when recognising those sounds in words. The authors therefore predicted that the BP contrasts that were perceptually difficult to discriminate in the non-native perception study should also be confused in spoken word recognition. Another important component of the L2LP model is its claim that perceptual learning occurs as it is meaning-driven, whereby learners infer phonological categories based on how well they understood the meaning intended by the speaker and they then attempt to improve their recognition by updating their lexical representations. The model further posits that there are two possible processing strategies that may be used to recognise L2 categories, namely a sequential/bottom-up strategy or an interactive strategy which allows lexical feedback to perception. Thus, the study also considered the possibility of whether individual listeners follow either a sequential or interactive lexical processing route when learning new words.

2.4.2 *Methodology*

In this study, the participants and stimuli were the same as in the previous study, however an additional seven BP pseudo words (/kɔko/, /kuke/, /pipe/, /popo/, /sase/, /seso/ and /teko/) were included as filler words. Each auditory token (both target and filler) was paired with a corresponding line drawing selected from the Shatzman and McQueen (2006) corpus. Participants were first trained to associate each word with its line drawing and were then tested on their recognition of these newly learned words. In the testing phase, the associated line drawing to the target word was coupled with a distractor picture. Each BP word was presented twice with one of the other 13 novel words, resulting in both minimal and non-minimal word pairings.

2.4.3 *Main findings*

In line with the results from the non-native perception study, AusE and ES listeners found the same BP contrasts easy/difficult to recognise; however, unlike the findings from the previous study, the ES participants had higher accuracy overall. In terms of an interrelation between non-native perception and spoken word recognition, the results in the spoken word recognition task essentially mirror the non-native discrimination results. In line with the finding for non-native discrimination, the BP contrasts /a/-/ɛ/ and /a/-/ɔ/ were easy to discriminate and /i/-/e/ and /o/-/ɔ/ were difficult to discriminate. The spoken word recognition results differ from non-native discrimination in the fact that /e/-/ɛ/ was as difficult as /i/-/e/ and /o/-/ɔ/ and interestingly the accuracy results for /o/-/u/ were not significantly different from the difficult contrasts, but neither was it significantly different from the easy contrasts.

When examining the relationship between discrimination and word recognition, Spearman's rank correlation analyses of the group data revealed a positive correlation for ES listeners ($r_s(5) = .886, p = .009$), whereby lower discrimination is associated with poorer word recognition accuracy. The correlation for the AusE participants was less reliable ($r_s(5) = .657, p = .078$), however when both groups were analysed the positive correlation was reliable ($r_s(5) = .538, p = .035$) (Elvin, 2016, p. 155)

When running the Spearman's rank correlations on the individual data, again reliable positive correlations were found (AusE: $rs(119) = .282, p = .001$; ES: $r_s(119) = .499, p = <.001$). However, upon closer examination, the author noted an interesting case for five AusE and three ES participants whereby individual negative correlations were observed, and furthermore, these individuals performed much worse overall in the spoken word recognition task than in the non-native discrimination task. Elvin (2016) suggests that these results could be related to differing task demands, but the finding could also be related to the type of processing strategy that these individuals use to learn and recognise new words. It may be that these listeners were sequential learners who require additional input in order to yield comparable accuracy scores to the other word learners. However, further investigation would be required to fully confirm this claim.

The findings in this study indicate that individuals at the onset of learning were able to learn novel BP words and that in this case the ES participants, as a group, had overall higher accuracy. Interestingly, when those participants with negative correlations were removed from the analysis, while still significantly different, the overall advantage for the ES participants is not as strong. This highlights the fact that different task demands can overshadow language-related differences.

2.5 Non-native production of Brazilian Portuguese vowels

2.5.1 *Overview of Elvin, Escudero, Williams & Best (2016a) and Elvin, Williams & Escudero (2016b)*

Elvin, Escudero, Williams & Best (2016a) and Elvin, Williams & Escudero (2016b) are studies that investigate the relationship between non-native speech perception and non-native production at the initial state of learning, with the former focusing on Australian English individuals and the latter focusing on European Spanish speakers. Recall that the L2LP model claims that learners will initially perceive and produce L2 vowels in the same way that they perceive and produce vowels in their L1. Therefore, both studies tested whether or not individuals at the initial state (or onset) of learning do in fact produce non-native vowels that are acoustically more similar to their own native categories than the target vowel categories. The authors further investigated the perception-production link by testing whether individuals are able to produce separate vowel categories for BP vowel contrasts that were easy to discriminate. Additionally, it was expected that the non-native production of perceptually difficult vowel contrasts would be less stable and more varied.

2.5.2 *Methodology*

The first six AusE participants and the first eight ES participants from Elvin (2016) were used in Elvin et al. (2016a, b). The participants in these studies completed a non-native repetition task in which they heard one of the target BP words and were required to immediately repeat the word that they heard. The stimuli for this task consisted of the same 7 target words from the aforementioned studies (/fife/, /fefe/, /fefel/, /fafel/, /fofel/, /fɔfel/, /fufel/) with the addition of three filler words (/pipe/, /kuke/, /sase/). A total of 100 trials were presented in the task. Both studies also report the results from the native vowel production task and XAB discrimination task reported in Elvin (2016) for the subset of participants that were investigated in these studies.

2.5.3 *Main findings*

2.5.3.1 *Acoustic similarity between native, non-native and target vowels.* Based on visual observations of the vowel plots presented in Elvin et al. (2016a) and Elvin et al. (2016b), it appears that AusE and ES speakers' production of BP vowels are in fact more acoustically similar to the closest vowel(s) in their native language than the target BP vowels. To determine the acoustic similarity between the native AusE categories and the speakers' production of BP, Elvin et al. (2016a) conducted a cross-language discriminant analysis similar to the one reported in Elvin (2016), where the model was trained on the participants' own native productions and tested

against their non-native production of BP using F1, F2, F3 and duration as input parameters (see Section 2.3.2.2 for further information regarding the discriminant analysis procedure). The results of the discriminant analyses confirmed that in many cases the AusE speakers' productions of BP vowels were acoustically similar to more than two native vowel categories, as was expected from the results of the non-native categorisation task reported in the non-native perception study of Elvin (2016).

In Elvin et al. (2016b) the Euclidean distances between the native and non-native vowel tokens as well as between the non-native vowel tokens and target tokens were calculated to determine acoustic similarity across ES and BP. Euclidean Distances were used in this instance to get a clearer picture of whether or not the non-native vowel tokens are indeed closer to their native counterparts than the target vowels (something which is masked in a cross-language discriminant analysis). The results did indeed confirm the predictions and the L2LP claim that at the initial state of learning, individuals will use their own native categories to produce the target tokens.

Both studies also included a cross-language discriminant analysis to determine the acoustic similarity between the target BP vowels and the AusE and ES participants' non-native productions. In this instance, the cross-language discriminant analysis is useful as it provides an indication of how native-like the non-native production is and how intelligible these sounds would be to a native BP speaker. The findings from both sets of analyses indicate that only about half of the AusE and ES non-native vowel tokens were produced with similar acoustic properties as the target BP vowels.

2.5.3.2 *The relationship between non-native speech perception and non-native production.* One of the main goals in both production studies was to determine whether there is a relationship between speech perception and production. The authors presented the results of an XAB discrimination task and non-native categorisation task (AusE only) for the selected participants analysed in these studies. The authors predicted that for those contrasts which were perceptually easy do discriminate (e.g., BP /a/-/ɛ/), participants would be able to produce two separate non-native vowel categories, however, for perceptually difficult contrasts (e.g. BP /i/-/e/, /o/-/u/, /o/-/ɔ/), the non-native production of these vowels would be less stable and more varied. The results from both studies indicated that this was indeed the case. Interestingly, the results indicated some overlap in the non-native production of both vowels in the BP /a/-/ɔ/ contrast. That is, despite the fact that individuals could easily discriminate the contrast, there was not a complete separation of these vowels in production. Furthermore, it seems as though this overlap is stronger for the ES participants than the AusE. Elvin et al. (2016b) suggest that in the case of the ES listeners (yet also applicable to the AusE listeners), although

they were able to discern a difference between the two vowels in perception, they may not be able to update their production during a short task and that further development might be required before they could accurately produce this contrast.

In sum, the findings from both Elvin et al. (2016a) and Elvin et al. (2016b) provide further evidence that an individual's ability to produce non-native vowels is indeed linked with their ability to perceive those same sounds. The findings were also in line with the L2LP model, which states that learners will initially perceive and produce the sounds of the second language in the same way they perceive and produce sounds in the first language. Crucially, our findings seem to suggest that non-native perception is related to and perhaps precedes non-native production.

3. Discussion and conclusion

In this chapter, we have presented a review of the studies that investigate non-native and L2 speech acquisition in Brazilian Portuguese (BP). In particular, we have presented a brief review of a recent body of work completed by the present authors that adequately test the L2LP model claims. Specifically, the non-native perception study reported in Elvin et al. (2016) shows that acoustic and perceptual similarity between L1 and L2 vowel categories can predict their performance when discriminating non-native BP vowel contrasts. The spoken word recognition study reported in Elvin et al. (2016) shows that the BP vowel contrasts that are perceptually difficult to discriminate are also confused in spoken word recognition. The study further highlights possible differences in L2 processing strategies that individuals use to learn and recognise novel words. These results seemed to suggest that the individuals with negative correlations between perception and recognition, who also had significantly lower word recognition scores, may use a sequential processing strategy (bottom-up processing) to learn new words.

Elvin et al. (2016a and 2016b) show that both Australian English and European Spanish speakers at the onset of learning produce non-native Brazilian Portuguese vowel tokens that are acoustically closer to their own native categories rather than the target vowels. The studies also provide further evidence that speech perception is linked to production and that learners must be able to perceive a difference between two vowels in a contrast before they can reliably produce two separate vowel categories. Thus, when considering these studies together, in line with the L2LP model, the findings seem to indicate an interrelation between all three speech abilities of perception, word recognition and production. In particular, the results seem to suggest that perception must be developed and in place before learning and development in the other two abilities can take off.

It is notable that these studies investigating Australian English and European Spanish learners of Brazilian Portuguese show that, despite their differing vowel inventory sizes, their difficulties with learning Brazilian Portuguese are similar across the three different abilities. Interestingly, in spoken word recognition, it seems that the European Spanish listeners outperform the Australian English listeners. A possible explanation for this finding could be that typological similarities between Spanish and Portuguese facilitate the recognition of novel words in Portuguese. Recall that in our introduction we reviewed some of the studies that show positive effects of the transfer of the typologically similar language Spanish on the learning of Portuguese. Although a similar finding was not observed in the non-native perception study reported in Elvin et al. (2016), it may be that these transfer effects are more salient when placed in a word context. One possibility is that the prosodic 'shape' of BP words more closely resembles those typical of Spanish words than English words, where unstressed vowels are not reduced to as great an extent as in English (Flege & Bohn, 1989). It would be worthwhile to compare both the AusE and ES groups to determine whether similar transfer effects are also present in non-native production. Regardless of the discrepancies between the ES listeners' performance in non-native discrimination vs. spoken word recognition, the results of all of the studies do clearly indicate an effect of the native language at the initial stages of learning and that perceptual abilities influence word recognition and pronunciation.

Another possible explanation for the lower performance by AusE participants in spoken word recognition might be found in the fact that AusE vowels are very dynamic (Elvin, Williams, & Escudero, 2016), that is, they contain varying degrees of spectral change. Two recent studies Escudero, Mulak, Elvin, & Traynor (2018) and Escudero & Kalashnikova (2020) showed that AusE infants' success at discriminating and learning vowel minimal pairs in their native dialect was influenced by the amount of variability in vowel inherent spectral change. In particular, Escudero et al. (2018) revealed that the infants were better able to distinguish between vowel minimal pairs when the word they were trained on contained less spectral change. Although this study focuses specifically on infants learning words in their native language, these findings may be applicable to adult non-native and L2 word learning. In that respect, Escudero et al. (2018) suggest that vowel inherent spectral change may be problematic in L1 (and L2) learning because it leads to phonetic overlapping which decreases the stability of vowel categories, resulting in increased difficulties in the perception and recognition of vowel categories. Given the steady-state nature of Spanish vowels it could be that the Spanish listeners performed better in spoken word recognition because there is less activation of competing vowel categories. The acoustic analyses conducted in the perception study of Elvin (2016) primarily consisted of static formant

measurements, therefore, it would be beneficial to conduct new acoustic analyses similar to Escudero et al. (2018) and Elvin et al. (2016) that include the dynamic information of the AusE vowel categories, such as the mean, magnitude and direction of the formant trajectory. Such analyses may provide a more accurate description of the cross-linguistic acoustic similarity between AusE and BP. Future studies should also consider examining whether or not the dynamic features of AusE vowels also influences AusE speakers' non-native productions. That is, we would expect that AusE participants would produce BP vowels with a greater amount of spectral change than that of both Spanish speakers and native speakers of BP. If AusE speakers do indeed produce BP vowels with a greater amount of spectral change then it would also be worthwhile examining whether or not this affects intelligibility or perceptions of foreign accent for native BP speakers.

Finally, the findings reviewed above therefore have important implications for the teaching and learning of Portuguese as a second or additional language. The L2LP model highlights the importance of perceptual learning in L2 acquisition, therefore teachers should spend time training their students to perceive differences between those words that are perceptually difficult to discriminate (for example the BP contrast /o/-/ɔ/ in the minimal pair words *avô* [avo] meaning *grandfather* and *avó* [avɔ] meaning *grandmother*). Language educators would benefit from training in the identification of the effects of the native sound system on the perception and production of the L2 sounds at the onset of learning. Furthermore, the findings for spoken word recognition in Elvin (2016) highlight the importance of identifying the processing strategy that a learner used to acquire new words (sequential vs. interactive). If future research can find an effective way of diagnosing this at the beginning stages of learning, language instructors should be trained to use certain strategies that could facilitate word learning. Lastly, as the results seem to indicate that perception precedes production (and word recognition), teachers should also consider incorporating new and interactive methods of perceptual training to facilitate students' development of these vital skills.

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Multi-directionality in language transfer

Development of the vowel system of Brazilian Portuguese as a second (L2) or third language (L3)

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This study addresses the multi-directionality of vowel transfer by L1 Riverplate Spanish learners of Brazilian Portuguese. We verify the influence of the second language (L2) and the third language (L3) on the production of the mother tongue (L1). Our results showed that (1) the development of the Brazilian Portuguese vowel system was highly dependent on the language systems the participants had previously acquired, and (2) the presence of an L2 or L3 system also affected the L1 (and the L2 system, in the case of the acquisition of an L3). These results shed some light on the multi-directionality of language transfer, as they show that all language systems are in constant development and interaction throughout the whole lifespan.

Keywords: multilingualism, complex dynamic systems, vowel transfer

Introduction

In a more traditional study scenario, the processes of language development and language transfer have long been seen as unidirectional phenomena. On this assumption, only the L1 system would affect the L2 and no influence from the L2 on the L1 would be considered. However, in the current scenario of investigations, the traditional unidirectional L1–L2 transfer account (from a dominant to a weaker, more recent language) may be replaced by a conceptualization of Language as a Complex Adaptive System (Beckner et al., 2009; De Bot, Lowie, Thorne, & Verspoor, 2013; Ellis & Larsen-Freeman, 2006; Larsen-Freeman & Cameron, 2008; Larsen-Freeman, 2013). According to this view, not only can the L1 system affect the L2, but the L2 may also affect the previously acquired system. In the case

of the acquisition of an L3 system, this multi-directionality can also occur, in a way that each one of the language systems may affect the other ones.

According to Amaro and Iverson (2018), unlike what happens in second language acquisition, there are two background languages to deal with when acquiring a third language. Under the complex perspective, there is an extra layer of complexity from two possible sources of cross-linguistic influence, the L1 and the L2 (Amaro & Iverson, 2018). Potential causes are discussed in the L3 literature by Rothman (2015). The author states that learners confronted with L3 input make use of the most salient cues across linguistic domains. In addition, based on Kellerman's (1983, 1986) psychotypology, Rothman (2013, 2015) points to structural similarity as the trigger for transfer of the L1 or L2 to the L3.

This study investigates the learning of the Brazilian Portuguese (BP) vowel system as an L2 and as an L3. We aim to investigate two tenets of additional language development as a Complex Adaptive System: (1) whether L2/L3 development can affect the L1, (2) whether both the L1 and the L2 systems affect L3 development. Specifically, we investigate the development of L2 English and L3 Portuguese by trilingual Argentinean learners (L1: Spanish) and compare their vowel productions to those produced by bilingual (L1: Spanish) learners of BP (L2), as well as monolingual Brazilian and monolingual Argentinean learners.

The Language as a Complex Adaptive System (CAS) approach conceives language development as the emergence of language abilities in real time, according to which changes occur over days, months, and years. Therefore, the traditional perspective that predicts the acquisition of abstract rules is rejected. Recent language acquisition studies have shown that the processes involved in language development do not follow a linear approach, but adhere to a non-linear, more complex, unpredictable view (Beckner et al., 2009; De Bot et al., 2013; Larsen-Freeman, 1997, 2011, 2013). Under this perspective, the term 'acquisition' has been replaced by the more dynamic term 'development', focusing on the process rather than the product. The former term implies that language learning has a final state, while the latter implies a continuous and ongoing process, which does not reach a definite end state. Researchers following this new approach support the theories of Emergentism (Ellis, 2011), Dynamic Systems Theory (DST) (Van Gelder & Port, 1995; De Bot, Lowie, Verspoor, 2007; De Bot et al., 2013) and Complexity Theory (Larsen-Freeman, 1997, 2011, 2013; Holland, 2006; Larsen-Freeman & Cameron, 2008), which all share common tenets such as change over time, non-linear and unpredictable development, and emergence of novel behavior. Linguistic structures emerge not from a single component, but through the interaction of various agents.

Given these aspects of a CAS, linguistic development can be seen as a complex adaptive system since it is a process that does not emerge from one

single component, but from a number of elements interacting with one another ('complex' status). Any language is only developed if there are other outer (other speakers, the environment) and inner agents involved (the speaker's motivation, the speaker's cognitive system, the speaker's grammar and other linguistic factors, such as phonology, syntax, semantics, pragmatics, among others). In other words, the emergence of language development occurs through various agents that are constantly interacting.

Basic characteristics of complex adaptive systems

According to De Bot et al. (2013), systems are defined as groups of entities or parts that work together, and whatever system includes embedded sub-systems which dynamically interconnect with one another. The term *dynamic* refers to the *changes* that the system undergoes due to internal forces and external energy. Behavioral patterns can change over *time*, due to their internal organization and the interrelation to the external environment. The heart of the dynamic approach, as Van Gelder and Port (1995) put it, is time. From a complex, adaptive perspective, language development emerges through interaction with other human beings within a social context from one time to the next. The authors affirm that "cognitive processes always unfold in real time" (p. 18), and language, like any other cognitive process, follows the same course.

Besides the interaction with other agents ('complex' status) and the changes over time ('dynamic' status), DST claims that these changes are also dependent on initial conditions. Thus, development is said to be unpredictable (De Bot et al., 2013). The property of 'sensitivity to initial conditions' refers to the great role played by the initial settings in the development of a system.

Another characteristic of complex adaptive systems is the complete *interconnectedness* among their inner agents: they are all interrelated and cannot be analyzed in their individual parts. The sheer sum of their parts, or agents, does not form the resulting emergent behavior; rather, it is the interrelation that the agents have among themselves that constitutes novel behavior. Thus, one change in one variable, or agent, might have an effect on all the other parts of the system. It is due to this interrelation that a behavior cannot be predicted linearly, since the variables change constantly over the course of development. Regarding this intrinsic interaction, De Bot et al. (2007) and Larsen-Freeman (2011) sustain that dynamic systems are nested, since all systems are always part of another system, ranging from micro to macro levels. We can see the interconnectedness in language development in the work of Pereyron (2017), which claims that one change in one of the multilinguals' (sub)systems can have an impact and may alter the remaining

language systems, as the L1 and L2. The author investigates the development of Portuguese (L3) open-mid vowels [ɛ] and [ɔ] by a Mexican speaker, who does not have these vowels in his L1 system. The results reveal that the development of low-mid vowels [ɛ] and [ɔ] in the L3 has crucial effects on the learner's L1 and L2, due to a complete interconnectedness among the learner's language systems.

Also related to the concept of interconnectedness is the dynamic property of multiplicity of agents, which characterizes the *complexity* of the system. Complex adaptive systems consist of a large number of agents interacting. They differ from simple systems in the sense that they involve multiple agents that interrelate with other variables from the system itself and with the outer environment, resulting in an unpredictable, non-linear performance. Due to this open relation with additional, emergent factors, these systems are also said to be open, differing from simple, closed systems.

In a direct relation to the property of openness, complex systems are also *adaptive* and self-organizing. Larsen-Freeman (1997) shows that such systems are open to new matter and energy. As they develop, they increase in order and complexity by absorbing energy from the environment. An open system that interacts with the environment also presents the property of non-linearity, due to the constant flow of energy that comes from this interplay and reaches a far point from equilibrium. Unpredictably, highly organized states may emerge. Non-linearity is, therefore, a crucial aspect of complex adaptive systems.

Complex systems are adaptive in the sense that they do not merely react to events; they play an active role in responding to new situations and are capable of learning. This is also why these natural systems are believed to be feedback-sensitive (Larsen-Freeman, 1997). In language development, any feedback given may lead to adaptation. As a learner receives feedback (new energy), s/he forces her/his language development to a novel form ('adaptive' status). Moreover, complex adaptive systems do not develop through the interaction with the environment only, but also through internal self-organization. They follow certain states for which the system itself shows preference. These specific states are called 'attractor states' or simply 'attractors'. Larsen-Freeman (2006) says attractors are "preferred paths" in development, and Bybee and Beckner (2015) state that attractors represent "the state(s) or pattern(s) toward which a system is drawn" (p. 1), and other related concepts involve the notion of repetition, states that occur frequently and repeatedly (Fleisher, 2009).

Given the adaptive, dynamic, and complex statuses of language development, we restate that additional language development constitutes a complex adaptive system. Specifically in multilingual development, De Bot et al. (2013) suggest that a new language is not a completely new entity, but an additional component in a multilingual system in which the new language interrelates with elements that

were learned previously. De Bot et al. show how the process of additional language development is a dynamic, complex adaptive system: it is dynamic, since language development changes over time; it is complex, adaptive, since the developing system interacts with various other factors in a non-linear fashion and adapts through interaction. De Bot (2017), at explaining the terminology employed, places both theories, the complex and the dynamic one, under the same phenomenon.

In other words, under the CAS perspective, language development is process-oriented rather than product-oriented. The aforementioned characteristics account for the multi-directionality of language transfer, which we investigate in this chapter.

The present study

A cross-sectional experiment was conducted, and speech production data were collected from twenty participants divided into four groups: (1) the trilingual group – 5 Argentinean participants (L1: Riverplate Spanish) who had been living in Brazil for at least 5 years, but had previously studied English (L2) before acquiring Brazilian Portuguese (L3), (2) the bilingual group – 5 Argentinean or Uruguayan participants¹ (L1: Riverplate Spanish) who had been living in Brazil for at least 3 years and learned Brazilian Portuguese as an L2, (3) the Argentinian monolingual control group – 5 monolingual participants, who lived in Argentina and spoke no other language but Riverplate Spanish, (4) the Brazilian monolingual control group – 5 monolingual Brazilian participants (Porto-Alegre dialect) who spoke no other language but Brazilian Portuguese (BP). Vowel productions were acoustically measured in terms of duration, F1 (tongue height) and F2 (tongue front-back dimension) frequencies on Praat – version 5.4.08 (Boersma & Weenink, 2015). In measuring formant frequencies, we employed the LPC method, which segments the acoustic signal by making an estimate of resonances of the vocal tract. Vowels were normalized on “Norm” <<http://lvc.uoregon.edu/norm>> using the Lobanov method, since this method considers the entire vowel system in its normalization procedure. The statistics were run on SPSS (version 16).

Two aspects of additional language development were tested. Firstly, Spanish vowel productions from Argentinian monolingual participants were compared

1. As far as the production of vowels is concerned, we consider that Argentinians (from Buenos Aires) and Uruguayans (from Montevideo) speak the same dialect – Riverplate Spanish. Future studies showing possible differences between the varieties of Riverplate Spanish spoken in Montevideo (Uruguay) and Buenos Aires (Argentina) may prove necessary. For now, it suffices to consider the participants in this group as speakers of the very same dialect.

to the bilingual and trilingual productions, which allowed the investigation on formant and durational values in the L1 (Riverplate Spanish), grounded on the premise that participants who have other language systems display different L1 vowel formant and duration values from those found in the productions by monolingual speakers of Spanish. Under a complex, adaptive perspective, we cannot predict exactly if L1 productions are most influenced by the L2 or the L3, but we can predict that the L1 of these bilingual and trilingual speakers constitutes a hybrid system which carries characteristics from additional languages, differing from the monolingual speakers' L1. Secondly, we investigated the roles of Spanish (L1) and English (L2) in the development of Portuguese (L3) by comparing the BP vowel systems of the trilingual and the bilingual participants, as this last group lacks the English system. As we consider Flege's (1995) claim that the L1 and L2 phonemic categories are located in the same phonetic-phonological environment, we assume these systems ought to influence each other, i.e. as the L1 can have effects on the additional languages, more recently learned systems can also affect the L1. In the same fashion, given the aforementioned assumption, we consider not only the L1, but also the L2, to play a role in L3 development.

Both investigations were theoretically grounded in the Complex Adaptive System view. Due to the multiple inner (linguistic and personal elements) and outer (environment, context, other speakers) agents which are found in constant interaction and, considering that learners' behavior is constructed based on their past interactions, while current and past interactions construct future behavior (Beckner et al., 2009), we assume each language can affect the target language, as the additional languages can affect the first language. To test such premises, the research questions and procedures will be presented in the next section.

Research questions and procedures

1. Do Spanish F1, F2 and vowel duration values of bilingual speakers (L1: Spanish, L2: Portuguese) and trilingual speakers (L1: Spanish, L2: English, L3: Portuguese) show significant differences from the values presented by monolingual speakers (L1: Spanish), due to the development of the second and third language systems?

Procedures: To answer this question, we compared Spanish F1, F2 and vowel duration values among bilingual (L1: Spanish, L2: Portuguese), trilingual (L1: Spanish, L2: English, L3: Portuguese) and monolingual speakers, in order to find possible significant differences among the groups.

2. Do Portuguese F1, F2 and vowel duration values produced by bilingual (L1: Spanish, L2: Portuguese), trilingual (L1: Spanish, L2: English, L3: Portuguese) and monolingual speakers (L1: Portuguese) show significant differences, due to the addition of the English system in the trilingual group? In other words, can both the L2 and the L1 systems affect L3 development?

Procedures: We compared Portuguese F1, F2 and vowel duration values produced by bilingual (L1: Spanish, L2: Portuguese), trilingual (L1: Spanish, L2: English, L3: Portuguese) and monolingual speakers (L1: Portuguese), to find possible significant differences among groups.

Method

Participants

As previously mentioned, twenty participants were divided in four groups: (1) The trilingual group – Argentinean learners (L1: Riverplate Spanish) of Portuguese (L3)² who had previously studied English (L2), (2) The bilingual group – Argentinean and Uruguayan learners (L1: Riverplate Spanish) of Brazilian Portuguese (L2), (3) a control group of Argentinian monolingual participants, who lived in Argentina and spoke no other language but Riverplate Spanish, (4) a control group of monolingual Brazilian participants (Porto-Alegre dialect). Table 1 presents some main characteristics of the participants in this study.

Tasks

Two reading tasks were administered in order to elicit the production of the Spanish and Portuguese vowel systems. The first task consisted of 2-syllable and 3-syllable words inserted in carrier sentences in Spanish (*Diga _____*), read in .ppt slides by Riverplate Spanish speakers, such as *Diga coche* and *Diga machaca* (*Say car and Say bother*). The second task also included 2-syllable and 3-syllable words inserted in carrier sentences in Portuguese, such as *Diga tosse* and *Diga alface* (*Say cough and Say lettuce*). The words chosen in both tasks did not have a cognate word in Portuguese or Spanish and had their frequency of occurrence controlled. In both lists of stimuli, the target vowels were found in stressed positions and were preceded and followed by voiceless stops/fricatives, so that the stressed vowel would

2. As Celpe-Bras is the only proficiency test in Brazil that tests proficiency in Brazilian Portuguese and this test is task-based and qualitative, with no quantitative multiple choice questions which would allow us to establish a numerical threshold for controlling language proficiency, the criteria adopted in this study to measure proficiency in Portuguese was based on the participants' length of residence in Brazil – at least 3 years.

Table 1. Participants' profile*

Participants	Languages (in order of learning)	Country of Residence	Gender and mean age
Group 1 – 5 trilingual speakers	Spanish, English, Portuguese	Brazil	2 men, 3 women 44,6 years of age (<i>SD</i> = 12,05)
Group 2 – 5 bilingual speakers	Spanish, Portuguese	Brazil	2 men, 3 women 46,8 years of age (<i>SD</i> = 10,92)
Group 3 – 5 monolingual speakers	Spanish	Argentina	2 men, 3 women 46,8 years of age (<i>SD</i> = 14,99)
Group 4 – 5 monolingual speakers	Portuguese	Brazil	1 man, 4 women 45,2 years of age (<i>SD</i> = 14,78)

*All participants filled in a questionnaire designed to obtain information on their L1 use as well as on their experience with their additional languages. Additionally, participants signed a Consent Form in their L1. No participant was older than 70 years old, all were literate and as for bilingual and trilingual participants, all had been living in Brazil for at least 3 years.

not be lengthened due to the voicing of the adjacent consonant (Alves, 2015). The task in Spanish consisted of 90 target words (5 vowels \times 6 words \times 3 repetitions) and 15 distractors,³ while the Portuguese list of stimuli presented 126 words (7 vowels \times 6 words \times 3 repetitions) and 19 distractors.

The recordings of the Brazilian speakers and of the bilingual and trilingual participants were conducted individually in a silent room in Porto Alegre by the first author, while the recordings of the Argentinian monolinguals were carried out by the second author in a silent room in the city of Mar del Plata, Argentina. The Audacity software was used for carrying out the recordings⁴ on a *Sony Vaio* laptop computer, with a microphone *Sony*, ECM XM1 model. Five-minute pauses were given to the participants between the reading of the Spanish and the Brazilian Portuguese tasks. The recordings were analyzed on *Praat* – version 5.4.08 (Boersma & Weenink, 2015), and we employed the LPC method to obtain the F1, F2 and durational values. Vowel segmentation and measurements were conducted manually, with no scripts, and the formant values were obtained by

3. Distractors in the reading task were words that presented the same or a greater number of syllables in comparison to the target words. They also differed from the target words in presenting different stress patterns and voiced adjacent contexts, such as in the words *nuvem* (cloud), in Portuguese, and *regalo* (gift), in Spanish.

4. Free Software. Download at <www.audacity.sourceforge.net>

measuring the steadiest portion of the vowel, i.e., its central part. As for duration, we measured both absolute and relative durational values,⁵ so we could examine whether speech rate had an effect on the duration of the target vowels. As already mentioned, vowel normalization was conducted on Norm and statistical analyses were conducted with S.P.S.S statistical software (version 16).

Results

The effect of additional language systems on L1 production

As for the first research question, we investigated the Spanish vowels produced by the participants in the three groups (monolingual, bilingual and trilingual speakers), in order to verify differences in the height (F1) and front-back (F2) dimensions in their acoustic space. Figure 1 shows the vowels produced by each one of the groups.

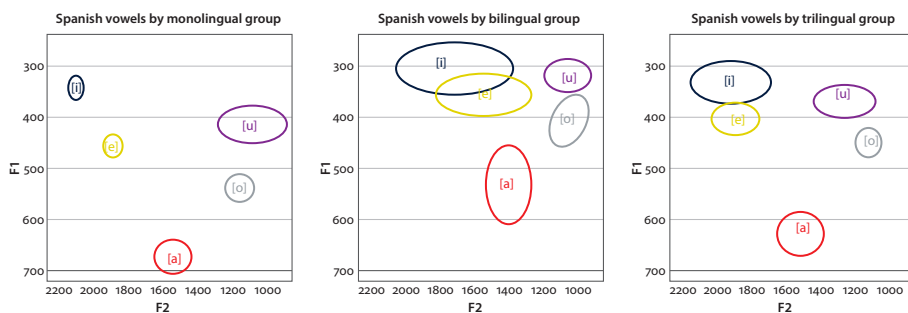


Figure 1. Production of Spanish vowels by the participants in the three groups (ellipses represent 1 standard deviation)

According to Figure 1, acoustic productions differ greatly among monolingual, bilingual and trilingual participants; this suggests that Portuguese as an additional language might have had effects on the mother language. It is worth mentioning that the bilinguals' productions seem to be the most variable, as the trilingual participants' productions look more similar to those of monolinguals. Both groups of bilingual and trilingual learners of Portuguese show a raised L1 vowel system, which suggests that BP might have influenced their L1 system, possibly due to the fact that the Portuguese system has more vowels than Spanish. These participants' vowel dispersions are higher than the dispersions found in the vowels produced

5. Relative durations are obtained by multiplying the time length of the target item by 100 and dividing it by the total temporal length of the event. The total event usually considers the length of the word; however, we opted for the length of the sentence, as it is more informative of the speech rate. According to Silva (2014), this type of normalization helps prevent prosodic factors, such as speech rate, from skewing outcomes.

by the Argentinian monolinguals. There is also an empty space in the acoustic region between 600 and 700 Hertz in the bilingual productions, and between 500 and 600 Hertz in trilingual productions. The latter represents the acoustic space where Argentinian monolinguals produce the closed-mid vowel [o] and Brazilian monolinguals produce their open-mid vowels [ɛ] and [ɔ]. It could be argued that the Portuguese open-mid vowels exerted effects on the entire L1 system, but more especially on the high-mid vowels [e] and [o], as the main difference between the BP and Spanish systems lies in the presence of low-mid vowels in the former, but not in the latter.

In order to answer the first research question, which enquired whether F1 and F2 values in L1 Spanish showed a significant difference among the 3 groups, One-Way ANOVAs were conducted, with 'formant frequency values' as the dependent variable and 'group' as the independent variable. Table 2 presents the results for the One-Way ANOVAs. These results indicate that there are differences among the L1 vowel systems of the three groups in terms of height and back/front dimensions, as expected. The results from the Bonferroni post-hoc tests are also shown in the Table.

Table 2. ANOVA results: Formant values of Spanish (L1) vowel system

Vowel	ANOVA (formants)	Post-hoc Monolingual × Trilingual groups	Post-hoc Monolingual × Bilingual groups	Post-hoc Bilingual × Trilingual groups
[a]	F1 $F(2, 12) = 31,32; p = .000$	$p = .000$	$p = .000$	$p = .038$
	F2 $F(2, 12) = 6,73; p = .011$	NS	$p = .016$	NS
[e]	F1 $F(2, 12) = 12,62; p = .001$	$p = .004$	$p = .002$	NS
	F2 $F(2, 12) = 23,41; p = .000$	NS	$p = .000$	$p = .016$
[i]	F1 $F(2, 12) = .594; p = .567$	-	-	-
	F2 $F(2, 12) = 48,01; p = .000$	$p = .019$	$p = .000$	$p = .000$
[o]	F1 $F(2, 12) = 50,06; p = .000$	$p = .000$	$p = .000$	NS
	F2 $F(2, 12) = 4,06; p = .045$	NS	$p = .047$	NS
[u]	F1 $F(2, 12) = 18,28; p = .000$	$p = .002$	$p = .000$	NS
	F2 $F(2, 12) = 21,11; p = .000$	$p = .000$	$p = .017$	NS

*NS = not significant; - = it does not apply

Post-hoc Bonferroni tests were carried out among groups and results show several statistical differences in the vowel productions of monolingual and trilingual participants. Except for the high vowel [i], all the remaining vowels were produced with lower F1 values in the trilingual group than in the monolingual group.

According to the plots in Figure 1, trilingual participants produced their vowel system higher than the monolingual group. In terms of F2, few significant differences were found between these groups: only the high vowels [i] and [u] were produced differently between groups, and plots show that trilingual participants tend to approximate these vowels, while monolinguals tend to produce them with a greater distance from each other.

As for bilinguals, except for the height of [i], all their remaining vowels are different from those produced by the monolingual group. Bilinguals produce lower F1 values; in other words, as can be seen in the plots, the entire vowel system is produced significantly higher by bilinguals. This suggests that these participants may be producing their L1 vowel system with great influence from the L2 (BP). Since Portuguese has the mid vowels [ɛ] and [ɔ], bilinguals seem to be condensing their L1 vowel space by raising the entire system, especially the central low vowel [a], as if they were trying to set some acoustic space for the new L2 vowels. As for F2 differences, bilingual participants seem to approach mid and high vowels, by approximating the front ones to the back ones (lower F2 values for the front ones and higher F2 values for the back ones). This may also be interpreted as an influence from Portuguese (L2), since Argentinian monolinguals display these vowels with a greater distance than Brazilians.

As also shown in Figure 1, ellipses – which represent standard variation – are larger in bilinguals' plots than in trilingual speakers' plots. One possible interpretation is that trilingual speakers have more vowels in their acoustic space, as they speak a third language. Thus, they do not seem to have much freedom in terms of F1 and F2 dimensions. On the other hand, bilinguals seem to have more freedom in the vocal tract as more acoustic space is available.

As for the comparison in F1 and F2 values between bilingual and trilingual groups, statistical differences are found only in terms of F1 for [a] and F2 for [e] and [i]. Our plots show that bilinguals considerably raise the low central vowel [a] and produce the front vowels [e] and [i] in a more centralized fashion than trilingual participants.

In summary, the three groups showed differences among their L1 vowel systems in the height and front-back dimensions, due to the development of additional language systems, just as posited by CAS: systems are interconnected, open to new matter and easily adaptive. Bilingual participants presented considerably lower F1 values than the remaining groups, which represent an entire raised vowel system, higher F2 values for back vowels and lower F2 values for front vowels, resulting in a more centralized production. Trilingual participants show a higher vowel system as well, but not as consistent as the bilinguals' raised vowel system, as their L1 vowel distribution is closer to the distribution of Argentinian monolinguals. In addition, the trilingual participants' acoustic space shows an empty F1

region (between 500 and 600 Hertz), which may indicate that these speakers are restructuring their acoustic space due to the development of the Portuguese vowel system, predominantly due to the effect of the low-mid vowels [ɛ] and [ɔ].

As for the differences in duration, Table 3 presents the means and standard deviations concerning the absolute values, while Table 4 presents the means and standard deviations of the relative durations. Highlighted cells indicate the longest vowel durations among the 3 groups.

Table 3. Means (in milliseconds) and Standard-Deviation (SD) of absolute duration values: Spanish (L1)

Groups	Paco, achaque [a]	Pepa, machete [e]	Sito, tacita [i]	Coche, capota [o]	Pucho, capucha [u]
Monolingual	86,74	78,03	70,48	89,40	85,82
	<i>SD</i> = 6,05	<i>SD</i> = 6,06	<i>SD</i> = 6,17	<i>SD</i> = 5,70	<i>SD</i> = 5,33
Bilingual	115,83	114,74	88,74	121,71	107,46
	<i>SD</i> = 25,05	<i>SD</i> = 25,73	<i>SD</i> = 14,15	<i>SD</i> = 22,76	<i>SD</i> = 20,36
Trilingual	102,81	90,80	79,18	103,08	90,46
	<i>SD</i> = 17,85	<i>SD</i> = 14,62	<i>SD</i> = 15,64	<i>SD</i> = 14,99	<i>SD</i> = 14,65

Table 4. Means (in percentages) and Standard-Deviations (SD) of relative duration values: Spanish (L1)

		Paco, achaque [a]	Pepa, machete [e]	Sito, tacita [i]	Coche, capota [o]	Pucho, capucha [u]
Mon. group	Disyllabic Words	11,06	9,64	8,69	10,88	11,16
		<i>SD</i> = 0,74	<i>SD</i> = 1,17	<i>SD</i> = 1,16	<i>SD</i> = 0,59	<i>SD</i> = 1,18
	Trisyllabic Words	9,12	8,70	7,80	9,51	8,57
		<i>SD</i> = 0,63	<i>SD</i> = 0,53	<i>SD</i> = 0,38	<i>SD</i> = 0,37	<i>SD</i> = 0,36
Bil. group	Disyllabic Words	13,37	12,16	10,09	14,03	13,19
		<i>SD</i> = 1,49	<i>SD</i> = 1,21	<i>SD</i> = 1,24	<i>SD</i> = 1,22	<i>SD</i> = 1,35
	Trisyllabic Words	11,49	10,56	8,86	12,24	9,49
		<i>SD</i> = 2,12	<i>SD</i> = 1,32	<i>SD</i> = 1,09	<i>SD</i> = 0,87	<i>SD</i> = 1,13
Tril. group	Disyllabic words	12,84	10,68	9,23	12,41	11,61
		<i>SD</i> = 1,81	<i>SD</i> = 1,27	<i>SD</i> = 0,85	<i>SD</i> = 1,45	<i>SD</i> = 1,14
	Trisyllabic Words	10,42	9,98	8,31	10,64	8,93
		<i>SD</i> = 1,53	<i>SD</i> = 0,96	<i>SD</i> = 1,31	<i>SD</i> = 1,48	<i>SD</i> = 1,18

In both absolute and relative duration values, the longest vowels were produced by the bilingual group, precisely the group of participants that has been immersed in the L2 context the longest. In addition, bilinguals seem to have acquired the Portuguese duration patterns and transferred it to their L1 vowel system, as Portuguese presents longer vowels than Spanish (Santos, 2014; Santos & Rauber, 2016). Table 5 presents the One-Way ANOVA results among L1 Spanish groups in terms of duration, while Table 6 presents the Bonferroni post-hoc results.

In a similar fashion to the results on formant frequencies, with regard to vowel duration, bilingual participants show significant differences from Argentinian monolinguals. This indicates that these participants are acquiring the longer temporal patterns of Portuguese vowels and transferring them to their L1 vowels. This can be seen in the mid vowels, which are longer among bilinguals – the vowels lengthened in the bilinguals' L1 were the Spanish mid vowels [e] and [o]. Spanish only presents two mid vowels ([e] and [o]), as discussed previously, while BP presents high-mid vowels [e] and [o] (with a shorter duration) as well as low-mid vowels [ɛ] and [ɔ] (with a longer duration, as their production requires a more open jaw). Thus, bilinguals may be lengthening their L1 mid vowels because of the longer L2 low-mid vowels.

Table 5. ANOVA results: Vowel duration in Spanish (L1)

Vowel	ANOVA (duration)
	Absolute $F(2, 12) = 3,23; p = .075$
[a]	Relative $F(2, 12) = 3,61; p = .059$ (disyllabic words) $F(2, 12) = 2,90; p = .094$ (trisyllabic words)
	Absolute $F(2, 12) = 5,70; p = .018$
[e]	Relative $F(2, 12) = 5,36; p = .022$ (disyllabic words) $F(2, 12) = 4,58; p = .033$ (trisyllabic words)
	Absolute $F(2, 12) = 2,53; p = .116$
[i]	Relative $F(2, 12) = 2,05; p = .171$ (disyllabic words) $F(2, 12) = 1,37; p = .290$ (trisyllabic words)
	Absolute $F(2, 12) = 5,03; p = .025$
[o]	Relative $F(2, 12) = 9,35; p = .004$ (disyllabic words) $F(2, 12) = 9,15; p = .004$ (trisyllabic words)
	Absolute $F(2, 12) = 2,95; p = .090$
[u]	Relative $F(2, 12) = 3,77; p = .054$ (disyllabic words) $F(2, 12) = 1,13; p = .355$ (trisyllabic words)

Table 6. Post-hoc results: Vowel duration in Spanish (L1)

Vowel	Trilingual × Monolingual	Bilingual × Monolingual	Bilingual × Trilingual groups
[a]	Absolute	-	-
	Relative	-	-
[e]	Absolute	NS	NS
	Relative	NS	$p = .020$
		NS	$p = .036$
[i]	Absolute	-	-
	Relative	-	-
[o]	Absolute	NS	NS
	Relative	NS	$p = .003$
		NS	$p = .003$
[u]	Absolute	-	-
	Relative	NS	NS
	-	-	-

The longer L1 vowels found in the trilingual group, as shown in Tables 3 and 4, do not differ significantly from the monolinguals' L1 vowels. Unlike bilinguals, it seems that BP, which presents longer vowels than Spanish (Santos, 2014; Santos & Rauber, 2016), does not seem to have had significant effects on these participants' L1 system, at least in terms of duration. As trilingual participants did not significantly distinguish vowel duration from Argentinian monolinguals, we found statistical differences between the vowels produced by the bilingual and the trilingual groups, as previously shown in Table 6.

To summarize, our results suggest that differences among the three groups, not only in terms of formant frequencies but also in terms of vowel duration, seem to emerge from the influence of Portuguese. Our results suggest that the L1 can also be influenced by more recently learned languages, especially in immersion contexts, and this finding reflects the dynamic, complex, adaptive properties of language development. Finally, our data provide support for the discussion on the multi-directionality of language transfer, as we have provided empirical evidence of the transfer of F1, F2 and durational values from an additional language to the L1 system.

The effect of the L1 and L2 systems on L3 production

The second research question aimed to investigate if both the L2 (English) and the L1 (Spanish) have an influence on the L3 (BP). In order to answer this research question, we compared the productions in Portuguese by Brazilian monolingual as well as Argentinean bilingual and trilingual participants. Significant differences, particularly between bilingual and trilingual participants, may suggest an influence exerted by the L2 on the L3. Figure 2 presents the vowel organization in Brazilian Portuguese by each group of participants.

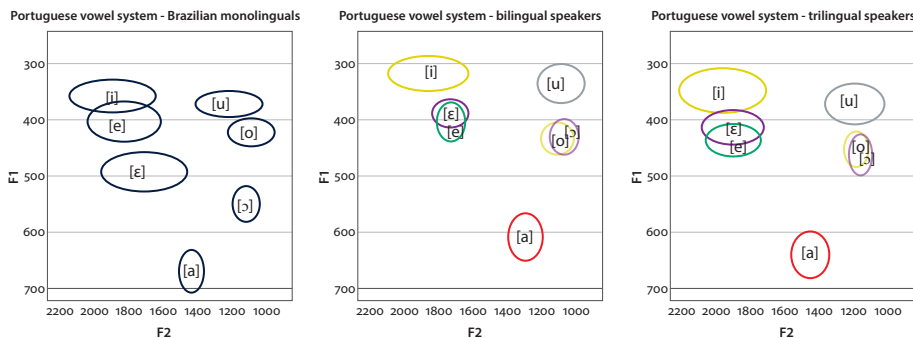


Figure 2. Production of Portuguese vowels by the participants in the three groups

Figure 2 shows that, unlike the monolingual Brazilian participants, the bilingual and trilingual speakers of L1 Spanish do not seem to distinguish the [ɛ, e] and [ɔ, o] contrasts, as they do not have low-mid vowels in their L1 inventory. These bilingual and trilingual speakers seem to merge both contrastive pairs of vowels [ɛ, e] and [ɔ, o] into one category in Spanish, [e] and [o]. Words like *tap[e]te* (BP for *rug*) and *raqu[e]te* (BP for *racket*) seem to be produced as one single category ([e]), which can be found in Spanish.

In addition, bilingual and trilingual participants also lack vowel productions in the F1 region between 500 and 600 Hertz, which corresponds to the acoustic space in which Brazilians produce their open-mid vowels [ɛ] and [ɔ]. This finding has already been observed in the trilingual participants' L1 system, and now there is some evidence that this emerges from the interrelation of their L1 with BP. It seems that L1 speakers of Spanish do not produce Portuguese low-mid vowels, but restructure their acoustic space by leaving an 'empty' acoustic region to allow for the possible production of these vowels in the future, which suggests that their developmental process is in progress.

In order to answer the second research question, One-Way ANOVAs were also conducted, and post-hoc tests (Bonferroni) were carried out to see if there were statistical differences between trilingual learners and Brazilian monolinguals, bilingual learners and Brazilian monolinguals, as well as trilingual and bilingual

learners. This last comparison allowed us to verify the possible role of the L2 system in the development of F1 and F2 values in their L3. The following table displays the results of the ANOVA and its corresponding post-hoc tests for F1 and F2 values.

Table 7. ANOVA results: Formant values in Portuguese

Vowel	ANOVA (formants)		Post-hoc Monolingual × Trilingual groups	Post-hoc Monolingual × Bilingual groups	Post-hoc Bilingual × Trilingual groups
[a]	F1	$F(2, 12) = 6,35; p = .013$	NS	$p = .015$	NS
	F2	$F(2, 12) = 21,21; p = .000$	NS	$p = .000$	$p = .000$
[ɛ]	F1	$F(2, 12) = 38,28; p = .000$	$p = .000$	$p = .000$	NS
	F2	$F(2, 12) = 2,55; p = .119$	–	–	–
[e]	F1	$F(2, 12) = 5,29; p = .023$	$p = .038$	NS	NS* ($p = .058$)
	F2	$F(2, 12) = 12,15; p = .001$	NS	$p = .005$	$p = .002$
[i]	F1	$F(2, 12) = 6,06; p = .015$	NS	$p = .015$	NS
	F2	$F(2, 12) = 1,86; p = .197$	–	–	–
[ɔ]	F1	$F(2, 12) = 37,86; p = .000$	$p = .000$	$p = .000$	NS
	F2	$F(2, 12) = 14,42; p = .001$	NS	$p = .001$	$p = .002$
[o]	F1	$F(2, 12) = 3,72; p = .055$	$p = .055$	NS	NS
	F2	$F(2, 12) = 6,55; p = .012$	NS	NS	$p = .012$
[u]	F1	$F(2, 12) = 4,91; p = .028$	NS	$p = .044$	NS
	F2	$F(2, 12) = 5,12; p = .025$	NS	$p = .038$	NS

From the results shown in Table 7, it follows that the vowels produced by the trilingual speakers do not seem to show many significant differences from those produced by the Brazilian monolinguals, except for the height values (F1) in the mid vowels [ɛ, e, ɔ, o], which are the vowels that differ between their L1 (Spanish) and their L3 (Portuguese). Although this group of trilingual participants had been living in Brazil for quite a long time (Length of Residence Mean: 12,2 years, $SD = 13,55$), these learners do not seem to have developed the Portuguese low-mid vowels [ɛ, ɔ], as their production was still different from that of the native speakers of Portuguese. They might have produced hybrid categories, but far from monolingual BP, as F1 values differ greatly between both groups (Brazilian monolinguals – [ɛ]: 492,5 Hz/ $DP = 26,06$; [e]: 404,8 Hz/ $DP = 17,37$; [ɔ]: 547,3 Hz/ $DP = 12,32$; [o]: 424,2 Hz/ $DP = 16,04$ – and trilingual learners – [ɛ]: 415,2 Hz/ $DP = 14,3$; [e]: 438,06 Hz/ $DP = 7,67$; [ɔ]: 465,4 Hz/ $DP = 25,9$; [o]: 455,2 Hz/ $DP = 13,96$), as Table 7 shows. The remaining vowels produced by these two groups did not show any significant differences, allowing us to interpret that trilingual

and monolingual speakers presented similar vowel productions of the peripheral vowels [a,i,u], but not of the mid vowels.

As for the vowels produced by the bilingual participants, they showed several differences from those produced by the monolingual Brazilian speakers. These results had not been expected at first, since these bilingual participants present a long length of residence in Brazil (Mean = 18 years, $SD = 10,77$), just as the previous group. However, as we have already suggested, as bilinguals lack the English system, they may present more freedom in their vocal tract to produce their L2 vowels. In the comparison between the vowels produced by monolinguals and bilinguals, [a, ɔ, u] showed statistical differences not only in terms of F1 (height), but also in terms of F2 (front-back dimensions); [ɛ, i] showed a significant difference in terms of height between both groups, and the closed-mid front vowel [e] showed a significant difference only in terms of the front-back dimension. The closed-mid back vowel [o] was the only one that had been produced in a similar fashion between bilingual and monolingual speakers, as no statistical differences were found. These findings indicate several differences between these two groups and lead us to interpret that the bilingual participants in this study had not yet learned the BP vowel system in a native-like fashion, but had built a hybrid system that contains characteristics of their L1, the L2 and their own developing system. These results corroborate the theories that conceive languages as Complex Adaptive Systems. On this account, language structures emerge not from the sum of agents belonging to the system, but from the interaction between and among them, leading to supposedly “unexpected” outcomes. In other words, as explained by Herdina and Jessner (2002), these two language systems seemed to be functioning as two liquids which, when mixed, acquired new proprieties that neither of the liquids had shown previously.

When Portuguese vowel productions by bilinguals and trilinguals were compared, we had predicted that there would be differences in their F1, F2 and durations, since one of the groups speaks an additional language (English) besides Spanish (L1) and BP (L3). These differences in the Portuguese vowels were expected to be found due to the higher number of vowels in English (9 vowels), and due to the fact that English has longer vowels in comparison to the other two languages involved in this study. Our results show some differences between groups in the front-back dimension for [a, e, ɔ, o], suggesting that bilinguals produce these vowels more posteriorly than trilingual participants. We might affirm that this difference is due to the English system; however, according to a Complex, Adaptive account, any agent can have an effect on other agents due to their multiple interactions. Thus, the presence of English (L2) might have exerted an influence on the development of L3 Portuguese for the height front/back dimensions.

As for duration patterns, Table 8 shows the means and standard deviation values for absolute duration in BP, while Table 9 presents the means and standard

deviation values for the relative durations. Highlighted cells represent the longest vowel durations among the 3 groups, and darker highlights represent the second longest productions.

Table 8. Means (in milliseconds) and Standard-Deviations (SD) of absolute duration values: Portuguese systems

Group	Faca, alface [a]	Seta, esquece [ɛ]	Beco, tapete [e]	Fita, chaticce [i]	Copo, pipoca [ɔ]	Soco, pescoço [o]	Suco, cutuca [u]
Monolingual	198,12 <i>SD = 28,5</i>	195,2 <i>SD = 27,4</i>	175,13 <i>SD = 20,0</i>	145,6 <i>SD = 29,9</i>	204,9 <i>SD = 33,99</i>	172,23 <i>SD = 31,99</i>	146,9 <i>SD = 36,9</i>
Bilingual	141,5 <i>SD = 40,3</i>	129,03 <i>SD = 37,7</i>	140,0 <i>SD = 37,4</i>	105,04 <i>SD = 20,6</i>	136,9 <i>SD = 32,61</i>	131,9 <i>SD = 36,2</i>	112,33 <i>SD = 30,6</i>
Trilingual	124,84 <i>SD = 27,6</i>	114,34 <i>SD = 23,8</i>	120,21 <i>SD = 24,7</i>	92,68 <i>SD = 19,9</i>	121,10 <i>SD = 26,33</i>	116,8 <i>SD = 24,4</i>	98,06 <i>SD = 19,1</i>

Table 9. Means (in milliseconds) and Standard-Deviations (SD) of relative duration values: Portuguese system

	Faca, alface [a]	Seta, esquece [ɛ]	Beco, tapete [e]	Fita, chaticce [i]	Copo, pipoca [ɔ]	Soco, pescoço [o]	Suco, cutuca [u]
Mon. 2-syl. Words	18,14 <i>SD = 1,7</i>	17,23 <i>SD = 2,1</i>	18,00 <i>SD = 1,4</i>	13,64 <i>SD = 2,9</i>	19,90 <i>SD = 2,1</i>	16,02 <i>SD = 1,9</i>	12,40 <i>SD = 1,8</i>
3-syl. Words	16,65 <i>SD = 2,1</i>	17,45 <i>SD = 2,1</i>	14,07 <i>SD = 1,4</i>	12,36 <i>SD = 1,9</i>	16,09 <i>SD = 2,3</i>	13,99 <i>SD = 1,4</i>	12,93 <i>SD = 2,5</i>
Bil. 2-syl. Words	16,23 <i>SD = 2,9</i>	14,04 <i>SD = 1,9</i>	16,93 <i>SD = 2,2</i>	12,26 <i>SD = 1,4</i>	15,91 <i>SD = 1,7</i>	14,85 <i>SD = 2,1</i>	13,09 <i>SD = 1,8</i>
3-syl. Words	14,0 <i>SD = 2,3</i>	13,42 <i>SD = 2,3</i>	13,17 <i>SD = 2,2</i>	9,87 <i>SD = 1,2</i>	12,67 <i>SD = 1,6</i>	12,20 <i>SD = 1,6</i>	10,74 <i>SD = 1,8</i>
Tril. 2-syl. Words	13,56 <i>SD = 2,4</i>	12,48 <i>SD = 2,3</i>	14,87 <i>SD = 2,6</i>	10,24 <i>SD = 1,5</i>	14,18 <i>SD = 3,1</i>	13,36 <i>SD = 2,8</i>	11,12 <i>SD = 1,8</i>
3-syl. Words	12,30 <i>SD = 3,3</i>	11,38 <i>SD = 3,3</i>	10,95 <i>SD = 2,2</i>	8,63 <i>SD = 2,2</i>	11,04 <i>SD = 2,1</i>	10,90 <i>SD = 2,3</i>	9,71 <i>SD = 1,8</i>

The results in Tables 8 and 9 show that Brazilian monolinguals present the longest vowel system. This was expected, as Santos (2014) and Santos and Rauber (2016) state that Portuguese has longer vowels when compared to Spanish. The results found in Tables 8 and 9 revealed that bilinguals lengthen most of their vowels

in the L2 to a similar extent as Brazilian monolinguals. Except for the absolute duration values of [a, ε, ɔ], the remaining vowels did not show any evident differences between monolinguals and bilinguals. Based on the descriptive values presented above, Table 10 shows the results of the One-way ANOVAs concerning the vowel durations in Portuguese, and Table 11 presents the results of the post-hoc Bonferroni tests.

As shown in Table 11, there are plenty of significant differences between the BP vowels produced by the trilingual L1 Spanish speakers and the Brazilian monolinguals. As already mentioned, according to Santos (2014) and Santos and Rauber (2016), Spanish vowels are produced with a shorter duration than Portuguese. In fact, the vowels produced by the trilingual participants show several statistical differences from the durations produced by the monolinguals, which reveals that these participants either present hybrid durations in their L3 system or still

Table 10. ANOVA results: Vowel duration in Portuguese

Vowel	ANOVA (duration)
	Absolute $F(2, 12) = 6,92; p = .010$
[a]	Relative $F(2, 12) = 4,45; p = .036$ (disyllabic words) $F(2, 12) = 3,38; p = .068$ (trisyllabic words)
	Absolute $F(2, 12) = 10,15; p = .003$
[ε]	Relative $F(2, 12) = 6,22; p = .014$ (disyllabic words) $F(2, 12) = 6,87; p = .010$ (disyllabic words)
	Absolute $F(2, 12) = 4,80; p = .029$
[e]	Relative $F(2, 12) = 2,71; p = .107$ (disyllabic words) $F(2, 12) = 3,13; p = .080$ (trisyllabic words)
	Absolute $F(2, 12) = 6,68; p = .011$
[i]	Relative $F(2, 12) = 3,38; p = .068$ (disyllabic words) $F(2, 12) = 5,34; p = .022$ (trisyllabic words)
	Absolute $F(2, 12) = 10,21; p = .003$
[ɔ]	Relative $F(2, 12) = 7,45; p = .008$ (disyllabic words) $F(2, 12) = 8,08; p = .006$ (trisyllabic words)
	Absolute $F(2, 12) = 4,20; p = .041$
[o]	Relative $F(2, 12) = 1,66; p = .231$ (disyllabic words) $F(2, 12) = 3,44; p = .066$ (trisyllabic words)
	Absolute $F(2, 12) = 3,55; p = .061$
[u]	Relative $F(2, 12) = 1,52; p = .257$ (disyllabic words) $F(2, 12) = 3,14; p = .080$ (trisyllabic words)

Table 11. Post-hoc results: Vowel duration in Portuguese

Vowel	Trilingual × Monolingual	Bilingual × Monolingual	Bilingual × Trilingual groups	
[a]	Absolute	$p = .012$	$p = .054$	NS
	Relative	$p = .035$	NS	NS
[ɛ]	Absolute	–	–	–
	Relative	$p = .004$	$p = .014$	NS
[e]	Absolute	$p = .014$	NS	NS
	Relative	$p = .010$	NS	NS
[i]	Absolute	$p = .030$	NS	NS
	Relative	–	–	–
[ɔ]	Absolute	$p = .013$	NS	NS
	Relative	–	–	–
[o]	Absolute	$p = .022$	NS	NS
	Relative	$p = .003$	$p = .014$	NS
[u]	Absolute	$p = .008$	NS	NS
	Relative	$p = .006$	NS	NS
[ɨ]	Absolute	$p = .048$	NS	NS
	Relative	–	–	–
[ɯ]	Absolute	NS	NS	NS
	Relative	–	–	–

produce durations similar to their L1. Except for the high-back vowel [u], all the remaining vowels show differences in absolute or relative durations between monolingual and trilingual speakers, indicating that vowel durations between both groups are not similar.

As for the comparison between Spanish/Portuguese bilinguals and Brazilian monolinguals, the only significant differences are found in the absolute duration of the open vowels [a, ɛ, ɔ]; this had been expected, since these vowels are considerably longer in Portuguese than in Spanish. All the other vowels were produced with similar duration rates between the two groups, indicating that bilingual learners had acquired the timing patterns of Portuguese vowels. Concerning the open vowels [a, ɛ, ɔ], bilinguals may be lengthening these vowels, but not as much as monolinguals. Besides this fact, as previously mentioned, the bilingual group seems to have more freedom in terms of duration than in height and front-back dimensions.

When the vowels produced by the bilingual and trilingual groups were compared, we found no statistical differences. This suggests that the additional L2 system (English) does not seem to have played a significant role in L3 development (BP), as far as duration values are concerned. This may be explained considering two possibilities: (1) unlike Portuguese, English was not being developed in an immersion context, not exerting any influence on other languages; thus, we may suggest that immersion contexts play a crucial role, as Zimmer and Alves (2012) propose; (2) as Spanish and Portuguese are typologically similar, L3 Portuguese is likely to be influenced by Spanish rather than English.

To sum up, the Portuguese system seems to have exerted some influence in terms of vowel duration in the bilingual speakers, but not in terms of height and front-back dimensions. On the other hand, the Portuguese produced by the trilingual speakers approaches native-like production more in terms of formant values than vowel duration values. It seems that L2 English has contributed more actively to formant than duration rates. We might speculate that this derives from the fact that English has a larger vowel inventory than Portuguese, which might help these trilingual learners notice vowel height differences more easily in their L3 developmental process. On the other hand, since vowel length varies according to the vowel segment in English, it takes longer for these learners to realize that BP does not seem to make a distinction between long and short vowels. In turn, vowel length takes priority among bilingual learners (L1: Spanish; L2: BP).

Conclusion

In this study, based on a view of language as a Complex Adaptive System, we discussed the multi-directionality of language transfer. We first tested if more recently developed language systems can influence the dominant language, more specifically, if vowel transfer can occur from additional languages (L2 and L3) to the mother language (L1). We also investigated if additional languages can influence each other, in that L3 development can be affected by both the L1 and the L2 language systems. The results of these two verifications would provide evidence in favor of a multi-directionality in language transfer.

Our results showed that additional languages may affect the L1, and results seem to align with the approach that immersion contexts play a crucial role in language development. Our results suggest that L3 development might be affected by both the L1 and the L2 systems, although a totally clear picture of these effects could not be directly found in our data. The emergent patterns shown throughout the chapter are the result of interactions among multiple factors, which characterize a non-linear developmental process, in accordance with the tenets of the

view of language as a Complex Adaptive System (Larsen-Freeman, 1997, 2011). These results shed some light on the discussions on the multi-directionality of language transfer, as they lead us to the conclusion that all the language systems of an individual are in constant development and interaction.

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PART 2

Linguistic insights into the PAL acquisition process

The Lexical Aspect Hypothesis

Off-line evidence from Chinese learners of European Portuguese as an L2

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This chapter investigates the acquisition of tense and aspect by Chinese learners of Portuguese as an L2 from a variationist perspective (Bayley, 2013). Difficulties in acquiring the aspectual contrasts set by the Perfect Preterit and Imperfect Preterit tenses in Romance languages have been widely documented (Blyth, 2005; Giacalone-Ramat, 2002; Kihlstedt, 2002; Martins, 2008). This study investigates the role of <lexical aspect> for the marking of Perfect and Imperfect Preterit following the tenets of the Lexical Aspect Hypothesis (LAH). It intends to design a different look into the LAH, as it considers other variables in interaction. Results show that lexical aspect plays a significant role in the learners' use of inflectional morphology for both verb tenses, showing the dynamics of the interlanguage continuum.

Keywords: Aspect Hypothesis, SLA, L2 verbal morphology, Portuguese, Chinese

Introduction

The study of Tense and Aspect (TA) acquisition by second and foreign language learners of Romance languages has centered on the acquisition of Spanish as L2 with the seminal research work based on the Lexical Aspect Hypothesis (LAH) initiated by Andersen (1991), as referred in Salaberry (2008, p. 96–97)¹ (Cf. also Rothman & Iverson, 2008, p. 274). As Salaberry (2008, p. 2) puts it, "(...) the development of tense-aspect meanings is becoming a very fruitful research area in L2 acquisition." Yet, the majority of these studies has focused on the English-as-L1 and Spanish-as-L2 language pair, and also French and Italian. European Portuguese as an L2 and Catalan are the least studied Romance languages (see Table 1).

1. Cf. also Rothman & Iverson (2008, p. 274).

Table 1. Studies on TA acquisition in Romance languages as an L2

Date	Authors	L1	L2	Characteristics of subjects	Theoretical framework
1991	Leiria	Several	Portuguese	University students	No specific theoretical framework
2002	Rocca	English	Italian	Children	Aspect Hypothesis
2002	Wiberg	Swedish	Italian	University students	Interactional Discourse Analysis
2002	Kihlstedt	Swedish	French	University students	Aspect Hypothesis
2002	Howard	English	French	Advanced University students	Aspect Hypothesis
2005	Comajoan	English	Catalan	University students	Discourse Hypothesis
2005	Ayoun	English	French	University students	Universal Grammar
2005	Rocca	English	Italian	Children	Aspect Hypothesis
2005	Salaberry	English	Portuguese (L3)	University students	Default Past Tense Hypothesis
2005	Labeau	English	French	Advanced University students	Aspect Hypothesis
2006	Comajoan	English	Catalan	University students	Aspect Hypothesis
2006	Leung	Chinese and English	Spanish	University students	Dual Mechanism Model
2008	Martins	Mandarin and Cantonese	Portuguese	University students	L2 language variation of tense and aspect
2008	Rothman and Iverson	English	Portuguese	University students	Universal Grammar
2009	Rossi	German, Spanish	Italian	University students	Connectionist Modelling
2009	Rebelo	Chinese	Portuguese	University students	Aspect Hypothesis / Discourse Hypothesis / Prototype Hypothesis
2010	Salaberry	English	Spanish	University students	Aspect Hypothesis / Discourse Grounding
2013	AO Sio Heng	Chinese	Portuguese	University students	Universal Grammar
2015	LIU Jia	Chinese	Portuguese	University students	Aspect Hypothesis

From Table 1, it becomes clear that there are two broad tendencies in studies on the L2 acquisition and development of tense and aspect in Romance languages. Some of these studies focus on the formal context of acquisition, the exception being Rocca's (2005) study. Others address the research topic from different theoretical approaches (Andersen & Shirai, 1996, p. 541–542; Martins, 2008, p. 69; Salaberry, 2008, p. 2). According to Salaberry & Shirai (2002, p. 6–7), such differences and approaches have brought difficulties to the possibility of comparing results among the different studies. They consider such discrepancies to stem from the complexity of the research topic (Cf. also Salaberry, 2008, p. 10–11), but also from: (1) differences in the definition of the lexical aspectual classes; (2) interlinguistic differences; (3) differences in the identification of stages of development; (4) differences in the L1/L2 combination; (5) methodological approaches.

Results of the various studies on the acquisition and development of TA categories in Romance languages as an L2, in general, regardless of the L1/L2 pair, have shown that the aspectual contrasts conveyed by the Perfect Preterit and the Imperfect Preterit are difficult to acquire by L2 learners.

Drawing on the Lexical Aspect Hypothesis (LAH), the current study aims to contribute to the theoretical discussion on the acquisition of the tense and aspect categories in L2 contexts. We focus on the acquisition of verbal morphology of European Portuguese as an L2 by Chinese L1 speakers.

In spite of the fact that most studies have attested to the importance of lexical aspect to the process of acquiring the categories of tense and aspect, some studies have refuted its principles (McManus, 2011), while others have partially confirmed the role of the LAH (Labeau, 2005).

In the next section, we shall review some of the studies on the L2 acquisition of tense and aspect in general, and those on Romance languages more specifically, from the perspective of the LAH. In Section 3, we concentrate on the description of the tense and aspect system of both Portuguese and Chinese (Mandarin and Cantonese). Section 4 discusses the concept of variation in inflectional morphology in L2 contexts. In Section 5, we describe the methodology of the study, and, in Section 6, we present and discuss the results of the data analyses. The final considerations and conclusions will be presented in Section 7.

1. The Lexical Aspect Hypothesis: Literature review

The theoretical debate in the field of SLA has centered, generally, on:² (1) the context of acquisition; (2) the type and quality of input; (3) language transfer (usually from L1); (4) the critical period of SLA.

The context of acquisition is considered by some researchers an important variable in SLA (Salaberry, 2002, p. 399), as it may define the rate of development both in informal contexts, as well as in formal contexts. According to Bardovi-Harlig (2000, p. 340), the formal context of L2 acquisition includes: (1) access to specifically salient input; (2) specific interaction situations; (3) focus on forms; (4) learners' access to target language structures (Cf. also Ayoun & Salaberry, 2005, p. 279–280; Duff & Duanduan, 2002, p. 447; Salaberry, 2002, p. 497).

The trend of studies on the acquisition and development of verbal morphology in L2 contexts can be distinguished between form- and meaning-oriented (Bardovi-Harlig, 2000). The form-oriented studies focus on the role of morphological markers of tense and aspect, whereas the meaning-oriented studies focus on the marking of aspectual contrasts by lexical-pragmatic meanings. Salaberry (2008, p. 1) mentions a more recent approach of tense-aspect acquisition of tense and aspect marking in L2: “the syntactic framework of analysis”, that has been carried out by Slabakova and Montrul, within a generative framework of analysis.

1.1 The Lexical Aspect Hypothesis: LAH

Although the study of the categories of tense and aspect can be traced as far back as to the classification of verb types by Aristotle, the study of tense and aspect development in L2 contexts “has a much shorter history.” (Salaberry, 2008, p. 1). This history started with the pioneering work by Roger Andersen on the importance of lexical aspect for the acquisition of tense and aspect, having given origin to the definition of the Lexical Aspect Hypothesis (LAH), which has had a relevant influence on further studies in the field across languages.

Both Roger Andersen's proposal on the importance of lexical aspect, as well as Bardovi-Harlig's stress on the relevance of discourse for the acquisition and development of tense and aspect have served as theoretical foundations for studies on the acquisition of tense and aspect in L2/L3 contexts across languages (Salaberry, 2010, p. 1).

2. Towell (2003, p. 2), apart from transfer, identifies other factors he considers specific to the field of inquiry of SLA: (1) stages of acquisition irrespective of learners' L1; (2) variation in learners' performance; (3) fossilization in the final stage of L2 development for the majority of learners (Cf. also Lakshmanan & Selinker, 2001, who consider the “end state” of SLA is usually a fossilized stage).

According to Bardovi-Harlig (1999, p. 353), the early studies on verbal morphology started incidentally, since morpheme-order studies included verbal morphology. She goes on to state that the Lexical Aspect Hypothesis can be traced to theories of temporal semantics.

The LAH has also been labeled the Primacy of Aspect Hypothesis (POA) (Bardovi-Harlig, 1999, p. 357). Andersen & Shirai (1996, p. 533) and Andersen (2002, p. 79) present the main tenets of the LAH:

1. Children first use past marking (e.g. English) or perfective marking (Chinese, Spanish, etc.) on achievement and accomplishment verbs, eventually extending its use to activity and stative verbs. (...)
2. In languages that encode the perfective-imperfective distinction, imperfective past appears later than perfective past, and imperfective past marking begins with stative verbs and activity verbs, then extending to accomplishment and achievement verbs.
3. In languages that have <progressive> aspect, <progressive> marking begins with activity verbs, then extends to <accomplishments> or achievement verbs.
4. <progressive> markings are not incorrectly overextended to stative verbs. (...).

Andersen and Shirai (1996) compare L2 acquisition of tense and aspect to that of L1. From this parallel, they postulate that in the initial stages of the acquisition process of tense and aspect in L2, what is important is the inherent lexical aspect, not the grammatical aspect. This is an important theoretical assumption, since it constitutes the basis of the Lexical Aspect Hypothesis. Furthermore, it also paves the way to consider tense and aspect acquisition a developmental process, which many of the research studies on the topic have confirmed. Andersen and Shirai (1996, p. 547) justify the Primacy of Aspect Hypothesis (POA), both through universal factors and L1 transfer, not only based on data from naturalistic contexts, but also on data from classroom contexts. Moreover, Andersen and Shirai (Cf. also Andersen & Shirai, 1994) also hypothesize there may be a distributional bias in the input that may condition the association of certain grammatical morphemes, more frequent in the input, with specific inherent lexical properties of verbs. This distributional bias in the input has been attested in studies both in L1 and L2. Andersen and Shirai (1996, p. 553–555) suggest that the input to which learners have access tends to be modified and simplified. The Distributional Bias Hypothesis (DBH) is supported by three principles: (1) the Relevance Principle; (2) the Congruence Principle; (3) the One-to-One Principle. The Relevance Principle relates the use of grammatical morphemes with the verb stems that best conform to the meaning of the verb. The Congruence Principle complements the Relevance Principle in that the use of grammatical morphemes is dependent on the congruence that exists between meaning and morpheme. As such, learners are still restricted by the

One-to-One Principle that leads the learners to assume that each morpheme has only one correspondence in “meaning, function, and distribution.”

Yet, not all studies on the LAH show consistent results according to its principles (Andersen & Shirai, 1996, p. 533; Comajoan, 2006, p. 207). Comajoan (2006, p. 207) refers to the contradictory results of studies on the LAH by Bergström (1995) and Hasbún (1995), as some results do not comply with some of the principles of the hypothesis. In Hasbún’s study, on the acquisition of L2 Spanish, learners mark Perfect Preterit across all lexical categories, except for achievements, whereas in Bergström’s study of French, learners marked Perfect Preterit more on <activities> than on telic verbal predicates. These results have been considered evidence against the LAH, namely by Salaberry (1999, 2000), who proposed the Default Past Tense Hypothesis, as support for the fact that in some instances learners were marking past tense across all or most of verb predicates.

Such differences in results have led to some critical perspectives of the LAH. For Comajoan (2006, p. 210), the LAH does not make predictions about accuracy of appropriateness of forms, nor does it attempt to predict IL (Interlanguage) tense-aspect morphology development. Comajoan (2006, p. 211) argues that “(...) incorporating appropriateness of use to research in the aspect hypothesis can provide a new perspective (...), since it allows “further predictions”. That new measure of analysis of the LAH, according to Comajoan, can help clarify the uses of morphology in prototypical and non-prototypical combinations. Comajoan (2006, p. 211) goes on to say that this innovative measure for the analysis of the LAH gives rise to new questions such as: “What proportion of state predicates is (a) inflected in imperfective forms and also (b) used appropriately”. This measure of analysis will deepen our understanding of the general predictions of the LAH across proficiency levels, providing “(...) a more complete picture of the learner’s development of L2 morphology.”

Salaberry (2008, p. 13), referring to the three main hypotheses of L2 tense and aspect acquisition and development – LAH, DH and the Default Past Tense Hypothesis (DPTH), assumes that:

The fact that there are several hypotheses about the acquisition and development of tense-aspect in a second language is a clear indication that each hypothesis has some limitations. (Salaberry, 2008, p. 13)

Salaberry adds to this that the LAH does not account for non-prototypical associations between grammatical and lexical aspectual classes, such as the possibility that <states> may occur with Preterit morphemes.

Some criticisms on the LAH also come from some researchers within the Generative framework. Gabriele, Martohardjono, and McClure (2005, p. 809) criticize the fact that the hypotheses based on the POA, especially those outside

the generative research theoretical framework, do not take the learners' L1 role, or the L1 and L2 typological differences into account in the process of L2 acquisition of tense and aspect categories, thus creating mismatches in morphological representation in L2 production.

Andersen (2002) presents a restructuring proposal of the LAH reinforcing the idea that verb semantics alone is not sufficient to account for TA development and acquisition. Under this new proposal, Andersen presents a six-dimensional model that intends to account for TA acquisition of languages with absolute past, like English, and also those that encode the perfective/imperfective aspectual contrast. This model intends to view verb semantics at the discourse level. These six dimensions are: (1) *verb semantics* – in the case of Romance languages (as well as in English) perfective morphemes are marked first with telic predicates and finally with <states>. Andersen justifies this marking sequence of TA morphemes as a “discourse-functional motivation” that relates boundedness with the events being asserted; (2) *event type* – past perfective morphology marking occurs first with events and then with unitary actions; (3) *realis/irrealis* – the discourse function of using the past to mark *irrealis* is marked late in L2 development, since past is prototypically associated with “real factual realized events”; (4) *pragmatic role* – the past is used initially in development as direct assertion, its pragmatic role (especially in Romance languages) is incorporated later; (5) *grounding* – bounded events in the foreground receive past/perfective marking first. Discourse is, according to Andersen (2002, p. 98), an important dimension in the study of TA acquisition and development because:

Failure to pursue the complexities of discourse structure on research on temporality will simply leave as unexplained and unexplainable (or even as potential counter-evidence) phenomena that do have an explanation.

(Andersen, 2002, p. 98)

The importance of both discourse and narrative structure (Bardovi-Harlig, 2000) has paved the way for what we consider to be a new phase in this area of SLA research. Adding to the debate, Salaberry (2008) defends that tense-aspect meanings are mainly a semantic-discursive phenomenon, rather than a syntactic-semantic one. In a more recent study, Salaberry (2010, p. 185) compares the effect of lexical aspect and discursive grounding on the marking of L2 Spanish Preterit and Imperfect morphology considering: “(...) grounding conveys a broader perspective than lexical aspect about the aspectual meaning of a text.” In general, Salaberry concludes: (i) there is a clear match between morphological marking and lexical aspect with proficiency level; (ii) that grounding indicates a distinction between native and non-native speakers; (iii) that the association of both lexical aspect and grounding does not decrease with proficiency.

Following Comajoan & Pérez Saldanya (2005, p. 47), Salaberry differentiates between prototypical and non-prototypical associations in terms of the association between narrative structure and tense/aspect marking, where the perfectivity/telicity/foreground and the imperfectivity/atelicity/background would be prototypical associations. The non-prototypical associations would be all those that do not match the prototypical mappings. As Salaberry further states, since lexical aspect and grounding are important “(...) to determine the aspectual meaning of the verbal predicate (...)”, we have to take into account, for instance, adverbials (Cf. Andersen, 2002, p. 99), which, according to Salaberry (2010, p. 5), broaden the definition of aspect, also because such a broad definition is necessarily contextualized. The evidence about the importance of the context to interpret aspect, according to Salaberry (2010), comes from decontextualized tests of data collection in a study by Coppieters (1987). What Coppieters concluded from the tests administered to both native and non-native speakers was that the context also conveys some aspectual information, and that it is not exclusively expressed through grammatical means, such as verbal morphology.

Although he considers the importance of the role of context for TA disambiguation, Salaberry is of the opinion that L2 learners may have difficulty in abstracting aspectual meaning from the context.

1.2 The Lexical Aspect Hypothesis in Romance languages

Research on the analysis of the LAH in some of the least studied Romance languages, like Catalan, have confirmed the predictions of the LAH. Comajoan (2006) focuses on two different research questions, analyzing the principles of the LAH on the one hand, and on the other focusing on the appropriateness of using past morphology in relation to the lexical aspectual classes. This study analyzes the data of three university students, beginner learners of Catalan and native speakers of English. The participants were in fact L3 learners, since all of them had knowledge of at least one Romance language. Data collection was based on three elicitation tasks: (1) video narratives; (2) storybook narratives; and (3) a folktale. As a longitudinal study, the learners completed several retellings of each of the narratives during a seven-month period. Comajoan (2006, p. 210) asserts that the LAH does not make predictions about the accuracy of appropriateness of forms, nor does it attempt to predict IL tense aspect morphology development.³ For Comajoan, to incorporate appropriateness of use to research on the aspect

3. Cf. previous Section (2.1.) on Comajoan's (2006, p. 211) views on the advantages and innovativeness of “(...) that incorporating appropriateness of use to research in the aspect hypothesis (...)”

hypothesis enables an understanding of the general predictions of the LAH across proficiency levels, “(...) providing a more complete picture of the learner’s development of L2 morphology.” Comajoan found evidence that: (1) learners combine perfective morphology with the prototypical lexical predicates, i.e., achievements and <accomplishments>; (2) learners mark <activities> and <states> with imperfective morphology. The results presented by Comajoan (2006) confirm one of his research questions – testing the principles of the LAH. One of the hypotheses that Comajoan (2006, p. 245) poses regarding the interpretation of these results is the fact that learners may have transferred the knowledge from another Romance language they knew to their L2 Catalan, in order to justify the rate of correct inflection, both for the perfective and imperfective situations. As for the second research question, Comajoan (2006, p. 251) states that: “(...) the rates of appropriate use followed an aspectual pattern,” confirming the predictions of the LAH that link morphological marking with prototypical lexical semantic properties.

Labeau (2005) tests the eight stages as initially proposed by the LAH (Andersen, 1991) in a context of acquisition of French as an L2 by advanced learners in a tutored environment. Based on the evaluation of the tenets of the LAH, Labeau (2005, p. 82) reveals that the association of PC⁴ (Perfect Preterit) with telic events first, and its later extension to other lexical aspectual classes the data are not clear. Nevertheless, there seems to be a preference for the prototypical association. Yet, since the control group of native speakers in Labeau’s study used the PC with telic verbs, she suggests that “frequency in input or formulaic use”, and not only lexical aspect, may play a role in the L2 learners’ choice. As for the second hypothesis of Labeau’s study, the emergence of the IMP (Imperfect Preterit) later than the PC and first with atelic events, Labeau confirms the results obtained by other studies (Howard, 2002; Kihlstedt, 1998), i.e., that there is a tendency to mark statives “être” and “avoir” with the IMP, supporting “the formulaic development of the IMP”. Labeau (2005, p. 90) concludes by saying that the standard version of the LAH does not account for the development of tense and aspect in her corpus. Labeau (2005, p. 90) further states that: “As the hypothesis relies on morphological development, it does not provide the means for semantic distinctions.” (*ibid*), which she considers to be essential in future analyses of the LAH, especially if it addresses the study of the development of tense and aspect in advanced groups of L2 learners.

In a study where Salaberry (2010) compares the effect of lexical aspect and discourse grounding in the marking of L2 Spanish Perfect Preterit and Imperfect Preterit morphology, he concludes that there is a clear match between morphological marking and lexical aspect with proficiency level. He further concludes that grounding indicates a distinction between native and non-native speakers.

4. Passé Composé

Furthermore, the association of both lexical aspect and grounding does not decrease with proficiency.

In the final discussion of his results, Salaberry (2010, p. 13) concludes that: (1) lexical aspect and grounding are both associated with the choice of morphological marking irrespective of proficiency level; (2) during the beginning stages of language acquisition the association of lexical aspect and grounding is not strong; (3) the increase in proficiency level has a positive effect in the association learners establish between grounding and Perfect Preterit and Imperfect Preterit marking; (4) grounding marks the distinction between native and non-native speakers (Cf. also Salaberry, 2008, p. 140). Based on these results, Salaberry (2010, p. 14) confirms the tenets for both the LAH and the DH, although beginner learners do not consistently associate lexical aspect and grounding. More importantly, Salaberry, following Andersen (2002) and Shirai (2004), <states> that these results also show a bias effect in terms of input, since classroom discourse may provide prototypical associations.

2. Inflectional morphology

2.1 Variation

Variation is probably the most obvious fact about SLA (Ellis, 1994, p. 139–141; Gabriele & Maekawa, 2008, p. 79; Kanno, 1998, p. 376; Robinson, 2001, p. 377; Romaine, 2008, p. 409; Rothman, 2008; Rothman & Iverson, 2008, p. 284; Slabakova, 2009, p. 56).

Variation may be influenced both by linguistic and non-linguistic factors. According to Pienemann (2007, p. 43), variable rules aim at identifying: the social context in which linguistic forms are being used; the linguistic context; the probability of rule application.

The study of language variation stems from sociolinguistic research by Labov in 1963 (Chambers, 2008). According to Chambers (2008, p. 4), “variants come into being and are sustained not for their linguistic content but for their social function.” For the Labovian theoretical research framework “variation is part of linguistic competence (...)” (Preston, 1996, p. 246). The fact that SLA processes are viewed as independent linguistic systems, characterized by specific interlanguage (IL) rules, has contributed to research perspectives whose focus falls on the identification of systematic variation of second and foreign language learners’ linguistic performance. Romaine (2008, p. 410–412) identifies different types of variation: (1) systematic; (2) unsystematic; (3) internal; (4) external. The core of sociolinguistic variationist research has concentrated on the identification and

characterization of internal and external variation and on their mutual interaction. Methodologically, variationist studies and research on second language variation are quantitative in nature. Quantitative data analysis, within a variationist multivariate approach, allows for variable “intersection” (Labov, 2001, p. 84). Through multivariate variationist analyses, it is possible to order in a hierarchy those variables that have the most influence in the rule application in analysis (Romaine, 2008, p. 411–412), giving the researcher an idea as to which variables and factors are most difficult in the process of language acquisition. The main methodological difference found in the field of SLA compared to the initial work on morpheme studies is the fact that it was acknowledged that L2 variation is influenced by a multiplicity of factors and variables, both internal and external. Thus, the explanations and understanding of SLA processes is bound by the intersection of both.

According to Bayley (2013, p. 357), applying quantitative approaches to the acquisition of L2 tense and aspect “(...) presents a number of challenges (...)”, since evidence from various studies has shown that even if aspectual classes are important in marking tense by L2 learners, it is not the only factor at play. According to Bayley, tense and aspect are no different from other interlanguage features in terms of variation. Such variation, as Bayley recalls, drawing on Young & Bayley (1996, p. 253), is justified by “the principle of multiple causes”. Bayley describes some of the factors that may affect L2 interlanguage variation: (1) saliency,⁵ i.e., “the difference between the present or base form of the verb and the past tense form”; (2) prosodic transfer; (3) frequency; (4) prototypicality; (5) social factors.⁶

Transfer from L1, in the case of Chinese learners may be beyond the prosodic level, since these learners’ L1 has a specific and refined aspectual system, even if it does not mark tense morphologically. In order to better understand the differences in this linguistic pair, in the next two sections we shall describe the aspectual systems of both Chinese and Portuguese.

5. Some studies consider this variable from a phonological perspective, that is, those verb forms that are the most salient at the base form or its morphology, such as the irregular verbs.

6. We would add other important variables that may have an important role in the acquisition of tense and aspect by L2 learners in formal contexts, such as: individual differences, proficiency level; psycholinguistic variables, or age, to mention just a few.

3. The categories of tense and aspect in Portuguese and Chinese

3.1 Tense and aspect in Portuguese

As a Romance language, Portuguese marks tense and aspect through overt morphology inflected on the verb (Oliveira & Lopes, 1995, p. 95). Romance languages are usually described as having a rich morphology, in terms of tense and aspect marking, not only because the various verb tenses mark mainly three temporal references: “anteriority, simultaneity or posteriority”, but also because the verbal system includes different conjugations that are related to the verbs’ thematic vowel. Portuguese has three main regular conjugations following the verbs with thematic vowel in *-a*, in *-e* and in *-i*, and it also includes a group of irregular verb forms. (Oliveira & Lopes, 1995, p. 95–97). The Portuguese verbal system is composed of simple and compound verb tenses. Oliveira et al. (ibid.) describe anteriority as being marked by both the *Pretérito Perfeito* and the *Pretérito Imperfeito*, and also the “simple *Mais-que-Perfeito*”, even if this tense be restricted to formal written language. They consider simultaneity is marked by the Present tense (PRS) and also by the periphrastic construction “*estar a + non-finite verb*” (gerund marker), which would correspond to the English periphrastic form, whereas posteriority is marked either by the Present Tense (PRS) or by a periphrastic construction with the verb *ir* (to go) in the present tense with the infinitive of the main verb.

Oliveira (2003), following Comrie (1976), defines tense as a relational category, and aspect as having internal structure, thus non-deictic. In Portuguese, just like in other Romance languages, such as Spanish, for instance, inflectional morphology marks both tense and aspect. The traditional view is that, in the past reference contexts, the Perfect Preterit and the Imperfect Preterit encode the perfective/imperfective distinction, respectively.

According to Oliveira and Lopes (1995, p. 100–101), the past can be marked both by the simple and the compound forms. Our review of their definition covers only the simple forms for the Perfect Preterit, as the corpus of our study did not take compound forms into account. They consider one of the simple forms – the Perfect Preterit – is associated with punctuality. Oliveira et al. (ibid.) consider the “Preterit generally describes an event or a state which is not only in the past, but has also terminated (...)” the reason why they associate this tense with punctuality. The Imperfect is characterized as a description of <states>, without specific boundaries. Oliveira and Lopes (1995, p. 100) also note that the:

Preterit doesn’t always show a perfective aspect, not only because it is possible that the event reported by that tense can have internal structure showing sub-events,

but also because this tense marks a past that includes at least the culmination point, depending on the type of verb it is combined with.

(Oliveira & Lopes, 1995, p. 100)

The support for this perspective on the Perfect Preterit comes from the following examples by Oliveira & Lopes (*ibid.*):

- (1) a. Ela passou (PRET) o dia na cidade. Primeiro foi (PRET) ao museu, depois encontrou-se (PRET) com uns amigos e a seguir foram (PRET) ao cinema
‘He spent the day in the town. First, he went to the museum, then he met some friends, and afterwards they went to the cinema’
- b. A Maria ganhou (PRET) a corrida
‘Maria won the race’
- c. A Maria escreveu (PRET) a carta
‘Maria wrote the letter’

The argument for this perspective has to do with the semantic features of the verbs involved, based on the DRT (Discourse Representation Theory) and on Moens et al.’s (1987) aspectual system network.

Oliveira expands the argument of the limited scope of the Perfect Preterit as a marker of perfectivity when referring to the compound tenses. Some of the compound tenses can be interpreted either as past with an iterative meaning or as past with consequences to the present. Such is the case of the Compound Perfect Preterit. Let us have a look at the examples given by Oliveira & Lopes (*ibid.*):

- d. Ele tem saído (PC) com os amigos.
‘He has been going out with friends’ (iterative reading)
- e. Ele tem estado (PC) sentado.
‘He has been sitting?’ (imperfective reading)

According to Oliveira and Lopes (*ibid.*), the Compound Perfect Preterit’s most likely reading is that of iterativity. In contexts with quantified arguments, though, the iterativity reading is only possible with temporal adverbials like “muitas vezes” (frequently). This is so because, as the authors point out: “The reason is that any of these verbs (accomplishment and achievement, respectively) include the culmination point and it is not possible to consider they could have other interpretation.” The second reading conveyed by the Compound Perfect Preterit, of past extending to the present is possible with stative verbs, also allowing an iterative reading with temporal adverbials.

Table 2 defines the semantic properties of the lexical aspectual classes according to Oliveira (2003, p. 137).

Table 2. Semantic properties of lexical aspectual classes according to Oliveira

	Dynamic	Telic	Duration	Consequent state	Homogeneous
Activity	+	-	+	-	+
Accomplishment	+	+	+	+	-
Achievement	+	+	-	+	-
Semelfactive	+	(-)	-	-	-
State	-	-	+	-	+

In the current study we assume a compositional perspective of aspect, in which both lexical aspect and grammatical aspect, at the sentence and discourse levels, contribute to aspectual distinctions, in line with the majority of studies on the acquisition of TA categories in SLA (Salaberry, 2008).

3.2 Tense and aspect in Chinese (Mandarin and Cantonese)

As previously mentioned, the acquisition of the perfective/imperfective aspectual contrast in Romance languages by L2 learners poses some problems, most likely due to differences in morphosyntactic and semantic cues. Even if the linguistic pair Chinese – Mandarin and Cantonese – and Portuguese are typologically distant, both mark aspect, but only Portuguese marks tense (and aspect) through verbal morphology. Mandarin does not encode tense or grammatical aspect morphologically (Chen & Shirai, 2010, p. 3), but it marks aspect through aspectual expressions or markers. Chen & Shirai (*ibid*) state that in Mandarin:

(...) temporal relations are either inferred from context, or typically marked with time adverbials (deictic, like tense) and aspect markers (non-deictic and dependent on a speaker's viewpoint). (Chen & Shirai, 2010, p. 3)

According to Chen & Shirai, (2010, p. 3) there seems to be no consensus as to how many aspect markers there are in Mandarin. Imperfective aspect can be marked in Mandarin by *-zai* and *-zhe*. Whereas *-zai* marks the <progressive> aspect, *-zhe* marks durative aspect. Aspectual marker *-zhe* marks a situation as enduring associated to background events in discourse. Marker *-zhe* can occur with <states>, whereas *-zai* cannot, since as Chen & Shirai, (2010, p. 4) mention, it is “(...) a dynamic imperfective marker (...)”.

Apart from lexical aspect, specific verb typology also interacts in the acceptability /non-acceptability of aspect markers in Chinese. Although Chinese (both Mandarin and Cantonese) verbs share general typological characteristics with non-sinic languages such as English or Romance Languages, it also possesses ‘resultative verbal constructions’ (RVC), such as for example: ‘学会 / study-know’

(Liu Jia, 2016). Such RVCs express events of the achievement and accomplishment types. However, according to Tai (1987 [*apud* Liu Jia, 2016, p. 45]), they do not accept a <progressive> marking. Hence, RVCs of the achievement and accomplishment types cannot be marked by *zai*, as they do not have a <progressive> aspect reading, as asserted by Liu Jia, (2016, p. 45):

- a. Mali zai xue youyong
 Maria Zai study/learn swim
 ‘*Maria is learning to swim*’
- b. *Mali zai xue-hui youyong.
 Maria Zai study/learn-know swim
 ‘*Maria is learning to swim and knows how to swim*’

Nevertheless, Li (1990) has contested this, presenting examples of the acceptability of ZAI co-occurring with achievements to express the <progressive>. According to Li & Shirai (2000), just like in Romance languages and in English, the Chinese RVCs are also dynamic and telic and entail a subsequent state. Their specificity lies in the fact that they are neither homogeneous nor durative (Liu, 2016).

We shall refer back to this feature during our analysis of the Imperfective markings in Section 7.

Perfective aspect in Mandarin can be marked by *-le* and also by *-guo*. Aspectual marker *-le* marks bounded events and its use may be restricted by certain predicates, such as the case of resultative verbs, indicating the completion of the event. Yet, when the verb does not entail a natural boundary, as is the case of atelic predicates, aspectual marker *-le* marks the termination of the situation. The syntactic position of *-le* has semantic implications. Aspectual marker *-le* can occur in a verb-final position, sentence-final position, and both verb and sentence-final. According to Chen and Shirai (2010, p. 4), if *-le* is verb-final it marks perfective aspect “(...) signaling the completion or termination of a situation with respect to a past, present, or future time and presents the situation as a whole (...)”. The verb and sentence-final position of *-le* can have different interpretations depending on verb semantics: (1) with accomplishment and achievement predicates it has a resultative reading; (2) with atelic predicates it has an inchoative reading. The perfective marker *-guo* is an experiential marker, i.e., when the event is experienced at some indefinite point in the past.

The aspectual marker *-le* is also classified by Li and Thompson (1989, p. 185) as perfective. Yet, they consider *-guo* an “experiential aspect” marker, whereas *-zai* and *-zhe* mark imperfective situations, and verb reduplication delimitative aspect.

3.2.1 Cantonese

Cantonese, just like Mandarin, does not mark tense overtly through grammatical morphemes, but also marks aspect through different aspectual markers (Matthews & Yip, 1994). As Matthews and Yip (1994, p. 198) note, in Cantonese: “In the absence of explicit tense marking, temporal relations are expressed by a combination of adverbials, aspect markers and contextual factors.” In Cantonese, perfective aspect is marked by *jó*, experiential aspect by *gwo*, <progressive> by *gán*, <continuous> by *gyuh*, delimitative by *háh*, and <habitual> by *hoi*.

4. Verb semantics: identification of verb properties

Identification of verb properties has raised some questions when analysing TA acquisition results. In this section, we present a brief discussion of some of these questions. As Salaberry (2008, p. 11) points out, two related issues have affected the studies on the acquisition of tense and aspect in L2: (1) vague classification of lexical aspectual classes; (2) the distinction between lexical and grammatical aspect. For Salaberry, the way we have to identify lexico-semantic properties of verbs is very important, since it raises several other questions that may have an impact on how sentences are interpreted: (1) is lexical aspectual meaning determined at the level of the verb phrase, with internal and external arguments? (2) is lexical aspectual meaning determined at the level of textual information, independent of sentence level? (3) does grammatical aspect determine the aspectual contours of each situation? Salaberry goes on to say that studies, in general, adopt a compositional perspective of aspectual interpretation. Yet, he considers these issues are even bigger a problem in terms of L2 acquisition studies, since, as Salaberry (2008, p. 12) states:

(...) the vagueness about the description and classification of the theoretical construct inevitably leads to a concomitant degree of imprecision at the level of methodological procedures of the research design of empirical studies.

(Salaberry, 2008, p. 12)

Even if we cannot treat the identification of the semantic properties of verbal predicates in depth, we shall briefly raise some of the aspects that could pose a problem for L2 TA research.

Such “vagueness” and differences in the identification of the semantic properties of verbal predicates are necessarily due to the topic’s complexity (Martins, 2008; Xiao & McEnery, 2004, p. 13).

The traditional conceptualization of aspect in the literature of L2 TA acquisition is that of Comrie (1976, p. 5):

Aspect is not concerned with relating the time of the situation to any other time-point, but rather with the internal temporal constituency of the one situation; one could state the difference as one between situation-internal time (aspect) and situation-external time (tense). (Comrie, 1976, p. 5)

This particular definition of aspect used in such literature refers to grammatical aspect. As Xiao and McEnergy (2004, p. 14) point out, grammatical aspect is only “(...) a partial account of aspect,” since: “(...) the internal temporal structures of situations also contribute to aspectual meanings (...)”.

Semantic properties of verbal predicates can be distinguished based on three distinct features (Comrie, 1976; Martins, 2008; Oliveira, 2003; Smith, 1991; Xiao & McEnergy, 2004): dynamicity, telicity and durativity. Such semantic properties identify types of lexical aspectual classes, usually referred to as lexical aspect; situation aspect or *Aktionsart*. Two of the factors that, according to Xiao and McEnergy (2004, p. 14–15; 22), contribute to the fuzziness of the term ‘aspect’, are: (1) sometimes the terms ‘lexical aspect’ and ‘grammatical aspect’ are used interchangeably, (2) the classification of the semantic properties of verbal predicates is usually “confusing and controversial” because of the variation in the parameters used. Xiao and McEnergy (2004, p. 22–23) define with precision the various terms that they consider have contributed to the differences in the semantic identification of verbal predicates. They clearly distinguish what they consider to be three key terms: ‘event’, ‘situation’, and ‘state’. They define ‘situation’ as “entities in the real world codified by language, including both events and states.” The concept of ‘event’ is used for dynamic situations as opposed to <states>. Xiao and McEnergy further advocate that “situation aspect”, from a compositional perspective, has to be understood both at the “lexical-level and [at the] sentence-level”.

The various studies on the acquisition of TA in L2 contexts have used Vendler’s four-way classification of lexical aspectual classes – <states>, <activities>, <achievements>, and <accomplishments>. Others have incorporated the <semelfactives>, such as Martins (2008). Some researchers, like Salaberry (2008, p. 31) question such specificity in the definition of the lexical aspectual classes. Following Langacker (1987), Salaberry considers telicity and dynamicity are the most relevant semantic properties, since: “the state-event distinction (...) is linked to a basic cognitive capacity: the ability to perceive change (or stasis) over time.” As for durativity, Salaberry (2008, p. 34) states that it “has been considered non-essential for the classification of verbs into semantic aspectual classes”, and that this semantic property is the one that distinguishes <accomplishments>, which are durative, from achievements, which are non-durative and punctual.

In line with Xiao & McEnergy (2004), Salaberry (2008, p. 37) also states that: “The classification of lexical aspectual classes based on the inherent semantic meaning of the verbal predicate alone is an oversimplification.” Following Verkuyl

(1993) Salaberry assumes “that aspect is compositional” (Cf. also Salaberry, 2010, p. 4), identifying the features that contribute to the compositionality of aspect: (1) internal arguments; (2) external arguments; (3) adjuncts; (4) aspectual particles (*se*, in the case of Spanish). Apart from these features that contribute to the compositionality of aspect, Salaberry (2008, p. 15), drawing on Coppieters (1987) and also Andersen (2002), contends that contextual information is vital for tense and aspect interpretation. As such, he distinguishes two levels in terms of tense-aspect meanings: invariant and contextualized. Both contextualized and invariant meanings of tense and aspect interpretation have “important consequences for the development of theoretical claims regarding the acquisition of L2 competence.” In this respect, Salaberry (2008, p. 17) refers to Coppieters, Montrul and Slabakova’s perspective on tense-aspect interpretation, as they consider pragmatics to be out of the scope of UG. The author opposes such a perspective, since he believes tense-aspect meanings have to be understood “as a continuum of invariant-contextualized meanings.”

According to Salaberry, L2 English learners of Spanish can progressively incorporate the aspectual meanings conveyed by the Perfect Preterit / Imperfect Preterit contrast in discourse, thus, in context, but they have difficulties in acquiring the invariant meaning of the Perfect Preterit and the Imperfect morphology. This difference is justified by Salaberry (2008, p. 17) with the fact that both English and Spanish convey aspectual contrasts at the discursive level, but not at the morphological level, thus not being able to conceptualize iterativity or boundedness.

5. The study: Methodological procedures

5.1 Introduction

The current study is based on the methodological approaches followed by the majority of the most recent studies on the acquisition of the categories of tense and aspect in L2 contexts. This option concerns the need to maintain methodological coherence, one of the issues that has been referred to as problematic in many of the previous studies (Salaberry, 1999).

Andersen and Shirai (1996, p. 541) refer to methodological problems in the interpretation of the POA.⁷ Comajoan (2006, p. 255) states that “Further research needs to incorporate known and new factors in the acquisition of morphology and to design longitudinal and cross-sectional studies that compare data in different languages.”

7. Cf. also Comajoan (2006, p. 246).

Reviewing some of the studies on aspect, Bardovi-Harlig (1999, p. 359) mentions the fact that they aim at determining if the distribution of morphemes differs across lexical aspectual classes. According to Bardovi-Harlig (1999), calculating the distribution values across categories may lead to uneven results due to the fact that some categories may have more tokens than others, as is the case of narratives that usually have more instances of achievements. Bardovi-Harlig (1999, p. 359) finds that internal category analysis of verb classes solves the problem of imbalance. According to Bardovi-Harlig (1999, p. 360), the spread of the perfective past is “(...) by far the most robustly attested stage in the distribution of verbal morphology in the interlanguage system (...)”. She justifies this fact of TA acquisition with the fact that achievements are abundant in narratives and also that perfective past marking is acquired first. Bardovi-Harlig (1999, p. 362) states that counterevidence to the LAH would entail finding an equal distribution of morphemes in all semantic classes, in the case of Present, Perfect Preterit, Imperfect Preterit and <progressive>.

5.2 Participants

The current study involved 41 Chinese university students studying for a degree in Portuguese Studies at a university in China, from a variationist perspective of data analysis. Of these 41 students, 14 were male and 27 were female. 17 of the participants spoke Cantonese as their mother tongue, while the remaining spoke Mandarin. Their average age was 20.9 and the average number of years studying Portuguese was 2.78 (see Table 3).

Table 3. Participants

Age (Average)	No. of Male Students	No. of Female Students	Cantonese (L1)	Mandarin (L1)	No. of Years of Study (Average)
20.9	14	27	17	24	2.78

5.3 Instruments of data collection

In view of the methodological coherence, mentioned in Section 6.1., our study analyses only oral data which were collected through a semi-structured interview and a retell story task.⁸

8. However, these data are only part of a larger corpus collected through both oral and written instruments. The written instruments included a written retell task and cloze passage (contextualized) based on the scene *Alone and Hungry* from the Charlie Chaplin’s film *Modern Times*, and a separate fill in the blanks exercise with the correct form of the verbs within specific and clear contexts.

The participants had to retell the scene *Alone and Hungry* from the Charlie Chaplin's film *Modern Times* and participate in an individual semi-structured interview that focused on personal past experiences, episodes and narratives.

The research question that guided the current study aimed at testing how lexical aspect may influence or constrain the marking of Perfect Preterit and the Imperfect Preterit, verifying the validity of the principles postulated by the Aspect Hypothesis.

6. Discussion of the results

In the earlier stages of SLA studies, specifically those focusing on variation, only one variable at a time was considered (Cf. Young & Bayley, 1996). This methodology did not allow for a full view of the complexity of SLA and L2 use, regardless of the item studied. As many factors are known to simultaneously influence SLA processes, a multivariable methodology and approach is ideally required. This became possible with VARBRUL⁹ (Cedergren & Sankoff, 1974), which is now an established tool in linguistic analysis.¹⁰ It provides us with the possibility of measuring the significance of each of the multiple factors that may be at stake in a particular case of SLA.

The current study took into account most of the aspects considered relevant in previous studies on the acquisition of Tense and Aspect in L2 contexts: (1) multiple data collection instruments; (2) a large number of participants; (3) a large set of data for analysis; (4) data collected restricted to a formal L2 learning context. However, our research study differs from others, since, on the one hand, it is the first to deal with the acquisition of the notions of tense and aspect of European Portuguese as L2 by speakers of Mandarin and Cantonese as L1. On the other hand, this study uses VARBRUL as statistical support for the treatment of the data collected, preceded only by Bayley (1994).

9. A statistical package designed specifically for linguistic analysis from a variationist perspective.

10. Paolillo (2002, p. 24–26) presents a list of variables that can be studied from the perspective of variation, so that they can be treated statistically in VARBRUL. Paolillo identifies the following areas: 1. phonology; 2. morphology; 3. syntax; 4. others such as: (1) code change; (2) dialectal characteristics, etc. For each of these areas, Paolillo identifies a list of themes that have been treated from the perspective of variation.

6.1 Results for Perfect Preterit: Discussion

The VARBRUL analyses were carried out based on two different corpora separately: one for the Perfect Preterit and another for the Imperfect Preterit.

As previously mentioned, the data analyzed in this study is part of a broader research project on the linguistic and nonlinguistic variables involved in the acquisition of verb morphology by Chinese learners of European Portuguese as L2, specifically of the Perfect Preterit and the Imperfect Preterit verb tenses. In view of the current focus on the role of the lexical aspect in acquisition, our analysis and subsequent discussion of results will be centered on the variable lexical aspect and its interaction with other variables, selected by VARBRUL¹¹ and relevant to the current study. For this set of data, VARBRUL selected the following variables as significant in the mentioned acquisition process: lexical aspect; length of exposure; morphological form; verb inflection and knowledge of other languages, other than English or Portuguese. Our aim is to draw a more detailed profile of the Aspect Hypothesis.

We begin by presenting the data, and our interpretation thereof, regarding the acquisition by the Chinese L2 learners of the Perfect Preterit morphology in European Portuguese. Given the purpose of the current text, we shall not be able to present the results of all these variables. Thus, we have selected for discussion the variables <lexical aspect>, as it corresponds to the actual theoretical framework followed and <length of exposure>, which was a variable also found to be of significance in Salaberry (2010) (cf. Introduction).

6.1.1 *Lexical aspect*

According to the tenets of the LAH (Andersen, 2002, p. 83) learners first acquire the perfect past and their perfective value, but not all aspectual semantic classes have the same distribution. Learners tend to mark perfective morphology according to the lexico-semantic properties of verbs in the following order: 1- achievements, 2- <accomplishments>, 3- <activities>, 4- <states>. In the case of the imperfective, the order of acquisition of the aspectual semantic classes works in the reverse order: 1- <states>, 2- <activities>, 3- <accomplishments>, 4- achievements. This order of acquisition is justified on the basis of the internal semantic properties of verbs. Thus, verbs which inherently have properties of telicity, i.e., achievements and <accomplishments>, will be marked in the Perfect Preterit before verbs with atelic properties.

11. VARBRUL is a statistical package that has been used in sociolinguistic studies, and more recently in L2 acquisition studies from a variationist perspective.

In another study, Howard (2002) presents results that are also in line with the Aspect Hypothesis with respect to marking the perfective. In this study on the acquisition of French as L2, <states> tend to be more marked in the present. Inversely, <states> and <activities> in *Passé Composé* show a low percentage of marking in comparison to telic verbs.

Howard (2002, p. 101), argues that native speakers do not mark the same type of verb identically, even though the results support the idea that the development and acquisition of verbal morphology in L2 is dependent on lexical aspect. Therefore, and given the variation that is also observed in learners, there may be an effect on the distribution and frequency of marking of the various types of verbs that are influencing the results obtained.

Table 4 shows the results of the analysis of the variable <lexical aspect>, as it was selected for the statistical model on the Perfect Preterit.

Results in Table 4 show that Perfect Preterit marking is favoured by telic predicates, namely, achievements with a relative weight of pr. .60,¹² and pr. .59 for <accomplishments>. On the other hand, statives (atelic predicates), clearly disfavour the Perfect Preterit marking, showing a relative weight of pr. .23. This draws a parallel with the LAH tenets as we mentioned in the introduction to this subsection.

<Semelfactives> are classified by Xiao and McEnery (2010) as telic predicates. However, these results also show that this type of predicate does not favour perfective marking, showing a relative weight of pr. .48¹³ (see Table 4).

On the other hand, <activities>, atelic in nature, marginally favour Perfect Preterit marking with a relative weight of pr. .56. We suggest three possible readings for this slightly unexpected overlapping of the favouring of the Perfect Preterit marking on activity verbs:

- i. As observed by Howard (2002), sequencing of verb morphology acquisition varies among learners, even among L1 speakers. The marginal favouring of <activities> by the participants in this study may correspond to a transitional phase in which they begin to expand the Perfect Preterit marking from telic to atelic verbs.
- ii. <activities> share the [+ dynamic] property with all the [+ telic] verbs, absent in <states>. This may enhance the perceptibility of the L2 learners of possible perfective reading for <activities>, thus explaining such a result.

12. In VARBRUL statistical significance ranges from pr. (relative weight) .50 to 1. All values below .50 are not statistically significant for result interpretation.

13. As shown in Table 4, this result cannot be fully conclusive, as the small number of tokens for semelfactives in this analysis may not have such an important statistical weight when compared with other factors and variables under analysis.

Table 4. Lexical aspect – Perfect Preterit

Variable	Factors														
	Statives			Accomplishments			Culminations			Activities			Semelfactives [*]		
Lexical Aspect	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.
	319/616	52	0.23	907/1233	73.6	0.59	482/604	80	0.60	211/308	68.5	0.56	51/69	74	0.48

*Even if most studies on the acquisition of TA in L2 contexts have followed Vendler's classification of lexical aspectual classes, we opted to include the <semelfactives>, following Smith (1991).

- iii. These results may also be due to transfer of the flexible use of the Mandarin perfective aspectual marker *le*. As pointed out in Section 4.2., *le* occurs both with telic as well as atelic verbs. In the latter case, i.e., when the verb marked by *le* is not naturally bounded, then this marker simply expresses an end point (Liu Jia, 2016).

6.1.2 *Length of exposure*

The variable number of years of exposure may be related to the notion of proficiency, albeit indirectly. Therefore, when we refer to “length of exposure” we do not necessarily refer to formally assessed proficiency levels. We chose not to identify each of these stages with levels of proficiency as we did not apply a proficiency test. However, it is hypothesized, that the longer they had been learning the language,¹⁴ the less difficulties they may reveal in acquiring the notions of tense and aspect expressed by both the Perfect Preterit and the Imperfect Preterit.

The notion of proficiency has been pointed out in several studies as one of the variables that may be relevant in explaining the marking of tense and aspect morphology. In this regard, it is more or less consensual that the end state of the acquisition process may be influenced by the level of proficiency (Giacalone-Ramat, 2002, p. 237).

Salaberry et al. (2005, p. 30) consider proficiency an important factor to take into account when designing a study on the categories of tense and aspect in L2 contexts:

(...) the proficiency of any learner, probably closely associated to learning setting, measured beyond the relative performance on the use of verbal morphology (e.g., lexicon) may have an effect on, for instance, whether learners are more akin to rely on associations between verb types and specific endings.

(Salaberry et al., 2005, p. 30)

In order to understand the possible influence, the variable length of exposure (learning period) may have on the choice of Perfect Preterit marking as distributed by the different lexical aspectual classes, we performed a cross-analysis of both variables, whose results are shown in Table 5.

The cross analysis between the variables lexical aspect and length of exposure to learning L2 Portuguese, in our data, reveal a certain degree of congruence with the LAH proposal of a <progressive> cline in the acquisition and use of the Perfect Preterit according to lexical properties of the verb types, i.e., which predicts Perfective marking on [+ telic] verbs at an earlier stage than on [- telic] verbs.

14. The participants in this study have between 1 and 10 years, or more, of exposure to learning Portuguese as L2.

Table 5. Cross analysis of learning period and lexical aspect – Perfect Preterit

Lexical aspect Factors	Length of exposure								
	1–5 years			5–10 years			> 10 years		
	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.
Activities	246/320	10.8	0.61	7/12	0.4	0.65	13/25	0.8	0.43
Achievements	456/560	19.0	0.59	28/32	1.1	0.71	32/42	1.4	0.65
Statives	295/540	18.3	0.23	17/33	1.1	0.22	20/34	1.2	0.24
Accomplishments	852/1136	38.5	0.55	53/68	2.3	0.71	64/81	2.7	0.68
<semelfactives>	47/61	2.1	0.51	3/6	0.2	0.23	–	–	–

The favouring of Perfect Preterit markings by both [+telic] classes (achievements and <accomplishments>) in our data is a common feature to all three learning groups (see Table 5). Moreover, a clear progression of this marking is observed between group 1 (1–5 years of exposure), and group 2 (5–10 years of exposure). In the case of achievements, the relative weight for group 1 is pr. .55, and for group 2, pr. .71. As for the accomplishment verb type, the relative weight is pr. .59 for group 1, and pr. .71 for group 2. This seems to be a confirmation of the role length of exposure in SLA contexts may have in the acquisition of verbal morphology, as reviewed above, based on Ellis (1994) and Salaberry (2005). As for the group with the longest learning period among the participants in this study, i.e., >10 years of exposure, both for achievements and <accomplishments>, the relative weight with which these lexical aspectual classes favour the Perfect Preterit markings is always higher than that for group 1, but slightly lower than for group 2. Achievements show a relative weight of pr. .68, and <accomplishments> a relative weight of pr. .65, respectively (see Table 5). Our reading of this, perhaps less expected result, given the progression in relative weight between group 1 and group 2, is that, once learners enter the intermediate to advanced learning stage, they tend to concentrate more on the importance of the meaning of their discourse, rather than simply on the morphological forms, as is the case with initial stage learners.

In the case of the [–telic] verbs, the Perfect Preterit morphology is not favoured by stative verbs in all of the three learning stages considered, as can be observed in the relative weight distribution presented: pr. .30 for group 1; pr. .22 for group 2; pr. .24 for group 3. These results mirror the higher level of semantic complexity of this class of verbs in terms of the imperfective and perfective meanings they may cover, indicating that even the group with the longest length of exposure shows difficulties in marking statives with perfective morphology in the Perfect Preterit.

The favouring of these markings by the other [–telic] group, the <activities> verb type, mentioned in the general analysis in Table 4, was confirmed to belong to the two initial learning groups, which presented the relative weights of pr. .60

and pr. .65, respectively. The longest learning group, however, disfavours Perfect Preterit marking on <activities> with a relative weight of pr. .43. The favouring of the Perfect Preterit morphology by <activities> in the first two stages of acquisition, according to our data, may be linked to the [+ dynamic] value that this [- telic] class shares with the [+ telic] <accomplishments> and achievements, (see Table 2), leading our group of learners to an easier association of the class with this morphology than is the case with statives, discussed above. The fact that <activities> are not marked with Perfect Preterit morphology in the most advanced stage of learning for our data (pr. .43) may be not only be driven by meaning instead of form, but also because of the nature of our data, which is exclusively oral. Oral production data may affect the distribution and choice of verbs.

As for the semelfactive verbs, the relative weight (pr.) obtained through VARBRUL the analyses Perfect Preterit morphology is favoured from an early stage of learning, with a marginal relative weight of pr. .51, which could again be related to the [+ dynamic] value it also shares with the [+ telic] classes. The data for the group 2 learners, on the other hand, presents a drastic fall of that value, to the non-favouring level, showing a relative weight of pr. .29. Nevertheless, it is important to take into consideration, as well, that this lexical aspectual class has a reduced number of tokens, both for groups 1 and 2, which, does not allow us, at this stage, to make any further considerations on the role of this class in the acquisition process of Perfect Preterit morphology. It is a point to be revisited in future research based on a larger set of data.

6.2 Results for Imperfect Preterit

The L2 acquisition of aspectual values involved in the notion of imperfectivity poses difficulties for learners (Blyth, 2005, p. 212; Giacalone-Ramat, 2002, p. 227), not only because of the multiple aspectual nuances of marking imperfectivity, but also because learners have to distinguish between the perfective/imperfect contrast from context (Andersen, 2002, p. 98–99; Giacalone-Ramat, 2002, p. 241).

As stated in Martins (2008, p. 313–314) and Salaberry (2005, p. 181), for instance, the Imperfect Preterit in Portuguese can assume various functions: (1) describe frequent or repetitive events in the past; (2) describe <continuous> events in the past; (3) describe people, events or things in the past; (4) refer to (clock) time in the past; (5) distinguish between two simultaneous actions in the past; (6) express frequency, repetitiveness, cause and consequence; (7) describe a planned but unfinished action; (8) narrating fables, legends or stories in the past; (9) indicate a single accurate fact in the past, where the date and time period in which this occurred is specified.

Semantic properties inherent to verbal predicates are yet another factor to take into account in the marking of imperfectivity and its various aspectual nuances in Romance languages. In European Portuguese, we find no restrictions in the association of the various aspectual semantic classes and the morphemes that mark both the Perfect Preterit and the Imperfect Preterit. But when the forms emerge in context, the situation changes. On the one hand, <semelfactives> and culminations, for example, when marked in the Imperfect Preterit assume an iterative perspective that may not be accepted in some contexts. On the other hand, atelic verbs, in most contexts, can assume both the perfective and the imperfective perspective of an event, bringing yet another aspectual nuance to the perfective/imperfective contrast in Portuguese. We predict that this aspectual nuance may be responsible for much of the variation accounted for in our study.

The VARBRUL analyses of the oral data of the Imperfect Preterit selected the following variables for the statistical model: <agreement>; <morphological form of verb>; <grammatical aspect>; <lexical aspect>; <gender>; <length of exposure>; <monitorization>; <gender>, and <type of instrument of data collection>. Considering the focus of our study, we shall concentrate on the analysis of two of the selected variables: (1) <grammatical aspect>; (2) <type of instrument of data collection>. Given the research question guiding this study, the analyses of these two variables aim at identifying their possible interaction with lexical aspect, and consequently gather evidence (or counterevidence) regarding the tenets of LAH.

In the following sub-sections, we shall first discuss the variable <grammatical aspect>, followed by <lexical aspect>, and finally, <type of instrument of data collection>.

6.2.1 Grammatical aspect

The notion of aspect can refer to the semantic properties inherent to verbal predicates, but also to the grammaticalization and/or lexicalization of the aspectual notions in the perfective/imperfective contrast. Hence, a distinction is normally made between lexical aspect, also designated as *aktionsart*, and grammatical aspect. This distinction is all the clearer as it refers to the Romance languages that grammaticalize the notion of grammatical aspect through verbal morphology. (Ayoun, 2005, p. 84; Salaberry, 2002, p. 398).

In Portuguese, the distinction and contrast of the notions of perfectivity and imperfectivity with respect to past contexts is expressed through at least two verbal tenses: the Perfect Preterit and the Imperfect Preterit (Comrie, 1976, p. 25).

Comrie (1976, p. 16) gives a brief definition of the notions of perfectivity and imperfectivity:

(...) perfectivity indicates the view of a situation as a single whole, without distinction of the various separate phases that make up that situation; while the imperfective pays essential attention to the internal structure of the situation. (Comrie, 1976, p. 16)

If the perfective is semantically less complex, the imperfective (Comrie, 1976: 25) presents a range of other aspectual perspectives, since imperfective situations can be <habitual> or <continuous>, and <continuous> situations may be <progressive> or <non-progressive>.

Research on the acquisition of the notions of tense and aspect in SLA contexts has centered around not only on the Aspect Hypothesis (LAH), but also on the Discourse Hypothesis (DH), and the Prototype Hypothesis (PI). All three hypotheses understand that the role of grammatical aspect is unequivocally linked to the inherent semantic properties of the verbal predicates.

As previously mentioned, the tenets of the LAH predict an order of acquisition of verbal morphology for the contrast perfective/imperfective which, in Romance languages, is expressed through the Perfect Preterit and the Imperfect Preterit tenses, respectively (cf. Sections 2.1., 2.2, 7.1.2). The variable <grammatical aspect> was selected as significant in the statistical model of the Imperfect Preterit analyses (see Table 6).

Table 6. Distribution of Imperfect Preterit marking according to Grammatical Aspect

Variable	Factors								
	<continuous>			<habitual>			<progressive>		
Grammatical Aspect	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.
	419/753	56	0.75	233/1001	23	0.30	50/63	79	0.68

According to these results, the marking of the Imperfect Preterit is favoured by the <progressive> and the <continuous> aspects, with the respective relative weights of pr. .75 and pr. .68. According to this same analysis, the <habitual> aspect, however, does not favour the marking of the Imperfective Preterit, as it shows a relative weight is pr. .30.

Given these results, we can conclude that the <continuous> and the <progressive> aspectual nuances are incorporated from the initial stages of language learning, whereas the <habitual> aspect presents difficulties for learners. These results partially confirm some of the assertions we find in the literature that have studied the acquisition of the notions of tense and aspect in L2. Rocca (2002, p. 256) justifies the favouring of the notion of continuity in the acquisition of Italian as L2, stating that:

<continuous> aspect is considered as the prototypical meaning of the imperfect: <habitual> and <progressive> aspects represent a less prototypical form of continuousness. <progressive> aspect represents continuousness with reference to a time point whereas <habitual> aspect represents <continuous>ness with reference to a time span. (Rocca, 2002, p. 256)

On the other hand, Kihlstedt (2002, p. 348) states that some studies have pointed to a late acquisition of the <habitual> value of the imperfect (these studies refer to the Canadian immersion contexts). In the absence of any justification for this fact, Kihlstedt (*ibid*, p. 348) suggests the following:

<habitual> Imperfect presents a situation as taking fragments of R only. This means that E and R are more or less separated. (...) learners give priority to Imperfect of Total Overlap, where E and R coincide. This might be the reason why learners hesitate on this value. (Kihlstedt, 2002, p. 348)

The results obtained from our data confirm the difficulties pointed out in the literature regarding the acquisition of the notions of tense and aspect in L2, specifically in the marking of the imperfective <habitual>, falling in line with Kihlstedt's other studies summarized in Kihlstedt (*op.cit*).

In order to have a clearer picture of the distribution and significance of the different lexical aspectual classes for the Imperfect Preterit, we performed an analysis that crossed all factors of the variable <grammatical aspect> and those of the variable <lexical aspect>, with each of the three learning groups separately (see Table 7).

No tokens of Preterit Imperfect marking were found with the <progressive> and the <habitual> aspectual values for learning groups 5–10 and >10 years. Thus, for the benefit of easier readability, Table 7 only shows the factors for which our data does have tokens for the relevant marking. According to these results, imperfective marking is inherently related to different aspectual classes for each of the learning groups. In the group with the shortest learning period (1–5 years), the Preterit Imperfect is favoured by all grammatical aspectual values through all lexical aspectual classes, except for statives with the <habitual> aspect (pr. .45), and <semelfactives> with the <habitual> aspect (pr. .40) and <continuous> aspect (pr. .50). No tokens were found for statives with the <continuous> and <progressive> aspects for this learner group. In fact, tokens of statives are also nonexistent in our oral corpus for all of the grammatical aspect contexts for the other two learner groups. The absence of tokens for achievements, statives and <semelfactives> denotes a frequency bias resulting from the nature of the oral data used for his study. Such a bias was also reported in Martins (2008). All-in-all, the most salient detail in these results is the almost complete favouring of Preterit Imperfect by the group 1–5 years, and especially that this paradigm includes the telic aspectual classes

Table 7. Cross-Analysis of variables grammatical aspect, lexical aspect, and length of exposure – Imperfect Preterit

Length of exposure / Factors	Lexical aspect														
	<activities>			Achievements			Statives			<accomplishments>			<semelfactives>		
	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.	No.	%	Pr.
<habitual> 1-5	9/11	82	.87	29/17	63	.70	452/1374	33	.45	-	-	-	2/4	50	.40
<continuous> 1-5	51/95	54	.70	-	-	-	-	-	-	49/90	54	.68	6/11	55	.50
<progressive> 1-5	23/28	82	.90	5/6	83	.76	-	-	-	9/12	75	.72	-	-	-
<continuous> 5-10	5/13	39	.55	-	-	-	-	-	-	4/12	33	.52	-	-	-
<continuous> >10	4/10	40	.68	-	-	-	-	-	-	-	-	-	-	-	-

<accomplishments> and achievements. Contrary to what the LAH predicts, in our data the learners acquire the Preterit Imperfect earlier with telic verbs than with atelic verbs, and the beginner learners present the highest degree of standard marking for the Imperfect Preterit among all three groups. The latter sets a parallel with what we observed for the Perfect Preterit, and suggests, here too, that the more advanced learners tend to concentrate on the content of their discourse rather than on form, whereas learners at the initial stage rely more on form for both prototypical and non-prototypical values. These results give a different perspective on the role lexical semantics may have on the development and acquisition of tense and aspect in L2 formal learning contexts. Despite the fact that the results of our analyses do not show a consistent pattern of development for the Imperfect Preterit according to the tenets of the LAH, it is clear, from the analyses of both the Perfect Preterit and the Imperfect Preterit, that lexical aspectual classes do play a role in the acquisition of tense and aspect. These results also show an opposite developmental pattern at the initial stages of the continuum, when compared to Labeau's (2005) study on learners at an advanced level of acquisition.

In the next subsection, we analyse the results of the variable <type of task>, not only because it was one of the variables selected in the final analysis of the Imperfect Preterit, but also because the type of task has been identified in the literature as a relevant variable in the acquisition and development of tense and aspect in L2 formal contexts (Blyth, 2005, p. 226).

6.2.2 *Type of task*

The variable <type of task> aims at identifying the role that type of task can have for the acquisition of tense and aspect morphology. Considering that the current study focuses only on oral data, the analyses focused on data from a semi-structured interview, and also on an oral narrative based on a scene (Alone and Hungry) from the Charlie Chaplin film: *Modern Times*.

Shehan and Foster (2001), for example, refer to the degrees of difficulty of certain tasks performed in formal contexts of learning according to the levels of attention that each requires. Ayoun (2005), in turn, identifies the factors that may be involved in the variation of the marking of the verbal morphology in L2, according to the degree of difficulty and the cognitive requirement of certain tasks.

Blyth (2005, p. 232), drawing on Salaberry & Lopez-Ortega (1998), and also on Ayoun (2005), indicates that the type of task can influence the results. In view of this, for this variable we hypothesize that since the interview does not present a defined and sequential context, it inhibits the marking of the Imperfect.

The variable <type of task> was one of the variables selected by VARBRUL as significant for the use of Preterit Imperfect verbal morphology by our participants. This confirms the hypothesis that the type of task can exert an influence on the

Table 8. Type of task – Imperfect Preterit

Variable	Factors					
	Interview			Oral Retell		
Task	No.	%	Pr.	No.	%	Pr.
	507/1906	27	0.44	140/254	55	0.86

marking of notions of tense and aspect. The oral narrative is the type of task that most favours marking of imperfect inflectional morphology, with a relative weight of pr. .86, whereas the interview inhibits marking, with a relative weight of pr. .44 (see Table 8)

We therefore claim the presence of a context, in this case the retelling of the scene of the film *Modern Times*, facilitates marking inflectional morphology.

According to Schmidt (2001, p. 3), the attention mechanism is important to understand the process of SLA, in terms of: (1) diachronic development of interlanguage (IL); (2) variation in IL; (3) development of fluency; (4) the role of individual differences in the L2 acquisition process, such as L2 learning strategies. According to Schmidt (ibid: 6–7), studies on the mechanism of attention, starting from the theoretical bases of cognition, suggest that learners process the information they receive based on cognitive factors, such as salience and frequency in the input.

The above results seem to confirm that learners use specific strategies linked to attention, especially when the forms are salient and frequent.

We can hypothesize that these results may be related to the L2 learning experience that the learner possesses. Thus, it seems that learners at the end of the developmental continuum will be able to develop a multiplicity of attentional-related mechanisms that will facilitate target forms. To verify the validity of this hypothesis, we performed a cross-analysis of the variables <type of task> and <length of exposure> (see Table 9).

Table 9. Cross-analysis of variables type of task and length of exposure – Imperfect Preterit

Task	Length of exposure								
	1–5 years			5–10 years			>10 years		
	Nº	%	Pr.	Nº	%	Pr.	Nº	%	Pr.
Interview	459/1490	31	.43	33/143	23	.41	51/153	33	.51
Oral retell	156/248	63	.85	1/6	17	.58	5/10	50	.80

These results reveal that the interview does not favour Imperfect Preterit marking for all groups of learners, even if the more advanced group shows a marginal relative weight of pr. .51. It is interesting to note, through this analysis, that learners in the initial stage of the learning process are the ones that show a higher value in

the oral retell task, favouring Imperfect Preterit marking with a relative weight of pr. .85, followed by those at the end of the continuum, with a relative weight of pr. .80. The intermediate group favours imperfect preterit marking, with a relative weight of pr. .58.

The apparent paradox of these results may be related to the mechanism of attention. Schmidt (*ibid*, p. 7), refers to the role attention may have in learners at the initial stages of acquisition:

(...) since beginning learners are cognitively overloaded, they cannot pay attention to all meaningful differences at once. If they have not learned what is simple, they cannot learn what is complex, but as simpler processing routines are over-learned, they have more capacity to attend to details, eventually being able to attend to whatever native speakers pay attention to. (Schmidt, 2001, p. 7)

These results may also be related to the frequency of forms and type of task, which may contribute to the fixation/automation of the forms.

Another possible explanation for these results comes from Blyth (2005, p. 227). According to this author, performance features reflect the possibility that learners may control the narrative, thus avoiding the use of certain verbs and verb forms that can interfere with their production, and possibly, with the conveyance of meaning.

7. Conclusions

The acquisition of the perfective-imperfective contrast in L2, especially in Romance languages, generally poses certain difficulties for learners. The acquisition of this contrast should be understood not only from the perspective of semantic properties inherent to each verb but also, and perhaps above all, in terms of context and discourse (Andersen, 2002). Acquiring the aspectual contrast encoded by the Perfect Preterit and the Imperfect Preterit in Portuguese, as in other Romance languages, entails, in our view, two issues: (1) the complexity of the functional multiplicity of aspectual features inherent to the imperfect; (2) the possibility of some types of verbs occurring in the same context, both with perfective and imperfective values. In the latter case, the choice between using one or the other depends on the perspective the speaker has of the event in discourse.

Section 1 (Introduction) provided an initial reference to the complexity of the field owing to discrepancies between studies concerning the theoretical concepts involved. In Section 2, we provided an extensive summary of the tenets of LAH and specific studies that followed this theoretical framework. The framework posits two possible perspectives with regard to the nature of tense-aspect meanings: as a syntactic-semantic phenomenon or as a semantic-discursive phenomenon

(Salaberry, 2008). The general tenet supporting the LAH is that the acquisition of Perfect Preterit and Imperfect Preterit verbal morphology (both in L1 as in L2) is sequential, according to the inherent lexical value of the verbs, where the perfective markings tend to be applied first to [+telic] verbs before being extended to [-telic] ones. The opposite is true for imperfective marking as it is acquired later (Cf. 2.2).

Salaberry (2008, p. 10–11) considers it important for researchers in this field to have a broad view “(...) of the phenomenon of tense-aspect marking in order to obtain an accurate picture of the development and ultimate attainment of tense-aspectual knowledge in the target language.” This was the rationale we followed upon designing a variationist study. The statistical models derived from the VARBRUL analyses allowed for a more specific outline of the Lexical Aspect Hypothesis, itself, since this was the focus of the study, and brought to light specific correlations with other linguistic and nonlinguistic variables involved in the relevant acquisition process.

VARBRUL selected several variables as significant in the acquisition of both the Perfect Preterit and well as the Imperfect Preterit, respectively. Given the scope of this study, we chose to focus on a restricted group of those variables and their mutual interactions that were directly relevant to our research aims.

In what regards the marking of the Perfect Preterit in our corpus, <lexical aspect> and <length of exposure> were the two variables, from those significant variables, we analysed for the Perfect Preterit. Our data partially conform to the LAH tenets for the acquisition of tense and aspect morphology, as it is favoured by two of the [+telic] verb classes – achievements and <accomplishments>, but not by <semelfactives>. Also, partially in line with those tenets, the Perfect Preterit is not favoured by the [-telic] class <states>, but is favoured by <activities>.

The significance of the variable <length of exposure>, selected in the VARBRUL analysis, is of particular relevance too, as it falls in line with previous studies, such as Giacalone-Ramat (2002) and Salaberry et al. (2005), which directly relate the marking of tense and aspect morphology to level of proficiency – hence, length of exposure. Our cross analysis of the variable <length of exposure> with <lexical aspect> revealed some congruence with the proposition that the acquisition of the Perfect Preterit morphology progresses from [+telic] classes before spreading to the [-telic] ones. Our results also highlighted the proposal of focusing more attention on form rather than meaning by the earlier stage learners.

As reviewed in Sections 1 and 2, the acquisition of the Imperfect Preterit presents equal, if not greater, difficulties to L2 learners given its higher semantic complexity and specificity (Salaberry, 2005, p. 181). Among the variables selected as significant in the acquisition of this morphology, we chose to analyse and discuss <grammatical aspect> and <type of task>. As for the first, from among the three grammatical aspects of the Imperfective, the <habitual> was the only one

that does not favour the Imperfect Preterit marking. This places our data in line with the general observations on the acquisition of the Imperfect Preterit in other Romance languages, namely, that the acquisition of this morphology in contexts of <continuous> and <progressive> aspects is expected at an earlier stage, whereas the <habitual> is acquired at later stages. As discussed, our data appears to confirm the proposed higher level of semantic complexity presented by the <habitual> for the Imperfect Preterit given the implicit iterativity of that aspectual value, in opposition to the inherent continuity of the imperfective for situations and events (Rocca, 2002). Also, as revealed by our cross analysis of the variables <grammatical aspect> and <length of exposure>, the Imperfect Preterit was favoured by the learners in early stages of the developmental continuum (1–5 years), who predominantly use this marking with [+telic] verbs. This contradicts the LAH tenet sustained for the acquisition of the Imperfect Preterit and also sustained in other SLA studies on Romance languages.

The influence that the type of task may exert on L2 speakers was confirmed in our study, as this was another of the variables considered significant in our VARBRUL analysis for the acquisition of the Imperfect Preterit. In line with such studies, our data strongly point to the fact that a more spontaneous discourse, as invoked by an <interview situation>, disfavoured the use by L2 learners of the Imperfect Preterit. The opposite was found to be true for the variable <oral narrative>, which is inherently less demanding in terms of changes in focus regarding plot and time references. Our overall results for this variable showed that the interview was the least favouring task of the two, even for the more advanced group of learners (>10), who can be expected to be at an optimal stage of management of multiple attentional-related mechanisms for the adequate use of relevant target forms.

We believe that the current study brings new insights to the field of L2 tense and aspect acquisition, as well as to the field of SLA. On the one hand, there is evidence that lexical semantics is important for marking the perfective/imperfective contrast in Portuguese as an L2. This is interesting, since previous studies have focused on analyzing data from linguistic pairs that shared some or many aspectual features, where L1 transfer may be, to a certain extent, a confounding variable, masking possible interactions with others. On the other hand, our study presents evidence that the developmental continuum in SLA is not linear.

The findings from the current study can only lead us forward in search of clearer evidence on SLA development paths, from the perspective of tense and aspect acquisition. Further studies need to adopt a more fine-grained approach to the research design in order to identify other variables that may also play a role on the acquisition of TA categories. An obvious next step is to assess online processing of these categories (authors, forthcoming), and complement research that has been undertaken in that direction (Chan, 2012).

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How learners of Portuguese as an additional language talk about their experience from a cognitive perspective

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This study aims to investigate how international students at a Brazilian university conceptualize their experience of learning Portuguese as an Additional Language (PAL). In the light of Cognitive Linguistics and at an interface with Applied Linguistics, we identify, analyze, and interpret metaphors and metonymies (Cameron, 2003, 2010; Lakoff & Johnson, 1980) that emerge from a focus group discussion of learners of PAL about their experiences. Therefore, we investigate what the PAL learning process is like from an emic perspective. Building on previous work by Ferreira (2014), Gomes Jr. (2015), and Oliveira and Ferreira (2016), results point to the use of conceptual metaphors such as LANGUAGE IS A CONTAINER, CULTURE IS A PARENT, and LANGUAGE IS A COMMODITY.

Keywords: metaphor, metonymies, Portuguese learning

1. Introduction

This year on Mother's Day my little nephew (7 years old) called me and said 'congratulations'. I was caught by surprise, whereas his grandmother corrected him saying I was not a mother, but a professor at a University. Then, he immediately replied 'a professor is the mother of all students'. His thought was motivated by the cognitive metaphor INSTITUTIONS ARE FAMILIES,¹ whose underlying submapping is TEACHERS ARE MOTHERS and STUDENTS ARE CHILDREN. Metaphors and metonymies are everywhere (Lakoff & Johnson, 2003), permeating our daily discourses in society, expressed in a variety of forms. They are both a cognitive and a discursive device, which enable us to conceptualize our experiences.

1. Conceptual metaphors are written in capital letters.

When asked about the experience of learning German as a foreign language, students enrolled in the Foreign Language Program at a public University in Minas Gerais, Brazil, replied using some wonderful metaphors and similes, such as “to know German is like eating a cake with topping,² [...]”, and “Not knowing German is like not missing something you haven’t even tasted, but you might enjoy”,³ whose underlying conceptual metaphor is KNOWLEDGE IS FOOD. Other metaphors, which appeared in students’ talks during the interviews in that preliminary study were “Knowing German is like traveling to an unknown place”,⁴ “Learning German is weird. You feel *lost* at the beginning, but then you get on the right track”,⁵ whose motivating cognitive metaphor is EDUCATION IS A JOURNEY (Edwards, Nicoll, Solomon, & Usher, 2004). Among students’ answers were also some metonymies, for instance “to speak German is to be *inside*, whereas if you don’t speak German, you are *outside*” (Ferreira, 2014), whose underlying motivation is the CONTAINER image-schema (Johnson, 1987). These uses of language provide some evidence of the huge number of concepts motivated by metaphorical and metonymical mappings in people’s minds.

Departing from those preliminary findings, the present study deals with empirical data from Graduate and Undergraduate students, all learners of Brazilian Portuguese in pursuit of acquiring language proficiency in order to take part in the various Graduate and Undergraduate programs available at the Federal University of Minas Gerais, Brazil.

In the present study, we aim to look at the way students talk about their motivations for learning Portuguese as an Additional Language, how they explain their learning process, i.e. how and where they learn and what were their expectations concerning studying abroad, and also regarding their stay at a University in Brazil. Therefore, an emic perspective has been adopted.

Cameron (2003) has pointed out the importance of using metaphor as a pedagogical tool for description, explanation, exemplification, restatement, and evaluation. It has also been claimed that metaphor has a meta-discursive function (Low, Littlemore & Koester, 2008). The present study is an attempt to show how all these notions appear in learner talk. Although there are some studies on teachers’ metaphors about learning and teaching (Cameron, 2003; Edwards et al.,

2. Original in Brazilian Portuguese: “Saber alemão é como *comer um bolo com cobertura*.”

3. Original in Brazilian Portuguese: “Não saber alemão é como *não sentir falta de algo que você ainda não provou para poder gostar*.”

4. Original in Brazilian Portuguese: “Saber alemão é como *viajar para um lugar desconhecido*.”

5. Original in Brazilian Portuguese: “Aprender alemão é *engraçado*. Você *fica perdido* no começo, mas depois começa a se virar.”

2004; Littlemore & Low, 2006), there are not many studies available which show the metaphors used by the learners themselves describing their experiences from an emic perspective (for a study from an emic perspective, see Paiva, 2008), that is from a learner's perspective. Most studies on this topic were carried out with learners of English as a Foreign/ Second Language (Falck, 2012; Ferreira, 2007; Gomes, 2015; Littlemore, Chen, Barnden, & Koester, 2011; Low et al., 2008; Paiva, 2008). Some studies investigating students' experiences on learning a foreign language other than English, for example, Norwegian as a foreign language (Golden, 2012), were conducted using another research methodology, for instance, Golden's study employs a corpus linguistics methodology.

Our aim in this study is to investigate the discourse of learners of Portuguese as an Additional Language from an experientialist perspective, where learners are regarded as part of the environment and in constant interaction with it. Participants describe their experience of learning Brazilian Portuguese as a process, in which they move through paths, journeys, interact with the learning content and project their FL learning experiences and their results into a future life when they will write academic articles in Portuguese, present their research to a PhD committee, and act as a bridge in the business relations between Brazil and their home countries.

Following some of the important tenets of Cognitive Linguistics, especially some studies on metaphor from an Applied Linguistics perspective are reviewed.

2. Research on metaphor/ metonymy and foreign language learning

In an investigation on metaphor and the curriculum, Lawton (1984) classifies curriculum metaphors based on Lakoff and Johnson's (2003) categories, as follows: (a) a curriculum as a building operation; (b) as food; (c) as a plant, since we talk about the core of the curriculum; (d) as a product, for instance, curriculum making; (e) as a commodity, for example, Paulo Freire's banking metaphor (see Berber Sardinha, 2007).

On her study on language learning histories (LLHs), Paiva (2008) investigates personal reflections in LLHs, framed by the 'landscape of learning', which includes educational events, personal experiences, identity issues, beliefs, fears, desires, preferences, as well as personal and institutional relationships. Paiva claims that the learner's view of how languages are learned may provide insights into Second Language Acquisition. The author argues that research which focuses on the learner's experiences helps researchers change from the objectivist to the experientialist paradigm, also helping to understand how languages are learned from the learner's perspective. Paiva (2010) suggests that foreign language learners' narratives give a voice to the learners, who express their experience, memories

and emotions by delivering their own explanations on how they learn or on how they have learned a foreign language. The results of this study present some more evidence, which support this view.

A study carried out by Ferreira (2016) investigated how Brazilian learners in the German for Academic Purposes (GAP) program at a Brazilian federal university interact in their mother tongue about their motivations to learn a foreign language as well as their motivations to participate in study abroad programs. Data were collected using a focus group methodology with one focus group of six students (A1 level according to the Common European Frame of Reference). We conducted a metaphor-led discourse analysis (Cameron et al., 2009) of the data in order to examine metaphors and metonymies, which emerged in the focus group interactions (Cameron, 2003) and looked at how some metaphors and metonymies were co-constructed by participants and appeared systematically in the flow of talk as stabilizations in the system, mainly to conclude a stretch of talk. Procedures included a semi-structured questionnaire, whose questions were used during the data collection.

As Cameron, Low, and Maslen (2010, p. 91) claim, ‘Within the discourse dynamics framework, a systematic metaphor is a collecting together of related linguistic metaphors that evolve and are adapted as the discourse proceeds’. We were able to identify the presence of systematic metaphors such as *LEARNING IS HARD WORK*⁶ and *LEARNING IS JUMPING HURDLES*, intertwined with conceptual metaphors such as *EDUCATION IS A JOURNEY* and *DIFFICULTIES ARE WEIGHTS*. These metaphors point to the motivation for learning verbalized by the Brazilian foreign language learners who took part in this research. The study revealed strong evidence for an interrelation among systematic metaphors and conceptual metaphors, where systematic metaphors in discourse are motivated by cognitive metaphors in thought.

Another study carried out by Ferreira (2014) investigated how university students conceptualize their experience of learning German as a Foreign Language. The conceptual metaphor *LEARNING IS A CONTAINER* appeared in expressions such as, “to speak German is to be *inside*, to not know German is to be *outside*”, “[...] it is to *walk into a labyrinth* and not being able to find the *way out*”, “[...] sometimes to know German is, as if you were *on a lonely island*”. Participants have also expressed their experience with German as a Foreign Language as something negative using discursive metaphors like “...it was a wrong decision *on my part*”. Metaphors, which describe the learning process like “*to bang your head against a brick wall*” point to the difficulties faced by students. In order to express those difficulties, one student talked about “*crossing a river without being able to swim*”. Students

6. Systematic metaphors are written in capital and italic.

have also employed conceptual metaphors such as *LEARNING IS DISCOVERY* and *LEARNING IS TO GO THROUGH HURDLES* to talk about their experience with learning German. Edwards et al. (2004) claim that metaphors of movement and journey introduce a certain spatial relationship to learning, depending upon the emphasis placed on the point of departure and arrival, and the moving experience itself. This claim is based on Lakoff and Johnson's (2003) argument that most of our fundamental concepts are organized in terms of one or more spatial metaphors, and that spatiality is so essential that it is difficult to find any alternative metaphor that could structure the concept, probably due to its abstract characteristics. Hence, spatial metaphors which conceptualized the head as a *CONTAINER* were recurrent in the data.

Oliveira and Ferreira (2016) examined the metaphors that emerged from the learning narratives of international students at a Brazilian public university. Through such metaphors, we seek to better understand how students conceptualize their ability to speak Portuguese as an Additional Language. The corpus for this study was composed of nineteen learning narratives available on the *AMFALE (Aprendendo com Memórias de Falantes e Aprendizagens de Língua Estrangeira)* website, which stores learning narratives of students of various languages. The Brazilian Portuguese learners answered a set of questions relative to their motivations to study the language, their learning difficulties and strategies, and what the learning process has been like. A *top-down* (from thought to language) and a *bottom-up* (from metaphorical expressions to thought) analysis was conducted in order to identify what metaphors had been used and what they reveal about the learners' conceptualization of the learning process. Conceptual Metaphors such as *LEARNING PORTUGUESE IS A JOURNEY* and *LEARNING PORTUGUESE IS A BRIDGE*⁷ emerged from the narratives, revealing interesting aspects about the learners' experiences.

Although we were able to find some studies which investigate students' experiences, emotions and expectations in relation to foreign language learning in Brazil from an Applied Linguistics (Gomes Junior, 2015; Paiva, 2008) and Cognitive Linguistics perspective (Ferreira, 2016, 2014; Oliveira & Ferreira, 2016), there are only a few studies that examine students interactions on learning Portuguese as an Additional Language from both a Cognitive Linguistics and an Applied Linguistics perspective. The authors have decided to further investigate on that topic, raising the following research questions.

7. Prof. Leandro Karnal (UNICAMP) employs this conceptual metaphor of *TEACHER IS A BUILDER* and *EDUCATION IS A BRIDGE* (4:44) in his speech presented in the following video <<https://www.youtube.com/watch?v=ZpRIldxYj74&spfreload=1>>

3. Research questions

The investigation focuses on discourse data produced by participants in focus groups as they engage in talk about their foreign language learning experience in Brazil and abroad. It is of particular interest to analyze attitudes, beliefs and values and how figurative language such as metaphors and metonymies emerge in their talk as participants interact verbally regarding the topic of learning Portuguese as an Additional Language (PAL) and their motivation to study abroad.

Which metaphors and other figurative language appear in learner talk when they try to explain how they learn PAL?

How are those learning practices explained through the use of metaphors and other figurative language that are at play?

Some further related questions:⁸

- What is it like to learn PAL?
- Why do participants learn PAL?

4. Methods

The data were collected from a structured focus group discussion with two groups of learners of PAL (A2 and B1 levels according to the Common European Framework of Reference) at the Federal University of Minas Gerais. Students were requested to answer questions related to their experience with learning a foreign language⁹ in general and, particularly, to elaborate on their experience with learning PAL.¹⁰

We have tried to elicit which metaphors students employ when attempting to explain their learning practices, and also to analyze which learning models underlie such metaphors. Since learning cannot be directly observed, an attempt has been made to describe what someone does when learning an additional language, i.e. which resources learners use. Learners were encouraged to recall their previous learning practices and to relate it to their current experience and motivations

8. Adapted from Silva (2013).

9. Based on Silva (2013).

10. I would like to thank the teachers of PAL at the Faculty of Letters (FALE) at the Federal University of Minas Gerais (UFMG), who allowed us to collect data during their classes in 2015. I also thank Catarina Flister (PROBIC-FAPEMIG) and Guilherme Costa (PIBIC-CNPq), who assisted us with the transcription of the data.

for learning PAL. Learners were also encouraged to talk about their daily routines in Brazil and to establish a parallel with their own culture.

4.1 Participants and procedures

Thirteen voluntary participants aged between 20 and 29 years-old, 9 men and 4 women, students at the Graduate and Undergraduate levels at the Federal University of Minas Gerais (UFMG), Brazil, took part in the study in November 2015.¹¹ In order to promote the discourse interaction during the focus group discussions, one member of the research team acted as a moderator in the discussions. The sessions lasted about 90 minutes. Focus group discussions usually last between 1–2 hours (Dörnyei, 2007). Each session was video recorded,¹² although only the audio part has been used in the analysis presented here. The transcription was double-checked by the research team in order to guarantee accuracy. Pseudonyms were adopted to protect the participants' identities. Students were proficient in Brazilian Portuguese, since they were immersed in the language and culture of Brazil, and they were mostly native Spanish speakers (there was one US-American student in the group). For this reason, the data collection was conducted in Brazilian Portuguese.

The transcribed data were subjected to a metaphor-led discourse analysis (Cameron et al., 2009). The data were coded for metaphors, metonymies, discursive topics, and image schemas. Individual metaphors and metonymies were collected together into groups to find systematic patterns and framing metaphors were identified. The steps followed in the study are explained below.

A modified version of the Metaphor Identification Vehicle (MIV) method as defined by Cameron (2003) has been adopted. Metaphor vehicles were identified and coded. After that, metaphor vehicles were grouped into families. For instance, words or expressions related to foreign language learning were grouped together. Linking categorizations to metaphor vehicles and discourse topics enabled the identification and characterization of the systematic metaphors and metonymies.

A top-down as well as a bottom-up analysis has been conducted in proposing a number of systematic metaphors and metonymies in the discourse of the participants and then linking them to themes across the discourse event, in order to identify the trajectories of possible systematic metaphors.

11. The project was previously approved by the Federal University of Minas Gerais research ethics committee.

12. The recordings were transcribed by two members of the research team using the software for qualitative analysis atlas.ti.

When reading the transcriptions of the focus group discussion, some metaphors and metonymies (i.e. their respective vehicles) were recurrent across the discourse produced by the participants under the discourse topic ‘learning Portuguese as an Additional Language’. Such metaphors seemed to describe student’s beliefs and ideas about the roles ‘Portuguese as an Additional Language’ has played in building their attitudes towards foreign language learning as shown below.

5. Metaphor use in learner discourse on learning Portuguese as an Additional Language

A discourse event like a focus group discussion emerges from the interaction among its participants. The emergent metaphorical language delivers ways of talking-and-thinking (Cameron, 2003), which end up stabilizing in discourse due to the salience of metaphorical language. The discursive topics verified in the interactions among participants were: 1. difficulties of Brazilian Portuguese (BP); 2. different regional varieties of BP; 3. pros and cons of studying in Brazil; 4. assets of the Brazilian culture.

In the following extract, a focus group interaction is analyzed, which clearly shows how the metaphor dynamics evolve and how participants co-construct an idea through the use of subsequent systematic metaphors and metonymies in the flow of talk. As Cameron (2010, p. 6) claims: “our objects of concern are not isolated linguistic metaphors but strings of connected metaphors and the patterns of meaning that they produce or reflect”. Therefore, the goal here is to use metaphors as a research tool in order to uncover people’s thoughts, emotions and beliefs, as shown in the extract below:

Question 1. What is learning Brazilian Portuguese like for you?

Excerpt 1.

- 241 Lupe: [Pois é]..[()] tipo em Avenida Brasil..que eles tinham,
 242 ..os autores eram de diferentes.. partes do Brasil.
 243 aí tinha uns sotaques que eu nem (contratava), tipo..sei lá o que ele falou ((risos)).
 244 Izabel: (é muito rápido).. eu acho que eu sou filha também da Avenida Brasil.

[Lupe: [That’s right].. [()] like in Avenida Brasil, that they had,/.. the authors were from different.. parts of Brazil./ then there were some accents that I didn’t even (contract), like.. I don’t know what he said ((laugh))./ Izabel: (it’s very fast).. I think I’m also a daughter of Avenida Brasil]

In Excerpt (1), Lupe claims that she is also a 'daughter'¹³ of Avenida Brasil'¹⁴ (line 244). This metaphorical expression is motivated by the conceptual metaphor CULTURE IS PARENT, where the metaphor highlights the fact that the participant has learned Brazilian Portuguese watching the Brazilian soap opera in her home country before moving to Brazil. In fact, she agreed with a previous speaker who also mentioned how much language she had learned watching the same soap opera.

Excerpt 2.

- 262 Izabel: mas é, é engraçado porque tipo, é,
 263 ..eu conseguia me comunicar muito bem no laboratório, com o pessoal do laboratório.
 264 pois tipo ia na lanchonete, e eu tinha que repetir uma, duas, três,
 265 ..eu ficava 'estou sem fome' ((sinaliza a ação de ir embora)).
 266 porque a gen-, eu tenho cara de estrangeira, aí 'você é indígena?', 'eu sou'.
 267 aí fica 'mas que língua você fala?' 'mas eu quero comer'. e fica [olhando].

[Izabel: But it's, it's funny because like, it's,.. I was able to communicate very well in the laboratory, with the people of the laboratory./ So like I would go to the cafeteria, and I would have to repeat once, twice, three,..I would go like 'I'm not hungry' ((signals the action of leaving))./because w-, I look like a foreigner, then 'are you indigenous?', 'I am./ Then it goes like 'but what language do you speak?' 'But I want to eat'. And keeps [looking]].

The role of ethnicity and otherness is at play when participants describe how the language they have learned through formal education helps them to improve at school, e.g. Izabel mentions how she manages to communicate in the lab where she carries out her research. However, her Brazilian Portuguese knowledge is not enough when she tries to solve her daily routines, for instance, when she tries to buy some food in a cafeteria. Instead of selling her what she had requested, the clerk would start asking questions about her ethnicity such as, for instance, if she was an Indian and what language she spoke. Izabel, who is a native from Peru, remarked she 'looks like an alien' (line 266). She not only employed a metonymy to refer to her ethnicity, but agreed that her ethnicity brandmarks her as a foreigner, a 'stranger' as we say in Portuguese. She summed up by mentioning that she was only trying to buy some food and that she was hungry (line 267). Apparently, these remarks on her ethnicity, when she was trying to accomplish some daily

13. Linguistic metaphors appear in bold and underlined.

14. Avenida Brasil was a soap opera shown on TV, which took place in a favela. This soap opera became very popular because it was the first time slum inhabitants played the main characters in a soap opera. Another reason for its success was that characters would use a more colloquial register of Brazilian Portuguese.

tasks like buying a snack, led her to some thoughts about her difficulties in feeling integrated in Brazilian society. As Norton (2013) claims in her landmark study on identity and language learning, ethnicity may account for asymmetric relations of power in interactions between language learners and target language speakers, which in turn curtail the learners' possibilities of cultural integration and investment in the language acquisition process. Drawing from Izabel's comments, it is apparent that her ethnicity becomes a significant feature when it comes to either facilitating or hindering interaction with Brazilian society at large. Her comment about the number of times she had to repeat her order at the cafeteria also corroborates Norton's challenge of the widely shared assumption that learner and target language speaker are equally engaged in achieving mutual understanding when interacting with each other. Due to disparate investments in many of these interactions, it is more often on the learner most of the responsibility to ensure mutual understanding (Norton, 2013).

In Excerpt (3), Eric, the only student whose mother tongue is North American English, employs the metaphor *LANGUAGE IS A CONTAINER*, which will be adopted by his interlocutor Ernesto in Excerpt (4). Ernesto explains how he has another 'personality', 'more *open*' (lines 500, 501) in Brazil, since it is common for people to start talking to each other when standing in a line for example, which he regards as unusual cultural behavior in Mexico, where he comes from. Both participants co-construct a systematic metaphor in the flow of talk, which is *LANGUAGE IS A CONTAINER (FOR DIFFERENT MENTALITIES)*. Eric claims that he has two 'mentalities' (line 475), that is one in English, his mother tongue, and another one in Brazilian Portuguese, as shown in the following excerpts.

Excerpt 3.

- 474 Eric: ... mas, acho que algo positivo que é muito interessante é que e- eu tenho,
 475 eu tenho dois menta-, duas mentalidades agora.
 476 Eu tenho minha mentalidade (.) em inglês, minha em português.
 477 Elas são (.) muito separadas porque a, bom quando estou falando em português (.), eu estou pensando (.) em português.

[Eric: ...but, I think that a positive thing that is very interesting is that I- I have, /I have two menta-, two mentalities now./ I have my mentality (.) in English, my mentality in Portuguese./ They are (.) very separated because the, well when I'm/ speaking Portuguese (.), I'm thinking (.) in Portuguese.]

According to Ernesto (lines 499, 500), when living in Brazil, where there is a 'more *open*' cultural behaviour, you also need to 'adapt to the culture'.

Excerpt 4.

- 497 *Ernesto*: a personalidade também, você adota outra personalidade em português.
 498 você não é a mesma pessoa em es-, bom eu não sou pelo menos, tô falando por mim,
 499 eu não sou a me- eu não tenho a mesma personalidade em espanhol do que em
 português.
 500 português sou bem diferente..tento dizer sei lá, muito aberto porque aqui a cultura é
 que você seja assim aberto.
 501 ...então acho que ..também isso é um pouco, você se adapta à cultura também.
 502 acho que é positivo.

[*Ernesto*: the personality also, you adopt another personality in Portuguese./ you are not the same person in Sp-, well at least I'm not, I'm speaking for myself,/I'm not the sa- I don't have the same personality in Spanish that I do in Portuguese./ Portuguese I'm very different (.) I try to say who knows, very open because here the culture is that you are open like that./ ...So I think that ..that it's also a little, you adapt yourself to the culture also./ I think it's positive. [...]]

In Excerpt (5), Ernesto (line 323) talked about 'entering in the Brazilian culture', where he mentions 'culture' as part of the Brazilian language. Hence, Ernesto keeps building with the other participants the systematic metaphor *LANGUAGE AS A CONTAINER* for culture (line 323, 324).

Excerpt 5.

- 323 *Ernesto*: Mas além disso você quer parecer ..pelo menos ..não sei, entrar na cultura
 brasileira,
 324 falar diferente como nativo ..então tem que fazer ..às vezes,

[*Ernesto*: But besides that, you want to look ..at least ..I don't know get into the Brazilian culture./ speak differently like a native ..so you have to do ..sometimes,]

Both Eric's and Ernesto's comments about entering the Brazilian culture and having a different "mentality" (Excerpt 3) or "personality" (Excerpt 4) when speaking Portuguese point to the reality of the fluctuating nature of identities (Canagarajah, 2010). Because identities are not static but fluid, it is possible for one to adapt to various cultures and shift between communities. It is even possible, in Eric's own words, to have "two mentalities", which are "very apart" (Excerpt 3).

On a similar note, Ernesto says he is more "open" in Portuguese than in Spanish because he believes that "here [Brazil] the culture is that you are open like that" (Excerpt 4). His metaphorically expressed desire, as denoted by the use of the verb "want", to "get into the Brazilian culture" (Excerpt 5) derives from his ultimate desire to achieve community (Canagarajah, 2010) in that new culture. As Canagarajah (2010, p. 48) claims, "community is not given but achieved", and we

posit that whether or not it will be achieved depends heavily, though not entirely, on the person's ability to adapt to the community's culture or, metaphorically speaking, to get into the culture.

In line 484, Priscila mentions the good side of learning Portuguese in Brazil, where you also have access to 'learning the culture' (line 485), and 'culture is [...] part of the language'. However, she also refers to the culture shock she had when arriving in Brazil. She had previously learned Portuguese in Mexico, but when she arrived in Brazil, she realized that her Portuguese knowledge was not enough. She even claimed that she does not 'speak Portuguese'. In fact, she believes she does not.

Excerpt 6.

484 *Priscila:* .. eu acho que algo positivo.. de aprender.. português aqui no Brasil é,
485 ..que você conhece a cultura. Que a cultura também uma coisa que é,
486 ..parte da língua, então conhecer tudo isso eu acho que é algo muito legal.
487 ..É negativo eu só acho aquele choque.. cultural.
488 que quando você acha que fala português chega aqui, e não fala português.

[*Priscila:* (.) I think that something positive.. about learning.. Portuguese here in Brazil is/..that you know the culture. that the culture is also something that is,/ ..part of the/ language, so to know all that I think is something very cool./ ..It's negative I think only that culture.. shock. /that when you think you speak Portuguese you arrive here, and you don't speak Portuguese.]

Question 2. Why are you learning PAL?

In Excerpt 7, Davi conceptualizes the knowledge of Portuguese as a commodity that he will take back to Argentina. Davi's utterance expresses through the use of metaphors such as 'opportunity' an instrumental view of the language (Mericka, 2015), which conceptualizes LANGUAGE AS A COMMODITY (Sardinha, 2007) and IDEAS ARE OBJECTS (Lakoff & Johnson, 2003), as you can see below.

Excerpt 7.

444 Davi: Eu vou levar pra Argentina e isto para mim dá a oportunidade de voltar
amanhã a estudar,
445 de conseguir arrumar bolsa.. ou lá na Argentina tem (um pessoa aconselhado ter
isso).
446 [muita] gente não tem lá.

[*Davi:* I will take it to Argentina and that gives me the opportunity to come back tomorrow to study,/ to get a scholarship.. or there in Argentina there is (a person advised to have that)./ [many] people don't have it there.]

Both Davi (line 444) and Ernesto (line 461) systematically employ the verb ‘*take*’ as a metaphor referring to how the knowledge of Brazilian language and culture can give access to the world of business opportunities. Hence, the verb ‘take’ is employed metaphorically as a means of transportation to this new world, that is, this knowledge is conceptualized as *COMMODITY*.

Excerpt 8.

- 461 Ernesto: Eu também tô *levando o português* pro meu país, acho que,
 462 a minha cidade tem ..agora tá aparecendo muita pessoa que fala em português na
 minha cidade,
 463 porque tem negócio com o Brasil ..então acho que vai ser uma *oportunidade*,
 464 ..pra eu poder trabalhar nessas companhias e dizer para eles,
 465 “eu tive a experiência de ter morado no Brasil (.), de conhecer um pouco a *cultura*
 então.”

[*Ernesto*: I am also *taking Portuguese* to my country, I think,/ my city has.. now many people who speak Portuguese are coming to my city/ because there is business with Brazil.. so I think it will be an *opportunity*/ for me to work in these companies and say to them/ “I had the experience of living in Brazil (.), so of knowing a little about the *culture*.”]

This instrumental view of the language suggests that the learners understand that by knowing Portuguese they will increase the value of their cultural capital (Bourdieu, 1997), which in turn will help them increase both their symbolic and material resources (Norton, 2013). In demonstrating to his potential employers that he “had the experience of living in Brazil”, and therefore “of knowing a little about the culture” (Excerpt 8), Ernesto asserts that he has had access to cultural capital others may not have had, and that in having it he is in a better position to understand and function according to the modes of thought and interaction that characterize Brazilian culture or, more specifically, Brazilian business culture. After all, “[linguistic] competence (like any other cultural competence) functions as linguistic capital in relationship with a certain market” (Bourdieu, 1977, p. 651). Like any form of capital, some people have it while others lack it. This reality resonates in Davi’s comment: “Many people don’t have it there” (Excerpt 7).

As in the study my team conducted with learners of German for Academic Purposes (Ferreira, 2016), students in the present study also talked about Brazilian Portuguese in terms of *OBJECTS* they can pick up (Ernesto, line 461) and *KNOWLEDGE* as an object they can carry (Davi, line 444).

6. Final remarks

The present study has investigated how learners of Brazilian Portuguese as an Additional Language conceptualize their language learning experience. From a cognitive perspective, data from the focus group discussions reveal metaphorical expressions motivated by the following conceptual¹⁵ and systematic metaphors:¹⁶ LANGUAGE AS A COMMODITY, LANGUAGE IS A CONTAINER, CULTURE IS A PARENT, LANGUAGE IS A CONTAINER (FOR DIFFERENT MENTALITIES).

These metaphors reveal that culture plays an important role not only in the language learning process but also in the outcome of the process. As learners come in contact with the target culture (via a Brazilian soap opera, for instance), they acquire a new language at the same time that they acquire a new identity as a result of the learning process. If, metaphorically speaking, culture can be considered a ‘parent’, it is sound to say that its ‘child’ (the learner) will inherit characteristics that will shape his or her new identity. Such a heritage is often conceptualized in terms of a container, as in LANGUAGE IS A CONTAINER (FOR DIFFERENT MENTALITIES).

Nevertheless, “being born” in the target culture does not necessarily entail being fully integrated in it, as Izabel’s comments about the interaction issues raised by her ethnicity point out. Hence, though the language learning process is culture-bound, cultural integration is bound by variables that go beyond culture. Our data, as well as studies like the one carried out by Norton (2013), suggest that ethnicity may account for one of these variables in some lived experiences.

The study also reveals an instrumental view of Brazilian Portuguese. The metaphor LANGUAGE AS A COMMODITY was recurrent when participants talked about the reasons they studied the language. This metaphor corroborates theories of cultural and linguistic capital (Bourdieu, 1977; Bourdieu, 1997).

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15. In capital letters.

16. Written in italic.

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PART 3

Linguistic results informing PAL instruction

Implementing the concept of ‘pedagogic mediation’ with the use of language corpora for the teaching of Portuguese as an L2 or L3

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Despite the salient benefits of using language corpora to guide and promote second language acquisition, it is not a straightforward proposition to develop a pedagogical approach based on the use of a language corpus. In the present chapter, we address the implementation of Flowerdew’s concept of “pedagogic mediation” through the use of a guided-induction, corpus-based approach to the teaching of Portuguese as a third language to speakers of Spanish and English. We use a contrastive approach and focus on linguistic properties that are systematically different in Portuguese and Spanish and that could potentially be subject to negative crosslinguistic influence.

Keywords: language corpus, deductive, inductive, guided induction, Portuguese, C-ORAL BRASIL

1. Introduction

Almost 20 years ago, Carter (1998, p. 64) predicted that the concept of corpus-based pedagogical approaches to L2 teaching would take some time to take shape: “The best corpus-based language teaching represents an evolution which, I predict, will be seen to be radical only after several years have passed.” Since then, there have been important changes both on the definition of language depicted by a corpus-based approach, and the procedures used to provide learners with access to the data that can guide their learning processes. Carter’s prediction about the relative contribution of corpus-based pedagogical practices will be analyzed in the context of recent developments in the theory and practice of the use of language corpora for L2 teaching and learning. To do so, we frame our discussion within the context of two basic concepts: pedagogic mediation (Flowerdew, 2009) and reflection-in-action (Schön, 1983).

In the present chapter, we address the implementation of Flowerdew's concept of "pedagogic mediation" through a guided-induction, corpus-based approach to the teaching of Portuguese as a third language to speakers of Spanish and English. The procedure to obtain the pedagogic mediation with the selected language corpora follows Schön's (1983) "reflection-in-action" approach to design: the initial selection of samples from the language corpus leads to the identification of target data for analysis and practice, effectively creating a syllabus that reverses the traditional rules-then-data approach. The benefit of this approach is that the definition of language is constrained – by design – by the data from the corpus, thus making the representation of language more realistic and viable towards actual language use.

The focus on Portuguese is relevant given the dearth of appropriate materials for the teaching of this target language to Spanish speakers in general (not just in the USA but in Brazil and even some Spanish-speaking countries as well). Furthermore, the teaching of a language that is typologically close to the L1 /L2 of the learner presents additional challenges given the apparent gap between receptive and productive abilities: Spanish speakers develop very quickly at the beginning, mainly on their receptive abilities, however they have a higher tendency to fossilize in their production of the L2/L3 (Almeida Filho, 1995, 2004). We focus on the analysis of both linguistic constructs and interactional abilities that are systematically different in Portuguese and Spanish and that could potentially be subject to negative crosslinguistic influence. An example of the former are the different syntactic structures of the Portuguese *gostar* and Spanish *gustar*, which share a similar semantic structure (Groppi, 2013). The curricular approach to *gostar* is specifically addressed in Section 4.2. With regards to contrasts in interactional competence we focus on politeness in request and refusal sequences in Portuguese while contrasting similar refusal strategies in Portuguese and Spanish (Serrani-Infante, 1994). The steps of the analysis are designed to help learners observe and identify crosslinguistic differences within the discourse-pragmatic domain, employing the same procedures used with more traditional grammatical items. The curricular approach to request and refusal sequences is specifically addressed in Section 4.3.

2. The use of a language corpus to teach an L2

Biber, Conrad, and Reppen (1998, p. 12) define a language corpus as "a large and principled collection of natural texts." McEnery, Xiao, and Tono (2006, p. 4) define a corpus more precisely as a "body of naturally occurring [written or spoken] language ... which may be annotated with various forms of linguistic information."

For L2 teaching and learning, the main benefits of a language corpus are (a) access to exemplars of the L2 in context, and more importantly, (b) access to information about the frequency of use of those items along with the patterning of those uses in the context of other language items.

Despite the salient benefits of using language corpora to guide and promote second language acquisition, there is no straightforward procedure to develop a pedagogical approach based on the use of a language corpus. Meunier (2002, p. 135), for instance, points out that “Concordances offer an ideal (and visual) way of helping learners discover the patterned nature of language.” On the other hand, she also cautions about the limitations of traditional corpus-based pedagogical techniques: “concordances offer access to limited context, not suitable for an approach to tenses which requires access to general principles of grammar at a textual level” (p. 138). Similarly, Braun (2007, p. 324) proposes “to move away from, or beyond, ‘classic’ concordance-based activities ... to foster exploration, knowledge construction and eventually the development of greater autonomy ...” Thus, the pedagogical implementation of corpus-based activities requires a level of analytical skill that needs to be part of any corpus-based activity (Braun, 2007). Corpus-based learning also poses important logistical challenges for learners, especially with regards to the time-consuming task of processing large amounts of data to identify lexicogrammar rules and usage patterns (Liu & Jiang, 2009). Given the above-mentioned challenges, the pedagogical use of language corpora requires “pedagogic mediation” (Flowerdew, 2009). That is, teachers may need to make explicit the connections between language samples (from language corpora) and the specific features or language categories represented in said samples so that they can use such guidance to progress more quickly – or simply to be able to process the data.

2.1 Direct and indirect uses of language corpora

Römer (2011) distinguishes two major conceptual dimensions to understand the relevance of corpus-based pedagogy: Direct and Indirect uses of corpora. The former are represented by the direct analysis of language data by teachers and/or learners (i.e., *how* to teach), whereas the latter addresses the questions of *what* to teach and *when* to teach it, thus having an “effect on the teaching syllabus and the design of teaching materials” (p. 206). McEney & Xiao (2011, p. 374) describe the consequential relevance of the theoretical distinction made by Römer pointing out that “corpora appear to have played a more important role in helping to decide *what* to teach (indirect uses) than *how* to teach (direct uses).”

2.2 Indirect uses: WHAT to teach

For McEney & Xiao (2011, p. 367), “a simple yet important role of corpora in language education is to provide more realistic examples of language usage that reflect the complexities and nuances of natural language.” This is nowhere clearer than in the comparative analysis of the examples of language use depicting oral communication in most language textbooks and samples of actual language use in the spoken mode. O’Keefe, McCarthy, & Carter (2007) rely on large databases of English spoken language to showcase the wide gap between traditional textbook examples and natural language speech samples. For instance, in Chapters 7 and 8 O’Keefe et al. bring up the notion of listenership, whereby communicative interaction is portrayed as a two-way speaker-hearer process. Along the same lines, in Chapter 8 they describe prevalent interactional features of spoken language that are rarely addressed in most L2 textbooks (e.g., small talk, conversational routines, hedging, vague language, creative language, etc.).

Numerous studies using language corpora have provided empirical support for the proposal advanced by O’Keefe et al. Mindt (1996, p. 232), for instance, described the presentation of several salient English grammatical topics (modal verbs, future tenses, and conditionals) in several widely used L2 English textbooks in Germany. His conclusion was that the presentations of the above-mentioned topics in textbooks “have been based on tradition and intuition rather than on empirical evidence” (p. 245). Even though the main objective of L2 English learning in German schools is communicative interaction in the spoken mode, L2 learners “very often find it hard to adapt to the English used by native speakers” (p. 232). Along the same lines, and analyzing data from textbooks used in the US educational setting for ESL instruction, Biber, Conrad, & Reppen (1998, p. 237) claim that “there are strong patterns in the conditions of use for subject position *that*-complement clauses. A review of several ESL textbooks showed, however, that learners often get no explanation of these conditions of use.” The access to large databases of natural spoken language – as proposed by O’Keefe et al. – provides a baseline data that shows that spoken grammars (types of spoken language use) are shaped by interactional factors that should lead to a reconceptualization of the definition of language. Consequently, the design of a spoken language corpus leads us to identify more precisely the target theoretical construct of (i.e., sociolinguistic and sociocultural contextualized language representation) across settings of language use.

3. Theory- and data-driven approaches: Deductive and inductive processes

Tognini-Bonelli (2001) proposed a distinction between corpus-based and corpus-driven approaches to conduct linguistics research. A corpus-based approach is used “to expound, test or exemplify theories and descriptions” of language (Tognini-Bonelli, p. 65). In other words, a corpus-based approach is theory-driven, and thus, may be criticized for its selective analysis of the data provided in a corpus. In contrast, in a corpus-driven approach the patterns reflected in the data of the corpus determine what is regular or exceptional in the language corpus: “recurrent patterns and frequency distributions are expected to form the basic evidence for linguistic categories” (*ibid*, p. 84). The specific contrast in the use of language corpora singled out by Tognini-Bonelli (i.e., theory-driven or data-driven) within the realm of linguistics research parallels a similar theoretical distinction that is crucial for understanding the variety of methodological approaches proposed for the pedagogical uses of language corpora.

3.1 Deductive and inductive approaches

Traditional deductive approaches to the analysis of the L2 rely on the selection of brief excerpts of the L2 to showcase linguistic features of the L2 (typically at the sentence level) singled out for presentation and practice of the given target item. The strategic choice of specific features of the L2 to be highlighted for learners in a specific language corpus purposefully “biases” the learner towards noticing selected linguistic features in the naturally-occurring sample of a language corpus. This is the theory-driven approach identified by Tognini-Bonelli and defended by Cook (1998, p. 61) within the realm of pedagogical claims:

The issue still remains how to simplify and stage the language presented to learners, and to simplify the rules used to explain it, in a way which will enable them to come gradually closer to native speaker use (if that is their goal). Surely, the point of grammars and textbooks is that they select, idealize, and simplify the language to make it more accessible?

Within a theory-driven approach, teaching by definition entails the selection, categorization and conceptualization of language above the level of simply “counting” and classifying language data. Seidlhofer (2002, p. 230) says as much while describing the use of concordances in the L2 classroom: “this way of working will always include the consultation of L1 corpora and descriptions based upon them.” In essence, the notion of pedagogical scaffolding and support integral to a theory-driven approach need not be seen as antithetical to corpus-based approaches in

general. In fact, while making the case for a distinction between corpus-based and corpus-driven perspectives in linguistics research, Tognini-Bonelli clarifies that a corpus-driven methodology “is not mechanical, but mediated constantly by the linguist, who is still behaving as a linguist and applying his or her knowledge and experience and intelligence at every stage during this process” (ibid, p. 85). In other words, it is not easy to distinguish what defines a corpus-driven approach from a theory-driven approach.

In a (pure) corpus-driven approach learners are expected to identify features of the L2 that are representative of the corpus. This is mostly accomplished through the analysis of patterns prompted by frequency of distribution of linguistic items: “data is approached without any pre-conceived notions in relation to how it should be analysed” (Flowerdew, 2009, p. 394). This perspective was first advanced by Johns (1991) who identified three stages of inductive reasoning with corpora in the data-driven learning (DDL) approach: observation (of concordanced evidence), classification (of salient features) and generalization (of rules). Along the same lines, Carter & McCarthy (1995, p. 155) proposed a similar idea that they called the ‘three I’s’ (Illustration – Interaction – Induction). ‘Illustration’ meant reviewing and describing real data; ‘interaction’ was implemented through discussion to share opinions and observations among students; and finally, ‘induction’ required making one’s own rule for a particular feature.

3.2 Guided induction

Flowerdew (2009, p. 407) proposed that we add another step to the processes proposed by Johns and Carter & McCarthy that she called “intervention.” Citing the work of Celce-Murcia (2002), Flowerdew poses the problems faced by L2 English learners in understanding complex conceptual aspects of the L2. She provides the example of learners’ inability to identify a pattern for ergative verbs in L2 English data (i.e. the use of “was decreased” versus “has decreased”) based on the analysis of concordance lines alone. Flowerdew concluded that it was necessary “to supply prompts of hints to enable learners to work out the tendencies of phraseological patterns” (p. 406). She further states that we use metadata to make corpus-based samples of language “pedagogically-accessible” for learners and to help learners analyze the L2. Essentially, Flowerdew argued for a type of guidance that would provide a sense of direction to the discussions and analysis of learners as they come up with their own generalizations about language data.

The notion of guidance is best conceptualized as a construct that is one component of a continuum of pedagogical options using Decoo’s (1996) classification of modes of inductive learning:

1. Deduction
2. Explicit guided induction (structured data & metalinguistic awareness)
3. Explicit guided induction (structured data with input enhancement)
4. Implicit guided induction (structured data)
5. Frequency-based induction (direct samples of language data in context)

A primarily guided induction approach maintains the focus on *active learning* required from learners as they actively peruse and analyze language data to form their own hypotheses at the same time that they are provided with guidance as to the significance of specific features of linguistic data.

Several studies have provided empirical evidence for the benefit of some type of guided induction (e.g., Haight, Herron, & Cole, 2007; Herron & Tomasello, 1992; Rose & Ng, 2001; Takimoto, 2008; Vogel, Herron, Cole, & York, 2011). Even though there have been several critiques about the benefits of induction in general (e.g., Mayer, 2004) and even guided induction (e.g., Kirschner, Sweller, & Clark, 2006), those critiques tend to focus mostly on the inductive side of the continuum presented above, or on very limited levels of instructional guidance.

4. Applications of guided induction activities with Portuguese

4.1 Description of C-ORAL-BRASIL

Our guided-induction approach to an L3 Portuguese curriculum draws a significant amount of data from C-ORAL-BRASIL, a corpus of spoken Brazilian Portuguese. Initiated in 2007, C-ORAL-BRASIL was developed in the “*Núcleo de Estudos em Linguagem, Cognição e Cultura*” of the “*Laboratório de Estudos Empíricos e Experimentais da Linguagem*” from the *Faculdade de Letras of Universidade Federal de Minas Gerais UFMG*, (Raso & Mello, 2012, p. 27). The corpus data and metadata are available on DVD and were made available to the authors of this chapter for incorporation into Portuguese for Speakers of Spanish curriculum at Rice University. According to Cresti and Moneglia, C-ORAL-BRASIL is geographically delineated to the metropolitan area of Belo Horizonte, in the state of Minas Gerais (Raso & Mello, 2012, p. 19), although some speakers are from other regions of Brazil.

Figure 1.1, reprinted from Raso and Mello (2012, p. 27), shows the composition of the corpus. The diversity of speakers and contexts is one of the most striking features of C-ORAL-BRASIL, even when restricted geographically to “*fala mineira*” (Cresti & Moneglia, 2012, p. 19).

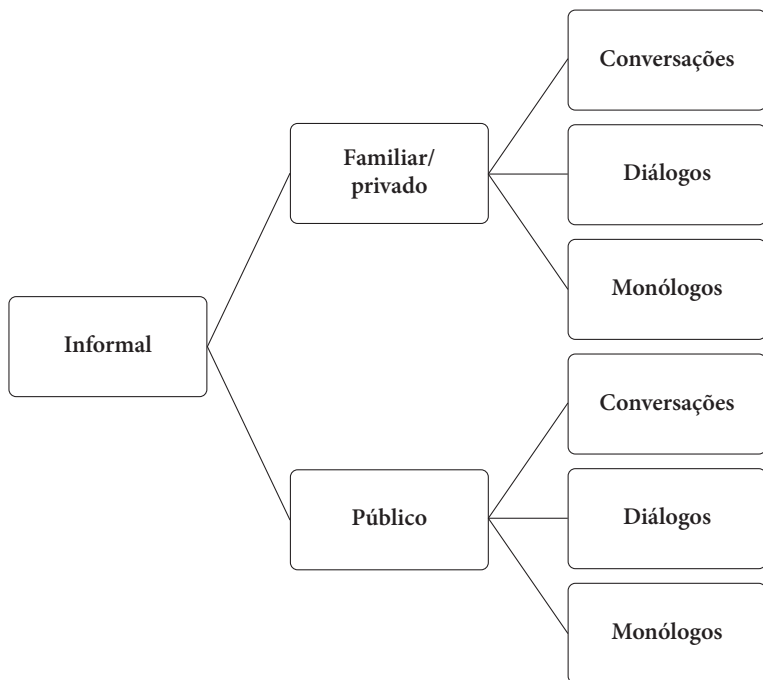


Figure 1.1 Organization of C-ORAL-BRASIL

C-ORAL-BRASIL is designed for scientific study rather than pedagogy,¹ and required significant mediation before reaching students. While we did not produce new data transcriptions, the shift to the classroom required us to choose which written conventions (detailed in Mello, Raso, & Mittmann, 2012) to maintain, and which to change. The dialogic turns were kept the same, since the corpus prioritized “*a manuten o de uma seq encia unit ria para preservar o turno dial gico de cada falante*” [“maintaining a unitary sequence to preserve the dialogic turn of each speaker”] (Cresti & Moneglia 2012, p. 18), which we found appropriate for pedagogical application. However, we chose to present learners with normative spelling and orthography, which entailed modifying the transcription when it selected “*uma representa o ortogr fica n o padr o da palavra*” [a non-standard orthographic representation of the word] (p. 20). In addition, we omitted text mark-ups. For example, the activity discussed below in Section 4.2 adapts a transcription from C-ORAL-BRASIL file “bfamnn08” (Family, Dialogue), as shown in Table 1.1.

1. That is not to say that there were no pedagogic applications inherent in C-ORAL-BRASIL. The corpus is based on C-ORAL-ROM, which listed learning as one of its explicit motives (Cresti & Moneglia 2012, p. 14).

Table 1.1 Modification of transcription

Transcription from C-ORAL-BRASIL	Transcription used in Portuguese curriculum
“bom // eu nũ sugiro jantar / sem a pessoa me falar que que ela gosta de comer”	“bom, eu não sugiro jantar sem a pessoa me falar que que ela gosta de comer”

The pedagogically-optimized transcription omits the text mark-ups, and changes the spelling of the negator from the non-normative “*nũ*” to the normative “*não*.” Such change may be thought of as provisional, since the curriculum project aims to more substantively bridge scientifically-rigorous linguistic study with student learning. Preparing students to generalize rules from non-normative spellings and prosodic information remains an important future development for the pedagogical mediation of corpus data.² In addition to primary data from C-ORAL-BRASIL, the Portuguese curriculum incorporated the corpus metadata, as will be observed in Figures 1.2 to 1.7 in the following section.

4.2 Teaching the syntactic structure of *gostar* using a teacher-corpus approach

Our particular use of the corpus C-ORAL-BRASIL is primarily defined as a teacher-corpus approach (Romer, 2011). In other words, the corpus data are not presented in their entirety for learners to search. Rather, the instructor selects, enriches, and sequences corpus data to design activities that address specific pedagogical aims. Accordingly, the activity described in this section makes extensive use of a single corpus recording, rather than of short samples from a wider selection of the corpus (as in Gabrielatos, 2005). As Meunier (2002, p. 135) points out, a widened conversational context is preferable for teaching grammatical principles; in this case, the syntactic structure of *gostar*. Using an extended corpus recording to design activities can be an especially time-intensive process for elementary levels, since corpus speakers often use naturalistic and/or non-standard forms that prove difficult for learners, and because target linguistic forms may not appear often enough within a single conversation. The activity implicitly leads learners to contrast the syntactic structure of the Portuguese *gostar* with the Spanish *gustar*.

The curricular context for the activity with *gostar* is in a course on Portuguese for Speakers of Spanish. The activity is found in Unit 4, “Passaporte Cultural.” Each unit lasts 3 to 5 50-minute class sessions, with approximately one hour of

2. Another important direction for the pedagogic mediation of corpus data in our Portuguese L3 course is interlinguistic comparison. As C-ORAL-BRASIL continues the project of C-ORAL-ROM, it is expressly relevant for crosslinguistic study: the corpus provides “dados mais estritamente comparáveis para o estudo da realização oral da linguagem em nível interlinguístico” (Cresti & Moneglia 2012, p. 14).

homework per class section. In the previous unit (“*Meu dia-a-dia*”), learners used corpus data as well as near-authentic materials, and formed lexical and grammatical features that specifically prepare them for the guided induction of *gostar*: regular verbs, food vocabulary, and contractions with prepositions (“de” + definite articles). The careful sequencing of data within the curriculum sequence leads to more effective pre-activities, in which learners activate their previous knowledge.

In this case, the pre-activity shown in Figure 1.2 forms part of the “presentation stage,” in which the teacher “establishes a context or situation and elicits appropriate language, asking concept questions to check understanding of form, meaning, and use” (Gollin, 1998, p. 88).


As sugestões da chefe

Vamos assistir a alguns trechos de uma conversa entre as irmãs Heloisa e Heliana, do estado de Minas Gerais. Heloisa é a chefe num restaurante em Belo Horizonte, onde bate um bom papo com a Heliana.


Escute os quatro trechos da conversa e indique onde se encontram as palavras e frases.

jantar	comida	carne	peixe
frango	verdura	frutos do mar	


A




B



C



D



Trecho A	Trecho B	Trecho C	Trecho D
ex. jantar			

Figure 1.2 Students complete pre-activity with raw data


The pre-activity activates the food vocabulary learned during Unit 3. In this way, the pre-activity offers learners a non-intimidating point of access into the raw, unenriched data. Although the speaker uses complex and non-standard forms in the data (relative to the learners’ still developing L2), a carefully-designed task that solicits vocabulary already known allows the lesson sequence to avoid adapting the data itself. Following the activation of previous knowledge, the activity with *gostar* follows the guided induction format, thus taking advantage of the pedagogical

benefits of authentic corpus data. During the activity, learners observe authentic oral data (also included in Figure 1.2); seek a pattern in an enriched transcription of the data (Figure 1.3); analyze the data to form generalizations (Figure 1.4); and practice with additional authentic data from the corpus (Figure 1.5). The pattern sought in the data, in this case, implicitly leads learners to contrast differences between Spanish and Portuguese. The guided induction format is then repeated (Figure 1.6 and 1.7), to treat a special case of ‘gostar’.

As shown in Figure 1.2, at first learners receive a thematic description of the recordings, adapted from the corpus metadata (metadata for file “bfamnn 08”). To initiate guided induction, learners are not informed ahead of time what language item they will learn. During the pre-activity, students hear the four recordings multiple times. As can be observed in the playback icons, the recordings are quite short, varying from 2 to 8 seconds in length. The second step, depicted in Figure 1.3, repeats the presentation of the data, but this time the recordings are accompanied by transcriptions that enrich the target form (*gostar* with its subject and object arguments) with bold lettering. The instructor once again plays the recordings, and students are invited to follow the transcription as they listen.


Agora assista aos mesmos trechos da conversa e acompanhe a transcrição. Preste atenção às frases **em negrito**, com o verbo *gostar*. Que verbo em espanhol corresponde a *gostar*?

A

 00:00:04


Eu não sujiro jantar sem a pessoa me falar que **ela gosta de comer.**

B

 00:00:08


porque **cada um** tem um...uma afinidade com um tipo de coisa, **gosta de um tipo de comida**

C

 00:00:04

ela tem que falar assim de que que ela gosta, **se ela gosta de carne, se ela gosta de peixe, se ela gosta de frango, se ela gosta de verdura**

D

 00:00:03

eu gosto de fazer a [paella] de frutos do mar

Figure 1.3 Students seek a pattern in an enriched transcription of the data

After observing the data first in raw audio form and then with enriched text, learners individually respond to a series of prompts (Figure 1.4). The prompts are strategically designed as “intervention” (Flowerdew, 2009, p. 406): by asking learners to identify the subjects and objects of *gostar* in the corpus examples, as well as the differing syntax of the preposition *de*, the questions implicitly target Spanish-Portuguese contrast. While they are working through the questions, the enriched text is still available for viewing. After using the questions to analyze the data, learners collaborate to form a syntactic generalization. Since all four of the examples follow the pattern targeted by the questions, learners receive sufficient linguistic information to form the desired generalization, without having received an explicit grammatical explanation from the textbook or the instructor. Both these steps appear next to the “thinking” icon that learners recognize from the previous lessons, which signals the guided induction structure and reinforces a routine.

Leia de novo as frases de Heloisa e responda as perguntas.

A Eu n o sugiro jantar sem a pessoa me falar que que **ela gosta de comer**.

B porque **cada um** tem um...uma afinidade com um tipo de coisa, **gosta de um tipo de comida**

C ela tem que falar assim de que que ela gosta, **se ela gosta de carne, se ela gosta de peixe, se ela gosta de frango, se ela gosta de verdura**

D **eu gosto de fazer** a [paella] de frutos do mar

- No exemplo A, o verbo gostar expressa a prefer ncia de quem?
Heloisa Heliana A pessoa
- No exemplo D, o verbo gostar expressa a prefer ncia de quem?
Heloisa Heliana O cliente
- Que palavra vem depois do verbo gostar nos quatro exemplos?
- No exemplo C, quem   o sujeito do verbo gostar?
“Ela” “carne, peixe, frango, verdura”

Com um parceiro, escreva uma regra para o uso do verbo *gostar*. Depois, vamos comparar as nossas conclus es com a turma. Chegaram   mesma conclus o?

Regra: o uso do verbo *gostar*

Figure 1.4 Students analyze the data to form generalizations

In the activity step depicted in Figure 1.4, students use the syntactic generalization that they produced to fill in short cloze exercises based on other data from other conversations in C-ORAL-BRASIL.

Vamos praticar individualmente com outros exemplos reais. Escolha a forma de gostar nas seguintes frases.

A
Gilberto: Eu _____ minha família¹

B
Pâmella: Que tipo de música você gosta?
Isabela: Pop
Pâmella: Eu _____ música internacional²

C
Claudia: Ela não _____ surpresas³

D
Plauto: Eu _____ Estúdio Bar⁴

¹ fonte: C-ORAL-BRASIL arquivo "bfamev09"
² fonte: C-ORAL-BRASIL arquivo "bfamd113"
³ fonte: C-ORAL-BRASIL arquivo "bfamev30"
⁴ fonte: C-ORAL-BRASIL arquivo "bfamev24"


Figure 1.5 Students apply their generalization to additional authentic data

After learners have formulated and utilized their linguistic generalization for the syntactic structure of *gostar*, the guided induction process is repeated, as shown in Figures 1.6 and 1.7. Students return to the original conversation to observe additional examples that feature a special case in which the object of *gostar* is implicit. As before, learners observe the data, consider questions that target Spanish-Portuguese contrastive analysis, form a generalization, and practice with additional corpus data.

Agora, vamos voltar à conversa das irmãs para observar alguns casos do verbo gostar que funcionam de uma maneira um pouco diferente.


E

Bom, eu acho que o salmão que...que eu sirvo aqui é bom.
Todo mundo gosta.



F

mas as pessoas gostam por causa da combinação do ... da redução do aceto balsâmico



Com um parceiro, responda:

Qual são as diferenças entre os exemplos A-D e os exemplos E-F?

Figure 1.6 Second guided induction sequence, part 1

Nos exemplos E-F, o verbo gostar não é seguido nem por um verbo nem por um substantivo. Quer dizer, nestes exemplos o item ou atividade preferida fica *implicito*. Nos dois exemplos, já sabemos que Heloisa está falando do salmão, e ela não tem que repetir a coisa preferida. Também, não aparece a preposição “de” quando a coisa/atividade preferida é *implícita*.

ex:

Marcos gosta de comida saudável, mas a irmã dele não gosta.

Vou dar uma festa bacana. Todos os convidados vão gostar muito!

O verbo gostar aparece três vezes no seguinte trecho. Na conversa, quando é o item ou atividade preferida *implícita*?

Lucas: Então, cê (você) gosta de estudar inglês, Marlon?
Marlon: Gosto.
Lucas: Por que que cê gosta de estudar inglês?
Marlon: Ah, porque eu achei legal.
Lucas: Cê acha interessante.
Marlon: É.³

³ fonte: C-ORAL-BRASIL arquivo “bpubd11”

Figure 1.7 Second guided induction sequence, part 2

4.3 Teaching interactional functions using a teacher-corpus approach

Language corpora like C-ORAL-Brasil provide a countless number of authentic data that can be used in the classroom to help students make generalizations about linguistic features of the target language. Language functions, however, are less likely to be immediately recognizable in a corpus. For instance, interactional functions such as apologizing, complimenting or refusing a request require paying attention to multiple layers of structural information that may or may not be already available in the corpus. One possible solution to address the problem is to record semi-natural conversations using role-plays that clearly target some of these functions. Native speakers can be given a prompt with a role to perform and the conversation can be audio or video recorded.³

Unlike in the activities described in the previous section and designed with audio samples from the corpus C-ORAL-BRASIL, the data-first approach was not used in this case. Rather, the instructor had the specific objective to teach politeness in request and refusal sequences and needed language data that helped fulfill this pedagogical goal. With the help of two native speakers of Brazilian Portuguese, three short phone conversations were video recorded and transcribed. The native speakers were given three different scenarios that included a request and a polite refusal made between close friends. After a careful analysis of the transcription, two of the dialogues were used to create a sequence of activities that aimed at teaching appropriate ways of requesting and politely refusing in Portuguese to second semester learners of Portuguese for Spanish Speakers.

Initially, learners were presented with an authentic request in Spanish, taken from the “Resources for Teachers of Spanish” published by *The Center for Advanced Research on Language Acquisition (CARLA)* (carla.umn.edu), and an authentic request-refusal sequence in English, taken from Schegloff (2007), and asked to reflect in pairs about similarities and differences between the two languages. This pre-activity intends to prepare students to observe and analyze request strategies by activating their previous experience in performing these communicative acts in the two languages they speak. Once their previous communication knowledge

3. Although Corpus Linguistics requires that researchers use only natural samples of language data, this principle cannot necessarily be applied (in isolation) to the design of a corpus-based pedagogical approach. The latter, by definition, shifts our focus of attention from the data to the process of learning and teaching. As such, it allows for the strategic combination of a variety of types of data, from natural to artificial. An example of a pedagogical application that illustrates this principle well is the contrastive presentation of (typically artificial) commercial textbook data and natural data to teach students the relevance and distinct nature of authentic uses of language. Along the same lines, the proposed use of semi-natural conversations can be properly incorporated to a corpus-based pedagogical approach.

as well as their observation skills have been activated, they are ready to listen to the first part of two of the three phone conversations; but only the first 30 seconds of the conversation until the request is made. They will initially focus on ways of requesting by moving from comprehension exercises to a guided analysis of two different ways of making requests in Portuguese and their meanings (Figure 1.8). After the analysis, learners are asked to produce requests for different interactional situations (Figure 1.9).

Fazer pedidos

(1) *Compreensão. Agora vamos ouvir o início de duas conversas telefônicas em que a Maírafaz um pedido à Érica. Assista aos vídeos e depois responda as perguntas.*

Conversa 1 (0-0:36)

Conversa 2 (0 – 0:37)

- a. Qual é o pedido que a Maíra faz à Érica na primeira conversa?
- b. Ena segunda?
- c. Qual dos dois pedidos, você teria mais dificuldade de fazer a um amigo? Por quê?

(2) *Análise. Agora vamos comparar as formas de fazer pedidos!*

- a. Volte à transcrição e identifique qual dos dois pedidos foi mais difícil para a Maíra? Justifique sua resposta.
 - b. Sublinhe a frase que a Maíra usa para fazer seu pedido nas duas conversas e verifique se há formas linguísticas comuns.
 - c. As formas linguísticas usadas no português para fazer um pedido são similares as do inglês ou do espanhol?
-

Figure 1.8 Students identify analyze two different ways of making requests in Portuguese

(3) *Prática. Agora considere as situações abaixo e escreva de que forma você faria cada um desses pedidos.*

- a. Pedir para o seu/sua professor/a para adiar a data de entrega do trabalho.
-

- b. Pedir o livro emprestado para um dos seus colegas de sala.
-

- c. Pedir para a vendedora de uma loja verificar o preço de um produto.
-

- d. Pedir uma carona.
-

Figure 1.9 Students produce requests for different situations

Once students have analyzed and practiced request strategies, they are ready to start learning different strategies to politely refuse a request in Portuguese. They

identify and analyze possible ways of refusing a request in Portuguese and compare refusal strategies in Portuguese, Spanish and English. The steps of the analysis are designed to help learners observe and identify crosslinguistic differences related to refusal strategies (Figure 1.10).⁴

Recusa a um pedido

(4) **Compreensão.** *Vamos assistir às duas conversas novamente, mas agora até o fim. Preste atenção nas respostas da Érica aos pedidos da Muíra. Como a Érica responde ao pedido da Muíra?*

Conversai: () Sim () Não Conversa 2: () Sim () Não

(5) **Análise.** *Como você classificaria as recusas de cada uma das conversas.*

Conversa 1: _____ Conversa 2: _____

(6) **Análise.** *Vamos olhar com mais detalhe o que acontece na conversa 2.*

a. Identifique as linhas que correspondem à recusa ao pedido da Maíra. Linhas: _____ até _____

b. O que acontece da linha 16 à linha 31?

c. Sublinhe pelo menos 3 suavizações usadas pela Érica durante a recusa.

d. Quantos turnos de fala são necessários para completar a recusa ao pedido da Maíra?

e. Que tipo de expressões faciais você identificou na Érica no momento de recusar o pedido e apresentar uma justificativa?

f. Com base nas respostas aos pedidos feitos em espanhol e em inglês, e na sua experiência como falante dessas duas línguas, quais são as semelhanças e as diferenças que você encontra entre a recusa a um pedido nessas duas línguas e no português brasileiro?

Figure 1.10 Students observe and analyze crosslinguistic differences in refusal strategies

Finally, learners are asked to practice, first in a more controlled activity in which they have to politely refuse a few semi-authentic requests in writing, and then in a role-play activity in which they are presented with different situations and instructed to alternate between the person who makes the request and the person who refuses it (Figure 1.11).

-
- (7) **Prática** *Complete as seguintes interações orais e escritas com as formas de recusa que você achar apropriadas. Lembre-se de que a negativa indireta e suavizada é a forma preferida de formular uma recusa peio falante do português brasileiro.*
- Será que você pode me mandar aquele artigo do Chomsky por e-mail?

4. See Mendes, E. A. de M. (1996, p. 31–41) for more information about refusal strategies in Brazilian Portuguese and Serrani-Infant, S. (1994, p. 79–90) for a crosslinguistic comparison of refusal strategies in Spanish and Portuguese.

- _____
 - Fecha essa porta pra mim, por favor. Não consigo me concentrar com tanto barulho.
 - _____
 - Tava pensando se você não quer combinar de estudar junto comigo pra prova de física. Tô com algumas dúvidas e quem sabe você pode me ajudar a entender melhor a matéria.
 - _____
- (8) *Prática. Em duplas, dramatizem algumas das seguintes situações. Não é necessário escrever. Não esqueçam que inicialmente vocês devem recusar os pedidos de forma suavizada. Podem chegar a dar uma resposta afirmativa no final.*

- Imagine que você precisa entrevistar vários alunos da Rice para uma pesquisa que você está fazendo para um dos seus cursos. Está difícil encontrar alguém que aceite ser entrevistado.

- Imagine que voei tem um casamento amanhã e acaba de descobrir que seu único vestido/terno está manchado. Peça uma roupa emprestada ao seu irmão ou à sua irmã. Ele/ela não costuma deixar você usar as roupas dele/dela.

- Você precisa entregar um trabalho para o seu curso de sociologia, mas seu computador parou de funcionar de repente. Peça o laptop de um dos seus/suas amigos/as emprestado para terminar seu trabalho.

Figure 1.11 Students practice requesting and refusing in a controlled activity and in a role-play

In addition to the class material, two assessment activities were also designed. One of them was a role-play to be performed with either a native speaker of Portuguese or with a classmate. The dialogue has to be audio-recorded and then evaluated by the instructor. The second assessment item is meant to be completed in writing and can be included in a quiz or an exam. Learners are given a specific scenario and are asked to write an interaction with a friend.

Both the teaching and the assessment activities were tested with a group of Portuguese learners in the spring of 2017. The results of both assessment activities showed that students learned the main linguistic and pragmatic features used in request-refusal sequences in Portuguese. Figure 1.12 below shows an example of a dialogue written by one of the learners.

Students also assessed the importance and effectiveness of this particular sequence of activities when they wrote about their learning experience. More than half of the students mentioned this specific sequence of activities when they wrote about the module of the course in which this topic was included. One of the learners not only recognized the value of learning pragmatic differences between her native language and the target language but also mentions how enjoyable the activity was for her.

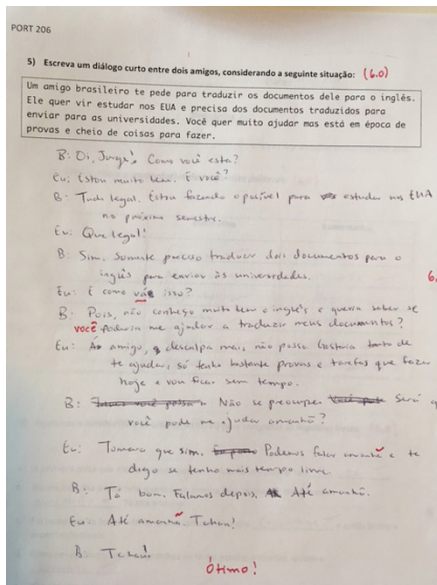


Figure 1.12 Dialogue written by a student in an assessment activity

Algo que eu gostei foi aprendendo pedidos e recursos, e como são diferentes em Brasil. Minha atividade favorita na classe foi assistindo os vídeos onde Maira e Érica interagiram. Eu acho que foi valioso para ver como pedidos e recursos acontecem, especialmente como as frases são diferentes e são mais longos em comparação com quando perguntamos para coisas nos Estados Unidos.

Something I liked to learn was requesting and refusing and how they are different in Brazil. My favorite activity in class was to watch the videos where Maira and Érica interact. I think it was very valuable to see how requests and refusals happen, specially how the phrases are different and longer compared to what we say when we make requests in the United States.

Another student mentions that after the class activities, it was easy to write an entire dialogue on the test that included requesting and politely refusing.

Por exemplo, praticando com os diálogos de Maira e Érica foi divertido em aula. Mas, mais importante, quando tivemos a escrever um diálogo similar no teste, foi fácil. Nós praticamos tanto que a conversa se faço algo natural para nós a falar e escrever.

For example, practicing with Maira and Erica's dialogues in class was fun. But, more important, when we had to write a similar dialogue on the test, it was easy. We practice so much that the conversation became natural for us in spoken and written forms.

This indicates that observation of natural or semi-natural conversations with a guided analysis of interactional patterns followed by practice can be an effective approach to teach pragmatic aspects of the target language.

5. Conclusion

The access to language corpora (especially spoken corpora) has provided L2 teachers and learners with an ecologically-valid object of study. At the same time, the field of conversation analysis (e.g., Carter & McCarthy, 2015) has shifted the focus of our attention on spoken language from the planned, written-based, monologic perspectives of the past to the discourse-based, co-constructed, interactive conversational grammar identified by Carter and McCarthy as the main objective of communicative interactional competence. Finally, corpus-based approaches to teaching along with the expansion of use of various types of social media (e.g., video-based phone calls via Skype or Facetime) have provided an impetus to an added focus on the features of multimodal aspects of language interaction and language learning. It is noticeable that the most radical outcomes of a technology-driven instructional methodology (corpus-based pedagogy) are predicated on the re-definition of language that teachers and learners can identify as the learning objective. The specific examples of pedagogical applications of corpus-based approaches analyzed in this chapter go beyond the traditional concordancing-related techniques of the 90s, more effectively using the representation of language embedded in samples of language that exemplify the objective of language learning.

The sequence of pedagogical activities using both an external corpus (e.g., C-ORAL-BRASIL), as well as a small corpus created by the teachers (e.g., locally produced language samples) demonstrated the scope of applications of a corpus-based approach that is based on a sound theoretical rationale. The activities depicted in previous sections also demonstrate that a corpus need not be the sole driver of learning. As the discussion of previous case studies demonstrated, it is important that the design of a corpus-based syllabus be focused on specific learning goals that can be achieved more efficiently, and perhaps more effectively, when any corpus is used as a tool that is adapted to the specific learning goal previously identified. In line with Carter's (1998) position – advanced twenty years ago –, the best representation of corpus-based language teaching may become a “radical evolution” in the same way that technological tools of the past have become integrated into a pedagogical framework of analysis. Once we are able to conceptualize corpus-based pedagogical approaches that attune the use of natural data for the specific learning goals at hand, we can design pedagogical activities that radically transform any language learning setting.

Acknowledgements

Authors are listed in alphabetical order. They all contributed equally to the article.

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Leveraging Spanish knowledge and cognitive aptitude in Portuguese learning

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This chapter describes a study investigating the question of whether and to what extent the presence of the donor language (L2; Spanish) and the first language (L1; English) in a reading comprehension task facilitates or impedes lexical learning in a related language (L3; Portuguese). The study also addresses the role of the learner's cognitive aptitude (as measured by the High-level Language Aptitude Battery, Hi-LAB; Doughty et al., 2010; Linck et al., 2013). We discuss the results in light of the importance of perceived similarities and differences between related languages in multilingual learning, as well as the importance of understanding the ways in which learners with different levels of cognitive aptitude may be differentially able to leverage existing linguistic knowledge.

Keywords: cross-training, third language acquisition, multilingualism, bilingual glosses, inhibitory control, cognates, cross-linguistic influence, aptitude, reading comprehension, vocabulary learning

Leveraging Spanish knowledge and cognitive aptitude in Portuguese learning

Teaching individuals with previously acquired skills in foreign languages has become quite common in recent years. The geopolitical changes in the world are creating constantly shifting requirements for expertise in certain languages, and instruction needs to adjust to these new situations. A common response to these shifting requirements is to identify individuals with documented skills in one foreign language and retrain them into a new language. This approach is often referred to as *cross-training* and is commonly defined as leveraging existing knowledge of any non-native language for purposes of learning a new foreign language. When

the languages in question are closely related – for example, when moving from Spanish to Portuguese – the term *conversion training* is sometimes used instead. Terms that encompass both of these scenarios are *third language (L3) acquisition*, often used in the field of second language acquisition, and *multilingualism*, more commonly used in the psycholinguistics literature. In this chapter, we maintain these distinctions and use *conversion* when referring to retraining into a related language and *L3* as a cover term for any case of L3 (multilingual) acquisition.

Even though L3 learning is increasingly common, there is still a lack of systematic investigation of L3 instruction. Relevant literature generally suggests maximizing learners' previous knowledge and learning expertise while learning a new language. This approach is particularly vital in conversion training, in which the donor language – the language that serves as the basis for conversion training – is closely related to the target language (Carvalho, Freire, & da Silva, 2010; Neuner, 2004). Because students come to the L3 courses with implicit and explicit knowledge of their L1 and L2, enhanced metalinguistic awareness compared to monolinguals, as well as general language learning skills (i.e., metacognitive skills and strategies), it is important to take advantage of what students already know and build on that knowledge as they learn an additional language. Courses such as Portuguese for Spanish speakers are designed to take advantage of the high degree of mutual intelligibility between closely related languages. There are also textbooks developed for such learning environments, for example, Portuguese for Spanish speakers (Simões, 2008), Bulgarian for Russian speakers (Gribble, 1987), or Czech for Russian speakers (Townsend, 1995). Despite these efforts, instructional techniques for teaching related languages have not been well documented. Examples of instructional techniques described in the scientific literature include an effort by EuroCom to familiarize individuals with entire sub-families of languages at once (McCann, Klein, & Stegmann, 2003); courses at California State University, Long Beach, that teach Italian to speakers of Spanish through intercomprehension (Donato & Pasquarelli-Gascon, 2015); an L3 acquisition program designed at the Hildesheim University to train translators who know three or more languages (Arntz, 1999); and the Plurilingual Project for multilingual education at the elementary school level (Hufeisen & Neuner, 2004). Despite these and other efforts, there is a need for documenting and evaluating instructional techniques for teaching related languages. In this chapter, we investigate the use of one such technique: the provision of glosses of unknown words during reading or vocabulary activities.

Background

Glosses as an instructional technique

Previous studies on the effectiveness of glosses for reading comprehension and vocabulary learning have focused on the effectiveness of glosses as opposed to no glosses, as well as comparisons of different types of glosses for L2 acquisition. Generally, numerous studies have demonstrated that glosses are better than no glosses for vocabulary acquisition and retention (Azari, Abdullah, Heng, & Hoon, 2012; Grace, 1998; Ko, 2012; Rouhi & Mohebbi, 2012; Salehi & Nasarieh, 2013; Samian, Foo, & Mohebbi, 2016; Watanabe, 1997). In contrast, one study found no difference in vocabulary learning or retention between the gloss and no-gloss conditions (Guidi, 2009), and another found a significant advantage for initial vocabulary learning but no difference for retention (Jacobs, Dufon, & Hong, 1994). Similarly, the beneficial effect of glosses on reading comprehension was also shown by several studies (Guidi, 2009; Palmer, 2003; Salehi & Nasarieh, 2013), whereas two studies found no effect of glosses on comprehension (Cheng & Good, 2009; Jacobs et al., 1994).

Numerous studies have also investigated the relative benefits of providing glosses as translations to the L1 or definitions or synonyms in the L2 (the language being learned) to reading comprehension and/or incidental vocabulary acquisition and retention. Studies have found advantages of L1 glosses over L2 glosses for reading and listening comprehension, as measured by the multiple-choice reading and listening sections of the TOEFL modified with accompanying glosses (Hashemian & Fadaei, 2013) and for reading comprehension, as measured by written recall in L1 (Palmer, 2003). In contrast, other studies have found advantages of L2 glosses over L1 glosses for various outcome measures: reading comprehension, as measured by multiple-choice questions (Ko, 2005); and vocabulary acquisition (but not retention), as measured by in-context multiple-choice items (Miyasako, 2002).

Numerous studies found no difference between L1 and L2 glosses for either vocabulary acquisition or retention, as measured by many different types of tasks: passive recognition (Azari et al., 2012; Ko, 2012; Rouhi & Mohebbi, 2012; Salehi & Nasarieh, 2013; Yoshii, 2006); passive recall (Hu, Vongpumivitch, Chang, & Liou, 2014; Jacobs et al., 1994; Rouhi & Mohebbi, 2012; Yoshii, 2006); and cloze or sentence completion (Hu et al., 2014; Rouhi & Mohebbi, 2012). Additionally, Hu et al. (2014) and Miyasako (2002) found that learners with higher L2 proficiency benefitted more in terms of vocabulary acquisition from L2 glosses as compared to L1 glosses, whereas Palmer (2003) found that both low and high proficiency learners performed better on measures of reading comprehension when using L1 as opposed to L2 glosses. A few studies that investigated learner preference for L1 or

L2 glosses also had mixed results, finding that learners preferred L1 glosses (Bell & LeBlanc, 2000; Salehi & Naserieh, 2013), preferred L2 glosses (Ko, 2005, 2012) or were evenly split between preferring L1 versus L2 glosses (Jacobs et al., 1994).

In addition to the studies comparing L1 and L2 monolingual glosses, a few studies have investigated the effectiveness of bilingual glosses (glosses with both L1 and L2 translations).¹ For instance, Azari et al. (2012) found that participants using bilingual (L1 and L2) glosses significantly outperformed those using either of the monolingual (L1 or L2) glosses on an immediate posttest, although on a delayed posttest the only significant difference was between bilingual and L2 monolingual glosses. Additionally, Salehi and Naserieh (2013) found a significant advantage of mixed glosses (bilingual glosses plus the sentence in which the target word first appeared) in delayed posttests over both no-gloss and L2 glosses.

Even though the results of studies on glosses in L2 instruction are not always in complete agreement, they generally show that glosses can enhance reading comprehension and incidental vocabulary learning. Although these studies provided mixed results with respect to the benefits of L1 vs. L2 glosses, we found some promising evidence in the literature supporting the provision of bilingual glosses. It should be noted that all studies concerning the use of glosses thus far have been conducted with L2 learners; extending this research to L3 acquisition would help understand the relationships among the languages a learner knows, and could possibly inform L3 instructional techniques. In addition to instruction, learner cognitive aptitudes, i.e., cognitive processing abilities that are relevant to language learning, can play a role in L3 acquisition, and consequently, can also be used to enhance L3 instruction or to help explain why some instructional techniques differentially benefit some learners.

Aptitude and multilingualism

There is little question that greater cognitive aptitude, particularly the set of aptitudes commonly referred to as “working memory,” is positively correlated with second language learning (Linck, Osthus, Koeth, & Bunting, 2014). In the L3 training context, aptitude may additionally play a role in terms of the extent to which being bilingual enhances or inhibits cognitive processes; the role of aptitude may be particularly important in the case of specific instructional techniques such

1. This research was based on Paivio’s (1971) Dual Coding Theory, which posits that creating memories with both words and images results in better learning. Several studies demonstrated that encoding words in two languages – although not as effective as encoding words and pictures – is more effective than encoding in a single language (Arnedt & Gentile, 1986; Paivio & Lambert, 1981; Taura, 1998; Vaid, 1988).

as use of L1 or L2 glosses, which require selective focus on one or multiple languages. Most of the literature in the area of multilingualism in relation to cognitive aptitude has focused on the differences in cognitive abilities among individuals with various multilingual backgrounds (i.e., multilinguals vs. bilinguals vs. monolinguals). Research comparing bilinguals and monolinguals generally shows that there are both advantages and costs of being bilingual. For instance, bilinguals tend to exhibit greater executive control than monolinguals, but they also tend to have smaller vocabularies in each language and weaker lexical access and retrieval (Bialystok & Craik, 2010; Bialystok & Martin, 2004).

Studies comparing multilinguals and unbalanced bilinguals have consistently shown that multilinguals obtain higher scores on aptitude tests than bilinguals. For instance, Thompson (2013) administered the Cognitive Ability for Novelty in Acquisition of Language (Foreign) aptitude test (CANAL-FT) to a group of 79 L1 Brazilian Portuguese speakers learning English and found that those who have studied other languages in addition to English (multilinguals) outperformed those for whom English was the only foreign language learned (bilinguals). Using the Modern Language Aptitude Test's (MLAT) Number Learning and Paired Associates tests to measure short-term memory and the Polish Reading Span (PRSPAN) to measure working memory, Biedroń and Szczepaniak (2012) found that the scores on all of these tests were higher for a group of 28 accomplished multilinguals than for a group of 36 bilinguals.

Unlike monolinguals, who only have competence in a single language, both bilinguals and multilinguals must actively suppress one or more languages not relevant to the immediate context (e.g., a French-English-Spanish trilingual must suppress French and Spanish when speaking in English), and research has shown that bilingual and trilingual children exhibit cognitive conflict resolution advantages over monolingual peers (Poarch & van Hell, 2012). Green's (1998) inhibitory control model posits that the cognitive cost of switching between languages is asymmetrical such that the effort needed to suppress or inhibit a language is proportional to the strength of its activation in the brain. For this reason, the model predicts that more effort is required to switch into the L1 from an L2 or L3 due to the need to inhibit the more dominant L1 when using the less dominant languages. This effect has been observed in multilinguals' performance on a Stroop task, which requires participants to name the color of ink in which color words (e.g., "red," "black," "yellow") are written; the color words appear in both *congruent* (the color of the ink matches the color word) and *incongruent* (the color of the ink does not match the color word) conditions. In a study by Marian, Blumenfeld, Mizrahi, Kania, and Cordes (2013), multilingual participants with heterogeneous L1, L2, and L3s performed the task three times, once in each of their three languages. All participants performed best (i.e., fewest naming errors) in their L1, followed by

L2 and L3. A greater between-language effect for accuracy was observed when the color words were presented in the dominant language (English L1) and the color of the ink was named in a less dominant language (other language L2), suggesting greater interference and, thus, the need for greater inhibitory control for dominant languages.

Given the role that inhibitory control seems to play in efficient multilingual language switching, several researchers have theorized that multilinguals who show greater inhibitory control on a non-linguistic task should also show a lower language switching cost than those with less inhibitory control. The non-linguistic Simon task requires participants to press a button located on the right or left side of a computer keyboard based on the color of a box presented on the screen. On congruent trials, the location of the box matches the location of the button that needs to be pressed; on incongruent trials, the location of the box does not match the location of the button. Smaller response differences between these two conditions are taken as evidence of greater inhibitory control. Using this task, Linck, Schwieter, and Sunderman (2012) found that unbalanced trilingual participants with greater inhibitory control did indeed show smaller switching costs on a picture naming task that required them to produce the name of basic drawings (e.g., house, pencil, bear) in one of their three languages depending on the color of the background. Linck et al. (2015) replicated this study with highly proficient trilinguals and found that unlike with unbalanced trilinguals, it was not inhibitory control that led to smaller switch costs, but better working memory updating and task switching abilities. Linck et al. concluded that as proficiency increases, individuals rely on different executive control functions such that greater demands might be placed on task disengagement (task shifting) and goal maintenance (working memory updating) than on inhibitory control.

A similar study by de Bruin, Roelefs, Dijkstra, and FitzPatrick (2014) also found that inhibitory control and language switching were correlated, but that better inhibition skills were associated with a larger switching cost to the dominant (L1) language. All of these studies reveal a more complicated picture for L2 and L3. In Linck et al. (2012), inhibitory control was predictive of switching cost from L1 to L3, but not from L1 to L2, suggesting that more inhibitory control is needed to suppress L1 when switching to a much less dominant L3. No L2/L3 switching effects were found in de Bruin et al. (2014), though fMRI scans during the picture naming task did show activation differences in areas assumed to be implicated in language switching. A study by Guo, Liu, Chen, and Li (2013) found that the degree of language inhibition may be modulated by proficiency as well as by task effects, such as the amount of time a stimulus is presented. In other words, different types of language cues in the input may result in different levels of activation of non-target languages and, thus, require different degrees of inhibition.

The literature shows a relatively complicated picture emerging about how multiple languages interact in the brain. The experimental studies reviewed above focused on lexical access for trilinguals and the cognitive costs associated with language switching during linguistic tasks such as picture naming. As such, they treat L1, L2, and L3 language knowledge as “fixed.” It is as yet unclear what, if any, impact these cognitive processes have on the efficacy of pedagogical approaches in which instructors intentionally try to leverage – rather than suppress – L1 or L2 knowledge in the teaching of L3, such as by providing non-target language glosses for unknown words during reading activities.

The empirical study presented in this chapter aims to explore some of these questions. In particular, this study tested whether learners are able to better learn L3 words and comprehend an L3 text with or without bilingual L1/L2 glosses. We also investigated relationships among the results obtained in the present study and selected cognitive aptitudes.

Method

Participants

Participants were 38 native English learners of Spanish with no knowledge of Portuguese (27 female), 35 of whom were right-handed. One participant was excluded for not completing the entire study, leaving 37 for the analyses. Spanish proficiency was determined via self-rated proficiency on the Language History Questionnaire and the number of items correct on the Spanish cloze Proficiency test (see Measures section for details). Descriptions of participants, especially regarding factors related to proficiency, are listed in Table 1.

Table 1. Language background and biographical information

	Mean	SD	Min	Max
Age (years)	20.42	1.54	18	25
Spanish age of onset (years)	5.69	3.81	1	15
Years of formal instruction in Spanish	6.36	2.61	0	11
Years lived in Spanish-speaking country	0.03	0.07	0	0.25
Self-rated proficiency (scale 1–10)	6.04	1.70	1	9.33
Proficiency test items correct (max 20)	9.44	3.22	0	15

Design and procedures

The primary independent variable was the presence or absence of English/Spanish glosses during reading of Portuguese passages, which was manipulated within-participants. In the Glosses condition, participants read an authentic Portuguese (L3) text with target vocabulary glossed in the margins in both English (L1) and Spanish (L2). In the Control condition, participants read a different authentic Portuguese text without any working aids. The two texts were counterbalanced such that half of the participants saw Text A in the Glosses condition and Text B in the Control condition, and the other half saw the reverse. Reading comprehension was measured via 10 multiple-choice questions that were administered immediately after exposure to each text. Vocabulary learning and retention were measured using the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996), which was administered twice: the Immediate VKS Test took place on the same day as initial reading and the Delayed VKS Test took place during a separate session two weeks later. Cognitive aptitude was measured using selected tasks from the High-level Language Aptitude Battery (Hi-LAB; Doughty et al., 2010; Linck et al., 2013)

Session 1 was 1.5-hours long. After providing informed consent, participants completed a set of tasks in the Control condition, cognate-status tasks (as part of the Cognate Status Study, described in the Materials section), and a set of tasks in the Glosses condition. To avoid any contamination of the Control condition from information that might be learned in the Glosses condition, the Control condition was always administered before the Glosses condition. Within each condition, participants first read the assigned text; in the Glosses condition the primary reading activity was supplemented with a set of pre- and post-reading activities, which are described in more detail in the Activities section below. Participants then completed a reading comprehension test for the passage they had just read, followed by an Immediate vocabulary posttest for the target words in that passage. Session 1 concluded with the Language History Questionnaire, one cognitive aptitude task, and the End-of-Session Questionnaire.

Session 2 was approximately 1-hour long and included a Delayed vocabulary posttest (containing words from both the Control and Glosses conditions) and four cognitive aptitude tasks.²

The study was conducted on a computer using Qualtrics, a web-based survey tool, and a web-based version of the Hi-LAB.

2. A few participants completed some or all of the additional tasks during Session 1.

Materials

Texts

The two texts selected for the study were both authentic in that they were written by native Portuguese speakers with an intention to be read by native Portuguese speakers. The two texts were of similar length, and included the same number of target words selected for study. Characteristics of target words are described below, and target word lists are provided in Appendix A. Text A (255 words) discussed research regarding which type of cooking oil is healthiest, and Text B (241 words) described research on how sleep patterns affect work performance. Both texts were excerpted from articles on the BBC's Portuguese news website and shortened for length, but they were not otherwise manipulated. A native speaker of Brazilian Portuguese reviewed the final set of materials to verify that the shortened articles were still coherent and comprehensible as standalone pieces. The original titles, which were written in the form of headlines, were replaced with shorter titles to avoid giving away the main idea of the passage. For each text, bilingual L1/L2 glosses in the margins and ten multiple-choice reading comprehension questions in English were created.

Target words

A list of 14 target words was selected from each text for a total of 27 Portuguese words (one word, *pesquisa*, meaning “research,” overlapped between the two texts). Target words were all nouns and were chosen to include a selection of non-cognates with Spanish (i.e., words with different roots and different meanings in L2 and L3), false cognates (i.e., words with the same or similar roots but different meanings), and cognates (i.e., words with the same roots and meanings). To the extent possible, a priori attempts were made to balance the two lists for cognate status. Deviations were necessary because the word lists were derived from authentic texts that were not adjusted in any way, resulting in about half as many non-cognates a priori compared to cognates and false cognates. In addition, the final determination of each target word's cognate status was made using the results of the Cognate Status Study, which was conducted during the first session.

The Cognate Status study included a translation-elicitation technique, in which participants were presented with Portuguese words and were asked to guess their meaning in Spanish. An English translation task was added to determine whether participants knew the Spanish words they were expected to know to complete the translation-elicitation task. The reason for including this task was that in order to provide a correct guess in Spanish, the participant would need to know the Spanish word in question. L2 words identified as unknown based on the results of the Spanish/English translation task were excluded from the translation-elicitation data for a given participant.

Based on the most frequent correct and incorrect guesses on the translation-elicitation task, words were classified as either cognates, false cognates, or non-cognates. If 50% or more of the participants guessed the correct Spanish (L2) translation, the Portuguese (L3) word was classified as a cognate with Spanish. If 50% or more of the participants chose the same incorrect Spanish word, the Portuguese word was identified as a false cognate with Spanish. All other possibilities were classified as non-cognates. The results are presented in Appendix A.

Activities

In the Glosses condition, participants completed three pre-reading and two post-reading activities. (In the Control condition, participants did only the main reading activity, and did not complete the pre- and post-reading activities.) Two of the pre-reading activities focused on cognate awareness. The first activity included a short note about similarities between Spanish and Portuguese and a list of Spanish/Portuguese borrowings and cognates taken from the Portuguese passage participants were about to read. Participants were then asked to match the borrowings and cognates with their translations (which were non-target words). The second pre-reading activity contained the Portuguese target text with highlighted borrowings and cognates from the previous activity for participants to recognize in context. The third pre-reading activity introduced target words (cognates, false cognates, and non-cognates) in context. Participants were asked not to read the text yet, but to go over the glosses to see how words are used in context. Then learners were instructed to read the text, which was displayed on screen twice for up to 5 minutes (minimum 2 minutes). The first time the text was shown in Portuguese only with no enhancements and the second time it was shown with glosses in the Glosses condition and again with no enhancements in the Control condition. The two post-reading activities were designed to practice newly learned target vocabulary. In the first post-reading activity, participants matched English and Portuguese target words. In the second post-reading activity, they completed a cloze version of the Portuguese text they just read, using Portuguese target words from a word bank.

Measures

Spanish cloze proficiency test

The Spanish cloze proficiency test was used as part of the pre-screen procedure (i.e., only those who scored above five out of 20 were admitted into the study) and as a proficiency variable in the analyses described in the Results section. The cloze test is based on an excerpt from an authentic passage entitled “En la ciudad

prometida,” *In the Promised City*. The text originally contained 173 words. To create the test, 20 words of all categories (e.g., noun, verb, function words) were removed and replaced with numbered blanks. Participants were shown this text and given a multiple choice response question for each blank, which included four answer choices, the last of which was always “no sé,” *I do not know*. Answers were automatically scored for accuracy.

Reading comprehension

The reading comprehension test consisted of 10 multiple-choice questions for each passage, with questions falling into one of six categories: (1) The main idea question for each text, which was always presented first, required participants to identify the main point or the thesis of the passage (e.g., *Which of the following statements best represents the main idea of the passage?*). Incorrect response options for this type of question included either a false main point or correct supporting ideas. (2) Supporting idea questions were related to facts from the passage that reinforced and supplemented the main idea and were usually expressed in several sentences (e.g., *According to the passage, which of the following is true about x?*). Incorrect response options comprised false statements. (3) Detail questions required participants to find a very specific piece of information that was directly stated in the passage and usually expressed in a single sentence (e.g., *According to the passage, which of the following oils are high in polyunsaturated fats?*). Incorrect response options comprised false facts. (4) Inferential questions required participants to make logical conclusions based on the information provided in the text (e.g., *It can be inferred from the passage that...*). Incorrect response options comprised false statements. (5) Co-reference questions asked participants to identify the specific word(s) referred to by a selected word, usually a pronoun (e.g., *In the final paragraph, what does the word “x” refer to?*). All response options included words in the passage near the given word. (6) Tone and style questions asked participants to identify the author’s attitude toward a given issue (e.g., *What is the author’s position regarding...?*) or to identify the possible source of the passage (e.g., *Based on its style, where was this passage most likely taken from?*). Incorrect response options comprised false statements. The Portuguese text without any working aids was available for reference during the reading comprehension test.

Vocabulary learning

The Vocabulary Knowledge Scale (VKS) was administered twice to measure initial learning immediately after the reading task and retention after two weeks. The VKS is the most widely used scale for measuring vocabulary depth (Wesche & Paribakht, 1996). It includes self-report responses ranging from “I don’t remember having seen this word before” to “I know this word.” In addition, because the test

takers are required to provide information (fill in the blank) rather than select it on a scale, the test can be characterized as combining self-report and performance items (Kim, 2008; Paribakht & Wesche, 1997).³ An example of the VKS from the current study is shown in Figure 1.

Self-report categories	
I	I don't remember having seen this word before.
II	I have seen this word before, but I don't know what it means.
III	I have seen this word before, and I think it means _____.
IV	I know this word. It means _____.

Figure 1. An example of a vocabulary knowledge test item (adapted from Wesche & Paribakht, 1996: 30)

The Immediate posttest comprised the 14 target words from the text being tested. The Delayed posttest included all 27 words from the study, but note that results will be discussed separately based on the condition in which the words were first encountered.

To score the VKS, a response of option I or II was coded as an incorrect response for that vocabulary word. When participants selected option III or IV, the typed guesses of the word meanings were used to determine whether to code the response as incorrect or correct. One researcher coded all responses and randomly selected two responses for each word to submit to a second coder (13.5% of responses) for reliability checking. Inter-rater agreement reached 92.3%. Disagreements were discussed and the original coder re-reviewed all coding.

Cognitive aptitude

Participants completed five tasks from the Hi-LAB representing multiple aptitude constructs. Table 2 shows the Hi-LAB tasks with typical administration times and the measured constructs. Each task is described in more detail in the following sections.

3. Several limitations of the VKS have been identified, including decontextualized prompts, the redundant nature of the scale, and the inability to fully gauge both receptive and productive lexical development (Bruton, 2009). However, Bruton admits that the scale shows learners' ability to label words for meaning and use these words in a sentence. In spite of the criticism, several studies have used the scale for English (Kim, 2008; Paribakht & Wesche, 1997), Spanish (Pulido, 2004), and German (Rott & Williams, 2003; Rott, Williams, & Cameron, 2002).

Table 2. Hi-LAB tasks and constructs

Construct	Sub-construct	Task	Time (min)
Explicit learning	Rote memory	Paired Associates (PA)	7
Explicit learning	Explicit induction	Letter Sets (LS)	9
Implicit learning	Implicit induction	Serial Reaction Time (SRT)	13
Processing Speed	–		
Working memory	Updating	Running Memory Span (RMS)	13
Executive function	Inhibitory control	Antisaccade (AS)	9

Paired Associates (PA)

In this task, participants must learn 20 word pairs, each an English noun paired with a non-word, which is presented as a word in an unspecified foreign language. Each word pair is presented three times for 3 seconds each time during a learning phase. In the recall test, participants are prompted with the “foreign” words, one at a time, and must produce the corresponding English word. The score represents the number of correctly recalled words out of 20. The test is adapted from Carroll and Sapon’s (1959) test of associative memory and is similar to learning new vocabulary words in a foreign language.

Letter Sets (LS)

In this multiple-choice test adapted from Ekstrom, French, & Harman (1979), four of five sets of letters obey the same pattern, and participants select the set that violates the pattern. Each set is composed of four letters. Participants have 7 minutes to attempt 15 items. The score represents the number of correctly recalled items out of 15, indicating the ability to consciously derive patterns and rules, such as grammar, from examples.

Serial Reaction Time (SRT)

In this task, adapted from Willingham, Nissen, and Bullemer (1989), four horizontally arranged boxes are shown on the screen, indicating the four positions in which an asterisk will appear. On each trial, an asterisk appears in one of the four boxes and the participant must press the corresponding button on the keyboard. The asterisk disappears before the next trial begins, at which point an asterisk appears in a different location from the previous trial. There are six blocks of 96 trials each. In the first and sixth block, the asterisks appear in a pseudorandom order. In blocks two, three, four, and five, the asterisks appear in a repeating pattern of length 12. In this version of the task, we used a slightly non-standard scoring method in order to calculate the speed-up due to implicit sequence learning of the 12-item sequence. We used the same method as Linck et al. (2013), in which the median

reaction time for every 12-item sequence was recorded, and then the mean of these medians in blocks 1 and 3 was computed; the difference in these means was used as the most stable estimate of speed-up that is not contaminated by anticipatory responses. This implicit induction score shows how much a person adapts their processing of stimuli with increasing practice on the test. The processing speed score is the mean of median RTs of the 8 item sets in the first random block and indicates general processing speed. Lower scores indicate faster processing speed.

Running Memory Span (RMS)

This test measures the updating subcomponent of working memory (Bunting, Cowan, & Sauls, 2006; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). In this task, participants listen to 20 lists of 12–20 letters drawn from a set of 12 consonants at a rate of three letters per second. At the end of the list, the participants must recall the last six letters in the list, in order. The score is the average number of letters correctly recalled in serial order per list. The maximum possible score is six. The score shows the ability to keep information in memory while updating that information without making mistakes.

Antisaccade (AS)

This test was developed by Unsworth, Schrock, and Engle (2004) to measure the inhibitory control subcomponent of executive functioning (Miyake et al., 2000). In this task, visual cues are presented on the screen, indicating the location of a letter that is displayed, 0 or 50 ms after the cue disappears, for 100 ms. Participants must press one of three buttons on the keyboard to indicate which letter – always either A, B, or C – is shown. In the initial practice phase, the cue and letter appear in the center of the screen. In the two critical phases, the cues and letters appear to the right, left, top, or bottom of the center of the screen. In the prosaccade phase, the cue and letter appear on the same side; in the antisaccade phase, the letter appears on the opposite side of the screen from the cue. Thus, in the antisaccade phase, the participant must inhibit the tendency to look toward the cue in order to see the letter. Scoring is based on accuracy, and higher scores indicate greater levels of ability to inhibit automatic responses, such as interference among known languages.

Questionnaires

Language History Questionnaire

The Language History Questionnaire took approximately 5 minutes to complete and was given to participants during Session 1. Participants filled in basic demographic information (e.g., age, gender) as well as various questions about their experiences learning Spanish, such as length of study, type of environment(s), and usage.

End-of-Session questionnaire

A short questionnaire was given to participants immediately after completing the study tasks. The survey asked participants about their experiences reading the texts, including which type of the two types of glosses they used more while completing the tasks.

Results

All analyses were conducted with logistic multilevel models (also called mixed-effects models or hierarchical linear models; Raudenbush & Bryk, 2002) with accuracy as the dependent variable for all models (0, 1), using the lme4 package version 1.1–7 (Bates, Maechler, Bolker, & Walker, 2014) and its “bobyqa” optimizer in R version 3.2.0 (R Development Core Team, 2015). Logistic multilevel models have several advantages over traditional analysis of variance (ANOVA) and multiple regression models, including: (1) conducting by-subject and by-item analyses simultaneously; and (2) including each individual trial in the analysis, which increases power, properly models the hierarchical structure of the collected data, and circumvents the assumption in other statistical methods for independence of observations (Baayen, Davidson, & Bates, 2008; Linck & Cunnings, 2015). Basic descriptive statistics are shown in Table 3. For details on the model fitting procedures, please see Appendix C. All graphs are simplified representations of the models (often collapsed across particular conditions) to highlight effects of interest.

First, we look at the difference in reading comprehension performance for the two conditions, and the pattern for each condition as a function of L2 proficiency, and, for VKS, the influence of test time and cognate status. Then we look at the role of each cognitive aptitude measure when controlling for the effects of condition, proficiency, test time, and cognate status, as appropriate.

Table 3. Mean accuracy of each outcome measure by condition

Condition	Reading comprehension		VKS	
	Immediate test		Immediate posttest	Delayed posttest
Glosses	.64 (.48)		.73 (.44)	.35 (.48)
Control	.56 (.50)		.20 (.40)	.25 (.43)

Reading comprehension

The final result of the model testing process for the effects of Condition, Proficiency, and their interaction regressed on reading comprehension via the method outlined above can be seen in Table C-1 (Appendix C) and is represented in Figure 2. There was a significant effect of Condition ($b = 0.37, p = .02$) such that participants performed better on reading comprehension questions for the text with glosses in the margins than for the text without glosses. There was also an effect of Proficiency ($b = 0.07, p = .02$); participants performed better on reading comprehension for the Portuguese passages as Spanish proficiency (measured by the cloze task) increased. There was not a significant interaction between Condition and Proficiency, indicating that the effect of proficiency on reading comprehension was similar with and without glosses.

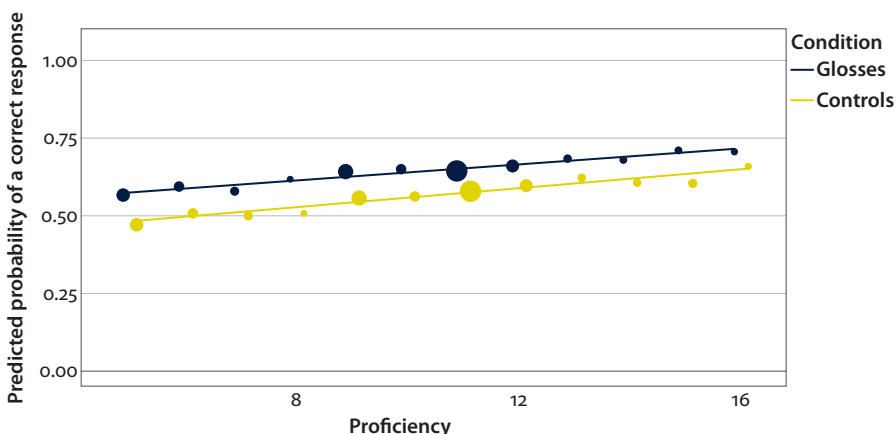


Figure 2. Predicted probability of a correct response on reading comprehension predicted by the multilevel model split by Condition and by L2 Proficiency. Dot size indicates the number of participants with a certain proficiency score, with larger dots representing more participants

Rote Memory (PA)

There was a significant effect of Rote Memory (PA; $b = 0.22, p = .01$), which did not vary by Proficiency or Condition. Participants with higher measures of Rote Memory performed more accurately on the reading comprehension questions, regardless of Condition or Proficiency. Results are shown in Table C-2.

Explicit Induction (LS)

There was a significant effect of Explicit Induction (LS; $b = 0.23, p = .004$), which did not vary by Proficiency or Condition. Participants with higher measures of

Explicit Induction (LS) performed more accurately on reading comprehension, regardless of condition, proficiency, or text. Note, however, that when controlling for the effect of Explicit Induction (LS), the effect of Proficiency became non-significant in this model ($p = .18$). This change may reflect the correlation in this sample between Proficiency and Explicit Induction (LS) scores ($r = .38, p = .02$). Results are shown in Table C-3.

Implicit Induction (SRT)

There was no significant effect of Implicit Induction (SRT) on the reading comprehension results.

Processing Speed (SRT)

There was a significant effect of Processing Speed (SRT; $b = 0.20, p = .02$), which did not vary by Proficiency or Condition. Thus, participants with higher measures of Processing Speed (SRT) performed more accurately on reading comprehension, regardless of Condition or Proficiency. Results are shown in Table C-4. Note also in this model that the effect of Proficiency became marginal ($p = .09$), as did the effect of Condition ($p = .06$). It is unclear why this pattern of results may have occurred, particularly given that there was no significant correlation between Proficiency and Processing Speed (SRT; $r = -.05, p = .79$).

Updating (RMS)

There was a significant interaction between Proficiency and Updating (RMS; $b = -0.07, p = .04$), indicating that there was a positive effect of RMS only at lower L2 proficiency levels (or, alternatively, a negative effect of RMS at higher proficiency levels), meaning as RMS increased, so did reading comprehension performance for lower L2 proficiency learners. The effect of Updating (RMS) did not vary by Condition. Results are shown in Table C-5. Note also in this model that the effect of Proficiency became marginal ($p = .095$). It is unclear why this pattern of results may have occurred, as there was no significant correlation between Proficiency and Updating (RMS; $r = .18, p = .28$).

Inhibitory Control (AS)

There was a significant interaction between Proficiency and Inhibitory Control (AS; $b = -0.08, p = .03$), indicating that there was a positive effect of Inhibitory Control (AS) as Proficiency decreased, regardless of Condition. In addition, there was a significant positive effect of Inhibitory Control (AS) for the Control condition ($b = 0.32, p = .01$) regardless of Proficiency, which was not present in the

Glosses condition ($p = .46$ when relevelled⁴ with Glosses as baseline). Results of the effect of Condition and Inhibitory Control (AS) are shown in Table C-6 and represented in Figure 3.

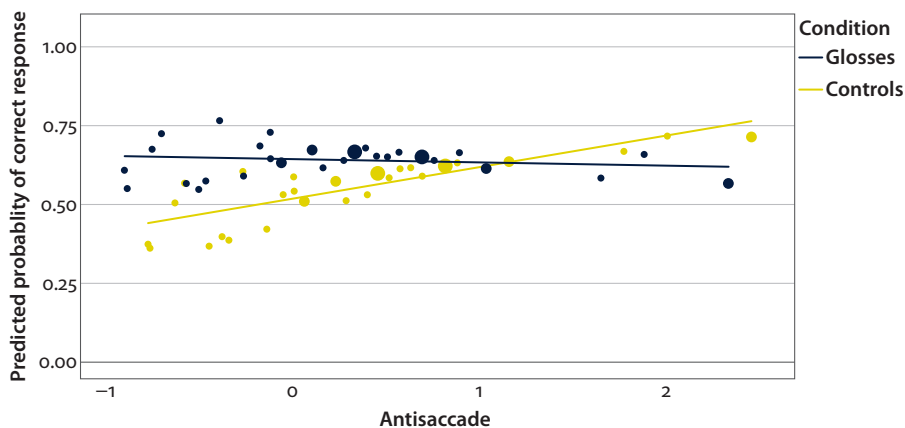


Figure 3. Predicted probability of a correct response for reading comprehension split by Condition and by Inhibitory Control (Antisaccade) score. Dot size indicates the number of participants with a certain Antisaccade score, with larger dots representing more participants

Vocabulary learning

The final result of the model testing process for the effects of Condition, Proficiency, Test Time, Cognate Status, and their interactions regressed on vocabulary learning via the method outlined in Appendix C can be seen in Table C-7 and represented in Figure 4. We consider each effect in turn.

Condition

There was a significant effect of Condition such that participants learned more Portuguese vocabulary (as measured by the VKS) in the Glosses condition at immediate testing than in the Control condition. This effect was strongest for non-cognates ($b = 5.10, p < .001$), but also true when releveling for false cognates ($b = 4.06, p < .001$) and cognates ($b = 3.44, p < .001$).

4. In order to directly assess the effect of Inhibitory Control (AS) on the Glosses condition, the model was refit with the Condition fixed effect “relevelled” such that Glosses, rather than Control, was the baseline level; this approach provides a direct test of differences without impacting the goodness of fit of the model to the data (e.g., Linck & Cummings, 2015).

Proficiency

Proficiency was a significant predictor throughout, such that higher L2 proficiency was associated with better vocabulary learning and retention ($b = 0.26, p < .001$), interacting with neither Condition, Cognate Status, nor Test Time.

Test Time

For the Control condition, VKS scores improved from the Immediate posttest to the Delayed posttest ($b = 0.60, p = .01$). In the Glosses condition, VKS scores decreased from the Immediate posttest to the Delayed posttest (when relevelled: $b = -2.80, p < .001$).

Cognate status

For both conditions at the Immediate posttest, VKS scores were higher for cognates (for Control: $b = 4.15, p < .001$; relevelled for Glosses: $b = 2.49, p = .002$) than for both false cognates and non-cognates, which had similar scores. At the Delayed posttest, when relevelled, there was no effect of Condition for cognates ($p = .92$). For non-cognates, scores in the Glosses condition were higher than scores in the Control condition ($b = 1.70, p < .001$). There was also a marginal difference favoring glosses on false cognates at the Delayed posttest ($b = 0.66, p = .067$).

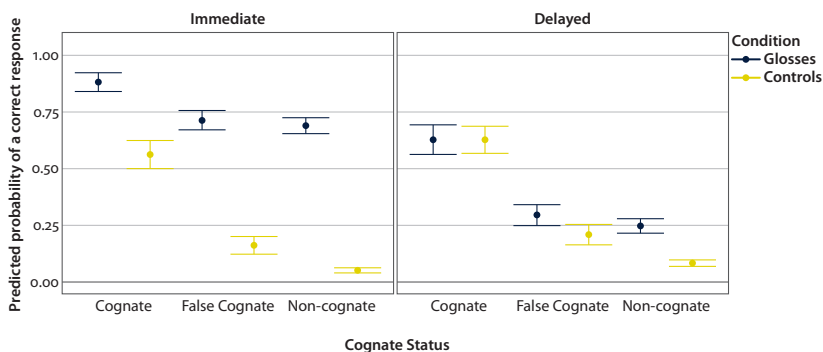


Figure 4. Predicted probability of a correct response on vocabulary knowledge split by Cognate Status, Test Time, and condition

Rote Memory (PA)

There is a marginal, positive effect of Condition \times Rote Memory (PA; $p = .07$) for non-cognates only in the Glosses condition that, when relevelled for Glosses at baseline, is shown to be significant and positive ($b = 0.74, p < .001$). This result suggests that, for the Glosses condition, accuracy increases on non-cognates as Rote Memory (PA) increases. There is a significant positive effect of Rote Memory (PA) for the Control condition on cognates only ($b = 0.99, p = .02$). There is a negative

three-way interaction of Glosses \times Cognates \times Rote Memory (PA) indicating that the effect of Rote Memory (PA) for cognates is not present for the Glosses condition (when revealed: $b = 0.12, p = .66$). Results are shown in Table C-8 and Figure 5.

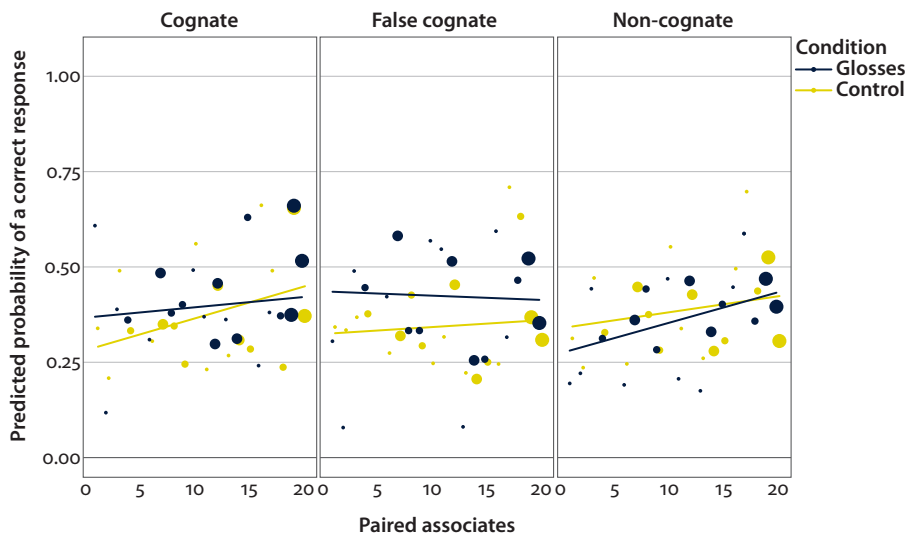


Figure 5. Vocabulary knowledge predicted probability of a correct response (i.e., accuracy predicted by the model) by Rote Memory (Paired Associates) score, condition, and Cognate Status. Dot size indicates the number of participants with a certain Paired Associates score, with larger dots representing more participants

Explicit Induction (LS)

There is a significant interaction of false cognate status and Explicit Induction (LS), indicating that participants get *worse* on vocabulary in the Control condition as Explicit Induction (LS) increases ($b = -0.86, p = .01$). There is a marginal three-way interaction of Glosses \times False Cognates \times Explicit Induction (LS; $p = .07$) suggesting that the Glosses condition does not show this detriment as Explicit Induction (LS) increases only for false cognates. Upon revealing, there is actually an effect of Explicit Induction (LS) for Glosses for non-cognates ($b = 0.78, p < .001$), and that effect was not significantly different for cognates ($b = -0.41, p = .12$) or false cognates ($b = -0.11, p = .63$) versus non-cognates. Results are shown in Figure 6 and Table C-9.

Implicit Induction (SRT)

There was no significant effect of Implicit Induction (SRT) on the vocabulary learning results.

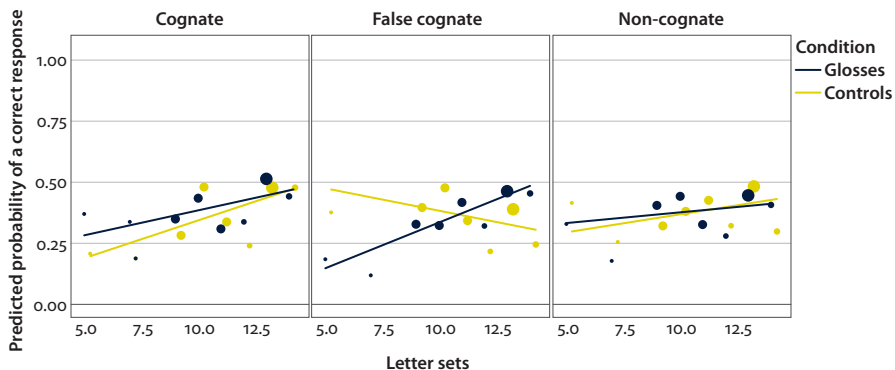


Figure 6. Vocabulary knowledge predicted probability of a correct response (i.e., accuracy predicted by the model) by Explicit Induction (Letter Sets) score, condition, and Cognate Status. Dot size indicates the number of participants with a certain Letter Sets score, with larger dots representing more participants

Processing Speed (SRT)

There is a marginal effect of better Processing Speed (SRT) performance being related to better VKS performance ($b = 0.35$, $p = .08$), and a marginal interaction of Proficiency \times Processing Speed (SRT; $b = -0.14$, $p = .07$) suggesting that the marginal effect of Processing Speed (SRT) disappears with increasing Proficiency. Results are shown in Table C-10.

Updating (RMS)

There is only a marginal three-way interaction for Glosses \times Test Time \times Updating (RMS; $p = .07$), indicating that there may be a positive effect of Updating (RMS) for the Glosses condition on the Delayed posttest. However, upon releveling, this effect was not significant ($b = 0.24$, $p = .35$). Results are shown in Figure 7 and Table C-11.

Inhibitory Control (AS)

There is a significant positive effect of Inhibitory Control (AS) for non-cognates ($b = 0.54$, $p = .03$). There is a marginal interaction effect suggesting the effect of Inhibitory Control (AS) is weaker for cognates ($b = -0.32$, $p = .08$), and a significant interaction effect indicating the effect of Inhibitory Control (AS) is weaker for false cognates ($b = -0.35$, $p = .046$). Finally, there is also a marginal interaction suggesting that the effect of Inhibitory Control (AS) is overall weaker on the Delayed posttest ($b = -0.26$, $p = .07$). There were no interactions with Condition, so all above effects apply equally to Control and Glosses. Results are shown in Figure 8 and Table C-12.

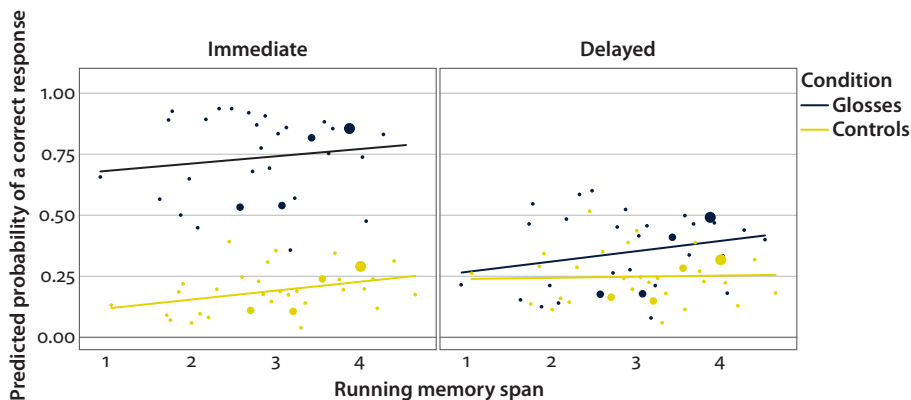


Figure 7. Vocabulary knowledge predicted probability of a correct response (i.e., accuracy predicted by the model) by Updating (Reading Span) score, Test Time, and condition. Dot size indicates the number of participants with a certain Updating (RMS) score, with larger dots representing more participants

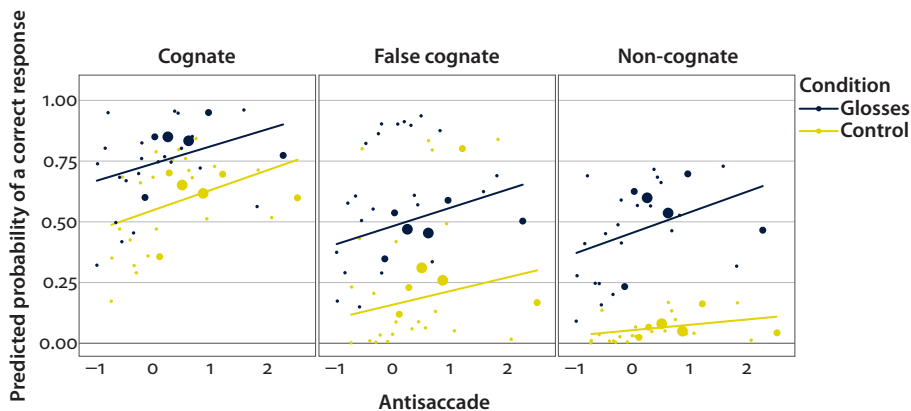


Figure 8. Vocabulary knowledge predicted probability of a correct response (i.e., accuracy predicted by the model) by Antisaccade score, Test Time, and condition. Dot size indicates the number of participants with a certain Antisaccade score, with larger dots representing more participants

Discussion

Glosses vs. Control

Our results show that L1-English learners of Spanish who were provided with bilingual (English/Spanish) glosses while reading a text in Portuguese were significantly more accurate at reading comprehension compared to participants in the Control condition who read the same passage with no glosses. In fact, whereas

the model shows that participants in the Control condition performed only at 57% accuracy on reading comprehension, their accuracy significantly increased to 66% in the Glosses condition when controlling for L2 Proficiency. This finding suggests that participants were able to comprehend more of the Portuguese passage when provided with glosses than when reading without glosses. In addition, participants reported on the End-of-Session Questionnaire that they understood the passage better and were more confident in answering reading comprehension and vocabulary questions when reading the passage with glosses than when reading it without glosses. In both conditions, participants said they relied heavily on their knowledge of Spanish; in addition, participants reported that they found the pre- and post-reading activities in the Glosses condition very useful for reading comprehension and vocabulary learning.

Regarding vocabulary, due to a high degree of congruence between Spanish and Portuguese, participants were able to use their knowledge of Spanish to figure out a lot of vocabulary on their own, as evidenced by the fact that even in the Control condition, participants were able to comprehend the Portuguese text to some degree and showed improvements between the Immediate and Delayed posttests. However, reading a passage with glosses generally led to significantly higher VKS scores than reading the passage in the Control condition; this pattern held for all word types on the Immediate posttest, but for only non-cognates on the Delayed posttest. In fact, the model showed that in the Control condition participants' accuracy on the Immediate VKS posttest was 57%, 6%, and 2% for cognates, false cognates, and non-cognates, respectively. The accuracy was significantly higher in the Glosses condition with 98%, 78%, and 77% for cognates, false cognates, and non-cognates, respectively.

These results demonstrate that initial vocabulary learning from reading can be enhanced through bilingual glosses that draw readers' attention to differences and similarities among words in the L1, L2, and L3. This finding is important for all three word types: non-cognates, which may not be recognized at all; false cognates, which can lead to interference and negative transfer based on incorrect assumptions; and cognates, which may not result in positive transfer if not pointed out, as learners do not always correctly recognize them as cognates. As noted above, this result held on the Delayed posttest only for non-cognates, indicating long-term benefits of glosses on words that differ in reader's L2 and L3.

L2 proficiency

The results of the present study also show that learners' proficiency in the donor language plays an important role in acquiring a new, closely related language. The higher the level of Spanish, as measured by a cloze test, the better learners could

perform in Portuguese, both with and without glosses. In particular, learners with higher proficiency in Spanish better comprehended the Portuguese passages and better learned and retained new Portuguese vocabulary in both the Glosses and Control conditions. It should be noted however, that in this study, proficiency was determined by participants' performance on a short cloze test. Because proficiency seemed to play a significant role in participants' success in L3 reading comprehension and vocabulary learning, we suggest that replicating this study with measures of global proficiency ratings for reading, listening, and speaking, such as those provided by ILR or ACTFL, may help better understand the role L2 proficiency plays in learning an L3. A related question for future research would be to investigate whether there is a minimum threshold level of L2 proficiency for successfully learning a closely related L3.

Vocabulary retention

In the Glosses condition, there was a significant drop in vocabulary retention between the Immediate and Delayed posttests. This result supports previous research on frequency of exposure and vocabulary retention, which shows that repetition increases retention overall (Brown et al., 2008; Golonka et al., 2015; Kweon & Kim, 2008; Rott, 1999). Furthermore, studies show that most of the words were not retained beyond four weeks (Rott, 1999) and three months (Brown et al., 2008; Waring & Takaki, 2003) and about half of the new words were lost after three months regardless of frequency of exposure (Waring & Takaki, 2003). These findings suggest that learners need reinforcement of learned information in order to be able to retain it.

Although VKS scores in the Glosses condition decreased from the Immediate to the Delayed test, performance in the Control condition showed the opposite pattern, with VKS scores improving over time. This finding may be due to the exposure to Portuguese that was provided in the experiment between the Immediate and Delayed posttests: All participants completed the Control condition first, so they completed the Immediate VKS without having been exposed to any glosses or other working aids. After completing tasks in the Control condition, participants completed the Cognate Status tasks, in which they were exposed to Portuguese-Spanish word pairs, followed by the tasks in the Glosses condition using a different passage. After the first session of the study, we assume they had no contact with Portuguese for two weeks before taking the Delayed posttest. We theorize that participants' awareness of Spanish-Portuguese similarities increased, mostly due to the exposure to word pairs and the tasks in the Glosses condition, and that this enhanced their performance on the Delayed posttest for words that they encountered in the Control condition. But why did participants not gain on the Delayed posttest for words they encountered in the Glosses condition? We speculate that

participants initially were exposed to a lot of new information during the tasks in the Glosses condition, but forgot some of it between testing sessions. On the other hand, participants were not exposed to as much information in the Control condition, but those words that they did learn required a lot of effort on their part because they needed to be figured out, which may have helped them remember the words. Craik and Lockhart's (1972) level of processing theory also offers some explanation of these results: improved memory performance over time for the Control condition could be attributed to greater depth of processing regardless of the incidental or intentional nature of the learning task. Then, even little exposure to Portuguese, such as during the Cognate Status task, might have triggered increased accuracy on the Delayed posttest.

Cognate status

Overall, different types of words (cognates, non-cognates, and false cognates) were acquired differently. As expected, cognates were initially learned best, followed by false cognates and non-cognates, indicating that learners can apply previously acquired knowledge to new situations. This cross-language interaction, in which the form and meaning of words correspond in the donor and target languages, can lead to positive transfer if the learner notices the similarities between the languages. The subjective similarities have been considered essential for transfer to occur because it is the learner's awareness of those similarities that determines which features of one language are transferable to the other (Kellerman, 1983). On the contrary, if the features differ in the two languages, learners can experience cross-language conflicts, for example, while learning false cognates with an already known language. Such conflicts can serve as desirable difficulties that can enhance vocabulary learning (Bjork & Kroll, 2015).

Aptitude

We found various relationships among all selected aptitude tests and learning outcomes investigated in this study. In particular, our results show that higher scores on rote memory, explicit induction, and implicit induction (as measured by the Paired Associates, Letter Sets, and Serial Reaction Time tasks, respectively) were associated with better passage comprehension as measured by the multiple-choice reading comprehension test, regardless of condition or learner proficiency in Spanish. Working memory updating, measured by the Running Memory Span task, and inhibition, measured by the Antisaccade task, showed a similar pattern, with higher aptitude scores associated with better reading comprehension; however, these results were observed only at lower L2 proficiency levels.

The Antisaccade task, which is a measure of inhibition that shows how well a person can focus their attention during a cognitively-demanding task, can help explain the difference in performance between the Control and Glosses conditions. Our results show that in the Control condition (i.e., reading a passage with no glosses), participants with better inhibitory control scores comprehended a Portuguese text better than those with lower scores. Presumably, while reading a text with no glosses in a language that is related to their already known language (Spanish), participants attempted to focus their attention on similarities with Spanish, either consciously or unconsciously, to comprehend the text in Portuguese. Because they were not provided with any help, it may have been more effortful to appropriately control their attention while reading the Portuguese text. This challenge may have led participants with better inhibitory control ability, as measured by the Antisaccade task, to perform better in the (more demanding) Control condition than those with lower ability. This finding suggests that learners with better inhibitory control may be able to read authentic texts with no help earlier than learners with poorer inhibitory control. For instance, it is possible that learners with better inhibitory control are better able to ignore or bypass unknown words or phrases (which may be distracting) and focus on the known or easily guessable words or phrases. Future studies using eye-tracking methods could test this hypothesis by examining whether readers with better inhibitory control show shorter fixation durations on unknown words.

However, in the Glosses condition, performance on the Antisaccade task did not show any relationships with reading comprehension performance, which suggests that the cognitive abilities engaged in the Control condition differ from those engaged in the Glosses condition. In other words, when learners were provided with glosses, they may not have needed to engage as much attentional control as when no glosses were present.

As for relationships between inhibitory control and vocabulary learning, the results showed that higher scores on the Antisaccade task were related to better vocabulary learning, regardless of condition. This finding suggests that inhibitory control seems to be a more important predictor of general ability to pick up on general comprehension in a task with no additional assistance such as glosses, but at the level of vocabulary learning, the presence or absence of glosses was less important, as learners with higher Antisaccade scores performed better generally in both conditions.

Similar to the result for Antisaccade for reading comprehension, two aptitude measures showed relationships with vocabulary learning outcomes in the Control condition only. In particular, better scores on the Paired Associates task, which measures the ability to associate pairs of words and retain these associations in memory, were related to better learning and retention of cognates in the Control

condition, but not in the Glosses condition. For the Control condition, participants had to engage more in cognitive abilities such as word association and rote memory in order to figure out word meanings, whereas in the Glosses condition, learners were provided with the word meanings and thus engaged in a different kind of processing, potentially neutralizing any advantage for learners with higher or lower Paired Associates scores.

There was a significant interaction between performance on the Letter Sets task, which measures explicit induction, and errors on false cognates only in the Control condition. Performance on false cognates decreased as Letter Sets scores increased, but there was also a marginal three-way interaction suggesting that an increased Letter Sets score does not show the same detriment to learning false cognates in the Glosses condition. A higher Letter Sets score indicates a strong ability in explicit learning. One interpretation of this finding might be that participants with a greater tendency to need or rely on explicit learning of rules may be less likely to 'suppress' the rules (the L2 meaning of the L3 false cognates) based solely on the context in which they are encountered. Conversely, participants with a lesser tendency to rely on learned rules (lower Letter Sets scores) may be able to override the misleading L2 meaning based on context alone. The results for the Glosses condition, however, suggest that exposure to the meaning of the L3 false cognates through L1/L2 glosses while reading may be sufficiently explicit to allow participants with higher Letter Sets scores to suppress the previously learned L2 meanings as well as participants with lower Letter Sets scores. An interesting question for future research related to the role of cognitive aptitude in L3 learning is to investigate the patterns of L3 acquisition in the context of typologically distant languages, where the cognitive processing demands will likely differ from those in this study involving closely related languages. Such a study might elucidate the cognitive aspect of L3 acquisition independent of the known typological effect.

Conclusions

Overall, providing bilingual (English/Spanish) glosses for Portuguese vocabulary words was found to be an effective technique for L1-English learners of Spanish. Learners performed better at reading comprehension in the Glosses condition (i.e., reading a text with glosses) than in the Control condition (i.e., reading a text with no glosses). Results were similar for vocabulary learning: for the Glosses condition, participants knew more words initially on the first posttest, although by the second posttest, this advantage only held for glosses for words that are non-cognates with Spanish. Although these results generally speak to the advantage of using bilingual glosses in L3 acquisition, the results are enhanced by examining

the patterns in cognitive aptitude. Higher cognitive aptitude performance on several of the tasks (namely, rote memory, explicit induction, and implicit induction for reading comprehension, and inhibitory control for vocabulary learning) was associated with better performance, indicating that these tasks may be a better predictor of performance on outcome measures than the instructional technique (presence or absence of glosses) utilized. As for differences between the conditions, we only saw associations with cognitive aptitudes for the Control condition and not the Glosses condition. In other words, cognitive aptitude played an important role in performance of the more cognitively demanding task (that is, reading a text with no glosses), whereas we saw no predictive role for cognitive aptitude in the supported task (that is, reading a text with glosses). This pattern suggests that the support of certain instructional techniques can “level the playing field” and mitigate any potential disadvantages based on certain aspects of cognitive aptitude. These results also demonstrate the dual roles of instructional techniques and cognitive aptitude in L3 acquisition, but, importantly, the lack of intersection between the two. In other words, it is not the case that we found the performance of participants with certain cognitive aptitudes benefited from the instructional technique used in our study. Exploring the possible intersection of cognitive aptitude and instructional techniques in further research will inform efforts that focus on instruction that is tailored to the cognitive abilities of the learners.

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Appendix A. Target words

Table A-1. Results of the Cognate Status Study*

Cognate status	Portuguese word	Spanish word	English word	Frequency/mil** (Port/Span)
Cognate	amostra	muestra	sample	14.4 / 155.2
	consumo	consumo	consumption	107.8 / 85.6
	inovação	innovación	innovation	34.9 / 26.3
	nível	nivel	level	179.5 / 304.7
	relógio	reloj	clock	20.1 / 22.2
	trabalhador	trabajador	worker	44.0 / 24.6
False cognate	criança	niño	child	255.5 / 246.7
	escala	horario	schedule	42.6 / 20.1

Table A-1. (continued)

Cognate status	Portuguese word	Spanish word	English word	Frequency/mil** (Port/Span)
	escritório	oficina	office	34.4 / 77.6
	funcionário	empleado	employee	33.7 / 30.8
	gordura	grasa	fat	41.6 / 42.0
	mudança	cambio	change	151.1 / 322.4
	óleo	aceite	cooking oil	45.6 / 48.3
	privação	privación	deprivation	4.5 / 3.9
Non-cognate	aula	clase	class	75.8 / 169.5
	banha	manteca	lard	1.9 / 3.0
	doença	enfermedad	illness	134.1 / 175.4
	hoje	hoy	today	942.9 / 670.0
	jornada	jornada	workday	48.9 / 40.3
	milho	maíz	corn	18.9 / 21.3
	morador	habitante	resident	11.9 / 3.6
	opção	opción	option	134.1 / 99.5
	pesquisa	investigación	research	212.4 / 195.9
	prateleira	estante	shelf	4.6 / 1.6
	prazo	plazo	term	144.1 / 84.0
	saúde	salud	health	411.1 / 328.2

*Cognate status was determined via a majority of participant responses regarding their perception of the Portuguese and Spanish translations.

**Frequency information obtained from Davies and Ferreira (2006) and Davies (2002).

Appendix B. End-of-Session questionnaire

Upon completing the study tasks, participants were asked to fill out a questionnaire regarding their experience with the study. Twenty-two participants completed the survey. The survey consisted of 12 items (nine using a rating scale, two open-ended, and one multiple-choice). Responses for the scale and multiple-choice items were averaged by item and open-ended responses were read and summarized. Because the open-ended questions asked to share additional thoughts about the experience, not all participants did that, resulting in just a few comments. Table B-1 shows participant responses regarding their experience with the study on a 5-point Likert scale (means).

Table B-1.

Survey question	Glosses	Control
How much of the passage were you able to understand?	4.4	3.1
How confident were you answering reading comprehension questions?	4.2	3.1
How confident were you answering vocabulary questions?	4.1	2.6
To what extent did you rely on your Spanish while reading in Portuguese?	4.4	4.5
What effect did Spanish have on your comprehension of the passage?	4.6	3.5
How helpful were pre- and post-reading activities for reading comprehension?	4.3	N/A
How helpful were pre- and post-reading activities for vocabulary learning?	4.5	N/A

Overall, participants in the Glosses condition felt they understood more of the passage and were more confident answering reading comprehension and vocabulary questions than those in the Control condition. The majority of participants (18 out of 22) indicated that when provided with bilingual English/Spanish glosses, they used both types of glosses while reading the passage. Four participants used Spanish glosses more; none of participants indicated the use of English only glosses or not using the glosses at all.

In the few additional open-ended comments participants expressed that they understood the passage with glosses better than the one with no glosses and that glosses helped them in performing tasks in Portuguese. A few comments also related to the comparisons between Spanish and Portuguese, stating that when Spanish and Portuguese words stood side by side, it helped them make comparisons and ultimately understand Portuguese better. People took advantage of their knowledge of Spanish while reading a text in Portuguese with no glosses, as demonstrated by one person who tried to sound out the words from the passage “to see if anything sounded familiar to Spanish” and another person who “was basically trying to read the [Portuguese] passage in Spanish in order to help understand it.” Overall, participants found the Control condition, in which no glosses were provided, more difficult than the Glosses condition; however, one person said she understood more of the Portuguese passage in the Control condition than she thought she would.

Appendix C. Data analysis procedure and statistical models

For the reading comprehension, and VKS data, the statistical analysis procedure involved fitting a sequence of mixed effects models by first building up the complexity of the random effects structure before then trimming down the complexity of the fixed effects (e.g., Raudenbush & Bryk, 2002; Snijders & Bosker, 2012). This procedure led to the best fitting models that are reported below, from which we drew the inferences described above in the main text.

The modeling sequence proceeded as follows. First, initial models included random intercepts varying by subject and item and all fixed effect predictors and interactions. Fixed effects for both dependent measures included *Condition* (Control as baseline versus Glosses) and *L2 Proficiency* (centered at the participant-level). The VKS models also included *Test Time* (Immediate as baseline versus Delayed posttest) and *Cognate Status* (non-cognates as baseline versus cognates and false cognates) as fixed effects.

Random slopes were tested one-by-one via likelihood ratio tests; only random slopes that significantly improved model fit at $p < .05$ and resulted in a converging model were retained. Finally, beginning with the highest-order interaction terms, any fixed effects that were not contributing to the model fit were removed from the model in a backward stepwise method to arrive at the model of best fit.

For all exploratory RC and VKS aptitude models, the final model of best fit for each dependent measure (RC and VKS) was taken and each aptitude measure in turn was allowed to interact with the retained fixed effects structure. Random slopes were tested and retained if significant. The backward stepwise method was then employed with the aptitude interactions in these models to arrive at the model of best fit for each aptitude measure.

Table C-1. MLM results of condition and L2 proficiency regressed on reading comprehension accuracy

Fixed Effects	<i>b</i>	$\exp(b)$	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.28	1.32	0.25	.258
Condition (Gloss)	0.37	1.45	0.16	.022*
Proficiency	0.07	1.07	0.03	.023*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	0.03		0.19	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.06		0.25	
Intercepts Text/Item Type/Item Number	0.74		0.86	

Table C-2. MLM results of PA regressed on reading comprehension accuracy

Fixed effects	<i>b</i>	$\exp(b)$	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.30	1.35	0.25	.232
Condition (Gloss)	0.38	1.46	0.17	.023*
Proficiency	0.07	1.07	0.03	.016*
PA	0.22	1.25	0.08	.009*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	<0.01		<0.01	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.07		0.26	
Intercepts Text/Item Type/Item Number	0.74		0.86	

Table C-3. MLM results of LS regressed on reading comprehension accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.30	1.35	0.25	.234
Condition (Gloss)	0.38	1.46	0.17	.023*
Proficiency	0.04	1.04	0.03	.175
LS	0.26	1.30	.09	.004*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	<0.01		<0.01	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.06		0.25	
Intercepts Text/Item Type/Item Number	0.75		0.86	

Table C-4. MLM results of SRT Processing Speed regressed on reading comprehension accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.32	1.38	0.25	.191
Condition (Gloss)	0.32	1.38	0.17	.062^
Proficiency	0.05	1.05	0.03	.093^
SRT Processing Speed	0.20	1.22	0.08	.017*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	<0.01		<0.01	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.05		0.22	
Intercepts Text/Item Type/Item Number	0.76		0.87	

Table C-5. MLM results of RMS regressed on reading comprehension accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.32	1.38	0.25	.202
Condition (Gloss)	0.38	1.46	0.16	.021*
Proficiency	0.05	1.05	0.03	.095^
RMS	-.01	0.99	0.09	.884
Proficiency × RMS	-.07	0.93	0.03	.037*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	0.01		0.08	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.06		0.25	
Intercepts Text/Item Type/Item Number	0.74		0.86	

Table C-6. MLM results of AS regressed on reading comprehension accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control)	0.39	1.48	0.25	.122
Condition (Gloss)	0.38	1.46	0.17	.025*
Proficiency	0.04	1.41	0.03	.235
AS	0.32	1.38	0.13	.013*
Cond. (Gloss) × AS	-0.41	0.66	0.17	.015*
Proficiency × AS	-0.08	0.92	0.04	.031*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	<0.01		<0.01	
Intercepts Text	<0.01		<0.01	
Intercepts Text/Item Type	0.07		0.26	
Intercepts Text/Item Type/Item Number	0.75		0.86	

Table C-7. MLM results of condition, L2 Proficiency, Test Time, and Cognate Status regressed on VKS accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-3.87	0.02	0.54	<.001*
Condition (Gloss)	5.10	164.02	0.37	<.001*
Proficiency	0.26	1.30	0.07	<.001*
Cognate Status (Cognate)	4.15	63.43	0.81	<.001*
Cognate Status (False Cognate)	1.07	2.92	0.75	.152
Test Time (Delayed)	0.60	1.82	0.23	.009*
Cond. (Gloss) × Cog. Status (Cog)	-1.66	0.19	0.42	<.001*
Cond. (Gloss) × Cog. Status (FC)	-1.04	0.35	0.40	.009*
Cond. (Gloss) × Test Time (Delayed)	-0.08	0.92	0.04	.031*
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	0.98		0.99	
Condition Subject	0.81		0.90	-.07
Intercepts Portuguese Word	2.17		1.47	

Table C-8. MLM results of PA regressed on VKS accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-3.88	0.02	0.53	<.001*
Condition (Gloss)	5.06	157.59	0.33	<.001*
Proficiency	0.27	1.31	0.06	<.001*
Cognate Status (Cognate)	4.20	66.69	0.80	<.001*
Cognate Status (False Cognate)	1.15	3.16	0.74	.122
Test Time (Delayed)	0.60	1.82	0.23	.009*
Cond. (Gloss) × Cog. Status (Cognate)	-1.82	0.16	0.40	<.001*
Cond. (Gloss) × Cog. Status (FC)	-1.13	0.32	0.39	.004*
Cond. (Gloss) × Test Time (Delayed)	-3.27	0.04	0.31	<.001*
PA	0.25	1.28	0.28	.379
Cond. (Gloss) × PA	0.49	1.63	0.27	.066 [^]
Cog. Status (Cog) × PA	0.74	2.10	0.31	.016*
Cog. Status (FC) × PA	-0.02	0.98	0.30	.949
Cond. (Gloss) × Cog. Status (Cog) × PA	-1.36	0.26	0.40	<.001*
Cond. (Gloss) × Cog. Status (FC) × PA	-0.45	0.64	0.38	.231
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	0.94		0.97	
Intercepts Portuguese Word	2.17		1.47	

Table C-9. MLM results of LS regressed on VKS accuracy

Fixed effects	<i>b</i>	<i>exp(b)</i>	<i>SE</i>	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-3.91	0.02	0.53	<.001*
Condition (Gloss)	5.07	159.17	0.34	<.001*
Proficiency	0.21	1.23	0.07	.002*
Cognate Status (Cognate)	4.19	66.02	0.79	<.001*
Cognate Status (False Cognate)	1.28	3.60	0.74	.082 [^]
Test Time (Delayed)	0.59	1.80	0.23	.010*
Cond. (Gloss) × Cog. Status (Cognate)	-1.78	0.17	0.41	<.001*
Cond. (Gloss) × Cog. Status (FC)	-1.22	0.30	0.40	.002*
Cond. (Gloss) × Test Time (Delayed)	-3.31	0.04	0.31	<.001*
LS	0.46	1.58	0.32	.152
Cond. (Gloss) × LS	0.32	1.38	0.30	.292
Cog. Status (Cog) × LS	-0.05	0.95	0.33	.887

Table C-9. (continued)

Fixed effects	<i>b</i>	exp(<i>b</i>)	SE	<i>p</i> -value
Cog. Status (FC) × LS	-0.86	0.42	0.34	.012*
Cond. (Gloss) × Cog. Status (Cog) × LS	-0.36	0.70	0.42	.383
Cond. (Gloss) × Cog. Status (FC) × LS	0.75	2.12	0.42	.073 [^]
Random effects	Variance		SD	Correlation
Intercepts Subject	1.00		1.00	
Intercepts Portuguese Word	2.08		1.44	

Table C-10. MLM results of SRT regressed on VKS accuracy

Fixed effects	<i>b</i>	exp(<i>b</i>)	SE	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-3.89	0.02	0.55	<.001*
Condition (Gloss)	5.11	165.67	0.34	<.001*
Proficiency	0.29	1.34	0.07	.039*
Cognate Status (Cognate)	4.14	62.80	0.82	<.001*
Cognate Status (False Cognate)	1.06	2.89	0.76	.165
Test Time (Delayed)	0.49	1.63	0.24	.039*
Cond. (Gloss) × Cog. Status (Cog)	-1.81	0.16	0.41	<.001*
Cond. (Gloss) × Cog. Status (FC)	-1.02	0.36	0.42	.014*
Cond. (Gloss) × Test Time (Delayed)	-3.14	0.04	0.32	<.001*
SRT Processing Speed	0.35	1.42	0.20	.076 [^]
Proficiency × SRT Processing Speed	-0.14	0.87	0.08	.070 [^]
Random effects	Variance		SD	Correlation
Intercepts Subject	1.07		1.04	
Intercepts Portuguese Word	2.26		1.50	

Table C-11. MLM results of RMS regressed on VKS accuracy

Fixed effects	<i>b</i>	exp(<i>b</i>)	SE	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-3.94	0.02	0.53	<.001*
Condition (Gloss)	5.10	164.02	0.33	<.001*
Proficiency	0.27	1.31	0.07	<.001*
Cognate Status (Cognate)	4.23	68.72	0.79	<.001*
Cognate Status (False Cognate)	1.12	3.06	0.73	.127
Test Time (Delayed)	0.62	1.86	0.23	.006*
Cond. (Gloss) × Cog. Status (Cog)	-1.85	0.16	0.40	<.001*

(continued)

Table C-11. (continued)

Fixed effects	<i>b</i>	exp(<i>b</i>)	<i>SE</i>	<i>p</i> -value
Cond. (Gloss) × Cog. Status (FC)	-1.11	0.33	0.39	.005*
Cond. (Gloss) × Test Time (Delayed)	-3.27	0.04	0.31	<.001*
RMS	0.27	1.31	0.25	.275
Cond. (Gloss) × RMS	-0.22	0.80	0.21	.314
Test Time (Delayed) × RMS	-0.37	0.69	0.23	.107
Cond. (Gloss) × Test Time (Delayed) × RMS	0.53	1.70	0.29	.073 [^]
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	1.16		1.08	
Intercepts Portuguese Word	2.09		1.45	

Table C-12. MLM results of AS regressed on VKS accuracy

Fixed effects	<i>b</i>	exp(<i>b</i>)	<i>SE</i>	<i>p</i> -value
Intercept (Control/Non-Cognate/Immediate)	-4.01	0.02	0.53	<.001*
Condition (Gloss)	5.18	177.68	0.34	<.001*
Proficiency	0.25	1.28	0.07	<.001*
Cognate Status (Cognate)	4.27	71.52	0.79	<.001*
Cognate Status (False Cognate)	1.24	3.46	0.73	.090 [^]
Test Time (Delayed)	0.62	1.86	0.23	.007*
Cond. (Gloss) × Cog. Status (Cognate)	-1.92	0.15	0.40	<.001*
Cond. (Gloss) × Cog. Status (FC)	-1.23	0.29	0.40	.002*
Cond. (Gloss) × Test Time (Delayed)	-3.26	0.04	0.31	<.001*
AS	0.54	1.72	0.24	.025*
Cog. Status (Cog) × AS	-0.32	0.73	0.18	.075 [^]
Cog. Status (FC) × AS	-0.35	0.70	0.18	.046*
Test Time (Delayed) × AS	-0.26	0.77	0.15	.073 [^]
Random effects	Variance		<i>SD</i>	Correlation
Intercepts Subject	1.16		1.08	
Intercepts Portuguese Word	2.09		1.44	

Autonomous Portuguese L3 learning through an adaptive platform

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Despite increasing need for on-demand, autonomous language learning, difficult technical issues render this approach insufficient without a human in the loop (e.g., blended learning). In this chapter, we discuss how recent advances in human language technology (HLT), cognitive science, and second language acquisition (SLA) combined can address seemingly intractable problems (e.g., intelligent feedback on error). We introduce an HLT-enabled adaptive language learning platform and examine the results from a pilot study in which English native speakers highly proficient in Spanish as a second language used the platform to learn Portuguese as a third language. Such “conversion” training from Spanish to Portuguese provides an ideal testbed for these innovative HLT and SLA ideas.

Keywords: autonomous learning, adaptive learning, language learning technology, cognitive science, human language technology, L3 acquisition, educational data mining

Introduction

In recent years, there has been a growing interest in examining third language (L3) learning. This has been motivated by research indicating that the L3 learning process is impacted by a bilingual’s existing linguistic knowledge and learning experiences. Given that the majority of the world’s population knows at least two languages (e.g., Ansaldo, Marcotte, Scherer, & Raboyeau, 2008; European Commission Special Eurobarometer, 2006; Grosjean, 1989), there is an opportunity to enhance L3 learning by taking advantage of the learner’s existing linguistic and metalinguistic knowledge. Over the past 20 years, researchers have developed

various language learning technologies that can enhance learning outcomes (for a meta-analysis, see Grgurović, Chapelle, & Shelley, 2013). With ongoing and rapid advances in such language learning technology, we are approaching broad availability of truly adaptive learning that is tailored to the learner's language background. In this chapter, we describe an adaptive language learning platform designed to enable autonomous learning of L3 Portuguese by proficient Spanish speakers. Results from a series of pilot studies demonstrate how the system can leverage learners' existing knowledge of Spanish to enhance learning outcomes.

The third language learning context

Research from the past three decades has demonstrated that both of a bilingual's two languages are active in mind when reading, speaking, or listening, even in purely monolingual contexts (e.g., Dijkstra, 2005; Kroll, Bobb, & Wodniecka, 2006; Marian & Spivey, 2003). This has the consequence of the non-target language being capable of influencing the processing or learning of a target language. For multilinguals, the situation is further complicated: all known languages can impact one another, with effects emerging for languages learned later in life as well as the native language (L1) itself (for a review, see Linck, Michael, Golonka, Twist, & Schwieter, 2015). These cross-linguistic interactions can result in facilitation (i.e., positive transfer from one language to another) or interference (i.e., negative transfer), and they tend to happen more frequently when there is greater typological similarity between the involved languages, as in the case of Spanish and Portuguese (e.g., Ringbom, 2007; Rothman, 2010, 2011).

This research suggests that third language (L3) instruction should take advantage of any congruence between known languages to maximize positive transfer from the previously learned languages – particularly when teaching related languages (Bonilla et al., this volume; Carvalho, Freire, & da Silva, 2010; Donato & Pasquarelli-Gascon, 2015; Hufeisen & Neuner, 2004; McCann, Klein, & Stegmann, 2003). Carvalho et al. specifically recommend tailoring to the needs of the Spanish-speaking population in the U.S., citing Portuguese courses geared for Spanish speakers such as those offered at the University of Arizona and textbooks by Simões and colleagues (Simões, 1992, 2008; Simões, Carvalho, & Wiedemann, 2004) as examples of much needed instructional materials for teaching Portuguese to speakers of Spanish. The authors especially stressed the need for supplemental instructional materials based on authentic texts such as those focusing on reading (Tesser, Pires, & Santos, 2006) and contrastive grammar skills (Carvalho, Freire, & da Silva, 2009).

Learners of a related language encounter a large number of word pairs that are identical or similar in both languages – that is, they have the same or similar

form and meaning and are derived from the same proto-language (e.g., Proto-Germanic, Proto-Romance). The word pairs that have these genetic relationships are referred to as true historical *cognates*. In addition to historical origin, perceived “cognate-like” similarities can stem from other sources, such as international loan words or even pure coincidence (Jarvis, 2009). However, some of these word pairs can have the same or similar form but dissimilar meaning that can potentially be confusing to learners. These word pairs are referred to as *false cognates* (also called deceptive cognates or false friends). There is substantial evidence in the literature that cognates are recognized, understood, and produced more easily than non-cognates (Lemhofer, Dijkstra, & Michel, 2004; Tkachenko, 2001; Van Hell & Dijkstra, 2002), and these effects are compounded by the presence of multiple languages in multilinguals. For instance, Lemhofer et al.’s study of trilinguals included double cognates, in which word forms and sounds were shared between the L1 and L3, and triple cognates, in which word forms and sounds overlapped in all three languages. They found cognate facilitation for both types of cognates, with greater facilitation for the triple cognates than the double cognates. These results suggest that greater amounts of overlapping information across all three languages can offer even more benefits to processing. L3 instruction takes advantage of the lexical and structural overlap between closely related languages and sets its goal on facilitation of positive transfer and mitigation of negative transfer. This can be done by making learners aware of similarities between languages (facilitation of positive transfer) and differences between them (mitigation of negative transfer).

Spanish to Portuguese conversion

In this chapter, we describe a prototype adaptive language learning platform for native speakers of English who are proficient in Spanish and are learning Portuguese. We first describe some of the key human language technology (HLT) components of our prototype platform before describing the types of activities that are automatically generated for learners. We then report preliminary findings from a series of pilot studies designed to examine two key aspects of the platform: adaptivity based on user performance, and automated feedback on error. These results demonstrate how usage data from language learning platforms can be mined to generate insights into learning processes and to test hypotheses about the effectiveness of platform features. We conclude with a brief discussion of limitations of the piloted prototype and future directions for research on language learning software for autonomous learning.

We focused on the Spanish-to-Portuguese use case because it provides a good starting point for the development of new language learning technologies for numerous reasons: Learners can capitalize on their previous knowledge of a

related language; there are ample learning materials for Portuguese that can be fetched from the internet and automatically ingested into an autonomous learning platform; there are existing HLT capabilities that can be repurposed for language learning; and there is a sufficiently large population of potential users whose rich data enable empirically based innovations. The platform is designed to provide authentic language input to the learners, and it can automatically detect cognates, which allows it to encourage positive transfer by capitalizing on learners' previously acquired knowledge.

Existing HLT capabilities

The prototype platform is being developed in collaboration with researchers at IBM's T. J. Watson Research Center, and thus leverages a number of IBM's existing HLT capabilities. The HLT tools listed below can provide automated methods for the curation, pre-processing, and preparation of authentic materials for learning activities. Note that for a number of these HLT tools, the language materials can be text-only, audio, or video content. These HLT tools form the computational backbone of many language learning applications, including our prototype platform. A discussion of the features and strengths of existing language-learning applications is outside of the scope of this chapter; the interested reader is referred to Golonka, Bowles, Frank, Richardson, & Freynik (2014).

- *Morphological analysis*: This requires the segmentation of a word into its morphological components. This is a core process underlying other HLT tools, such as text-to-speech (e.g., to determine the context-appropriate grapheme-phoneme conversion rules to be applied), and part-of-speech tagging (to identify the morphological structure).
- *Text-to-speech*: Based on a speech model that captures rules for grapheme-phoneme correspondences, this component converts text input into synthesized speech output (e.g., speech output in GPS navigation systems).
- *Cognate detection for multiple languages*: This component identifies translation equivalents through semantic analysis, then compares their written forms to identify cognates based on highly similar or exactly matching forms. This analytic can be extended beyond the bilingual case to examine multilingual cognates, for example in the current scenario to identify words that are cognates across English, Spanish and Portuguese (e.g., English 'problem,' Spanish and Portuguese 'problema').
- *Lemmatization*: In this process, inflected word forms are stripped of affixes (e.g., inflectional suffixes) to identify the canonical lemma form. For example, in English the singular 'car' and plural 'cars' are linked to the same lemma

- ‘car.’ This is implemented through the combination of vocabulary analysis and morphological analysis. Lemmatization allows more appropriate tracking of core lemma forms rather than treating affixed forms as separate lexical entities.
- *Part-of-speech tagging*: This analytic identifies the part of speech for each lemma, based in part on morphological analysis of the word and its surrounding context (e.g., phrase or sentence structure).
 - *Machine translation*: The Machine Translation (MT) system automatically translates content in the source language to the target language (e.g., Google Translate). This can operate at the single word level up to full-length passages. The MT system itself can incorporate some of the HLT tools listed here (e.g., morphological analysis) to enhance the accuracy of the generated translation.
 - *Topic detection*: This allows a specific passage (e.g., news article) to be identified as covering one or more predefined topics (e.g., sports, politics, culture). A topic model is developed by providing a set of materials – such as a group of texts – that have been annotated with their topic(s) as determined by human raters.
 - *Text difficulty leveling*: An algorithm estimates the level of difficulty of a passage along some rating continuum (e.g., the Common European Framework of Reference for Languages). This can help to differentiate materials that are at an appropriate difficulty level for the learner.

The current prototype

At the time of the pilot studies, the prototype was able to draw on an internal annotated corpus of Portuguese content (processed from parallel corpora of movie subtitles and European Parliament Proceedings). The prototype drew content from the corpora to generate a variety of learner activities. Based on these corpora, the activities included a mix of Brazilian and Peninsular Portuguese, although the long-term goal was to focus on Brazilian Portuguese by increasing its presence within the corpus. Learners accessed the prototype on a computer web browser. The learning activity templates available at the time of this pilot study are listed below in Table 1.

These learning activities are generated for users based on an individualized learning plan and the user’s performance in previous activities. The plan identifies a learning sequence and consists of three types of learning targets: lexical (specific lemmas), thematic (e.g., colors, days of the week), and concepts (e.g., grammatical elements such as indefinite articles). Exposure to learning targets is generally contingent on the successful completion of other learning targets, similar to “unlocking” levels in games or apps. Depending on the target, “successful completion”

Table 1. Learning activity templates implemented in the prototype

Activity template	Description
Fill in the blank	A Portuguese phrase or sentence is presented with a word blanked out, along with an English translation; users must type in the missing word in Portuguese.
Flashcards	A target word is presented visually or auditorily, with audio sources representing pronunciation from Brazilian Portuguese; users must transcribe (in Portuguese) or translate (in English) the target word.
Matching	Content from Wikipedia articles are presented with headings on the left and short passages (1–3 sentences in length) on the right; users must match the heading to the corresponding associated text. For non-Wikipedia content, Portuguese words and English translations are presented and must be matched.
Partition	A set of words are presented visually, and users must separate them into the appropriate categories (e.g. colors, numbers).
Scrabble	Scrambled letters are presented visually, and users must unscramble the letters to spell a Portuguese word.
Make sequence	A sentence is presented visually with the words out of order, and users must rearrange the words to make a sentence.
Reorder	A series of sentences is presented out of order, and users must reorder the sentences to make a coherent text.
Choose	Given four sentences with scrambled word order, users must choose the one sentence with the correct order.
Correct MT	Users must correct the error in a Portuguese phrase resulting from a machine translation from English.
Video transcription	A video is presented along with its transcript, and users must listen and fill in the missing words from the transcript.
Split to make words	Given a string of characters with the punctuation and spaces removed, users must add spaces to separate the words into a comprehensible phrase.
Choose unspoken text	Users watch a short passage from a Portuguese-language TED Talk, then must choose which phrase was not heard in the text.

may range from simply being exposed to the learning target in an activity (e.g., being presented a short overview slide of Brazilian Portuguese pronunciation) to requiring certain levels of success on target “challenges” (i.e., activities which can be scored as correct or incorrect). Thus, the set of learning targets active for a particular user will depend upon success on targets up to that point. All learners with the same learning plan will eventually see all of the same learning targets given enough time in the prototype, though the particular order of those activities and number of successful challenge attempts needed to reach mastery will differ.

Because the prototype is still in development (i.e., improvements and adjustments are constantly being incorporated), the goal of this study was to describe the pilot context and participants and to provide some empirical information on how individuals in those contexts interacted with the platform. This information will be a useful benchmark to inform the development of this and other autonomous learning platforms.

Methods

Participants

Pilot 1

Participants included IBM staff not associated with the development of the platform. Participant recruitment targeted native speakers of English with knowledge of Spanish, although as will be seen below, the final sample included a substantial number of native Spanish speakers. Participants were expected to use the system at least 5 hours a week (outside of normal work hours) over a period of 4–6 months, for a target total of 80–120 hours. A total of 23 participants were identified through this process and were given usernames to access the system. In lieu of financial compensation for their participation (which was prohibited by company regulations), individuals who participated in study were entered into a raffle for a donation to be made in their name to a charity of their choosing.

Given the similarities between Spanish and Portuguese, we would expect a learner with some proficiency in Spanish to show a non-zero proficiency in Portuguese (especially in reading) even prior to study. Before using the system, pilot learners took computer-delivered reading and listening assessments in Portuguese.¹ The tests report proficiency in terms of the ACTFL Proficiency Scale.²

Figure 1 shows the pretest Portuguese reading and listening scores from Pilot 1. For the most part, learners scored at the Intermediate Low or Intermediate-Mid level, with reading scores being somewhat stronger than listening. These scores illustrate that there is a moderate degree of mutual intelligibility between Spanish and Portuguese.

1. These tests are administered by Language Testing International on behalf of the American Council on the Teaching of Foreign Languages (ACTFL). Details can be found at <http://www.language-testing.com/reading-proficiency-test-rpt>.

2. Details on the ACTFL proficiency scale can be found at <https://www.actfl.org/publications/guidelines-and-manuals/actfl-proficiency-guidelines-2012>

The participants self-reported varying degrees of proficiency for a variety of native and other languages on a simple questionnaire administered prior to starting learning with the platform. The questionnaire asked learners to indicate one of three levels of proficiency for all languages they know:

1. Intermediate: I can handle elementary constructions accurately but don't have thorough or confident control of the grammar
2. Advanced: I am capable of using the language with sufficient structural accuracy and vocabulary to participate effectively in most conversations
3. Native: I am capable of using the language easily and accurately

As seen in Table 2, most learners were advanced to native Spanish or English speakers with little Portuguese knowledge reported. Their English knowledge was more varied; most participants were advanced English speakers or native speakers. One learner reported knowledge of Catalan, but did not indicate level of proficiency.

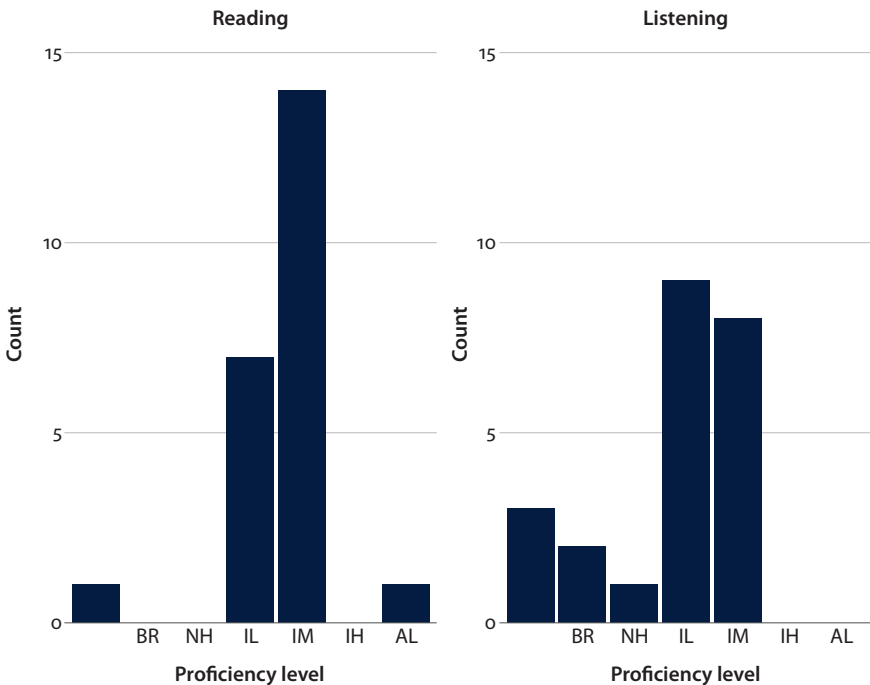


Figure 1. Proficiency pretest ACTFL scores for IBM pilot 1 participants. (BR = Below Range, NH = Novice High, IL = Intermediate Low, IM = Intermediate Mid, IH = Intermediate High, AL = Advanced Low)

Table 2. Self-assessed proficiency level for all languages known by Pilot 1 participants ($n = 23$)

Language	Proficiency level		
	Intermediate	Advanced	Native
Arabic	1 (4%)	0 (0%)	0 (0%)
Catalan	–	–	–
English	1 (4%)	11 (48%)	9 (39%)
French	1 (4%)	1 (4%)	3 (13%)
Italian	4 (17%)	1 (4%)	1 (4%)
Portuguese	4 (17%)	0 (0%)	0 (0%)
Spanish	0 (0%)	2 (9%)	16 (70%)

Learners were also tested with a Portuguese vocabulary knowledge scale (VKS) test (Wesche & Paribakht, 1996). Rather than treating knowledge for a particular vocabulary item as an all or nothing proposition, the VKS recognizes that learners may have different levels of vocabulary knowledge – from awareness that a word exists in the language to productive facility with that word. For this VKS version, learners were given a target Portuguese word, e.g., *boneca* ‘doll,’ and asked to choose one of four options:

1. I don’t remember having seen a word like this before.
2. I remember having seen a word like this before, but I don’t know what it means.
3. I think this word means ____.
4. I know this word means ____.

The test included 59 target words from various frequency bands chosen from the 5,000 most frequent words, based on a Portuguese frequency dictionary (Davies & Preto, 2007). Note that this corpus served to inform the selection of target words for the vocabulary test, separate from the broader corpus that provided content for the learning activities. Words for the VKS were selected to represent general Portuguese knowledge without bias toward either variant (i.e., Brazilian or Peninsular Portuguese) in particular, and included non-cognates with Spanish and English (44 items) or cognates with Spanish (15 items). Sixteen participants from Pilot 1 completed the VKS test prior to starting to use the prototype. The VKS results illustrate that learners reported varying degrees of certainty of knowledge of Portuguese words. (See Figure 2 in next section.) Learners did not know the majority of the non-cognate words (scores of 1 and 2), but did know many cognate words with higher certainty (scores of 3 and 4).

Pilot 2

Learners in the second pilot were recruited in a manner similar to the first pilot. A total of 28 participants were identified through this process and were given access to the system. While pre-course proficiency testing was not performed due to administrative constraints, learners did complete the self-report questionnaire of their language background (Table 3). The profile of this group with respect to self-reported English, Spanish, and Portuguese proficiency is similar to that of the Pilot 1 group.

Table 3. Pilot 2 participants' self-assessed proficiency level for known languages ($n = 28$)

Language	Proficiency		
	Intermediate	Advanced	Native
Catalan	2 (7%)	1 (4%)	0 (0%)
Czech	0 (0%)	0 (0%)	1 (4%)
English	4 (14%)	14 (50%)	7 (25%)
French	2 (7%)	1 (4%)	0 (0%)
German	2 (7%)	0 (0%)	0 (0%)
Italian	2 (7%)	2 (7%)	0 (0%)
Portuguese	4 (14%)	1 (4%)	0 (0%)
Russian	1 (4%)	0 (0%)	0 (0%)
Slovak	0 (0%)	0 (0%)	1 (4%)
Spanish	1 (4%)	2 (7%)	23 (82%)

The Pilot 2 participants also took the Portuguese VKS test prior to starting the platform. The distribution of cognate and non-cognate knowledge is similar to that found in the first pilot. These pilot participants knew more cognates than non-cognates at the outset of using the prototype. A Rasch analysis was performed on combined VKS data from the two pilot groups to provide a visual representation of the participants' Portuguese lexical knowledge. Figure 2 shows the logit difficulty values for the words on the VKS pre-test arranged by increasing difficulty. Words towards the top of the scale (e.g., *poeira*, *cerne*) are estimated as being most difficult for the learners; words at the bottom of the scale (e.g., *terra*, *trabalho*) are estimated to be the easiest. (Note that some words are truncated in the figure to facilitate display.) Cognates are designated with a "C" on the graph and are highlighted in yellow. Ability estimates for individual learners are depicted as Xs on the left side of the figure, and are on the same metric as the words. The probability of knowing a Portuguese word at the outset is .50 when the person's ability estimate matches the word's difficulty estimate. As anticipated, cognates were generally easier for the learners than non-cognates, as demonstrated by the fact that cognates tend to be on the lower end of the scale.

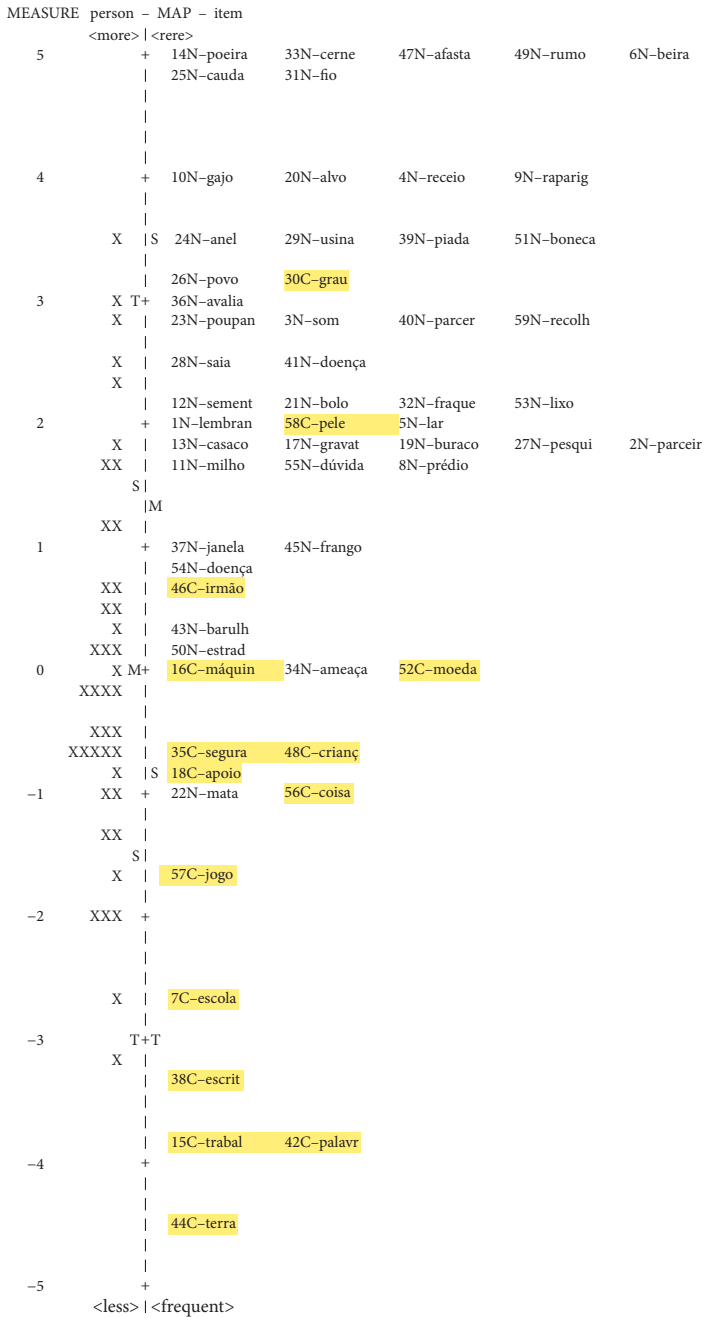


Figure 2. Rasch analysis of VKS scores for Pilot 1 and 2 participants

Subject matter experts

Concurrently with the first pilot, three researchers involved in this project were given logins to pilot the system. The researchers have considerable academic background in languages and language learning, and all hold advanced degrees in second language acquisition, linguistics, or language instruction. All three are native speakers of English. Their self-reported ability in Spanish based on the simple questionnaire was advanced to native. One researcher reported advanced knowledge of Persian, and two reported intermediate to advanced knowledge of French. Although the researchers accessed the system as learners, their primary purpose was to experience learner-system interaction in the prototype with an eye towards future platform development based on their knowledge of best practices in instructed second language acquisition and computer assisted language learning.

For the analyses reported below, we combined the data from both pilots and the subject matter experts in order to allow direct comparisons and examination of broader patterns.

Results

Data from system logs were analyzed to investigate how participants interacted with the platform. It should be noted that because the prototype was in continuous development during the pilot studies, internal changes to the system or temporary system “bugs” may have impacted the consistency with which data were captured. Thus our analysis may not represent the actual user experience with 100% accuracy. Nevertheless, we believe that the following analysis can serve as an approximate baseline against which future pilot groups can be compared. When referring to data from individual learners, Pilot 1 participants have been coded as 10**, Pilot 2 as 20**, and researchers as 30**, where ** signifies unique identifiers (e.g., 1001).

We discuss three main aspects of the data: overall usage statistics (e.g., overall time spent in the system, types of learning targets and activities experienced by users), the lexical learning environment, and individual tailoring. We also present an example of how information captured by this kind of autonomous learning system can be used in principle to study the effect of corrective feedback.

Overall usage statistics

The prototype platform captures all *user events* in the system, where user events include any participant interaction with the system (e.g., clicking a link, entering a word, listening to a file). This time-stamped information can be used to estimate the amount of instructional time for a given user. Temporally contiguous user

events within a specified time window (e.g., one minute of elapsed time) are considered to reflect “active” time using the prototype, whereas longer gaps in between user events (assuming that the user is still logged into the system) is considered “idle” time. This activity information is reported separately for different parts of the system: a home page, a profile page, a logout page, a forum page,³ a history page, and an exercise page. For all the pilots, the bulk of participant time was spent on the exercise page, as this is the part of the system in which the actual learning activities are presented. Thus, time spent in the exercise page can be used as a proxy for the amount of language instruction provided by the platform. Because learners may be contemplating a response even during “idle” system time, it is sensible to treat both active and idle time on the exercise page as a rough estimate of time spent engaged in instructional activity.

Table 4 shows the amount of time spent in the exercise part of the system for the various pilot groups, including both active and idle time. There was a great deal of variation in the amount of time spent for the pilot groups. Although pilot participants were requested to spend 5 hours per week for 4–6 months (80–120 hours), actual total time ranged from 0 to 56 hours. Researchers were accessing the system as part of their job duties and thus were compensated for time spent piloting the platform. One potentially useful avenue for future research would be to interview users to identify those aspects of the platform that influence, either positively or negatively, a participant’s decision to continue with the system.⁴

Table 4. Total time spent learning in system (in hours)

	Pilot 1	Pilot 2	Researchers
N	22*	28	3
Mean	6.10	6.43	14.36
SD	11.88	13.28	10.64
Median	1.74	2.96	12.84
Min	0.17	0.39	4.56
Max	55.72	71.16	25.68
Range	55.55	70.77	21.12

Note.

*Does not include a participant who spent no time in the system.

3. The forum, or discussion board, provides space for users to leave and answer comments.

4. A survey along these lines was developed, but unfortunately was never administered due to logistical constraints.

Lemmas represented the most frequent type of learning target in the system, a fact which can be readily seen in Figure 3 depicting the target types for the 12 selected participants. Because a single learning target (e.g., lemmas) can be delivered through a variety of activity types, it is instructive to look at the distribution of activity types as well.

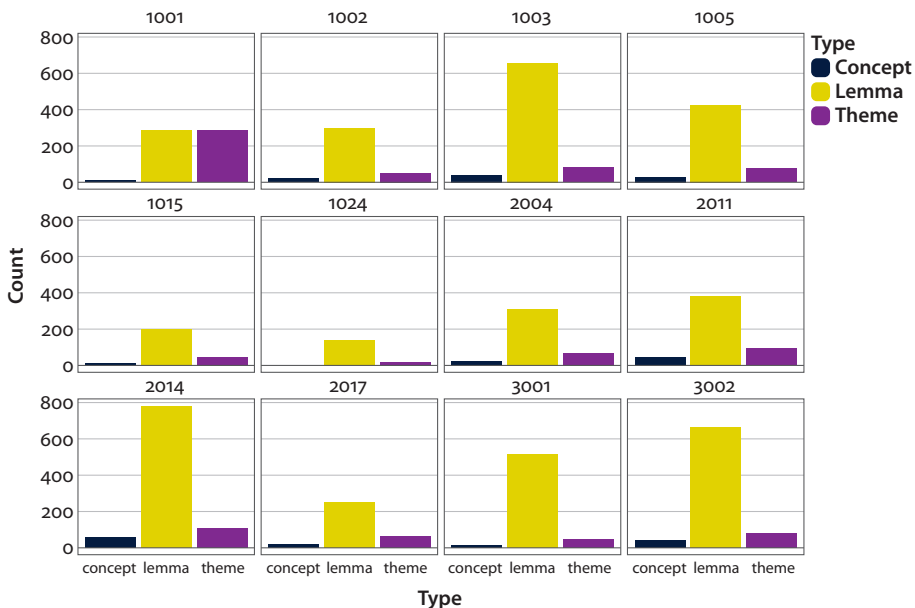


Figure 3. Relative number of targets by type for each of the 12 participants who completed at least seven hours of system use

In order to provide a more detailed view of the distribution of activity types by learning target type, we examined data from the user who spent the most time with the platform in Pilot 2. Figure 4 shows the relative frequency of these activity types for this learner (2014), over 72 hours of system use, plotted separately by the three learning target types (i.e., concept, lexicon, theme). Most activities targeted the lexicon, as indicated by the largest bars being in the middle panel. The most frequently recorded activity type, Listening to Audio (labeled as “Audio” in Figure 4), may include any time the system plays a word for the learner, or when the learner takes advantage of the system capability to click on a Portuguese word to hear it spoken. The second most frequent activity for this learner is Fill-in-the-Blank (labeled *FITB* in Figure 4). There is also a category in Figure 4 (Word Look Up) for when the learner utilizes the feature of the platform to click on a word and see its translation and example usages. The same activity type can pinpoint different learning targets; for example, while Fill-in-the-Blank largely focuses on

the lexicon, it also can highlight concepts. Some activity types, however, are only programmed for certain target types; for example, Split to Make Words is paired with concept targets but not lexical targets. Likewise, some activity types may not be linked to a specific learning target.

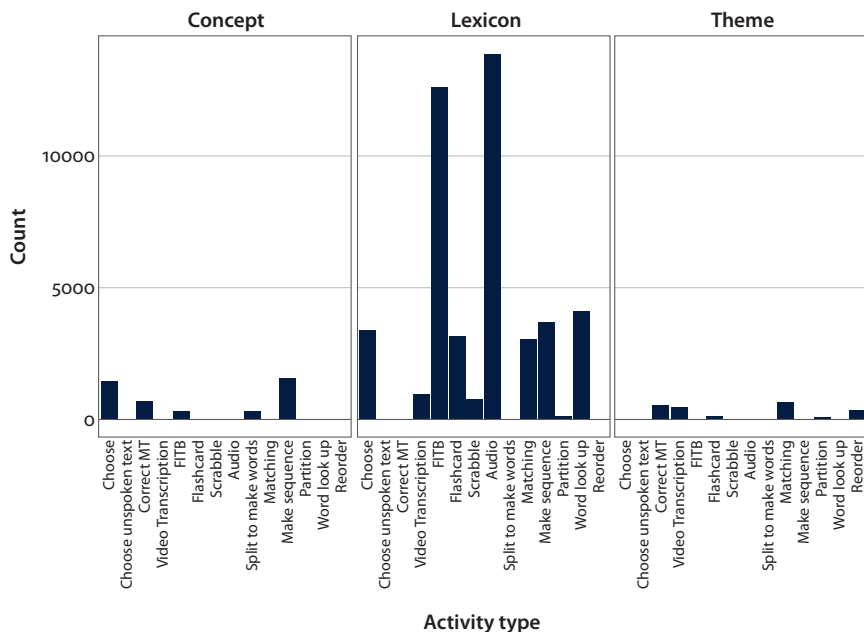


Figure 4. Relative number of activities by learning target for participant 2014 across 72 hours of system use

Lexical environment of the platform

A rich lexical environment is vital to language learning (Nation, 2010). In addition to intentional presentation of lexical items as explicit linguistic targets, such as through the prototype's Flashcards, incidental exposure to additional lexical items in other activities occurs, contributing to the total number of words seen within activities. For words that are part of the learning plan, the system includes "challenges" (i.e., an activity that can be scored as correct or incorrect) to monitor success on those lexical targets.⁵ As seen in Table 5, the majority of target words appeared at some point in a challenge, though these words represent a subset of all

5. Based on the robust empirical evidence of positive transfer of cognates as well as user feedback, the developers updated the learning plan partway through the pilot to consider Spanish-Portuguese cognates as learned targets even if those targets had not been shown or challenged. For this reason, information in the table should be treated as illustrative rather than definitive.

words actually encountered, as some activities present target words in multiword contexts. In other words, system users have the opportunity for the incidental acquisition of lexical items that are not part of the learning plan.

Table 5. Word exposure and challenges

Participant	Total words (% challenged)		Target words (% challenged)	
1001	387	(56%)	282	(77%)
1002	410	(50%)	294	(70%)
1003	1220	(37%)	654	(68%)
1005	725	(32%)	424	(55%)
1015	389	(21%)	198	(42%)
1024	210	(37%)	137	(57%)
2004	586	(24%)	305	(47%)
2011	786	(23%)	377	(47%)
2014	1502	(34%)	777	(66%)
2017	503	(20%)	252	(40%)
3001	737	(57%)	517	(81%)
3002	1050	(49%)	665	(77%)

Research on lexical learning suggests that focusing on high frequency words is an efficient language learning strategy (Nation & Chung, 2009). The prototype relies on a set of system-internal corpora to provide word frequency information which, in turn, influences the lexical items presented in activities. To independently investigate the system's lexical environment, we used frequency information from the Corpus do Português (Davies & Ferreira, 2002). For this analysis, we employed the rank information from the 20 million word 1900s corpus, which comprises texts from both Portugal and Brazil across a range of genres. For the rank information, a lower ranking corresponds to a higher frequency of occurrence in the corpus. By examining the corpus-based ranking (i.e., frequency) of words that participants encountered during their time using the prototype platform, we can get a sense of the relative frequency of words that participants were presented across learning activities.

Figure 5 shows histograms for the word rank information for each of the selected learners. As can be seen in the figure, the prototype's learning activities covered words from the highest frequency bands (the left side of the figure) at a much higher rate than the lower frequency bands (the right side). In one sense, this is not terribly surprising, as one would expect frequent words to appear more frequently in any random sample of language. Nevertheless, our analysis provides

independent evidence that learners will receive a good deal of exposure to the most frequent words in the language with only several hours of exposure to the system. This is in line with the pedagogical recommendation of focusing on frequent words before infrequent words for initial learning.

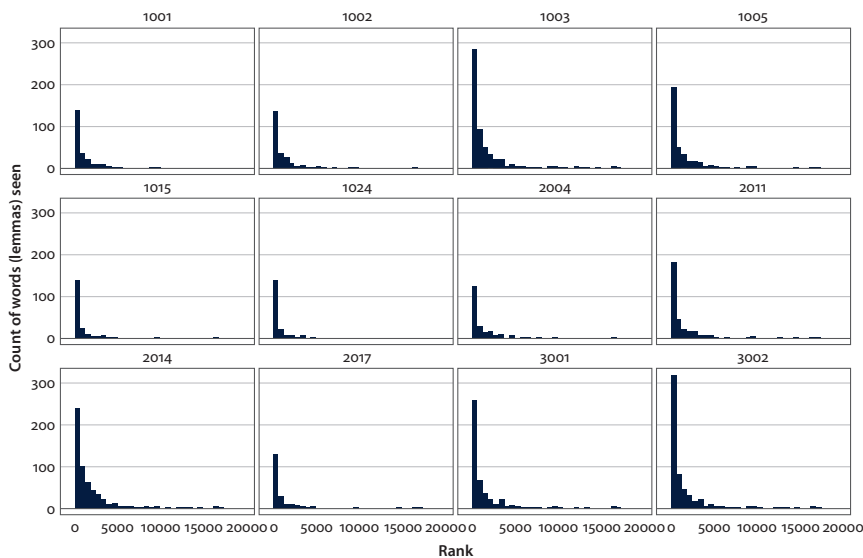


Figure 5. Proportion coverage for various frequency bands based on word rank values from the Corpus do Português (Davies & Ferreira, 2002)

Individual tailoring

In the piloted version of the platform, all learners operating under the same learning plan would eventually be exposed to all of the targets in that plan if they spent a sufficient amount of time using the system. Thus, differences in lexical items seen are attributable to time spent by individual learners progressing through the learning plan. However, this does not mean that the learning experience for each participant was the same. Indeed, because the system tailors the experience based on the user's success, the number of times that any individual word is encountered may vary between users. As seen in Table 6, participants' experiences varied in terms of average number of times words were shown or challenged, with one participant being challenged on a single word (lemma) 47 times.

Table 6. Number of words, challenges, and success rates for the subset of pilot users

Participant	Target words	Average times shown	Average times challenged	Challenge max	Success rate
1001	282	5.34	2.18	19	0.71
1002	294	5.35	1.78	42	0.65
1003	654	9.63	2.34	46	0.60
1005	424	6.34	1.70	47	0.50
1015	198	6.30	2.33	39	0.34
1024	137	3.79	1.36	12	0.51
2004	305	7.75	2.49	35	0.40
2011	377	7.30	1.53	31	0.42
2014	777	9.63	2.05	19	0.60
2017	252	6.26	1.49	28	0.36
3001	517	6.66	2.03	23	0.73
3002	665	6.62	1.30	15	0.71

The descriptive statistics above were aggregated over the users' entire experience. As noted, learners differed in their exposure to lexical (and other) targets based both on time spent in the system as well as success on target challenges.

To provide a sense of the learning experience, it is instructive to look at the types of activities that were seen in the course of a learner working through a single target lemma. Tables 7 and 8 show the sequence of activities for a completed learning target, *caminhão* 'truck', for two participants, 1015 and 1001. Data from these two participants were chosen to illustrate how the trajectory of a given word may differ depending on the learner's success with the word. This particular word is also a good example of a difficult word for L2 Spanish speakers learning Portuguese, as the spelling is similar to both the Spanish word for 'path,' *camino*, and to the Spanish word for 'truck,' *camion*.

As seen in Table 7, participant 1015 made several translation and transcription errors during his or her first interactions with this word, which ultimately led to the word being reintroduced via a presentational flashcard activity. When the learner gave two successive correct answers for this word, the system marked the word as completed or "learned." On the other hand, as seen in Table 8, Participant 1001 correctly answered two successive attempts and received no further activities targeting this lemma, as it was then marked as "learned" within the system database.

While this example is just a single word for two participants, the sequence is typical for lemma targets in the piloted prototype platform. Although lemma targets always started with the same activity – Flashcard followed by a Fill-in-the-Blank

Table 7. Sequence of activities for *caminhão* ‘truck’ for participant 1015

July 3 09:01–09:19	<p>Flashcard with audio: The learner saw the target word paired with an English translation and could click to hear up to four pronunciations of the target word.</p> <p>Fill in the Blank: The learner was presented with an English phrase (“Sell the house, sell my truck, everything you can”) and the parallel Portuguese phrase (“Venda a casa, venda meu _____, venda tudo o que puder vender”) with a blank for the learner to type the missing Portuguese word. After typing “camion” in the blank, the learner received the feedback “Try a different word”. The system gave the learner five options: <i>caminhao</i>, <i>meu</i>, <i>telefonema</i>, <i>outono</i>, and <i>victimizer</i>. After the feedback, the learner entered the correct answer.</p> <p>Scrabble: Learner had to unscramble letters to spell the correct word and answered correctly.</p>
July 3 16:38–16:38	<p>Scrabble: Learner had to unscramble letters to spell the correct word and answered correctly.</p>
July 4 10:37–10:37	<p>Flashcard: Learner listened to the word and transcribed it incorrectly on three successive attempts. The learner transcribed “camion” twice, then entered “truck” on the third attempt. After the third try, the system moved on to the next activity.</p>
July 4 10:49–10:56	<p>Flashcard with audio: The learner saw the target word paired with an English translation and could click to hear up to four pronunciations of the target word. This occurrence of the target word was coded as reintroducing, or reteaching, this word.</p> <p>Word challenged: Learner was asked to translate the word to English and answered “walk” incorrectly on three attempts. After the third try, the system moved on.</p>
July 4 11:05–11:05	<p>Matching. Learner correctly matched five Portuguese words with their English translations (helmet, typical, truck, knee, and shorts)</p>
July 4 11:13–11:13	<p>Scrabble: Learner had to unscramble letters to spell the word and answered correctly.</p>
July 4 11:17–11:17	<p>Flashcard: Learner listened to the word and transcribed it correctly on the first attempt.</p>
July 7 13:15–13:15	<p>Flashcard: Learner listened to the word and transcribed it correctly on the first attempt.</p>

activity – it is notable that the learners did not see the same sentence for the Fill-in-the-Blank activity. Nor did the learners see the same set of words in the Matching activity. These differences highlight the ability of the platform to import novel contexts for target words.

As seen in Tables 7 and 8, the prototype presents the learner with corrective feedback to incorrect responses. In activities which require learner written

Table 8. Sequence of activities for ‘truck’ for participant 1001

Apr 23 07:48–07:48	<p>Flashcard with audio: The learner saw the target word paired with an English translation and could click to hear up to four pronunciations of the target word.</p> <p>Fill in the Blank: The learner was presented with an English phrase (“Go back in the truck”) and the parallel Portuguese phrase (“Volte para o _____”) with a blank replacing one of the words. The user entered the word correctly.</p>
Apr 28 12:10–12:11	<p>Matching: Learner correctly matched Portuguese words with their English translations (house, baggage, truck, get, and white)</p>

production, this feedback is generated based on a parse of the learner’s input. Because the system records both the learner’s response and the feedback given by the system, it is possible to track the effect of feedback on subsequent attempts. Though this information is not yet readily available through the platform itself, it can be obtained by analyzing the log file generated by the system. Through the use of a Python program created by one of the authors, we present a subset of error information from a single learner in Table 9. The activity required the learner to type in the appropriate Portuguese word in each blank, given the English prompt. Both the correct answer (Expected Input) and the learner’s attempt (User Input) for each prompt are provided, as well as the feedback presented to the learner by the system. Note that the column labeled “Subsequent Result” indicates success or failure on the *next* attempt (i.e., the effect of the feedback). As can be seen in Table 9, some errors took more than one try for the learner to correct. Also note that the specific feedback given to the learner depends on the type of error that the learner made and on the system’s ability to identify the type of error through its parsing algorithm. The feedback message is selected based on the most probable error type identified. (It should be noted that Table 9 shows only instances of error on a single activity type over several hours of use and not the complete sequence of activities that the learner experienced.)

Table 9. Error feedback given to individual learner in Fill-in-the-Blank activity

Target Prompt [English]	Expected Input	User Input	Feedback Given	Subsequent Result
Lembrar _____ ! Remember September?	Setembro	setembre	Was it a typo?	success
Os _____ The boys	rapazes	rapaz	Try a word with different form().	success
Para _____ Árvores ! To the trees !	As	os	Try a different word.	failure

Table 9. (continued)

Target Prompt [English]	Expected Input	User Input	Feedback Given	Subsequent Result
Para ____ Árvores ! To the trees !	As	aos	Try a word with different form.	success
____ Seus pés ! Feet Your feet !	Pés	P[e	There is no such word “P[e”.	failure
____ Seus pés ! Feet Your feet !	Pés	Pã	Was it a typo?	success
Venda a casa, venda meu ____, venda tudo o que puder vender. Sell the house, sell my truck, sell everything you can.	caminhão	camiãon	Was it a typo?	success
A ____. The window.	Janela	jalena	Was it a typo?	success
Tomoko Nogata, ____ Nogatas de Tachikawa. Tomoko Nogata, of Tachikawa Nogatas	Dos	de	Try a word with different form(gender).	success
Mas ____ Kalahari? But in the Kalahari?	No	na	Try a word with different form().	failure
Mas ____ Kalahari? But in the Kalahari?	No	nas	Try a word with different form(gender).	success
Que ____ na Sulaco? What happened on the Sulaco?	aconteceu	paso	Try a different word.	failure
Que ____ na Sulaco? What happened on the Sulaco?	aconteceu	acontecio	Was it a typo?	success
Sim. Para ____. Yes to all.	Todos	tudo	Try a different word.	failure
Sim. Para ____. Yes to all.	Todos	todo	Try a word with different form().	success
____ o seu marido. fetch your husband.	Buscar	busca	Try a word with different form(person).	success
____ para o ataque ! Prepare to attack !	Preparar	Preparado	Try a word with different form(gender).	failure
____ para o ataque ! Prepare to attack !	Preparar	Preparai	Was it a typo?	success

(continued)

Table 9. (continued)

Target Prompt [English]	Expected Input	User Input	Feedback Given	Subsequent Result
Queremos que você ____ para o jantar. We want you to come for dinner.	Venha	com	Try a different word.	failure
Queremos que você ____ para o jantar. We want you to come for dinner.	Venha	venham	Try a word with different form().	failure
Queremos que você ____ para o jantar. We want you to come for dinner.	venha	venhas	Try a word with different form().	success

As indicated previously, although subsets of participants took one or more pretests before using the system, we are generally lacking posttest measures, especially for those learners who spent a sufficient amount of time in the system to expect change. However, one participant, 1024, first completed the VKS prior to starting activities in the platform and took the test again after 7.25 hours of platform use. This participant reported being a native Spanish speaker, advanced English speaker, and intermediate Portuguese speaker. Overall, the VKS scores improved between pre- and post-use of the platform, from 28.8% (17 of 59 words) correctly recalled on the first test to 61.1% (36 of 59 words) correct on the second test. Figure 6 illustrates gains on binary score (knows word/doesn't know word) by word condition (cognate/non-cognate). As we would expect, the learner knew more cognates initially on the pretest than non-cognates, and thus, most improvement was seen on non-cognate words.

Twenty-one of the 59 words targeted on the VKS were also present in the platform as lemma learning targets or were recorded as being part of the vocabulary coverage across exercises. Of the 23 words for which the learner showed an improved VKS score, four words were targeted as lemma targets and eight words were present in the vocabulary coverage. Of the remaining words for which the learner did not show an improved score, two were present in the platform as learning targets: *grau* 'degree' and *janela* 'window'. For *grau*, the learner saw this word presented in a Flashcard, then in the next activity was immediately asked to produce a translation of 'degrees' from the English phrase 'down five degrees.' The learner produced the singular form rather than the plural form. The system responded with the feedback to try a word with a different form, and then the learner produced the correct plural form. The next interaction the learner had

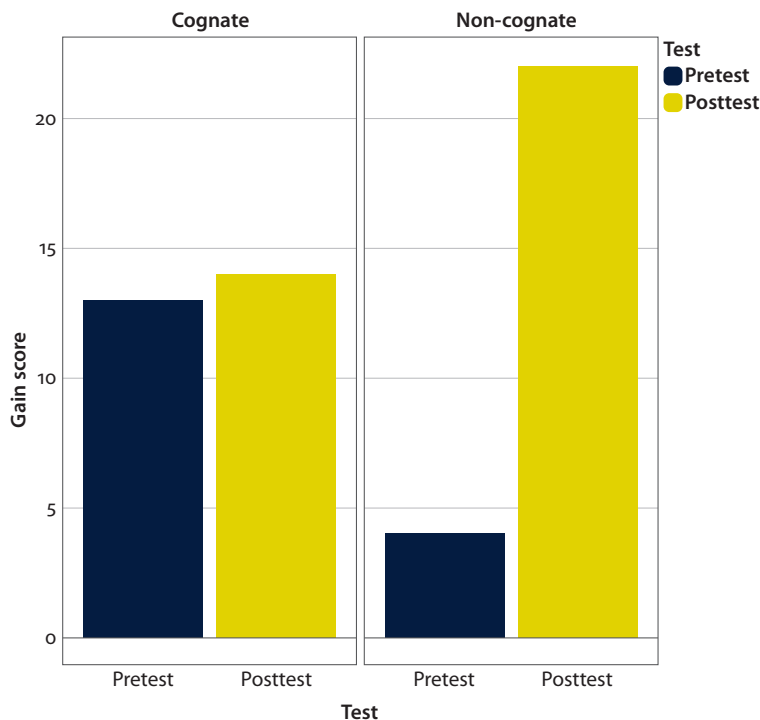


Figure 6. Pretest to posttest VKS gains for a participant 1024, who completed 7.5 hours of system use

with this word was in the Scrabble activity to unscramble letters to spell the word, which the learner did correctly with no hints. Since the learner met the criteria for this word (i.e., two successive correct attempts), the system designated its status as completed. On the VKS during both pretest and posttest, the learner's response was that he or she did not remember seeing a word like that before. For *janela*, the learner only saw this word in the same Flashcard and Fill-in-the-Blank activity as *grau*. The learner produced the correct translation given the English word 'window.' At the end of the pilot study, this target was still open, or not completed, for this learner because he or she had not yet met the threshold of successive successful attempts. On the VKS, the learner translated the word incorrectly as 'pencil' both on the pre- and posttests. Thus, the amount of exposure to the words seems to have been insufficient.

Discussion

We piloted a prototype language learning platform to examine the users' experiences when interacting with an automated, adaptive system designed to enable autonomous language learning. These pilot results illustrate the kinds of analyses that could be performed on user data along with language measures before and after platform use. We were able to mine information in system log files to gather evidence of lexical adaptivity (e.g., targeting higher frequency items, repeating items that were incorrectly responded to in a previous activity) and to show how the provision of feedback on error influenced subsequent performance for a small number of learners on a single activity type. The possibility of using an HLT-enabled learning platform to investigate the impact of feedback on error at scale opens up new, exciting opportunities for SLA researchers to test hypotheses and inform theory development.

These pilot studies also identified important considerations for future development of HLT-enabled platforms. Although our current prototype grabs activity context for target words "on the fly" from its internal corpus, learning could likely be enhanced by more intentionally and systematically presenting the learner with multiple examples of the target word in different contexts. Another point to consider for future systems is the time spent with a lemma target. In the case of our deep dive investigation of the target word *caminhão* ('truck'), learners needed two successive correct attempts for that lemma target to be deemed completed. Of our two learners, participant 1001 spent only a few minutes total with this target word before moving on to other target words. On the other hand, because participant 1015 made an early spelling error, he or she ended up spending considerably more time with this word, which allowed for a confusability to show itself – i.e., the confusion with 'walk.' A more nuanced conception of what it means to "know" a word, perhaps incorporating likely confusions based on the analysis of previous users, could help make the system more robust. Moreover, because such automated systems have precise control over frequency of presentation of individual words, the learning principle of *spaced repetition* could be implemented to target specific words for retrieval practice at the optimal intervals known to enhance vocabulary learning (e.g., Karpicke, 2012; Rowland, 2014).

Additionally, participant 1024's interaction with an inflected form of a targeted singular lemma (*grau* 'degree') highlights the disconnect between lemma and concept (grammatical) target types; as it stands, our system pulled a plural form of the target word, but the learner may or may not yet have experience producing plurals. Ideally, an HLT-enabled learning platform would be able to assess the appropriateness of a word pulled from the corpora not only for being a relevant lemma learning target, but also in terms of the morphological characteristics of the word that may

interact with concept (grammatical) targets in the learning plan. Again, this illustrates the difficulty of assessing when a learner has “learned” a word and the need to make use of information regarding not only the accuracy of the learner’s responses but also the number of exposures to the word in varied activity types over time.

Finally, there was considerable participant attrition over the course of the pilots – an issue that is not unique to our prototype but rather is common with computer-mediated learning systems (Angelino, Williams, & Natvig, 2007; Nielson, 2011). The prototype’s ability to ingest new material and create content for many activities “on the fly” allows for a potentially unlimited sequence of activities (and, in fact, did provide over 70 hours of learning activities for our most prolific user). However, this capability is untapped if learners do not persist with the platform. To address this with our prototype system, we are conducting a study with university students to gather detailed user feedback from surveys and in-person interviews with the goal of identifying strengths of the prototype as well as any potential causes of reduced usage or complete attrition.

Conclusions

Ongoing advances in HLT capabilities, artificial intelligence, and data analytics are creating new opportunities to develop innovative language learning technology. For this increasingly sophisticated technology to successfully enable and improve autonomous learning, it is essential that its development be informed by learning principles from second language acquisition and cognitive science (e.g., providing sufficient and comprehensible input and incorporating opportunities for interaction and feedback on error). Although technical challenges remain in automating a seamless transition from the lexical level to extended discourse (e.g., connected sentences and paragraphs), active collaborations between researchers and software developers can generate innovations with great potential to revolutionize on-demand, autonomous foreign language learning at scale.

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Exploring second language acquisition

The role of implicit and explicit knowledge in native and target languages

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This paper discusses the role of implicit and explicit knowledge in Second Language Acquisition (SLA). Through Action Research (AR) across a three-year period, involving 160 native English-speaking adult participants from Australia, with little to no exposure to second/foreign language learning, this research explores how language students draw on their explicit and implicit knowledge of their native language to inform their sense-making of a second language. This research finds that students utilise their explicit/implicit knowledge of their native language as a framework to make sense of the target language, in this case, Portuguese. It further finds that students with poor explicit knowledge in their native language have difficulty grasping explicit instruction in the target language.

Keywords: second language acquisition, implicit knowledge, explicit knowledge, Portuguese, English, learning

1. Introduction

This qualitative action research outlines the role of implicit and explicit knowledge in second language acquisition. While a number of scholars have researched the role of implicit and explicit knowledge in second language acquisition (SLA), where English is the target language (see, for example, Arbona & Chireac, 2014; R. Ellis, 2005a, 2005b; Hu, 2011; Wong & Simard, 2016) this research uses English as the source, or native, language. It aims to provide new insights into the field of SLA by exploring the difficulties that native-English speakers (NES) face in learning a second language, in this case Brazilian Portuguese (see Shaffer, 1989; Tokowicz & MacWhinney, 2005 for similar studies in languages other than English).

Scholars have researched how the acquisition of an L2 accelerates the acquisition of a third, and further languages, how dynamic interactions occur differently among L1, L2 and L3, and the transfer and interference of L1 (Arbona & Chireac, 2014; Gass, 1996; Odlin, 2005). Thus, prior research draws a link between a person's metalinguistic knowledge and his/her ability to learn a second or third language. However, this research paper explores a student's ability to make sense of a second language when little or no such metalinguistic awareness exists, and in so doing asks: How does the level of metalinguistic knowledge in the native language affect one's ability to learn an L2?

More specifically, this action research explores how native English speakers apply explicit and implicit knowledge in learning Brazilian Portuguese. I utilise action research as a research method, because it is a "practical yet systematic research method to investigate the teachers' own teaching and their students' learning" (Nolen & Putten, 2007, p. 401). This allows me, as the researcher, to explore students' demonstration of their explicit and implicit knowledge, their application and to experiment with the effectiveness of various teaching methods in the 'real world' of language teaching.

Implicit knowledge, also referred to as the 'acquired system', represents a process of subconsciously acquiring language skills, such as the case of infants learning to speak their native language through television, radio, newspapers, and everyday interactions with other native speakers (Wong & Simard, 2016). In second language literature, awareness is the distinctive feature of implicit knowledge – learning without awareness, and explicit knowledge – learning with awareness (R. DeKeyser, 2003). For instance, a native speaker usually does not need to think about his/her language to talk or use it because his/her knowledge of their mother tongue is implicit. What learners know in an intuitive way is implicit knowledge (Gregg, 1989). In other words, implicit knowledge is non-intentional, but incidentally obtained. For example, Wong and Simard (2016, p. 2) illustrate this by comparing two similar constructs:

1. "Carrie thinks that her colleague is sneaky" and
2. "Why does Carrie think her colleague is sneaky?"

Native English speakers implicitly know that the pronoun "that" is omitted from the first construct (statement) to form the second (question), but may not have the explicit knowledge to explain why it is omitted.

One hypothesis of SLA (Krashen, 1981) is the Acquisition-Learning hypothesis, which states that there are two independent systems of second language performance. The first is 'the acquired system' and the second is 'the learned system'. The acquired system refers to implicit knowledge that is learned through interactions in the environment where the language is commonly spoken. It is concerned

with the ‘meaning’ of interactions rather than the ‘form’ of interactions. It enables people to communicate effectively, to convey a message, and to understand the target language. Whereas the learned system informs explicit knowledge, it is generally in a classroom setting and reliant on formal instruction of the target language. It focuses on learning through structure, syntax and rules. Both systems may contribute to and inform ‘second language learning’, in different ways, with different rates of efficacy and effectiveness.

Explicit knowledge may lead to implicit knowledge through practice (R. M. DeKeyser, 1998; N. Ellis, 2011; R. Ellis, 2009), such as the case of learners first learning the rules, then producing output until they internalise the rules through usage. In comparing implicit and explicit knowledge, Wong and Simard (2016) declare that implicit learning can take longer than explicit. On the other hand, explicit knowledge should accelerate learning as it is “a very convenient short cut to the point where connectionist-type fine-tuning of procedural knowledge can begin” (R. DeKeyser, 2003, p. 331).

2. Motivation for research

The author had positive experiences with a communicative approach, with emphasis on form,¹ in teaching Brazilian Portuguese in Spain and Spanish in Brazil.² However, upon relocating to Australia, this same method proved less successful with monolingual NES, Australian students. For example, in year 1 of this research, a number of students³ mentioned not having studied English grammar at school (explicit knowledge) and that they did not understand “anything” about the form-based lesson in Brazilian Portuguese grammar.⁴ The students’

1. This does not mean that I attempted to teach all the grammar rules, or that grammar was the center of my teachings, but it plays a highly supportive role in it.

2. Students were adults, who had completed their schooling, or were continuing at University level. They were studying after-hours because they wanted to learn their Brazilian spouses’ native language, to introduce some basic language knowledge prior to travel, or they intended to work in Brazil, or other Portuguese-speaking country.

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4. I note this is similar to Diana’s (2011, p. 61) observation in her study on the benefit of explicit instruction for L2 learners in South Africa, where the respondents claimed “never to have been taught much explicit grammar at school level and feel frustrated because of a lack of

admission of poor explicit knowledge in their native-English corresponded with their inability to make sense of grammatical concepts, requiring further research to explain why, for example, students grasped some implicit instruction (such as colloquialisms and phrases) better than explicit instruction (such as grammatical concepts and syntax).

The students' inability to demonstrate explicit knowledge of their native language hindered the students' ability to grasp explicit instruction in L2. For example, students were asked to cite English "verbs", any English verb, to which they provided responses of: "water", "hot water", "chocolate", or "girl". Although the students were literate adults, who had completed schooling, their inability to cite verbs versus nouns hindered their ability to grasp verb conjugation, leading to a refinement of the research question: How does the level of metalinguistic knowledge in the native language affects one's ability to learn a L2?

3. The role of implicit and explicit knowledge in second language acquisition

Although some researchers make a clear distinction between 'second language acquisition' and 'second language learning', there are some who have been using these terms interchangeably, in part because the concepts of 'second' and 'foreign' language overlap. For instance, Ellis (1997, p. 3) states that "second can refer to any language that is learned subsequent to the mother tongue, and may therefore include the learning of a third or fourth language". Whereas, Moeller and Catalano (2015, p. 327) offer a slightly different, and broader, definition when they state that "foreign language learning and teaching refer to the teaching or learning of a non-native language outside of the environment where it is commonly spoken", and "a second language implies that the learner resides in an environment where the acquired language is spoken". Despite these varying definitions for what constitutes second or foreign language learning, for the purpose of this paper, terms "second" and "foreign" are used interchangeably to identify languages other than English.

Metalinguistic knowledge, or explicit knowledge about language (Roehr, 2008) – used in this paper as synonyms, plays an important role in second language learning as it refers to one's conscious knowledge of grammatical concepts and rules as opposed to their subconscious acquired learning of their native language (Geeslin & Long, 2014). Students will thus apply their metalinguistic knowledge, of their

understanding as to why they are making errors". She further notes that "during the last quarter of the 20th century there was a swing away from the explicit teaching of grammar rules as the bias toward communicative approaches to teaching an L2 took hold".

native language, to make sense of the construct and application of a foreign language and research has shown that explicit knowledge allows students to move beyond item-based constructions to more schematic-based constructions (Roehr-Brackin, 2014). However, this implies that students would first need to have metalinguistic knowledge of their native language (L1), as opposed to solely relying on their implicit knowledge, or understanding of the native language, to learn a foreign language.

Explicit knowledge is a contributing factor to L2 learning because grammar awareness can connect form to meaning, thus facilitating the learning of a second language (R. Ellis, 1994). According to Jessner (2008, p. 277) “individuals who are metalinguistically aware are able to categorise words into parts of speech; switch focus between form, function and meaning and explain why a word has a particular function”. Furthermore, Hu (2011) details a large body of literature that supports the role that explicit knowledge plays in L2 learning, especially for adolescents and adults who are able to recognise linguistic structures. He further explores how students recognise structure and draw on explicit knowledge by measuring the ability of English native speakers (L1) and Chinese learners of Advanced English (L2) to identify inaccuracies in English texts. The L1 participants were able to identify and correct inaccuracies implicitly, but were unaware of the rules / reasons to justify such corrections, whereas the L2 participants were able to identify and correct the inaccuracies through awareness of the rules / reasons for such corrections. In South Africa, Diana (2011, p. 7) finds “L1 respondents seem to be able to correct the inaccuracies implicitly, as may be attested to by several nil responses to the rule articulation, but there was a high rate of accuracy in their corrections”. Similarly, while the L2 South African learners – who claimed not to have received English grammatical instructions at secondary school level, “are less likely than their German counterparts to be able to articulate rules of grammar and are also less well equipped to correct the errors focused on in the test”.

Hu (2011, p. 71) suggests that the emphasis on form-based learning “might result in more accurate written discourse” and claims that his findings challenge Krashen’s (1987) previous study. According to Hu (2011, p. 71), Krashen stated that learners can only learn “simple rules that are easiest to describe and remember” and “will be able to learn and utilise [only] a small part of the grammar of a language as a conscious monitor”. Hu states that “the participants possessed a great deal of correct explicit knowledge of the six target structures investigated in his study, whose complexity and difficulty are well recognised” (Hu, 2011, p. 71). In fact, Arbona and Chireac (2014) have established that one’s explicit knowledge and exposure to foreign languages directly influence and affect one’s ability to learn new languages.

Ellis (2005b) states that the ideal conditions to acquire a language are the ones that present opportunities for learners to create pragmatic meaning with real acts

of communication. He believes that effective learning should entail explicit instructions that promote opportunities for learners to create pragmatic meaning. In Ellis' (2005a, p. 144) words, "irrespective of the role played by explicit knowledge in the acquisition of implicit knowledge, there is wide acceptance that explicit knowledge can contribute to performance".

Several studies (see, for example, Diana, 2011; Hu, 2011; Spada, 2013; Tomita & Spada, 2013) report the benefits of instruction-based form, or form-focused instruction (FFI) in L2 learning. For Tomita and Spada (2013, p. 592) "the assumptions among SLA researchers are that the effectiveness of FFI is mainly due to noticing and to raising learners' awareness of the target L2 linguistic features". This supports the Noticing Hypothesis and the claim that noticing promotes L2 learning (Diana, 2011; Schmidt, 2001).

In short, the scholarly contributions to SLA show students' implicit and explicit knowledge play integral, but different roles in how they learn a first and second language. Moreover, they suggest that a person's explicit knowledge of linguistic and grammatical rules in his/her native language further enhances his/her ability to learn and correctly utilise a second or foreign language. However, it is not clear if the same applies to the contrary position – whether a person's lack of explicit knowledge in his/her native language hampers his/her ability to acquire a second language.

4. Research site, method and participants

The participants of this action research are the students of two beginner-level Brazilian Portuguese classes conducted over a period of three years, totalling 160 participants. Students without any prior exposure or learning were enrolled in Beginner 1, while students who had some basic prior learning or exposure, such as those who had spent time travelling in Portuguese speaking countries, or who had completed the first course, enrolled in Beginner 2. Beginner 1 comprised 10 weekly sessions, totalling 20 hours, while Beginner 2 comprised 10 weekly sessions, totalling 25 hours.

Annexure A – table of research participants shows the diversity of students across a three-year period. In year one, students were homogeneously monolingual native-English speakers. In year two, one student⁵ was bilingual, but illiterate,

5. Originated from a European Portuguese-speaking family (from Portugal), but had grown-up in Australia. This student spoke Portuguese at home, with his parents. Despite this ability to speak Portuguese, the student did not demonstrate explicit knowledge of Portuguese, and was unable to read or write in this language.

in Portuguese. In year three, two students were from Germany, and were fluent in English, one student was from England, and had good metalinguistic knowledge in his L1, one bilingual Australian, who was fluent in French (speaking and writing), and one bilingual Australian student who was fluent in Japanese, both in speaking and writing.

4.1 Research method

Action research “enables people to find effective solutions to problems they confront in their everyday lives” (Stringer, 2014, p. 1) and allows the researcher to “develop a context in which individuals and groups with divergent perceptions and interpretations can formulate a construction of their situation that makes sense to them all” (Stringer, 2014, p. 75). This action research evolved iteratively over a period of three years, as students expressed difficulty in making sense of explicit form-based instruction, but could not explain why they had difficulty. As students progressed (from Beginner 1 to Beginner 2), and I trialled different methods of instruction, new insights of plausible explanations emerged. For example, the inverse relationship between the students’ explicit knowledge of L1 and their ability to acquire L2 (i.e. the less explicit knowledge in the L1, the greater the degree of difficulty in L2 acquisition).

I collected data and monitored my students’ practices from multiple sources, including in-class surveys, minute papers,⁶ completed formal exams, and my own observational notes and discussions. Some exams aimed to measure the students’ explicit knowledge, such as specific grammatical rules and required an explanation of technical terms like verb, infinitive, conjugated verb, noun, article, singular/plural, gender, and others aimed at measuring implicit knowledge, such as colloquialisms and phrases. I have based the analysis and findings presented in this paper on the collective of all data sources.

6. A ‘minute paper’ is a self-developed paper comprising three questions and designed to elicit student’s satisfaction with the class, learning, and any areas of difficulty. Students completed their minute-papers in class, within a minute, anonymously. The teacher / researcher collected all minute-papers and analysed the feedback, into themes, to identify areas for increased focus or explanation. An example of a student’s comment provided in a minute-paper is: “I feel I’m learning a lot in this course – vocabulary, expressions, cultural points and grammar. I find it easy to learn grammar and I’m really enjoying it, particularly because you contrast both Portuguese and English and it makes sense! I never paid attention to my own language the way I do now. Actually, I don’t recall learning English grammar at all!”

4.2 Research analysis

This research took place in a real-life teaching situation, meaning there were multiple data sources available to capture the role that explicit and implicit knowledge plays in SLA, such as in-class formal exams, in-class student exercises, discussions and teacher interactions, and student homework. Each of these units of analysis provided valuable information, and were analysed separately and triangulated (Yin, 2014, Chapter 4), meaning the analysis of multiple data sources, from the same research project, which corroborate the same findings. Within this research project, I analysed and coded each data source until I was able to identify consistent themes to describe how the level of metalinguistic knowledge in the native language affects one's ability to learn an L2.

I completed my analysis over three phases. First, I collected data from multiple data sources and entered them into NVIVO, qualitative data analysis software (Parker & Roffey, 1997). Second, I iteratively coded the data into themes that helped describe students' level of explicit and implicit knowledge in their L1. Third, I coded the level of explicit / implicit knowledge by the explicit / implicit instruction in the L2 to identify the various levels of difficulty the students had in comprehending instruction. The iterative process involved in continual coding evolved until I identified the research findings.

4.2.1 *Phase 1: Collecting multiple data sources*

The multiple data sources comprise the various tests (such as formal exams that contributed toward student grading) and other informal means of assessment (such as quizzes, discussion, class contribution), which form part of the student assessment. Additionally, Yin (2014, p. 114) states that direct observations are “invaluable aids for understanding....curriculum and any problems being encountered”. Some scholars describe participant observations as “the gold standard among qualitative data collection techniques” (Morgan, Pullon, Macdonald, McKinlay, & Gray, 2017, p. 1060), as they allow the researcher to observe how students demonstrate their explicit and implicit knowledge that is not evident in formal assessment procedures, such as a participant's feeling, mood, anxiety, long pauses or comfort levels (Collis & Hussey, 2003; Cousin, 2005; Qu & Dumay, 2011). While Cousin (2005, p. 423) calls for “systematic methods of recording through the writing up of field notes” as observations, others (Morgan et al., 2017, p. 1061) state “recording methods range from structured template recording to unstructured field noting”. Within this action research, I took unstructured field notes during and following each student interaction.

Table 1. Multiple data sources

Assessment	Frequency of collection	Method of collection	Validity
In-class tests / exams	Middle / end of each term	Written test, completed in-class	Teacher corrections and grading
In-class surveys	Ad-hoc	Student verbal interaction	Teacher corrections and observations
In-class Q & A	Each class	Verbal teacher / student interaction	Teacher corrections and observations, recorded in teacher notes, post class
Minute paper	Every four class	Students written feedback	Teacher's corrections
Observations	Each class	Teacher's / Researcher's observation of students' ability to answer questions, contribute to class discussion, display comprehension of structure / syntax, etc.	Teacher's observations

4.2.2 Phase 2: Coding data as a display of explicit or implicit knowledge

I collected all data and coded them according to Ellis' (2005a, p. 151) operational constructs of implicit and explicit L2 knowledge, allowing me to categorise student responses and observations as being representative of explicit or implicit knowledge. Qualitative researchers use 'coding' as a means of analysing qualitative data, such as free text and participant behaviour to arrive at patterns, themes and (analytic) generalisations (Creswell, 1998), which help the researcher to make sense of his/her data. Yin differentiates analytical generalisations from statistical generalisations (2014, p. 68) by stating "analytics generalisation consists of a carefully posed theoretical statement, theory, or theoretical proposition. The generalisation can take the form of a lesson learned, working hypothesis, or other principle that is believed to be applicable to other situations". For my research, I have coded students' responses and behaviours into themes that help explain how a student's level of metalinguistic knowledge in his/her native language affects his/her ability to learn a L2.

This categorisation enabled a more consistent means for coding, while also aiding my understanding.

As an illustration, upon introducing the concept of "verb conjugation" in the present indicative, I frequently observed the term itself brought 'blank stares' and expressions of confusion among students. In reviewing my observational notes, I coded this as a lack of conscious awareness of linguistic norms and re-phrased my question by asking the students to correct the English sentence "I to talk on the

Table 2. Adopted from Ellis (2005a)

Characteristics	Implicit knowledge	Explicit knowledge
Awareness	Intuitive awareness of linguistic norms	Conscious awareness of linguistic norms
Type of knowledge	Procedural knowledge of rules and fragments	Declarative knowledge of grammatical rules and fragments
Systematicity	Variable but systematic knowledge	Anomalous and inconsistent knowledge
Accessibility	Access to knowledge by means of automatic processing	Access to knowledge by means of controlled processing
Use of L2 knowledge	Access to knowledge during fluent performance	Access to knowledge during planning difficulty
Self-report	Non-verbalisable	Verbalisable
Learnability	Potentially only within critical period	Any age

phone everyday” or “I to run to work every day”, to which they correctly removed “to”.⁷ I explained that, in English, the regular present indicative verb is conjugated in one of two forms (I talk / He talks), whereas in Portuguese the conjugated verb varies with the 1st, 2nd, 3rd, singular/plural, forms.⁸ My coding evolved to consider the occasions when students drew on their explicit/implicit knowledge in their L1, and the explicit/implicit instruction provided. In this example, students did not demonstrate explicit knowledge, but in drawing a direct comparison with their implicit knowledge, they exhibited⁹ an understanding or comprehension of “conjugation”, more easily. While examples in English enabled progress, this approach proved time consuming, particularly for those students who comprehended conjugation earlier than their peers did.

McKinnon (1988) recommends that researchers consider their own bias, and its impact on the research project, particularly in qualitative research. For this research, I have considered, and managed, the potential for my bias to interfere with the research results, as follows in Table 3:

7. Data retrieved from Teacher’s observational notes.

8. For example, the verb “to talk” is conjugated as *Eu falo / Tu falas / Ele fala / Nós falamos / Vós falais / Eles falam*.

9. Students exhibited an understanding or comprehension by explaining grammatical concepts back to me, by correctly answering in-class questions and through formal means, such as end-of-term exams.

Table 3. Managing researcher bias

Threats	Strategies
<i>Observer-caused effects – the reactive effects of the observer’s presence</i>	I encouraged open, in-class, dialogue, student peer-to-peer interaction and made observational notes of student behaviour.
<i>Observer bias – distorted effects of the researcher’s selective perception and interpretation</i>	I collected data from multiple sources, such as formal exams, in-class and at-home exercises, and in-class observations. I coded and re-coded these data sources iteratively to arrive at analytical generalisations and themes.
<i>Data access limitations – restrictive access to information or the researcher only being exposed to certain phenomena</i>	Each student provided multiple sources of data, each contributing to my analysis of his/her comprehension and application of explicit and implicit knowledge.
<i>Complexities and Limitations of the human mind – subjects may consciously seek to mislead or deceive the researcher</i>	I collected data (students’ responses) from exercises and quizzes completed in-class/at-home, and end-of-term. I clarified their responses, and comprehension through in-class discussion. I was able to detect any attempts to mislead or deceive my understanding of the students’ comprehension in my analysis.

4.2.3 Phase 3: Coding data by degree of difficulty

Creswell (1998, p. 57) explains coding as when “the researcher forms initial categories of information about the phenomenon being studied by segmenting information”. I analysed and coded each data source, as summarised in *Table 1: multiple data sources*, in two stages. First, I coded students’ responses as demonstrating explicit or implicit knowledge according to the structure and syntax evident within their responses. Second, I coded their responses by the degree of difficulty that I perceived the student encountered in grasping various concepts, being easy, medium and difficult. This two-stage approach enabled me to: (a) explore how NES draw on their explicit and implicit knowledge, in English, when learning Brazilian Portuguese as a L2; and (b) identify the occasions or circumstances in which they encountered difficulty, such as:

Table 4. Measuring degree of difficulty

L1	L2	Degree of difficulty
Good explicit knowledge e.g. How to apply personal pronouns	→ Explicit instruction e.g. direct relationship in personal pronouns in L1 and L2	→ Easy to understand

(continued)

Table 4. (continued)

L1	L2	Degree of difficulty
Good implicit knowledge e.g. how to conjugate verbs in present tense	→ Explicit instruction e.g. Conjugation of present indicative, and regular/irregular verbs	→ Medium level of difficulty, understood basic conjugation but regular/irregular forms were more difficult
Good implicit knowledge e.g. greetings and everyday phrases	→ Implicit instruction e.g. direct translation of “see you later” in both languages	→ Easy to understand
No explicit/implicit knowledge e.g. nouns attract a gender	→ Implicit instruction e.g. Feminine nouns end in ‘a’, and masculine nouns end in ‘o’	→ Easy to understand
No explicit/implicit knowledge e.g. different verbs for “to be”	→ Explicit instruction e.g. Ser versus Estar*	→ Difficult to understand

*In Portuguese, the infinitive verb “to be” is *ser* and is used in situations such as *profession* (I am a doctor), *nationality* (I am Brazilian), a *permanent feature* (He is tall/He is pale), and *descriptions* – when permanent characteristics cannot be applied (My 5-year-old niece is tall). The infinitive verb “to be” is also *estar*, which is used for *states of being* such as *sobriety* (He is drunk/He is sober), *location* (She is here) and a *changeable state* (He is fat/She is pregnant/He is pale). However, students can become easily confused because the conjugated form of *ser* or *estar* may be used to describe a person as being fat, depending on context, such as the person has gotten (temporarily) fat during the Christmas festive season because he ate too much or whether the person is always fat. Furthermore, *ser* is used in situations that we do not expect to change suddenly like personality features, e.g. “Ela é simpática.” (She is a nice person.) and that verb *estar* implies a change that can or cannot be expected, like behaviour, e.g. *Hoje, ela está muito simpática!* (Today she is being [acting]) very nice!). This is a verbal form not found in English; thus, students do not have explicit or implicit knowledge to help frame and make sense of it.

5. Research findings

I have categorised these findings according to the themes that emerged from the coding process, which identified the students’ explicit / implicit knowledge (as defined by Ellis, 2005a) in the L1 and the perceived degree of difficulty students demonstrated in acquiring an L2. My analysis examined the degree of difficulty in L2 acquisition dependent upon the students’ explicit knowledge in the L1 and the type of instruction given in the L2, providing five different variations. I now present my research findings according to these five variations.

5.1 Explicit L1 knowledge receives explicit L2 instruction

While there are a number of similarities between English and Portuguese, there are also a number of differences, which require a detailed explanation, or explicit instruction. For example, when completing minute papers and an in-class discussion, monolingual students exhibited more difficulty in citing personal pronouns than their bilingual peers, but were quickly conversant with personal pronouns, and their application, following a brief explanation.¹⁰ Moreover, NES monolingual students were able to grasp such an explanation when I provided direct examples and comparisons in English. Thus, for everyday constructs such as personal pronouns, students more easily understood a translation through examples (i.e. “I” in English = “Eu” in Portuguese) than an explicit instruction of “the first person singular nominative pronoun in Portuguese is “Eu”; please use it in an example.

Monolingual NES students had more difficulty than bilingual students in citing or explaining grammatical forms, such as nouns and adjectives. However, after a brief and basic explanation, they understood nouns are names of people, places and things, while adjectives are describing words. This explanation helped me to state that whilst, in English, adjectives generally precede nouns, the opposite occurs in Portuguese. During in-class exercises, I observed monolingual students having more difficulty in processing this information and progressing in this exercise than they did in applying the correct personal pronoun, and frequently reverted to verbalising the exercise, in front of the class whiteboard, before being able to complete it.

In these examples, I found that when students had good explicit L1 knowledge, they responded favourably and readily grasped explicit L2 instruction. I also found that enhancing or reiterating explicit instruction in the L1 could greatly enhance a student’s ability to grasp explicit L2 instruction. However, within these examples, I was fortunate to have equivalent and direct comparisons available in the L1 to which the students could relate in the L2.

5.2 Implicit L1 knowledge receives explicit L2 instruction

“Verb conjugation” is not a term that Beginner 1 monolingual NES students were able to relate to, or explain. However, Beginner 2 and bilingual students were more

10. These explanations, in English, did not go to the extent of explaining the nominative singular pronoun “I”, the objective case of “me” and reflexive pronoun “myself”, and the circumstances for using each but merely offered an explanation of I = first person, you = second person singular / plural, s/he = third person singular, they = third person plural. This latter explanation was sufficient to offer a direct comparison in Portuguese, such as “I” in English = *Eu* in Portuguese, “You” (singular) in English = *Você* in (Brazilian) Portuguese etc.

conversant, and able to explain and apply it in various exercises. While the adult students participating in this research were educated, able to construct and use their native language effortlessly, many were unable to demonstrate the explicit knowledge necessary to explain why “I run” is different from “He runs”, other than noting the latter has an “s”. For example, students completed at-home exercises, which I then corrected through in-class discussion.¹¹ I explored the student’s rationale and logic for believing the incorrect answer. In my observational notes, I noted how students continued to apply the “s” to third person singular conjugated verbs in Portuguese, and they indicated plurality on the end of nouns similarly to how “house” becomes “houses” in English, indicating an application of their implicit knowledge and sense making.

When students were able to apply a relationship between their implicit knowledge in the L1 and L2, they were able to demonstrate learning and apply it in their use of Portuguese. For example, first person, present tense, regular verbs in Portuguese follow a similar, predictable pattern of conjugation (i.e. root of the verb + o), such as the verb *beber* (to drink) becomes *bebo*, the verb *falar* (to talk) becomes *falo* and the verb *insistir* (to insist) becomes *insisto*. However, students receive greater and more complex explicit instruction when the tense changes, the verbs are irregular or a stem-changing verb does not follow the same predictable pattern, such as the verb *ir* (to go) becoming *vou*.

In circumstances where students were not able to apply their implicit or explicit knowledge in English to make sense of Portuguese, they demonstrated higher levels of difficulty. Instead of digesting the explicit instruction provided, students placed greater emphasis on memorising specific examples as opposed to grammatical rules, meaning they were attempting to replicate the implicit knowledge of their L1 in learning the L2. For the students who continued to rely on creating an implicit knowledge bank, rather than grasping explicit grammatical rules, they continued to exhibit greater learning difficulty in comprehending matters that are more complex and difficulty in progressing to Beginner 2.

5.3 Implicit L1 knowledge receives implicit L2 instruction

All languages have their own unique expressions, colloquialisms, phrases, profanity and expletives that have a metaphorical meaning or connotation different

11. Students returned to the following class with their at-home exercises completed. Each student would exchange the completed exercise with his/her classmate and I would ask for the answers to each question. When students did not provide the correct answer, asked why something was wrong or were confused, we would discuss the students’ rationale / logic in how they derived their responses and understanding.

from the literal meaning of the individual word(s) and are therefore more prone to implicit instruction than explicit. Students are able to implicitly learn language components, in the L1 or L2, and communicate with other native speakers without ever learning or questioning the literal meaning. Students in this research were able to use this implicit knowledge, gained from interacting with other native speakers, watching television, listening to the radio, attending parties or simply listening to people “on the street” with the greatest ease, since the instruction and application are both implicit.

However, the difficulty or limitation in applying this implicit knowledge rests on its verbal form. For example, students implicitly understand the ‘sound’ of the expression or phrase, but will not understand the literal meaning, its orthography or its application to more complex linguistic structures, such as negation or subjunctive tenses. Thus, while students may easily learn how to say something is cool, someone is down to earth, or someone drives you up the wall, such implicit learning has limited application.

5.4 No explicit or implicit L1 knowledge receives implicit L2 instruction

In (Brazilian) Portuguese, and Latin-based languages in general, nouns have a gender whereas in English they do not. Teaching monolingual NES students Brazilian Portuguese and noun genders usually generates wry smiles and questions of why a table is feminine, but a car is masculine. The implicit answer of: nouns ending in ‘a’ are usually feminine and nouns ending in ‘o’ are usually masculine, will generally suffice. However, such an instruction omits the exceptions to the rule (i.e. “day” in Portuguese is “dia”, which is masculine), how to manage nouns ending in ‘e’ (“student” = “estudante”) and why Portuguese nouns even have a gender.

NES monolingual students therefore do not have the explicit or implicit knowledge that may be relied upon to help make sense and create new ‘rules’ for why Portuguese nouns have gender. Students focused on memorising the exceptions without being overly concerned with the rationale as to “why”, instead relying on implicit knowledge. In this sense, without an equivalent example in English by which to make sense of noun gender, monolingual NES students grasped implicit instruction with relative ease, while their bilingual colleagues had already created their own sense making.

5.5 No explicit or implicit L1 knowledge receives explicit L2 instruction

One of the most difficult tasks for monolingual NES students to grasp in (Brazilian) Portuguese is two different verbs for the one English verb “to be”. Students struggle to grasp the need, or application, for two different “to be” verbs, which

in Portuguese are *ser* and *estar*. The former is for descriptive / (semi) permanent situations such as a person's height, profession, ethnicity or nationality, whereas the latter is for states of being, changeable states or locating people/things, such as pregnancy, mood and place.

Despite these definitions, there are situations where a person's profession or nationality may change, and thus a monolingual NES framing *ser* based on permanency becomes confused. Additionally, a person may use the verb *ser* or *estar* to describe someone being fat / skinny, depending on the context. If describing an obese person, you would generally use *ser*, whereas if describing someone as being fat (during this phase/period of his/her life), you would use *estar*. Monolingual NES have the greatest difficulty in making sense of explicit instruction when they do not have any explicit knowledge (such as two "to be" verbs in English), or implicit knowledge (of why one needs two "to be" verbs).

In this example, providing implicit instruction, without the explicit rationale and explanation, leads to more difficulty and confusion. For many students, they tended to "hedge their bets" by alternating and applying both verbal forms, believing that while they may use the wrong form on some occasions, they would be right on others. Other NES students explained that they would listen and pay attention to native speakers' use of different forms and ask questions about why the native speaker applied one form or the other. While proving effective, this method aims to build on implicit knowledge and align verbal usage with situations as opposed to relying on grammatical rules.

6. Discussion

These findings present a view in which students draw on their L1 knowledge, as a framework, in order to make sense of L2 instruction and when they cannot, they will encounter a greater degree of difficulty in L2 learning. For example, my research shows that explicit L2 instruction is most effective when the student has good explicit L1 knowledge, and when the student only has good implicit L1 knowledge, implicit L2 instruction is more effective.

This research found that students with poor levels of (explicit) conscious metalinguistic knowledge in their native English have higher levels of difficulty in learning Portuguese as a foreign language through instructed grammar than their counterparts who have good levels of conscious metalinguistic knowledge. Students with poor or low levels of explicit knowledge in their L1 responded to implicit instruction and relied on constructing implicit contextual rules (as opposed to explicit grammatical rules) to make sense of the L2. This finding calls into

question the effectiveness of different teaching styles when teaching students with greater levels of explicit knowledge compared to those without explicit knowledge.

The degree of difficulty encountered in learning Portuguese as a Foreign Language (PFL) dissipates as metalinguistic knowledge increases. Students with greater levels of explicit knowledge were able to apply their explicit and implicit knowledge from their native language (L1) in making sense of the L2, which made for an easier and quicker learning process. These research findings are significant for second language teachers, educators and linguists as they affect how, and the extent to which students comprehend linguistic concepts.

This research highlights the difficulties that native English speakers encounter in learning a second/foreign language, particularly when they lack explicit understanding of their native language. Having taught monolingual and bilingual students from various ethnic backgrounds in the same classroom setting, I find the learning aptitude of those with good explicit knowledge far outperforms those students without good explicit knowledge.

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Annexure A. Table of research participants

Year	Student code	Origen	Native language	L2	Parents
1	1.01	Australia	English	None	Australian
1	1.02	Australia	English	None	Australian
1	1.03	Australia	English	None	Australian
1	1.04	Australia	English	None	Australian
1	1.05	Australia	English	None	Australian
1	1.06	Australia	English	None	Australian
1	1.07	Australia	English	None	Australian
1	1.08	Australia	English	None	Australian
1	1.09	Australia	English	None	Australian
1	1.1	Australia	English	None	Australian
1	1.11	Australia	English	None	Australian
1	1.12	Australia	English	None	Australian
1	1.13	Australia	English	None	Australian
1	1.14	Australia	English	None	Australian
1	1.15	Australia	English	None	Australian
1	1.16	Australia	English	None	Australian
1	1.17	Australia	English	None	Australian

(continued)

Year	Student code	Origen	Native language	L2	Parents
1	1.18	Australia	English	None	Australian
1	1.19	Australia	English	None	Australian
1	1.2	Australia	English	None	Australian
1	1.21	Australia	English	None	Australian
1	1.22	Australia	English	None	Australian
1	1.23	Australia	English	None	Australian
1	1.24	Australia	English	None	Australian
1	1.25	Australia	English	None	Australian
1	1.26	Australia	English	None	Australian
2	2.01	Australia	English	Portuguese (Speaking only)	Portuguese
2	2.02	Australia	English	None	English
2	2.03	Australia	English	None	Australian
2	2.04	Australia	English	None	Australian
2	2.05	Australia	English	None	Australian
2	2.06	Australia	English	None	Australian
2	2.07	Australia	English	None	Australian
2	2.08	Australia	English	None	Australian
2	2.09	Australia	English	None	Australian
2	2.1	Australia	English	None	Australian
2	2.11	Australia	English	None	Australian
2	2.12	Australia	English	None	Australian
2	2.13	Australia	English	None	Australian
2	2.14	Australia	English	None	Australian
2	2.15	Australia	English	None	Australian
2	2.16	Australia	English	None	Australian
2	2.17	Australia	English	None	Australian
2	2.18	Australia	English	None	Australian
2	2.19	Australia	English	None	Australian
2	2.2	Australia	English	None	Australian
2	2.21	Australia	English	None	Australian
2	2.22	Australia	English	None	Australian
2	2.23	Australia	English	None	Australian
2	2.24	Australia	English	None	Australian
2	2.25	Australia	English	None	Australian
2	2.26	Australia	English	None	Australian
2	2.27	Australia	English	None	Australian
2	2.28	Australia	English	None	Australian

Year	Student code	Origen	Native language	L2	Parents
2	2.29	Australia	English	None	Australian
2	2.3	Australia	English	None	Australian
2	2.31	Australia	English	None	Australian
2	2.32	Australia	English	None	Australian
2	2.33	Australia	English	None	Australian
2	2.34	Australia	English	None	Australian
2	2.35	Australia	English	None	Australian
2	2.36	Australia	English	None	Australian
2	2.37	Australia	English	None	Australian/English
2	2.38	Australia	English	None	Australian/Chilean
2	2.39	Australia	English	None	English
2	2.4	Australia	English	None	Australian
2	2.41	Australia	English	None	Australian
2	2.42	Australia	English	None	Australian
2	2.43	Australia	English	None	Australian
2	2.44	Australia	English	None	Australian
2	2.45	Australia	English	None	Australian
2	2.46	Australia	English	None	Australian
2	2.47	Australia	English	None	Australian
2	2.48	Australia	English	None	Australian
2	2.49	Australia	English	None	Australian
2	2.5	Australia	English	None	Australian
2	2.51	Australia	English	None	Australian
2	2.52	Australia	English	None	Australian
2	2.53	Australia	English	None	Australian
2	2.54	Australia	English	None	Australian
2	2.55	Australia	English	None	Australian
2	2.56	Australia	English	None	Australian
2	2.57	Australia	English	None	Australian
2	2.58	Australia	English	None	Australian
2	2.59	Australia	English	None	Australian
2	2.6	Australia	English	None	Australian
2	2.61	Australia	English	None	Australian
3	3.01	Australia	English	None	Australian
3	3.02	Australia	English	None	Australian
3	3.03	Germany	German	English (Speaking & Writing)	German
3	3.04	Germany	German	English (Speaking & Writing)	German

(continued)

Year	Student code	Origen	Native language	L2	Parents
3	3.05	England	English	English (Speaking & Writing)	English
3	3.06	Australia	English	French (Speaking & Writing)	Macedonian/Turkish
3	3.07	Australia	English	Japanese (Speaking & Writing)	Japanese
3	3.08	Australia	English	None	Australian
3	3.09	Australia	English	None	Australian
3	3.1	Australia	English	None	Australian
3	3.11	Australia	English	None	Australian
3	3.12	Australia	English	None	Australian
3	3.13	Australia	English	None	Australian
3	3.14	Australia	English	None	Australian
3	3.15	Australia	English	None	Australian
3	3.16	Australia	English	None	Australian
3	3.17	Australia	English	None	Australian
3	3.18	Australia	English	None	Australian
3	3.19	Australia	English	None	Australian
3	3.2	Australia	English	None	Australian
3	3.21	Australia	English	None	Australian
3	3.22	Australia	English	None	Australian
3	3.23	Australia	English	None	Australian
3	3.24	Australia	English	None	Australian
3	3.25	Australia	English	None	Australian
3	3.26	Australia	English	None	Australian
3	3.27	Australia	English	None	Australian
3	3.28	Australia	English	None	Australian
3	3.29	Australia	English	None	Australian
3	3.3	Australia	English	None	Australian
3	3.31	Australia	English	None	Australian
3	3.32	Australia	English	None	Australian
3	3.33	Australia	English	None	Australian
3	3.34	Australia	English	None	Australian
3	3.35	Australia	English	None	Australian
3	3.36	Australia	English	None	Australian
3	3.37	Australia	English	None	Australian
3	3.38	Australia	English	None	Australian
3	3.39	Australia	English	None	Australian
3	3.4	Australia	English	None	Australian

Year	Student code	Origen	Native language	L2	Parents
3	3.41	Australia	English	None	Australian
3	3.42	Australia	English	None	Australian
3	3.43	Australia	English	None	Australian
3	3.44	Australia	English	None	Australian
3	3.45	Australia	English	None	Australian
3	3.46	Australia	English	None	Australian
3	3.47	Australia	English	None	Australian
3	3.48	Australia	English	None	Australian
3	3.49	Australia	English	None	Australian
3	3.5	Australia	English	None	Australian
3	3.51	Australia	English	None	Australian
3	3.52	Australia	English	None	Australian
3	3.53	Australia	English	None	Australian
3	3.54	Australia	English	None	Australian
3	3.55	Australia	English	None	Australian
3	3.56	Australia	English	None	Australian
3	3.57	Australia	English	None	Australian
3	3.58	Australia	English	None	Australian
3	3.59	Australia	English	None	Australian
3	3.6	Australia	English	None	Australian
3	3.61	Australia	English	None	Australian
3	3.62	Australia	English	None	Australian
3	3.63	Australia	English	None	Australian
3	3.64	Australia	English	None	Australian
3	3.65	Australia	English	None	Australian
3	3.66	Australia	English	None	Australian
3	3.67	Australia	English	None	Australian
3	3.68	Australia	English	None	Australian
3	3.69	Australia	English	None	Australian
3	3.7	Australia	English	None	Australian
3	3.71	Australia	English	None	Australian
3	3.72	Australia	English	None	Australian

The linguistic and anthropological dimensions within enunciation in additional languages

A look at a Portuguese language instructional setting

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Drawing from enunciative linguistics (Benveniste, 1966; 1974)¹ and the anthropology of enunciation (Dessons, 2006), this study suggests that both teacher and student discourses are rooted in speaker and language analyst categories. Analysis of dialogues between a teacher and her students in a Portuguese as an additional language classroom revealed two mechanisms: (1) the teacher's history of utterances, and (2) the learners' inquiries. Both mechanisms address reorganization of form and meaning based on previous experiences in the language. Importance of language awareness and implications for teacher education are discussed.

Keywords: Portuguese as an additional language, discourse, enunciation, teacher education, Benveniste

Introduction

As additional language teachers, we enter the classroom with a variety of concerns in mind: teaching methods, materials and activities planned for the day, and assessment practices developed according to learning outcomes. However, not only do these decisions play a role in how effective an additional language class can be, but they can also affect how we deliver the explanations about language through discourse in class. Taking this perspective as a starting point, we pose one question: what choices are involved in the rhetorical process of unveiling how language produces meaning, and how do these choices inform the ways we convey linguistic explanations to our students? By looking at dialogues from a Portuguese

1. These are the original publication dates of *Problèmes de Linguistique Générale I* and *II*. The dates will follow the consulted version in English (1971) and Portuguese (1974) along the chapter.

as an Additional Language (PAL) class for Spanish speakers taught by a novice teacher in Brazil, this chapter investigates how personal experiences in and with language influence the practice of teaching and learning additional languages in instructional settings.

Drawing from Émile Benveniste's notions of enunciation and culture as well as the anthropology of enunciation perspective (Dessons, 2006), this analysis will focus on the discursive mechanisms through which a teacher's and learners' utterances occur. For the purpose of this work, enunciation is defined as the "conversion of language into discourse" (Benveniste, 1974). This definition addresses two domains of language: language as a system, which comprises all the formal possibilities of which speakers can make use, and discourse as language put into use, which comprises actual utterances. The enunciative scene,² then, is formed by constitutive elements: the speaker (first person, who says *I*), the addressee (second person, who is addressed by *I* as *you*), and the third person, who is referred to by *I* as *s/he*.³

Considering enunciative linguistics uses enunciation as its core, language analysis always focuses on who is speaking, since *you* and *s/he* are assumptions of the enunciative scene and part of *I*'s reference. These positions in discourse will be filled only when they become speakers – when they say *I*, figuratively speaking – or when they create a discursive reference for themselves in language and in society through their utterances. These notions are the foundation for the concepts of subjectivity and intersubjectivity, for which Benveniste's theory is most known in linguistics. Even though Benveniste does not explicitly assign an anthropological dimension of enunciation in his work, the perspective of "man in language" is the core axis of enunciative theory as well as of all Benveniste's analyses (Flores, 2017).

The interweaving of linguistic and anthropological dimensions within enunciation were operationalized in the categories of *speaker and language analyst* to verify how students and teachers negotiate meaning to teach and learn an additional language. Inspired by enunciative perspectives on how man is founded in language when producing an utterance, some questions were raised during my additional language teaching experience. These questions framed my study:

2. This term does not refer to a specific theoretical assumption in this study.

3. Benveniste refers to the third person as *he*, as in the excerpt in English: "It must be seen that the ordinary definition of the personal pronouns as containing the three terms, *I*, *you*, and *he*, simply destroys the notion of 'person.' 'Person' belongs only to *I/you* and is lacking in *he*. This basic difference will be evident from an analysis of *I*". (Benveniste, 1966, p. 217). Although this trinity does not mean a reference in the real or physical world, but reveals the formal apparatus of the linguistic system, this chapter will include both *she* within *he* as *s/he* to refer to the third person.

1. How does the negotiation of meaning between the positions of *speaker* and *language analyst* occur both in learner and teacher utterances inside the classroom?
2. How do speakers reorganize meaning based on experience to convey it as linguistic formal knowledge in a Portuguese as an Additional Language classroom?

By looking at classroom dialogues through a discursive lens, this work not only expands enunciative analysis to language instructional settings, but it also offers a new perspective on how instructors can become more aware of possible strategies to discuss meaning in their language classes. As Wright (2002) points out, language awareness can be an ally to additional language methodologies because “[a] linguistically aware teacher not only understands how language works, but understands the student’s struggle with language and is sensitive to errors and other interlanguage features” (p. 115). Drawing from these perspectives, I suggest that raising awareness about the enunciative mechanisms involved in classroom dialogue may act as a springboard for noticing both discourse features, and question and explanation patterns from a critical point of view. This discussion can potentially improve the understanding of how we, as teachers, position ourselves in class: both as speakers and as language analysts. In this sense, being aware of how enunciation may function in classroom dialogue can help teachers make more informed decisions about pedagogy and, consequently, better guide students in noticing their own positionings as speakers and developing their language analyst abilities.

The following section explains the categories of speaker and language analyst used to operationalize data analysis. Subsequently, the second section describes the research context. The third section analyzes the classroom dialogues to respond to the research question by pinpointing the “history of utterances” mechanism. Finally, the discussion section explores pedagogical implications.

1. Discourse positioning: Speakers and language analysts

1.1 Intersubjectivity as the main element of culture

As briefly described in the introduction, the *I, you,* and *s/he* trinity forms the axis of enunciative theory. By observing the relationship between the first, second, and third person in discourse, concepts of subjectivity and intersubjectivity form the foundation of man in language and, consequently, in society. Benveniste clarifies that “The establishment of ‘subjectivity’ in language creates the category

of person – both in language and also, we believe, outside of it as well” (Benveniste, 1971, p. 227). Thus, when a person speaks, s/he is establishing a relation with language as well as a connection with whom s/he is speaking, for these are conditions for enunciation. Subjectivity and intersubjectivity are thus originated at the same time, producing man’s experience in language by giving him a position as a speaker.

Hence, it is the notion of *speaker* that inculcates an anthropological dimension in the language system. The fact that the essential foundation of subjectivity lies on intersubjectivity is a central tenet in enunciation theory that explains the speaker’s role: at the same time an individual is singularized by his/her speech, s/he creates an addressee and evokes collectivity. Language, the individual, and society are the constitutive elements of the very act that constitutes the linguistic exercise, and these elements are created when an individual enunciates. It is under these terms that the field of linguistic anthropology assumes the existence of an anthropology of enunciation (Flores, 2013). In this sense, the interpretation of enunciation theory assumed in this study is that the language system is not closed or fixed, but it reverberates outwards. Benveniste (1971) explains this argument when he states:

We can never get back to man separated from language and we shall never see him inventing it. We shall never get back to man reduced to himself and exercising his wits to conceive of the existence of another. It is a speaking man whom we find in the world, a man speaking to another man, and language provides the very definition of man. (Benveniste, 1971, p. 224)

This excerpt clarifies that language is not seen as an instrument but creates the possibility for man to become one of humankind since language is born at the same time man is born. Also, the frequency with which the author repeats the term “man” to promote the relationship between man and the act of speaking is noteworthy. The complexity of the anthropological dimension underlying this postulate makes explicit how language places a man in the world because he is able to speak. By creating a double reference – one within the language system itself and another in the world amongst other speakers – the enunciation act represents the foundation of subjectivity because it connects the individual who says *I* with the society in which s/he is born, therefore creating the concept of intersubjectivity.

Moreover, the notion of subjectivity is intrinsically embedded in the exercise of language and the personal experience of the speaker, whose identity is associated with one’s experiences in everyday life. In this sense, since the value of unique experiences in language is stressed in this study, communication is not what is being examined in the data. Instead, the enunciative scenes represent how one’s unique experiences in language affect choices regarding how language will become discourse, thus enunciation, through the manipulation of formal elements.

Nonetheless, communication, which is an important concept in additional language pedagogy, is also part of this conversation. For Benveniste, communication is a pragmatic consequence of the fact that *I* and *you* speak to each other. The condition of dialogue, defined as when each person says *I* in their respective turns, is considered the fundamental condition for language appropriation to occur. There is a transcendence of *I* and *you*, and this possibility represents the unique condition of man in language and society. Therefore, the focus here is not the communication that occurs, but the individual act of language use (Benveniste, 1974). In other words, the mechanisms that allow the speaker to position him/herself in the language are the focus since this is the procedure for the speaker to become a subject in discourse. This process is individual because enunciation is unique for each person who says *I* and appropriates the pronoun categories provided by language. In other words, there is a negotiation of singular meanings for each speaker (teacher and learner in our data) since they emerge from and are (re)signified based on their unique experiences in and with language. To clarify this theoretical underpinning, I cite the following excerpt I translated from Benveniste (1966):

Thus, it is truth word for word that the foundation of subjectivity lies in the linguistic exercise. If we wish to reflect deeply on this, we will see there is no other objective testimony of the subject's identity than the one he gives this way, about himself. (p. 288)⁴

In this sense, when we speak, we speak from our experiences in language and in society.

Inside the classroom, the relationship between speakers is also established based on individual experiences, which are in constant (re)negotiation for individual and collective purposes. As pointed out by Schlatter (2000), studying a language is only meaningful if it happens through a dialogue between two ways of experiencing and seeing the world. This chapter examines the discourse mechanisms through which these two ways of experiencing and seeing the world manifest.

1.2 The linguistic and anthropological dimensions within enunciation

As previously noted, the claim of Benveniste's theory is that language and society are co-dependent and organically create and recreate one another through the roles performed by the speakers. By observing linguistic structures, the author

4. Free translation from: "*É portanto verdade ao pé da letra que o fundamento da subjetividade está no exercício da língua. Se quisermos refletir bem sobre isso, veremos que não há outro testemunho objetivo da identidade do sujeito que não seja o que ele dá assim, ele mesmo sobre si mesmo*" (Benveniste, 1966, p. 288). Any ambiguities are under the researcher's responsibility.

argues that specific elements provide space for this connection to occur, and its core axis are the subject pronouns. This perspective is theoretically dense and poses challenges for conducting data analyses. Therefore, a theoretical scheme was created to operationalize how we look at enunciative scenes taking both linguistic and anthropological aspects into account. Although Benveniste has not addressed language produced in instructional settings specifically, such a context also benefits from enunciation theory due to the crucial understanding of both language and culture for learning additional languages. These processes are embedded within enunciation in its linguistic and anthropological dimensions.

When we teach or learn a language, much of what we have experienced as speakers plays a role in how we understand usage rules. As teachers, these rules are (re)considered in a way to convey explicit instruction about language. As learners, these rules are the basis of comparison between the known language and the new one being learned. In this sense, structural elements, the meaning making process, and usage rules and rhetorical effects are the foci of constant (re)negotiation carried out in classroom dialogues. This interaction reflects two positions taken by students' and teachers' enunciation in the context of the PAL classroom: *speaker* and *language analyst*.

When referring to the *speaker* position, the assumption is the link between individuality and collectivity evoked by the intersubjectivity established when one enunciates. This principle represents our experiences in language. How does the teacher rely on her experiences in Portuguese to reorganize meaning for the students? How do learners draw on their experiences in Spanish, their first language, to make connections to Portuguese? The speaker category sheds light on the interpretation of teacher and learner discourse, and the extent to which they indicate cultural experiences.

The development of knowledge about language underlies the language analyst position. In this sense, the focus is not how one uses the language uniquely, but how one is able to draw from experiences and deduce rules of usage. How does the teacher combine her knowledge as a speaker with her professional expertise to provide instruction about language? How are the learners able to establish connections between inferred rules in Spanish and transfer them to new knowledge about Portuguese? The language analyst category is posed as an embedded discursive position taken on by learners and teachers when in the classroom context.

2. Context

The dialogues analyzed in this chapter were collected in a Portuguese as an additional language class taught in a Portuguese for Foreigners' program in Southern

Brazil. The program is part of a federal university, and it provides the opportunity for novice teachers studying linguistics and pedagogy to gain and improve their teaching experience. The teachers are required to design lessons, plan classes, and participate in teacher education seminars.

Two classes of the Portuguese for Spanish Speakers course taught by a Brazilian teacher were recorded and then transcribed by the researcher for a broader project. Also, the researcher kept a journal with field notes while observing the classes. The class worked with a learning task that scaffolded augmentative and diminutive usage and rules in Brazilian Portuguese based on two video commercials starring a famous Brazilian singer. This chapter analyzes data from one class about the augmentative. The dialogue between the teacher, pseudonym Marta, and one Colombian student, pseudonym Oscar, is analyzed in the next section.

Since the classes were in Portuguese, the English translation follows the original passages. The transcription conventions marked words pronounced in a louder tone with capital letters, and additional comments made by the transcriber were placed in brackets, e.g. [While she speaks, she writes on the board]. Since the augmentative and diminutive are not morphologically marked in English, note the word in Portuguese for the actual suffixes.

3. Analysis

The analytical process of language mechanisms constitutes a challenge for linguists (Normand, 2009). According to Normand, the key point is to create a homogeneous method to combine an analysis of the elements in play, and the description of how this linguistic play produces meaning. Bearing this in mind, this section examines dialogues between the learners and the teacher to discuss the following mechanisms:

1. How meaning is negotiated between the discursive positions of speaker and language analyst;
2. How the speakers reorganize meaning built by lived experiences to convey linguistic formal knowledge.

The fact that the teacher built – and rebuilds every day – her *history of utterances* through her experiences as a speaker creates a basis on which she can interpret and produce meaning in a wide range of spheres. When entering a classroom, not only as a *speaker*, but also as a *language analyst*, she may be expected to convey explanations of both prescriptive and descriptive rules. Table 1 illustrates how Marta negotiated both domains in her response to Oscar, who makes an inquiry about the augmentative form of beans (*feijão*):

Table 1. Oscar asked how the augmentative form of beans (*feijão*) is formed since the word and the suffix end in *-ão*. Marta provides the following explanation

Line number	Original Portuguese utterances	English translation
1	<i>Se eu fosse fazer um aumentativo de feijão, eu faria feijão zão.</i> [Ela escreve o exemplo no quadro.]	If I were to form the augmentative of beans, I would form <i>feijão zão</i> . [She writes the example on the board.]
2	<i>Eu faria assim. Isso não é um feijão qualquer, isso é um feijãozão.</i>	I would do it like that. This is not any kind of beans, this is big beans.
3	<i>Mas assim, é bem engraçado, a gente não faz muito isso, né. Tipo, ah, isso não é um chão, é um chãozão.</i>	But like, it is quite funny, we don't do it much, you know. Like, ah, this is not a floor, this is a big floor.
4	<i>Até é possível, eu acho que, se fizemos aumentativo de palavras assim, colocamos o z, feijão feijãozão. Vamo pensar em outra?</i>	It is even possible, I think, if we form the augmentative of words like that, we add z, like <i>feijãozão</i> . Let's think of another one?
5	<i>Coração, coraçãozão. Cora-ção-zão.</i> [Enquanto fala, ela escreve no quadro.]	Heart, big heart. [While she speaks, she writes on the board.]
6	<i>Eu acho que isso a gente faz bastante, ele tem um coraçãozão! Ele adota todo mundo!</i> [Sua entonação procura imitar uma fala em situação real.]	I think that we do it a lot, he has a big heart! He adopts everybody! [Her intonation attempts to imitate a real situation pitch.]
7	<i>Né. Vamo pensar se tem algum diferente. Irmão irmãozão. Pode ser, ó.</i>	Right. Let's think if there is any different. Brother big brother. It might work, look.

The excerpt in Table 1 illustrates how Marta's speaker repertoire is accessed to shed light on the explanation. She uses expressions like *Eu faria assim* ("I would do it like that") in line 2, highlighting her position of user of the language, as well as *a gente não faz muito isso, né* ("we don't do it much") in line 3 pointing to her particular community of speakers. Even when she uses hedging, such as *Eu acho que isso a gente faz bastante* ("I think that we do it a lot") in line 6, her authority to provide information on these terms is asserted by her position as a speaker of the language. Therefore, based on her intuition, she derives a principle for linguistic analysis: to form augmentative of words with a nasal ending such as *-ão*, it is necessary to add a-z before you add the *-ão* augmentative suffix. To corroborate her hypothesis, she elicits other examples under the same rule. The scene continues as shown in Table 2:

Table 2. Marta provides more examples to illustrate the augmentative formation rule. She draws from words used in the commercial and mentions the feminine word *cerveja* (beer)

Line number	Original Portuguese utterance	English translation
1	<i>Ahn, vamos pensar, ser uma cerveja, um cervejão.</i>	Ah, let's think, a beer, a big beer.
2	<i>[Desta vez, ela pronuncia cervejão com entonação descendente, pois parece perceber que a regra para essa palavra é diferente do que está buscando explicar.]</i>	[This time, she pronounces <i>cervejão</i> with descending intonation, because it seems that she noticed the rule for this word is different than the one she is trying to explain.]
3	<i>E continua: ahn, bom. É uma cerveja, né, tomar uma cerveja, só que aqui conforme o masculino fica um cervejão. Tá?</i>	And she continues: Ah, well. It's a beer, right, drink a beer, but here according to the masculine it is big beer. Ok?
4	<i>[Os alunos não manifestam reação, olham atentamente para o quadro e mantêm silêncio.]</i>	[The students don't show any reaction, they look mindfully to the board and remain silent.]

In the excerpt in Table 1, Marta provided examples that followed the rule she was explaining: *coração* and *irmão* were masculine words that received the suffix *-ão*. In contrast, Table 2 depicts an unplanned situation, described by the researcher's journal as: *Professora fala dos aumentativos femininos e 'esbarra' em 'cerveja', que estava escrito no quadro. Ela percebe que funciona de modo diferente, pois é uma palavra feminina que tem o aumentativo masculino (não é 'cervejona', mas 'cervejão')* ("The teacher mentions feminine augmentatives and comes across beer, which was written on the board. She notices that this word works in a different way since it is a feminine word formed by the masculine augmentative rule (it's not *cervejona*, but *cervejão*)" (Journal excerpt). Even though both suffixes, *-ona* and *-ão*, can be attached to a feminine word in some cases, like *cerveja* (beer), they present different meanings and, consequently, usage rules. When Marta realized the exception, she decided to resume her explanation by mentioning another word under the same "add -z" rule, and leave aside the variation aspect for a moment, as shown in Table 3:

Table 3. Marta explains that the grammatical rule adds the suffix *-ona* to feminine words, like *irmã* (sister)

Line number	Original Portuguese utterance	English translation
1	<i>Mas poderia ser, em palavras femininas fica diferente o final, não fica ão, fica ona,</i>	But it could be, in feminine words the ending is different, it is not <i>ão</i> , it is <i>ona</i> ,
2	<i>tá, por exemplo, irmã, irmãzona. [Ela escreve no quadro.] Irmãzona. Tá?</i>	okay, for example, sister, big sister. [She writes on the board.] <i>Irmãzona</i> (big sister). Okay?
3	<i>Feminino fica ona, não ão. Ahn, ok? Mas a gente vai ver mais isso depois.</i>	Feminine becomes <i>ona</i> , not <i>ão</i> , okay? But we are going to see more of that later.

Although Marta attempted to follow a logical scaffolding process to categorize different augmentative formation rules according to feminine and masculine words, thus reserving the variation aspect for later, the beer example (*cerveja*, *cervejão*) triggered Oscar's interest. He asked: "*Mulher, mulherona?*" establishing an association to the correct augmentative suffix of woman. One possible interpretation is that the student may have made connections with his speaker position in the language, possibly recalling past experiences when he heard *mulherão*, the augmentative masculine suffix attached to the feminine word, instead of *-ona*, the regular feminine augmentative suffix. Just like *cervejona* and *cervejão*, *mulherão* and *mulherona* carry different meanings and are used to create diverse references in discourse. Marta provides the explanation as shown in Table 4:

Table 4. Marta explains the cases she came across in excerpt 2: *Mulher* (woman) and *cerveja* (beer)

Line number	Original Portuguese utterance	English translation
1	<i>A professora responde: Mulherão ou mulherona. E aí pode ter diferenças de sentido, né, tu dizer, é um mulherão!</i>	The teacher answers: Big woman or big woman. And then there can be meaning differences, if you say, you're a <i>mulherão</i> !
2	<i>[Sua voz em tom exclamativo.] Aqui não tem né, mas um mulherão é uma mulher grande ou uma mulher bonita.</i>	[Her voice in exclamatory tone.] There is none, right, but a <i>mulherão</i> is a big woman or a beautiful woman.
3	<i>[Ela passa a falar pausadamente, como se estivesse organizando seus pensamentos em concomitância com a explicação dada.]</i>	[She starts to speak slowly, as if she were organizing her thoughts simultaneously with the given explanation.]

Table 4. (continued)

Line number	Original Portuguese utterance	English translation
4	<i>Pode ser os dois, né. Mas assim, também tem questões de que, uma mulher, poderemos dizer</i>	It can be both, right. But like, there are also things like, a woman, we can say
5	<i>uma mulherona, mas eu acho que, como acontece com cerveja, fica um cervejão, então é como se estivesse transformando em outra palavra. Sim?</i>	a <i>mulherona</i> , but I think that, as it happens with <i>cerveja</i> , it becomes a <i>cervejão</i> , so it is as if another word is being formed. Right?
6	<i>Então não é uma cerveja, é um CERVEJÃO. [Ela dá ênfase na entonação desta última palavra.] Como se eu tivesse mudando a palavra inteira, né.</i>	So, it is not a beer, it is a CERVEJÃO (BIG BEER). [She emphasizes this last word.] It is as if I were changing the whole word, right.
7	<i>É possível, uma mulherona, mas parece que se criou uma outra palavra, mulherão, um mulherão, para a categoria de mulher que é bonita, por exemplo, tá.</i>	It is possible to say a <i>mulherona</i> (big woman), but it seems like another word was created, <i>mulherão</i> , a <i>mulherão</i> , for the category of women who are beautiful, for example, right.
8	<i>Também pode ter contextos que tu diz ela é um mulherão, nossa, ela é muito alta! [Voz empregada em tom exclamativo.]</i>	There can also be contexts in which you say she is a big woman, wow, she is very tall! [Voice in exclamatory tone.]
9	<i>Ideia de tamanho, é possível, mas é como se tivesse criado palavras diferentes, assim, palavras novas, com colocando o aumentativo, e aí chega até mudar para masculino, né, um mulherão, um cervejão, tá?</i>	It is the idea of size, it is possible, but it is as if new words were created, like, new words when adding the augmentative suffix, that it even changes to masculine, right, a <i>mulherão</i> , a <i>cervejão</i> , okay?

In the excerpt in Table 4, the teacher draws on uses of *mulherão* and *cervejão* to call students' attention to varied attributions of the suffix, which is not limited to qualification of elements by size. Marta states that the same suffix might produce double meanings depending on the context, and pinpoints that both are valid. Hence, she formulates another principle to describe the suffix usage in line 7: *É possível, uma mulherona, mas parece que se criou uma outra palavra, mulherão, um mulherão, para a categoria de mulher que é bonita, por exemplo, tá.* ("It is possible to say a *mulherona*, but it seems like another word was formed, *mulherão*, a *mulherão*, for the category of women who are beautiful, for example, right"). In other words, although an idea of size is implied by the *-ão* ending, the formation mechanism would no longer be associated with the augmentative suffix. In this sense, the word with the augmentative form would not necessarily convey

meaning related to size, but it would become part of a “beautiful woman” or “good beer” semantic category.

After this explanation stage, the class proceeded to discuss definitions of augmentative and diminutive forms as displayed in dictionaries and grammar textbooks. This activity sought to problematize grammar definitions using authentic materials as a reference, and foster learners’ reflective stance when comparing real language uses with definitions prescribed by grammarians. As can be seen, the enunciative scenes showed that the material did not provide detailed explanation on meaning variation. Nonetheless, both teacher and students used enunciative mechanisms to establish references and unveil specific meanings about vocabulary in Portuguese. The next section will discuss how the categories of speaker and language analyst, both rooted in their utterances, manifest through these mechanisms.

4. Discussion

The first research question sought to better understand how the negotiation of meaning between the positions of speaker and language analyst occur both in learner and teacher utterances. In this enunciative scene, the reorganization of meanings was performed through two mechanisms: first, the teacher employed a description of her history of utterances; second, the learner manifested his doubts through continuous inquiry.

These two mechanisms were reciprocal in the sense they accomplished a dialogic process of meaning co-construction. An enunciative analytical lens understands the (inter)subjectivity as rooted in the interlocutors’ enunciations, which led to the negotiation of two individual perspectives about languages and the world during the learning process. This scene constitutes what Surreaux (2010) titles “utterances in relation”. Both Marta and Oscar established their positions as speakers and language analysts, and each category introduced different sets of references based on their individual experiences in language.

Oscar voiced his thought process about word formation with the augmentative form: drawing from his knowledge as a speaker of other languages, and his experience hearing Portuguese in Brazil, he analyzed the possibility of combining a suffix *-ão* with a word that has the same ending, such as *feijão*. This is an example of how speaker and language analyst categories were manifested through inquiries about the language. In addition, Oscar seemed invested in a constant process of re-arranging meanings during Marta’s exposition. Even when the teacher attempted to scaffold the usage rules differently and suggested to examine the augmentative with feminine words later, the learner insisted, and posed his question about the word *mulher* (woman).

Oscar's enunciation suggests that learners perform an active role inside the classroom. Thus, they occupy the same position as the teacher in the scene: as speakers of other languages, they make connections with form and meaning in these languages, as well as refer to situations experienced in the communities to which they belong. Oscar did not accept Marta's explanation passively, but processed references from his schema in order to build new references in Portuguese. This association process, instilled by the positioning of speakers and language analysts in all participants of the enunciative scene, is ubiquitous. In other words, the fact that a learner prefers not to utter inquiries or comments does not mean s/he is not analyzing portions of discourse in silence.

In the teacher's case, Marta's speaker experience shed light on how she formulated explanations and provided examples, such as in line 6 (Table 1): "*Ele tem um coraçãozão! Ele adota todo mundo!*" (He has a big heart! He adopts everybody!). In this sense, the history of utterances is represented by the scenarios mentioned by the teacher, which are based on situations when she had heard or used those words. This mechanism also works favorably when words as *mulher* and *cerveja* were not in accordance with the rules she had previously displayed, although a more detailed set of rules would have improved the content's elucidation. She explained: *Mulherão ou mulherona. E aí pode ter diferenças de sentido, né, tu dizer, é um mulherão!* ("Mulherão or Mulherona. And then there can be meaning differences, if you say, you're a mulherão!") (line 1 Table 4). Her intonation invokes the contextualization of meaning variation of the word *mulher*. Marta's enunciation is, therefore, composed of features that refer to her position as a speaker of a certain community but that are reorganized due to her language analyst position. These features aid the operationalization of meaning reorganization for her addressee. For instance: "**I think that**, as it happens with *cerveja*, it becomes a *cervejão*, so it is as if **another word is being formed**" (excerpt 4 line 5). Hence, the sentences highlighted suggest that there is a constant negotiation between individual use experience, and creation of formal principles to establish language as a descriptive object.

This study demonstrates that the history of enunciations is a favorable mechanism to illustrate language use from an individual perspective. Nevertheless, learners' inquiries also indicate that a previously prepared formal set of rules is needed for the history of enunciations may not sufficiently inform students' questions during instruction. The complexity of a learner's initiation as a speaker of another language is equivalent to the analytical complexity demanded from the teacher when s/he rearranges the forms into meaningful categories for teaching purposes.

Finally, the second research question examined the reorganization of meaning built by experience to convey linguistic formal knowledge. Oscar demonstrated he was positioned as both speaker and language analyst when noticed and inquired about usage patterns. Marta brought in her experience in language to shed light

on word usage and cultural effects, which showed the interweaving of speaker and language analyst categories through her explanations.

5. Implications

Although the data analysis conducted in this chapter stems from enunciation linguistics, these findings contribute to both discourse and applied linguistics studies. Trappes-Lomax (2002) points out that, since language is about everything, it is about discourse, and “as such, it has been perhaps the most potent influence shifting the concerns of applied linguistics from the linguistic to the socio-political, from the study of language to the study of language practices” (p. 10). Contributions to enunciation linguistics include the suggestion that an anthropology of enunciation be interpreted as realized through speaker and language analyst categories when looking at dialogue in instructional settings. These categories enable the researcher to acknowledge the experiences of man in language when each person says *I* in their respective turns.

Implications for applied linguistics and language instruction include that enunciation mechanisms, namely the history of enunciations, can shed light on teaching practices about linguistic rules and their contexts of use. Such a discursive lens can also contribute to raising awareness about noticing linguistic patterns while experiencing the language in different settings and building flexibility about linguistic variation and ambiguity. More specifically, the mechanisms of history of enunciations and inquiries illustrated how an anthropological dimension of enunciation, intrinsic to language use, can enhance meaning conveyance in an instructional setting. Inviting teachers to observe the overlap of linguistic and anthropological dimensions in their own enunciations can contribute to develop awareness about effective strategies to address learners’ questions, and how to balance off lived experiences and rules from linguistic reference materials.

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This book includes a selection of theoretical and practical accounts of the acquisition of Portuguese from a broad range of linguistic perspectives. This collection is particularly appealing in the broad academic sphere of language acquisition due to the fact that there has yet to be one entirely dedicated to Portuguese as an Additional Language (PAL). This volume showcases the breadth of research being carried out on topics ranging from the acquisition of aspects from the main language modules (syntax, morphology, semantics, phonology, and pragmatics) to applied perspectives involving corpus-based approaches and experimental methodologies. Moreover, we present studies addressing a variety of learning contexts and learner types. The target audience includes researching scholars with a background in second language acquisition studies interested in learning more about the acquisition of Portuguese as an Additional Language from linguistic perspectives.

ISBN 978 90 272 0500 1



9 789027 205001

John Benjamins Publishing Company