Cross-linguistic syntactic, lexical and phonetic influence in the acquisition of L3 Spanish

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Thesis submitted to the

Faculty of Graduate and Postdoctoral Studies

In partial fulfillment of the requirements

For the Doctorate in Philosophy degree in Spanish

Department of Modern Languages and Literatures

Faculty of Arts

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Abstract

The main ongoing debate within the recently-established field of Third Language (L3) Acquisition revolves around which of the previously-acquired languages prevails as a source of cross-linguistic influence (CLI) during production in the target language. Whereas several factors have been found to promote CLI, the existing body of L3 research points to a potential stronger rivalry between two of them: typology, or the relative distance among the languages involved, and second language (L2) status, also known as foreign language effect. In fact, they are at the core of two models of multilingual transfer that stem from the area of L3 morphosyntax, namely the Typology Primacy Model (TPM; Rothman, 2010, 2011, 2013, 2015), and the L2 Status Factor Model (L2 SFM; Bardel & Falk, 2007, 2012).

For the most part, claims backing a more determinant role for typology come from studies investigating lexis. Whether or not typology overrides the effect of the L2 with regards to syntax and phonology as well is less clear. On the one hand, studies focusing on syntactic CLI can be divided into those whose findings suggest a crucial role either for the L1 (Na Raong & Leung, 2009) or for the L2 (Bardel & Falk, 2007), those in which findings point to typology as the deciding factor in determining a source of CLI (Rothman, 2011), and those that fail to show any influence from the L2 on the L3 (Håkansson, Pienemann, & Sayehli, 2002) even when the L2 and the L3 are typologically close (Martínez Adrián, 2005). On the other hand, results from previous research investigating phonological CLI also yield three main distinct findings: i) a more marked L2 effect (Llama, Cardoso & Collins, 2010), ii) a predominant influence from the first language (L1; Llisterri & Poch, 1987), and iii) combined CLI, that is, the L1 and the L2 concur in influencing the L3 (Wrembel, 2014). The primary goal of this dissertation is to add to

the debate by looking into all three sub-areas among trilinguals at a high-intermediate to advanced level of proficiency, which has been the least targeted proficiency level until now. The selected topics, per area, are: lexical inventions, relative clause attachment preferences (RCA), and voice onset time (VOT). The secondary goal was to compare the relative influences of typology and L2 status across sub-areas, and to examine all results in light of three of the current L3 multilingual transfer models, the TPM, the L2 SFM, and the Cumulative Enhancement Model (CEM; Flynn, Foley, & Vinnitskaya, 2004). The results obtained are in clear agreement with previous reports in the area of lexis. However, the interplay of our trilinguals' linguistic systems with regard to RCA and VOT is more complex. Findings in these areas seem to suggest that other factors (language exposure in the case of RCA, and the L1, in the case of VOT) may trump the two under investigation.

Acknowledgements

It takes a lot of support to complete a dissertation, and I have been privileged to receive a helping hand, or two, from my family, and many friends, and colleagues. It is only fair that I take a few paragraphs to thank them.

I would like to start by expressing my deepest gratitude to my two supervisors, Dr. Juana M. Liceras and Dr. Elena Valenzuela, for their guidance and words of encouragement, for their insightful suggestions, and for giving me academic wings. It has been a true honour to get to learn from them. I extend that gratitude to my committee members, Dr. Laura Colantoni and Dr. Jason Rothman, whose invaluable comments were key in improving this dissertation. I am also indebted to my internal and external examiners, Dr. Nikolay Slavkov, Dr. Carmen Muñoz, and last but certainly not least Dr. Raquel Fernández Fuertes for their knowledgeable feedback and genuine interest in my work. Thank you all for your generous contribution to this project.

Of course, I am very grateful to the participants who made all of this possible, and to friends and colleagues, near and far, who have been there to support me at a personal or an academic level (or both!). Heartfelt thanks go to Daniel Medrano for giving me technical support, to Marie-Philip Matthieu and Javier García for assistance with French data, and to the members of the LAR LAB, for commenting on my work, and for inspiring me with theirs. I am especially indebted to Luz Patricia López for her faith in me and for often being my partner in crime, and to Estela García for lending a listening ear in times of panic. Special thanks go to those friends who suffered with me through my M.A., and yet were there to support me a second time around, like my Tunisian sister in Montreal, Souha Ayed, and *mis chicarronas del Norte*, Isa Ros and Sonia García. During my M.A., I was also lucky to cross paths with Cintia Blank, who has been a

decisive presence during my PhD years. I am glad to say that now we share more than our enthusiasm for L3 acquisition. Thank you, Cintia, for giving me the chance to partake in your projects.

Finally, I cannot forget to thank those closest to me. To all those friends who have endured endless talks about participants, instruments and data analysis, I owe you all a nice glass of sangria. Thank you, Glauco, for choosing to share this part of my life with me, for understanding how demanding and trying a PhD can get, and for having my back all of this time. Thank you to my nieces, Noa and Naia who, at the ages of 4 and 7, have put the right amount of pressure on me by asking, at the beginning of each Skype call, if I had finished writing my thesis yet. Thank you to my sister and my mum (who I suspect were behind my nieces' PhD-related questions) for always being there. ALWAYS. Above all, thank you to Jordan for everything.

A las dos personas que más han salido perdiendo para que yo me gane este título,

Jordan y mi madre.

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Introduction

0.1. Overview

Until the 1990s, most research concerning the acquisition of a third or additional language (L3/Ln) was carried out under the umbrella of Second Language Acquisition (SLA). Trilinguals and L3 learners were not considered any different than bilinguals or second language (L2) learners, and the effect that adding a non-native language to the mix may have on the acquisition of a subsequent non-native language was usually overlooked.

Over the last two to three decades, however, Third Language Acquisition (TLA) has emerged as a "distinct area of research" (Hoffman, 2001, p.1), and the new century has witnessed a boom in studies on the learning and use of an L3. This is partly due to the fact that some researchers have started to acknowledge that current models of bilingualism and bilingual speech processing do not seem to properly account for trilingualism and multilingual acquisition. Included among those researchers is Grosjean, who in 1997 introduced the concept of monolingual-bilingual mode. Later on, in 2001, he felt the need to further develop his model in order to accommodate a trilingual mode as well. According to Edwards and Dewaele (2007), this alone is a telling illustration of the "growing awareness that trilingualism is not just an extension of bilingualism" (p. 221), and the "assumption that trilingualism differs from bilingualism only inasmuch as it represents more of the same" (Edwards & Dewaele 2007, p. 221) is not sustainable.

To date, the bulk of the research conducted in this new field has focused on the role played by the first (L1) and second languages, and on identifying the factors that can privilege influence from one over the other. Some of the most often referred to factors are: context of acquisition, recency of acquisition and use of each of the languages, proficiency in both the source and the

target languages, exposure to the L2 and the L3, psychotypology, typology and L2 status (a detailed review of all of them can be found in De Angelis, 2007). Along with proficiency, typology and L2 status have been argued to be the most decisive factors in promoting the activation of previously acquired languages (PALs), as singled out by Falk and Bardel (2010). While it is clear from many studies that all three aid in determining the sources of transfer to the L3 in several situations, more research is needed in order to better understand their effects on the acquisition of an L3, and how they may combine or interact to cause cross-linguistic influence (CLI) in the different areas of language. CLI and transfer will be used interchangeably throughout this document, as will be justified later. Unless otherwise stated, these terms will refer to both positive and negative transfer.

0.2. The present study

The present study is intended to gain insight into the acquisition of L3 lexis, syntax and phonology by adults, and more specifically into the role played by two factors in hindering or promoting (negative / positive) transfer from the L1 and / or the L2 into the L3. For the purposes of this study, L2 is to be understood strictly as the second language learnt by all participants, not only because of the order of acquisition but also in terms of proficiency, i.e. it is the language learnt after the L1 and the level of proficiency in that language is lower than in the L1 and higher than in the L3. This will allow us to clearly link the L2 status factor to the first non-native language acquired after the L1 and to investigate the potential privileged position it could have in becoming a source of transfer in L3 production. The other factor under investigation will be typology, understood as the relative distance or similarity with regard to the different linguistic items under investigation (lexical inventions, relative clause attachment and voice onset time)

across the three languages of interest. To explore how these two variables condition lexical, syntactic and phonetic transfer in an L3, we collected data in the domain of lexis, syntax and phonetics in the L1, L2 and L3 of our informants. All participants in the experimental groups shared, on the one hand, the same L3 (Spanish) and, on the other, the same previously known languages (English and French, either as an L2 or as an L1). This language combination, as will be explained in the upcoming sections and / or chapters dedicated to the different linguistic elements across English, French and Spanish, is intended to put the typology variable to the test. In order to compare its effects to those of L2 status, and / or to explore their interaction, two main groups of participants were recruited. The first group was made up of 12 L1 English-L2 French speakers; the second one, of 12 L1 French-L2 English speakers. Some data were also collected from three control groups: one of 14 Spanish monolinguals, the second one of seven L1 English monolinguals, and the last one of seven French monolinguals. More details about all groups will be provided when presenting the study per se.

The data collected from these 52 participants were analyzed in order to answer the following main research question: Which is a stronger predictor in the selection of a source language for lexical, syntactic and phonetic influence in L3 acquisition: L2 status or typology?

This dissertation is organized in seven chapters. Chapter 1 serves as an introduction to Third Language Acquisition as a recently emancipated field of research, and to cross-linguistic influence as one of its main domains of inquiry. The chapter presents a sketch of the term cross-linguistic influence, along with previous labels used in the literature to refer to (roughly) the same phenomenon. This is followed by an outline of the main factors that affect CLI in L3 acquisition other than the two under investigation, which are touched upon towards the end of the chapter.

Chapters 2, 3 and 4 present on the one hand a language domain and its investigation from a TLA perspective and, on the other, a particular linguistic item selected in this study to further explore the linguistic area they pertain to. In that vein, Chapter 2 provides an account of the acquisition / processing of L3 syntax. It also incorporates and examines the three main models of L3 morphosyntactic transfer among those proposed thus far, along with a selection of results from recent studies that lend support to each of them. They are in fact the backbone of the present work, and key to the formulation of the abovementioned general research question. In the second part of the chapter, the focal point moves to relative clause attachment preferences: its characterization, insights from SLA work, and a review of the only two TLA studies that have taken this issue up.

Chapter 3 presents an overview of lexical transfer in multilinguals, and highlights the points that make it the most appealing domain to TLA researchers. Special attention is placed on two seminal studies, which focused mainly on lexis, but have provided crucial insights for other sub-areas as well. A good part of this section is devoted to lexical inventions, and to a review of relevant TLA research on this topic.

Chapter 4 is dedicated to the acquisition of L3 phonetics / phonology and addresses the issue of how this domain has fared in relation to the other two. It brings to light the differences, when compared to lexis and syntax, with regards to the impact typology and L2 status seem to (not) have on pronunciation. In fact, this can make the reader wonder if the main research question is the most appropriate way of tackling CLI in this area. It is, however, worth highlighting that some voices have been raised calling for the undertaking of the investigation of all areas together, under the same framework and conditions, with the same group of participants (Falk & Bardel, 2010). The present study is, to my knowledge, the first attempt to answer to those calls.

In Chaper 5 all three sub-areas, so far treated as separate issues, are tied in. This is done, firstly, by presenting a joint summary and, secondly, by formulating a general research question that applies to all sub-fields alike. It is worth to mention that the hypotheses presented may at times be linked to some data sets, and not others. A distinct part of the chapter is that in which the methodology, i.e. participants, tasks and procedure, is detailed.

Whereas in Chapter 6 we present our results rather matter-of-factly, in Chapter 7, we further discuss our key findings per domain, and assess to what extent they are in agreement with previous results mainly from the TLA literature. This extends to SLA studies when relevant. Subsequently, we offer our main conclusions, outline our limitations and contributions, and provide suggestions for further research.

As stated in the previous paragraph, the contributions this dissertation makes will be detailed in Chapter 7. We can, nonetheless, advance a few here. From a theoretical point of view, we make an effort to present our data in light of the three main models proposed to predict influence in L3 acquisition. From an experimental perspective, we: i) contribute data from a new language combination in relation to the understudied topic of L3 relative clause attachment preferences, ii) propose a more controlled way of eliciting lexical inventions, and iii) address the main limitation of a previous L3 phonetic study. Lastly, this dissertation does not devote a specific section to the pedagogical dimension. We are confident, however, that this research can inform professionals involved in the teaching of an L3, and lead both to a better understanding of trilingual / multilingual students and the interplay among their languages, as well as to the designing of vocabulary and pronunciation materials.

1. Cross-linguistic influence in Third Language Acquisition

It must be acknowledged that the study of multilinguals is nothing new or recent and that many studies within the field of SLA were probably conducted on speakers of more than two languages. However, with a few exceptions (Chandrasekhar, 1978; Stedje, 1977, cited in Ringbom, 1987; Thomas, 1988; Vildomec, 1963), this fact was seldom reported (for some examples of studies that do see Liceras, 1988, 1989). Moreover, the influence of the L2 was never one of the targets in those studies and, according to Falk (2010), the role of the bilinguals' non-native language was only referred to when their behaviour differed from that of monolinguals or could not be traced to their L1.

At present, TLA as a field of research is "characterized by new areas of inquiry and methodologies" (Falk, 2010, p. 24). Yet, from its inception, the topic that has been central to most L3 acquisition work is that of transfer, a concept that has evolved and has been designated by different names over the years: from Weinreich's (1953) term "interference" (which focused exclusively on negative transfer caused by differences across languages) to Sharwood-Smith and Kellerman's (1986) "cross-linguistic influence" (a broader term, as we are about to explain). According to various authors, the word "transfer" tends to be equated to L1 influence in the SLA tradition (Ellis, 1994; Odlin, 1989). It could be partly for that reason that the term CLI appears to be more widely used in TLA work. Moreover, when they started using this term, Sharwood-Smith and Kellerman stated that it is more inclusive than transfer in that it refers to avoidance, borrowing and L2-related aspects of language loss as well, and therefore goes beyond the notion of influence as a result "from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired", which is Odlin's definition for transfer (1989, p. 27). Psycholinguists even go beyond Sharwood-Smith and

Kellerman's claims in that they include phenomena such as overgeneralization within the definition of transfer, even if induced by the target language itself (Gass & Selinker, 1992). Having said this, it is not uncommon to see transfer and CLI used interchangeably to designate the same phenomenon. As already mentioned, such will be the case throughout this work, in which I will use both terms to refer to the influence of a person's prior linguistic knowledge on the use of the language that is currently being learnt.

Considered as one of the central processes in SLA (Andersen, 1983; Gass, 1979; Gass & Selinker, 1983, 1992; Odlin, 2003; Selinker, 1972), CLI is now being investigated from a broader perspective, that of TLA. In fact, many researchers view TLA as an opportunity to revisit recurrent questions in SLA (García-Mayo, 2012; Rothman, 2010) in the hopes that L3 data will provide on the one hand, unique research contexts that lend themselves to a more nuanced study of SLA issues (transfer being an example) and, on the other, new theoretical insights. For the last two decades, most of L3 research has focused on identifying the different factors operative in CLI, and their impact on the process of acquiring non-native languages beyond the L2.

1.1. Some factors that Affect CLI in TLA

What follows is a brief account of findings pertaining to the variables that have been either most investigated or cited as more important in studies exploring CLI in TLA: proficiency, language exposure and context of acquisition, recency (or last language effect), psychotypology, typology and L2 status (Falk, 2010; Williams & Hammarberg, 1998).

1.1.1. Proficiency

Since in TLA we are dealing with at least two non-native languages, it is relevant to take into

account the level of proficiency in both the L2 and the L3. The main assumption regarding L2 proficiency in such a context is that there is a certain level to be achieved before the L2 can become a source of influence. This certain level or threshold has been linked (Jaensch, 2007) to the Threshold Hypothesis by Cummins (1976), which postulates that for bilinguals to experience the cognitive benefits of speaking two languages, they first need to attain a given level of proficiency in their L2. Among the first authors to claim the existence of an L2 threshold in order for this language to become a potential source of transfer for the L3 were Ringbom (1987) and Hammarberg (2001). Since then, results from other experiments seem to further support their claim (Jaensch, 2007; Tremblay, 2006). For the most part, L3 researchers do control for proficiency but hardly ever make it the focus of study. Instead, they usually turn to their participants' L2 proficiency level as a factor that could help explain their results. Two experiments that have actually targeted L2 proficiency as their main variable are: Jaensch (2008) and Tremblay (2004). Overall, they reported that: i) the impact of the L2 on the L3 depends on the level of L2 proficiency (the higher the level, the higher the impact); ii) the L2 can become a source of influence, provided that the learner has reached a threshold in this L2; and iii) a higher proficiency level in the L2 translates into a better overall performance in the L3 regardless of whether the L3 feature being tested is also present in the L2 (and absent in the L1) or not, that is it is absent in the L2 and the L1.

It is worth noting, nonetheless, that some studies have shown influence from languages in which the participants were not particularly proficient. The work by authors such as Möhle (1989), who observed influence from the typologically closest language, and Shanon (1991), who pointed to the most recently acquired language as the source of influence, could lead us to believe that the threshold level to be reached for the L2 to provide material for transfer could be relatively low,

and that other factors could override proficiency in the selection of a source language for CLI.

As for L3 proficiency, the main assumption implies that the less proficient the speaker is in the L3, the greater the influence he or she will experience from the L1 and the L2 (Dewaele, 2001; Lindqvist, 2009; Sikogukira, 1993; Williams & Hammarberg, 1998), and that as L3 proficiency increases, learners rely on the L3 itself (intralingual influence) instead of resorting to their background languages (interlingual influence). Although various studies do lend support to this presumption (Bardel, 2015; Naves, Miralpeix, & Celaya, 2005; Rast, 2010, Williams & Hammarberg, 1998), Odlin (1989) calls for caution on accepting this belief. According to him, not all types of transfer occur alike across the different stages of acquisition: negative transfer (as the use of calques, for example) could be more frequent at the earlier stages, while positive transfer (as relying on cognate vocabulary) would be more common at more advanced stages. It seems that, at this point, there is insufficient research to properly understand the way in which CLI changes as L3 proficiency raises.

1.1.2. Language Exposure and Context of Acquisition and Use

The amount of exposure to both the L2 and the L3 are also variables to be taken into consideration when exploring CLI in an L3. However, they often are not, as was the case with L2 and L3 proficiency, the targeted factors in TLA studies. Among the authors who have looked into their impact on L3 production, we find Stedje (1977, cited in Ringbom, 1987), Dewaele (2001), Fouser (2001), and Tremblay (2006). According to their claims, we could argue that: (i) an increase in L3 exposure translates into a decrease in CLI (Dewaele, 2001), (ii) that the higher the amount of L2 exposure, the higher the L2 influence is on the L3 (Stedje, 1977, cited in Ringbom, 1987; Tremblay, 2006), and (iii) that exposure to the L3 in an L3 context could lead to backward

influence onto L2 production (Fouser, 2001).When discussing language exposure, we often need to bring other factors to the scene, such as proficiency and context of exposure. In fact, amount of exposure and proficiency may often be confounded, since we could expect proficiency gains when the amount of exposure increases. As for the contexts in which it takes place, we encounter two possibilities: the speaker can be immersed in an L2 / L3 context or learn the language in a foreign language setting, in which neither the L2 nor the target language are the community's language of use.

It seems reasonable to assume that immersion contexts lead to higher influence on the other languages known (including backward influence on the L1), than foreign language learning settings, and several studies, as highlighted above, hint in that direction. As Pavlenko and Jarvis (2002) suggest, the mix of exposure and the context in which it takes place play a decisive role with regards to the type and extent to which CLI occurs and these variables deserve to become the focus of further work.

1.1.3. Recency of Acquisition and Use

Previous research has revealed a role for recency of use in promoting influence from one of the background languages during production in an L3 (Shanon, 1991; Vildomec, 1963; Williams & Hammarberg, 1998). Needless to say, a language that has been recently used is likely to be more accessible than a language that has gone unused for a long period of time. It is possible that this claim can be extended to recency of acquisition as well, that is, the last language that was acquired would likely be more accessible than other previously acquired languages. To our knowledge, two researchers have looked at this potential 'last language effect'. The first one would be Shanon (1991), who noticed that her participants seemed to be relying on the last

language they had learnt or used during production in the language they were learning, and this regardless of their level of proficiency in it.

The second one would be Fernandes-Boëchat (2007), according to whom "each new foreign language learning experience is linked involuntarily by the learner to one's preceding foreign language learning experience in a chain-like domino-effect fashion" (p. 93). This link would become weaker, and less involuntary, as proficiency in the target language progresses. Based on results from a questionnaire and a lexical and grammatical task, Fernandes-Boëchat developed the Cognitive Chain-Reaction (CCR) Theory (1999), to account for the fact that her participants resorted to the last acquired language when using the one being acquired. With one of his studies, Dewaele (1998) provides additional support to back Shanon's and Fernandes-Boëchat's remark that order of acquisition may in fact encourage learners to establish a special link between the language they are acquiring and the language they learnt immediately before. After comparing the production of lexical inventions by two groups of participants with Dutch as an L1, French as an L2/L3 and English as an L3/L2, he realized that the group of L2 French learners relied more on their L1 (Dutch), while the group of L3 French learners relied more on their L2 (English). As can be inferred, all participants spoke all three languages and the main detail that set the two groups apart was the order of acquisition of their two non-native languages. Once again, caution is in order when considering this remark in light of Dewaele's results alone, since there could be other factors at play besides simply the order of acquisition. It is worth highlighting that his findings do not rule out influence from at least another factor, proficiency, as we will argue in the following lines. Recall from previous discussion that a threshold level may need to be attained for a particular language to cause influence on another. It could have been the case that Dewaele's participants were not proficient enough in English as an L3 for this language to cause

backward influence on their L2 French.

Contrary to what has been presented in the previous paragraphs, some studies have found influence on the target language from background languages that were not learnt last, and had not been used for long periods of time (Herwig, 2001; Möhle, 1989; Rivers, 1979). Moreover, some of the participants in one of those studies (Möhle, 1989) had reported a low level of proficiency in the languages, and therefore proficiency would not help explain results in this case.

In brief, the notion of recency can refer not only to the use of a language but also to its acquisition. The effect of the recency of use seems to be backed by the literature (Shanon, 1991; Vildomec, 1963; Williams & Hammarberg, 1998) and, for the most part, undisputed (for rare counter-evidence see studies mentioned in the paragraph above).

1.1.4. Psychotypology

As hinted in previous pages of this work, linguistic similarity is a decisive factor in conditioning CLI, and one that seems to interact with and even override at times all other factors that may be operative in promoting transfer from a particular background language. The technical term most often used to refer to this similarity within the TLA field is typology, one of the variables under focus in this study and to which we will devote a section later in the chapter.

A simple definition for typology could be: the objective degree of similarity between two languages, objective being the key word here. While the actual degree of congruence (objective closeness) between languages could help predict the potential of L1 and L2 transfer into the L3, it is possible that it is the perception the learner has of that congruence that ultimately drives CLI (Spoelman, 2011). As a matter of fact, Odlin (1989) considers that the "objective estimation of

language distance can sometimes be misleading about the likelihood of transfer" (p. 142) and that the subjective perception by learners can in some cases supersede an objective measure or, in Hammarberg's words (2009) "it is similarity as perceived by the learner that is relevant as a cause of cross-linguistic influence" (p. 129).

The notion of perceived linguistic distance was first proposed by Kellerman (1983), the coiner of the term psychotypology. In line with the definition provided for typology, psychotypology could be described as the subjective degree of similarity between two languages, i.e. the degree of congruence learners perceive between languages, regardless of whether their perception of distance (psychotypology) coincides with actual distance (typology) or not. It follows from this line of reasoning that these two variables may act together at times, but function separately at other times. Nevertheless, and despite a potential lack of coincidence between both factors at a particular point in time for a particular learner, psychotypology is by and large considered as a subcomponent of typology.

It is not uncommon for researchers to mention the presence of a noticeable psychotypological effect in their studies (Ecke, 2001; Kellerman, 1983; O'Laoire & Singleton, 2009; Singleton, 1987; Singleton & Little, 1991), however, in many cases, no objective measure of psychotypology is included in their work. Thus, they base their assumptions of psychotypology being at play on certain comments made by their participants during the data collection process. When measured within a TLA context, it is usually done via think-aloud protocols and/or questionnaires.

Given that the existence of an actual typological relationship between two languages does not necessarily translate into a perceived typological relationship by the learners, and that the lack of typological proximity may not prevent the learners from perceiving it, it is fair to consider

psychotypology as the most elusive of all factors. To complicate matters further, this issue of perception of relatedness does not only apply to the languages as a whole but also to all features or components of two languages, which means that the same learners may perceive two different features of two languages as one being similar and the other, dissimilar.

It is therefore advisable to devise, when possible, some kind of psychotypology measure to be included in the research design of studies investigating typological effects, in an effort to tease these two variables apart, if necessary. This advice becomes particularly crucial when all languages investigated are related. This said, and as suggested before, the very subjective nature of psychotypology makes it a rather elusive factor and it is acknowledged that tapping into it is a great challenge.

1.1.5. Typology

From a typological point of view, languages can be compared on the basis of a genetic, a geographical or a formal relationship (Rossi, 2006). The least common of all approaches is to cluster languages as a result of their geographical proximity, and thus it will not be considered for this study. It has to be acknowledged, nonetheless, that this kind of proximity may have caused the sharing of certain features by languages with different genetic affiliation (Whaley, 1997). Such is the case for Albanian, Romanian and Bulgarian, since they have a common trait, namely the use of a suffix to mark definiteness, which is not part of any of the language families they belong to.

To group languages that are considered to belong to the same family is a more popular practice, both by researchers and, most importantly, by learners (psychotypology). However, in Rossi's (2006) opinion, this approach to understanding typology is superficial and faulty and she advises

against equating similarity and same linguistic family for there is no guarantee that one thing will go hand in hand with the other. The null subject parameter constitutes an example of a feature that can vary within the same linguistic family. Let us consider the combination of two genetically related and two genetically unrelated languages: French and Spanish, and Spanish and Arabic. The two Romance languages differ with regard to this trait in that French is the only Romance language that disallows it. Arabic and Spanish, on the other hand, both allow it, regardless of the fact that they are not closely related. Of course, there are some differences in how null subjects are licensed in both languages. This is merely an illustration of how, at least at a superficial level, unrelated languages can share traits not always shared with related languages.

According to Rossi, understanding typology as a function of geographical or genetic association is to consider it in a broad sense, which may not always be the most appropriate standpoint. Instead, she proposes to think of typology in a more narrow sense: a formal approach in line with Whaley's (1997) definition of typology: 'the classification of languages or components of languages based on shared formal characteristics' (p. 7). The fact that we could be considering either languages or just components of languages renders the term somewhat inconsistent or imprecise. In this sense, when faced with the ambiguity of the term, Falk and Bardel (2010) decided to establish a distinction between language relatedness, to refer to the genetic relationship between languages, and typology, to indicate "ad hoc similarity of certain linguistic structures between languages that are not genetically related" (Lindqvist, 2015, p. 232). Liceras and Alba de la Fuente (2015) go a step beyond in that they anticipate the need to include as well those cases in which two languages from the same family display subtle structural differences, not just similarities. They bring into play two more terms, typological proximity and typological similarity. To deeply explain what each of those labels implies, the authors resorted to

typological universals (Greenberg, 1963), formal universals (related to Chomsky's Government Binding Theory, 1981), and Baker's (1996) macroparameters. In broad strokes, typological similarity applies when a formal universal is equally realized in two genetically-related languages, whereas typological proximity obtains when they share the same macroparameter but it materializes in different ways. For a full discussion on this topic, please refer to Liceras and Alba de la Fuente (2015). Lindqvist (2015), from a TLA perspective, and Liceras and Alba de la Fuente (2015), from an SLA standpoint, both address a terminological void. Admittedly, there is a need to further develop these concepts, and to do so in a way that they cover all possible TLA scenarios, mainly forseeing feature mismatches between same-family languages (as in Liceras & Alba de la Fuente, 2015), as well as matches between genetically unrelated languages (as in Lindqvist, 2015).

That being said, this study adopts the narrow perspective proposed by Rossi (2006), privileging the formal relationship between English, French and Spanish with regards to all linguistic elements under investigation, for two reasons: i) this study is going to consider typological ties not only with regards to syntax, but also lexis and phonology, which would complicate matters if we tried to apply Liceras and Alba de la Fuente's framework, who deal with syntax exclusively; ii) the linguistic items have been selected so that they can be likened in the two genetically-related languages only. Thus, our operational definition for typology could go as follows: the objective degree of formal similarity or distance between the linguistic feature(s) of interest across a given set of languages. The specific typological relationship for this work will be hinted to in the sections devoted to each of the features, and explicitly established in Chaper 5. It will suffice to say for now that, fortunately and as stated above, both the genetic and the formal approaches coincide for our language combination. We reckon this fact as something positive,

given that it can encourage our participants to perceive French and Spanish as typologically close, and consequently teasing typology and psychotypology (language distance as perceived by the learner) apart does not become critical here.

1.1.6. L2 Status

L2 status is the term used to refer to 'languages other than the L1" (Cenoz, 2001, p. 9). It is described as a tendency to activate non-native languages when using another non-native language and, on the basis of such activation, to transfer from one non-native language to the other. All L2s are classified in the learner's mind as having a common status, that of "foreign languages", a category from which the L1 is excluded. According to De Angelis (2005), this leads to the establishment of a cognitive association between non-native languages, a process that she labeled as "association of foreignness" (2005, p. 11). It has been suggested that this cognitive association would promote the activation of the L2 while blocking the activation of the L1 during L3 production. In Grosjean's Language Mode model (2001) this would mean that, in a language mode continuum where the languages we know fluctuate from active to dormant, the L2 would be closer to the active end and the L1 closer to the dormant end. Needless to say, the more activated one of the languages is, the more CLI it can cause. However, it remains to be proven that it is in fact the association of foreignness and not the typological closeness that maintains one particular language activated.

If we were to adapt Grosjean's model to trilingual speech, as suggested by Murphy (2003), it could help explain why the L2 may be the preferred source of influence. Assuming the speaker has more control over the L1, (s)he would be more successful at deactivating it, being left in a "foreign language mode" (Hammarberg, 2001; Williams & Hammarberg, 1998) that is, the

languages perceived as foreign remain activated.

1.2. Typology vs. L2 Status: A selection of previous findings

Countless are the TLA studies in which language similarity (or perceived similarity) has stood up as the most decisive factor in conditioning transfer from a background language to the one that is being learnt (Ahukana, Lund, & Gentile, 1981; Cenoz, 2001; De Angelis, 2005; Foote, 2009; Möhle, 1989; Montrul, Dias, & Santos, 2011; Ringbom, 2001; Rossi, 2006; Rothman & Cabrelli Amaro, 2010; Singleton, 1987). Many of those studies focused on the acquisition and production of lexis, and some of them will be selected for a more detailed review of how typology seems to trump one or more among the other determinant factors in Chapter 3. As will be discussed in Chapter 2, there are several L3 syntax studies we could also take as evidence that learners usually turn to close languages as sources of information during L3 production / acquisition. This said, there are also a few authors that have reported evidence to the contrary, i.e. reliance on distant languages, and that even when the learners had knowledge of closely related languages as well (Rivers, 1979; Schmidt & Frota, 1986). It is worth mentioning that contradicting findings are easier to come by in the area of syntax than for lexis. Unlike the case with L3 lexis and syntax, there is no strong evidence that typology outweighs other variables when it comes to L3 phonetics and phonology. At most, there are advocates of using similarities in the classroom to encourage positive transfer and enhance learning (Mehlhorn, 2007).

Although research on the effects of the L2 actually has a shorter history than the literature that has addressed typological issues (Sánchez, 2011), the L2 has proven to be a key factor in causing CLI in a number of investigations, some of them on the acquisition of L3 lexis (De Angelis & Selinker, 2001; Dewaele, 1998; Williams & Hammarberg, 1998), some on the acquisition of L3

syntax (Bardel & Falk, 2007; Falk & Bardel, 2011), and some on the acquisition of L3 phonology (Llama, Cardoso, & Collins, 2010; Tremblay, 2007; Wrembel, 2010), as will be presented in Chapters 3, 4 and 5.

According to Sánchez (2011), when reviewing the L3 literature two factors appear to be competing in promoting the selection of a background language as a source of CLI in L3 acquisition, and this rivalry "has divided the research community into advocates of theoretical stances defending one factor or the other" (p. 86). For the most part, claims backing a more determinant role for typology come from studies investigating lexis, while L2 status was found to outweigh typology mainly in the area of phonology, with L3 syntax being the most divided between the two. This study intends to explore such rivalry in three different areas of language.

2. THE ACQUISITION OF L3 SYNTAX

Some researchers appear to be "skeptical about transfer in syntax and morphology" (Odlin, 2003, p. 437). Odlin (2003), however, states that such skepticism is unwarranted and holds the opposite view, according to which CLI affects all linguistic sub-systems. In order to investigate whether (and how) transfer obtains, from the L1 and/or the L2, in the L3 syntactic system, the following topics have been studied: sentence negation (Bardel, 2006; Bardel & Falk, 2007; Perales, García-Mayo, & Liceras, 2009), relative clauses (Berkes & Flynn, 2012; Flynn, Foley, & Vinnitskaya, 2004), relative clause attachment preferences (Rah, 2010; Rothman, 2010), the determiner phrase (Jaensch, 2008; Leung, 2005), word order (Håkansson, Pienemann, & Sayehli, 2002; Martínez Adrián, 2005), and object pronouns (Falk & Bardel, 2011; Montrul, Dias, & Santos, 2011). The investigations into relative clause attachment preferences are particularly relevant to this work and will be reviewed in detail when discussing this topic further below.

If we leave the topics under investigation aside, studies dealing with CLI in L3 syntax can be divided into four main groups: i) those in which findings suggest a crucial role for the L2 in promoting influence (Bardel & Falk, 2007); ii) those in which findings point to typology as the deciding factor in determining a source for influence (Rothman, 2011); iii) those that report transfer mainly from the L1 (Jin, 2009; Na Ranong & Leung, 2009), and iv) those in which findings fail to show any influence from the L2 on the L3 (Håkansson, Pienemann, & Sayehli, 2002) even when the L2 and the L3 are typologically close (Martínez Adrián, 2005). These contradicting results reported by studies such as Bardel and Falk's (2007) on the one hand (L2 status is the prevailing factor), and Rothman's (2010, 2011, 2013, 2015) on the other (syntactic transfer is conditioned by typology / psychotypology), embody the rivalry between these two factors indicated by Sánchez (2011). Moreover, they are at the core of two out of the three

transfer models in L3 morphosyntactic acquisition we are about to present.

2.1. L3 Morphosyntax Models

Initially formulated to account for and potentially forsee the selection of a source language for transfer mainly at the initial stages of L3 morphosyntactic development, the L3 morphosyntax models below have already been tested with learners at different levels of proficiency. Common to all three[1] is the assumption that the L1 is not the sole linguistic system available for transfer in L3/Ln acquisition. Another commonality they share is that they stem from the generative paradigm. Moreover, they "all embrace the idea that transfer in multilingual acquisition scenarios is dynamic but predictable" (Rothman & Halloran, 2013; p. 61). Let us now compare them to uncover the differences among them.

2.1.1. The Cumulative Enhancement Model

Flynn et al. first proposed the Cumulative Enhancement Model (CEM) in 2004 after looking into the acquisition patterns in the production of three types of relative clauses by L3 English learners who also spoke Kazakh (L1) and Russian (L2). The two main claims put forward by this model are that language learning is i) cumulative, and as such the accumulated linguistic knowledge results in the enhancement of subsequent language learning; and ii) non-redundant, and as such the mind avoids re-acquiring in the L3 any property previously learnt during L1 or L2 acquisition.

Behind this idea of non-redundancy, we find the belief that L3 developmental patterns "reflect

[1] We are aware that two additional models have been proposed recently, namely the Linguistic Proximity Model (Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2016), and the Scalpel Model (Slabakova, 2016). They were not known at the time of designing this study, and they will not be taken into consideration here.

general economy reflexes" (Rothman, 2015; p. 183) that turn language acquisition into a thrifty process. Somehow, non-facilitative transfer is viewed under the CEM as not being economical and, crucially, as not enhancing Ln learning. Hence, only positive transfer from the L1 and/or the L2 is predicted by this model. This last sentence will be of key importance in differentiating between the CEM and the other two models.

In what could be considered circular logic to a certain extent, support for the CEM comes mainly from two studies: Flynn et al. (2004), and Berkes and Flynn (2012). The latter served to fine-tune and provide further evidence for the model postulated on the basis of findings from the former, along with a series of studies of adult L2 acquisition of the same property, namely English relative clauses. Taking the development of the Complementizer Phrase (CP) as an exponent of linguistic development, Flynn and her various co-authors compare, using the same test sentences, the acquisition of English CP structures by groups with different linguistic backgrounds. L2 studies (Flynn, 1983, 1987, 1989, 2009) are here of less interest than L3 studies (Flynn et al., 2004; Berkes & Flynn, 2012), and even then these will not be reviewed in detail. For a comprehensive overview of this series of works, please refer to Berkes and Flynn (2012). Suffice it to say that by selecting language combinations where CP features are similar in the L2 and the L3 but not in the L1 (Flynn et al., 2004), or similar in the L1 and the L3 but not in the L2 (Berkes & Flynn, 2012), the authors conjecture that morphosyntactic transfer from either PAL (previously acquired language) only materializes when it is positive. Their complementary study designs helped them rule out a potential L2 effect in the first experiment or L1 effect in the second. However, several studies in different realms on TLA have provided evidence of non-facilitative transfer from the L1 (Gut, 2010) and the L2 (Rothman & Cabrelli Amaro, 2010), which puts this model into question.

2.1.2. The L2 Status Factor Model

Although the role of the L1 in L3 learning is not completely disregarded, in this model the L2 is expected to be the preferred source of syntactic transfer irrespective of how facilitative this may be. Following in the steps of other authors who had commented on this tendency to resort to the L2 in earlier work (Williams & Hammarberg, 1998; Meisel, 1983), Bardel and Falk (2007) posit the L2 Status Factor, favouring in naming their model the term used by Williams and Hammarberg (1998) to refer to a phenomenon others have called "foreign language effect" (Meisel, 1983; Ecke & Hall, 2000). At its core lies a cognitive association between non-native languages, labeled by De Angelis in 2005 as "association of foreingness" (p. 11), which stems from a higher degree of similarity between non-native languages, to the exclusion of the L1, in a number of points regarding the acquisition process, such as "age of onset, outcome, learning situation, degree of metalinguistic awareness, learning strategies" (Bardel & Falk, 2012, p. 68), among others.

Much like in the case of the CEM, two studies are key in drafting and refining this model. The first study, Bardel and Falk (2007) explored the effect of the L2 on the acquisition of negation placement in L3 Swedish and Dutch by putting to the test two groups of bilinguals for which their L1 behaved similarly to Swedish / Dutch while the L2 did not, and vice versa. Their findings supported earlier claims that the L2 structure is more easily transferred to the L3, and in the case of one of their groups even when the L1 was typologically closer to the target language. In 2011, Falk and Bardel sought further evidence for the L2 status factor by comparing English (L1/L2) and French (L2/L1) learners of L3 German at an intermediate level: the same tendency was found.

Backed by an increasing number of studies claiming L2-to-L3 transfer, the authors link the L2-

reliance during L3 learning to differences in L2/L3(n) versus L1 representation, and go on to search for a theoretical explanation. They seem to find it in Declarative / Procedural models such as those of Ullman's (2001) and Paradis' (2009), according to which "all late-learned languages (L2, L3, Ln) are sustained to a large extent by declarative memory" (as opposed to the L1, which would be sustained by procedural memory), and "more likely to manifest dynamic interference from one another than from the native language(s)" (Paradis, 2009, p. 344). The L2 Status Factor is thus grounded in a neurolinguistic framework whose predictions are aimed at a specific group of L3/n learners, namely adults who, having acquired their L2 formally, are learning an additional foreign language in a formal setting. Whether or not they extend to early bilinguals and L2 users who have acquired the L2 naturally and / or are highly proficient in it, as well as the kind of impact that the L2 has on these kinds of L3 learners are issues that remain, according to Bardel and Falk (2012, p. 70), to be investigated.

2.1.3. The Typological Primacy Model

Whereas the CEM predicts only facilitative transfer and the L2 Status Factor Model assigns a prominent role to the L2 in promoting CLI, the Typological Primacy Model (TPM; Rothman, 2010, 2011, 2013, 2015) states that the most structurally similar language, as determined by the parser, will trump the other PALs and will become the default source of influence. But how does the parser assess the overall structural similarity of all linguistic systems involved? Why does it do so, and what kind of transfer results of this operation?

Given that the TPM is not concerned with surface structural similarity but rather with those "linguistic properties that overlap cross-linguistically at the level of mental representation" (Rothman, 2015, p. 179), the assessment takes place subconsciously. After a four-step structural

comparison that starts with the lexicon and ends with phonological and phonotactic cues, the parser selects one of the previously acquired systems for transfer. This happens: i) as early as possible, that is, as soon as the parser deems to have enough linguistic information to guess which the typologically closest system is, and ii) results in complete transfer for better (facilitative transfer if there is an actual match between the target and the transferred language) and for worse (non-facilitative transfer if there is a mismatch instead). These two steps are crucial in rendering the language acquisition process cognitively economical, as advocated by the TPM.

As hinted by Rothman in his 2015 article, his model finds support in a growing number of empirical studies featuring diverse language combinations. Most of those studies centered around language triads where the two typologically related languages were of Romance origin. Lesser known are other investigations which also back the TPM and where Romance languages are not (as) involved, for example that of Kulundary and Gabrielle (2012), who studied coordinate and relative clauses in Tuvan, Russian and English.

In the pages from the outset of this chapter, we have presented a brief overview of L3 syntax as a sub-area of TLA, and covered the models that will be our guiding thread throughout much of this work. It is now time to turn to the description of one of the chosen features for investigation, along with some relevant findings from SLA and TLA studies that lay the foundation for one of our tasks.

2.2. Relative clause attachment preferences

When faced with an attachment ambiguity, as in sentences (1), (2) and (3), the grammars of English, Spanish and French allow speakers to attach the RC to either the first noun phrase

(NP1) or the second (NP2). However, different studies point to the fact that English monolinguals tend to associate the RC to NP2 (the lower noun, low attachment; see Carreiras & Clifton, 1999; Cuetos & Mitchell, 1998; Dussias, 2003), while speakers of most Romance languages would associate it to NP1 (the higher noun, high attachment; Spanish: Carreiras & Clifton, 1999; Cuetos & Mitchel, 1998; Dussias, 2003; French: Frenck-Mestre & Pynte, 2001; Zagar, Pynte, & Rativeau, 1997). Ultimately, this could lead to the same sentence being interpreted in different ways by speakers of English (the actress was on the balcony) and Spanish or French (the maid was on the balcony).

(1). Someone shot the maid$_{[NP1]}$ of the actress$_{[NP2]}$ who was on the balcony.

(2). Alguien disparó a la criada$_{[NP1]}$de la actriz$_{[NP2]}$que estaba en el balcón.

(3). Quelqu'un a tiré sur la bonne$_{[NP1]}$de l'actrice$_{[NP1]}$qui était sur le balcón.

2.2.1. L2 Relative clause attachment preferences

Preferences with regards to relative clause attachment have been widely investigated in SLA (English-Spanish: Dussias & Sagarra, 2007; Fernández, 2003; Senn, 2008; Valenzuela, Klassen, Llama, Goundareva, & López-Morelos, 2013; Valenzuela, Borg, Klassen, & Zamuner, submitted; English-French: Dekydtspotter, Donaldson, Edmonds, Liljestrand Fultz, & Petrush 2008; Frenck-Mestre, 2002; Spanish-French: Frenck-Mestre, 1997; among others), which can be a useful starting point for L3 researchers. Such investigations have been carried out with a varied collection of language pairings, and using a vast array of on-line and off-line methods that go from untimed questionnaires to ERPs, passing through self-paced reading tasks and eye-tracking paradigms.

Among all of these studies, the ones centered on English-Spanish, English-French and Spanish-French bilinguals, and employing untimed questionnaires are the most pertinent to us. It has to be highlighted at this point that on-line and off-line procedures may in some cases yield different results. Let us consider two experiments conducted by Fernández (2003), one tapping into on-line (early stages) processing by means of a self-paced reading task, the other into off-line (later stages) processing using a pen-and-paper questionnaire. Her off-line data further supported previous findings that revealed cross-linguistic divergences in attachment preferences in monolingual Spanish (low) and English (high) informants. Bilinguals were found to use a single strategy for both languages that overall matched the preferences exhibited by monolinguals of their dominant language. In the case of the self-paced reading task, however, both monolingual groups preferred to attach low. Somewhat unexpected in the case of the Spanish-speaking group, this finding was not completely new, and the author makes reference to other on-line studies that report this tendency for speakers of Italian and French (De Vicenzi & Job, 1993, 1995; Baccino, De Vicenzi, & Job, 2000), normally considered to be high-attaching languages, and even Spanish (Carreiras, Betancort, & Meseguer, 2001, in Fernández, 2003). The fact that speakers of Romance languages exhibit a tendency to attach low during on-line tasks has been interpreted in the literature (Maia, Fernández, Costa, Lourenço-Gomes, 2006) as a potential universal preference for local (low) attachment on a first parse, which is ultimately reversed in off-line tasks, in high-attachment languages, at later processing stages. The reversal can be guided by lexical factors, pragmatics or prosody. With regards to bilinguals, the on-line task failed to reveal a clear preference for either attachment site.

Given the focus of the present work, we will not go on to present a literature review for RCA preferences within SLA. Nor will we discuss the various theoretical proposals seeking to account

for cross-linguistic divergences with regards to this phenomenon, and how they challenge the view of a universal, language-independent, sentence parsing mechanism, as espoused by the Late Closure principle. Instead, we will provide a general view of SLA relevant findings, and move on to review the two L3 studies on RCA conducted to date.

A quick look at SLA studies points to a strong likelihood of L1 attachment preferences being transferred to the L2, "at least to some extent and up to a certain proficiency level" (Rah, 2010, p. 152). It has also been claimed that, when bilinguals only have regular access to one of their languages, not only their dominant language but also the language in which they are immersed can guide the way in which they process syntactic ambiguities. That is, language dominance and language experience are determining factors in the way in which bilinguals will parse a given sentence. Fernández (2003) reported that, at least with regard to her off-line data, her English-dominant bilinguals showed an overall preference for low attachment in both English and Spanish. Moreover, her Spanish-dominant bilinguals displayed an overall preference for high attachment in both Spanish and English. However, speakers who had been immersed in their L2 for extended periods of time, have been shown to present L1 attrition effects in this regard, and to apply L2 parsing strategies to L1 sentences, as suggested by findings from off-(and-on)-line data obtained by Dussias (2003, 2004) and Dussias and Sagarra (2007), whose L1 Spanish-L2 English speakers were prone to low attachment in Spanish. The unification of the parser or resorting to the same parsing strategy on the part of bilinguals makes sense insofar as it turns out to be cognitively economic. Nonetheless, it has also been suggested that regular use of both languages would result in the capability of parsing each language in a more native-like manner (Blattner, 2007).

2.2.2. L3 relative clause attachment preferences

RCA is not commonly investigated in TLA. To our knowledge, only two L3 studies (Rah, 2010; Rothman, 2010) have targeted this phenomenon to date. When investigated, we perceive a shift in focus from SLA to TLA. Whereas within L2 RCA research the attention is geared towards differences between L1 and L2 processing, L3 RCA research places more interest in the interplay of L1 and L2 attachment preferences and if one of them prevails in determining L3 ambiguity resolution.

Rah (2010) tested two groups of native speakers of German (a high-attaching language, like French and unlike English), one of which had learnt English before French, while the other had learnt French before English. She expected the L1 to transfer to all subsequent languages. Alternatively, if her participants displayed different preferences in the L1 and the L2, transfer from the L2 could obtain in the L3. The author justified her choice of syntactic processing phenomena to further investigate CLI within an L3 morphosyntactic frame claiming that "the theoretical positions that have been forwarded with regard to syntactic transfer are for the most part also valid for the transfer of processing differences" (Rah, 2010, p. 148).

Her off-line questionnaire consisted of 16 fillers and eight ambiguous clauses with the prepositions *with* and *of*. Participants were asked to choose between the two interpretations provided. Informants for whom French was a stronger L2 than English showed a clear high-attachment preference. In contrast, English-dominant German speakers produced higher rates of low attachment choices. The author argues that her results agree, on the one hand, with previous findings from L2 processing studies in that a group of her learners may have transferred from the L1 (German) to the L2 French, and, on the other, with previous findings from L3 studies that reported transfer effects from the L2 (English) to the L3 (French). The author considers language

dominance as a factor, and does not discuss typology nor L2 status in her interpretation of the findings. Of relevance for our own data is the fact that learners seem to be able to apply different resolution preferences in the L1 and the L2, and transfer from a non-native language to the other. As per the description of the procedure, it seems that Rah's participants were only tested in French.

Rothman (2010) explored RCA preferences as part of a tandem of experiments seeking to add or subtract support to the three multilingual transfer models already discussed. In contrast to the previous study, here the author chose a predominantly Romance language triad with Brazilian Portuguese (BP) as the L3, and English and Spanish as L1s and L2s. The task these L3 BP learners were confronted with presents some similarities but also some differences to Rah's (2010). It was untimed, and participants were expected to tick off their answer. We find the first difference here, given that Rothman gave his participants three options to choose from (the last of them being "I don't know"). He included two more items containing an ambiguous RC than Rah did, added unambiguous RC by forcing either high (10 RCs) or low (10 RCs) attachment (a type of item which was missing in Rah's experiment), and did not include any variation in the preposition linking the NPs. Results from both experiments reported in Rothman (2010), and crucially for us, those from experiment 2 on RCA preferences showed transfer from Spanish (L1 and L2) to BP (L3), confirming that typological proximity outranks L2 status. Unlike Rah's, Rothman's participants were tested in the three languages.

It is worth recalling that this chapter actually covers only one out of three sub-sections within this dissertation, and that all of them will need to be brought together once the last one is presented. Therefore, in order to avoid repetition, a brief summary of this chapter will not be provided here but further ahead, at the beginning of Chapter 5, along with those for Chapters 3

and 4, as if they were pieces of a jigsaw puzzle. This will help set up the appropriate context in which to formulate my main research question and hypotheses, which pertain to all topics alike.

3. THE ACQUISITION OF L3 LEXIS

It has been suggested that, when it comes to research on cross-linguistic interaction at the lexical level in trilinguals or multilinguals, there is a divide between the studies of a more abstract type that try to tap into mental representations, and those that describe "surface configurations of interlanguage transfer without explaining" its nature in depth (Wei, 2006; p. 95). Among the first group of studies, we find work by authors like Dijkstra and Van Hell (2003), Lemhöfer, Dijkstra and Mitchell (2004) or Schwieter and Sunderman (2011), who are mainly concerned with lexical access, and whether it is language selective or not. For them, the issue of lexical transfer is rather a tool to investigate the organization of the trilingual mental lexicon. A selection of studies from the second group could be: Bois (2013), Cenoz (2001), De Angelis and Selinker (2001), Dewaele (1998), Muñoz (2006), Lindqvist (2010), Llama (2008), Rossi (2006), Singleton (1987), Tremblay (2004), and Williams and Hammarberg (1998). In these investigations, lexical transfer is regarded as a compensatory strategy in the face of a lexical gap, and has served to explore how a variety of factors (including but not limited to those reviewed in Chapter 1) determine the way in which the learners' PALs influence the acquisition of an additional language. Despite the fact that they could inform each other, for the most part these two lines of research seem to run in parallel, only crossing paths occasionally (for a clear example of this, see Ecke, 2015).

Of the two strands, the latter appears to be more firmly rooted in the field of TLA research. Although there are earlier works on lexical transfer in trilinguals (Chandrasekhar, 1978, LoCoco, 1976; Magiste, 1979; Rivers, 1979; Stedje, 1977, in Ringbom, 1987; Vildomec, 1963, Voorwinde, 1981), two investigations, Ringbom (1987) and the seminal case study by Williams and Hammarberg (1998), seem to have sparked most of the research on CLI in L3 lexis undertaken during the first decade of this century and onwards (Lindqvist, 2009; Llama, 2008;

Rossi, 2006; Tremblay, 2004, among others). Given their pivotal position within the field, they will be included among the studies reviewed later in the chapter.

In their 2010 state-of-the-art article on the role of background languages in TLA, Falk and Bardel asserted that the area of L3 which had "as yet been more investigated" was vocabulary, whereas L3 syntax contributions were just starting to take off. Since then, and in spite of a considerable upsurge of mainly L3 syntax but also phonology studies, TLA researchers have not lost interest on the lexical sub-field, according to Bardel (2015). Among the factors that could have contributed most to the proliferation of L3 lexical work, we may list the fact that instances of lexical CLI are readily identifiable (Singleton, 1999), since the "traces of non-target information are mostly overt" (De Angelis, 2007; p. 41), and that, methodologically speaking, this sub-area can be relatively uncomplicated to handle (Falk & Bardel, 2010). As Ecke (2015) points out, it is common for L3 researchers in this domain to rely on naturalistic or quasi-naturalistic studies, reflected in the use of interviews. To a lesser degree, the elicitation task goes beyond a conversation or the (re-)telling of a story, and consists of a more controlled experimental design such as a translation task (Herwig, 2001; Bois, 2013), picture naming (Abunuwara, 1992) or primed picture naming (González Alonso, 2012), which include certain target items. For an exhaustive table of L3 studies along with their language combinations, tasks and main results in terms of source language, please refer to Ecke (2015, pp. 156-158).

Proficiency aside, the role of typological proximity as either potentially reinforced or weakened by L2 status has been the hottest topic in CLI research within two sub-areas of TLA from the outset. In fact, it remains the dominant issue in L3 syntactic and lexical studies to the present day. De Angelis, Jessner and Kresic (2015) contend that typological proximity, and psychotypology as a related phenomenon, "have been shown to be robust predictors of language

transfer" (p. 2). To their statement, we would add that this seems particularly true when it comes to lexis and / or to syntax, and even more so if Romance languages predominate in the language combination being considered, as evidenced by the three brief literature reviews provided later in this chapter, as well as in chapters 2 (syntax) and 4 (phonology).

So far we have briefly outlined the sub-field of lexical CLI within TLA research, and where it stands mainly with regard to L3 syntax. The position occupied by L3 phonetic-phonological studies in relation to these two sub-areas will become clear in Chapter 4. For now, we will tackle the description of the second feature under investigation, lexical inventions, followed by a literature review of L3 studies that focus on it.

3.1. Lexical inventions

With a view to explore CLI in L3 lexical production, previous studies have looked at code-switches, lexical inventions and, more often than not, at both phenomena. According to Ecke (2015), both switches (if they consist of a single word) and inventions offer a similar type of solution in the face of a failed word retrieval attempt: the target is replaced by an intruder from another language (switch) or it is substituted by a combination of parts of two or more words (inventions). We will see on page 51 that these two solutions constitute the category of *borrowings* in Ringbom's (1987) taxonomy of cross-linguistic lexical influence.

Word retrieval attempts can fail in another way as well: the word-finding problem may persist and the retrieved item may be incomplete, in which case we are dealing with tip-of-the-tongue (TOT) states. A TOT state can be defined as "the feeling that a known word will be recalled although it is not accessible immediately" (Schwartz, 2006). Moreover, the speaker often recollects fragments of the elusive word, and may have access to associates (i.e., related words).

For an example, taken from Ecke and Hall (2013), see Figure 1. Although this phenomenon has been studied experimentally since the seminal work of Brown and Mc Neill (1966), it has only received marginal attention in the L3 literature (Ecke, 2001; Ecke & Hall, 2013), and will not be further discussed here.

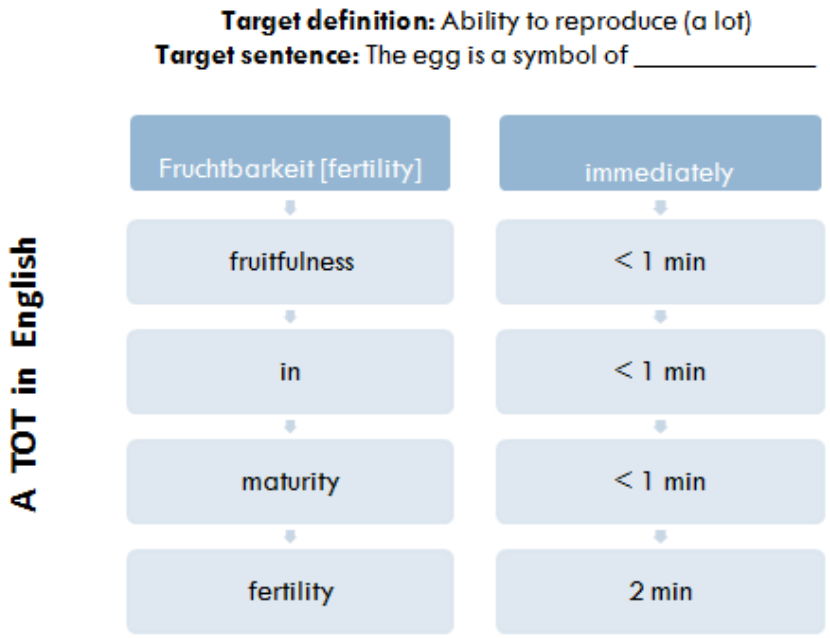


Figure 1. *Example of a TOT state (adapted from Ecke and Hall, 2013).*

For their part, code-switches consist of taking "utterances that clearly belong to one of the background languages" and using them in an unmodified form (Lindqvist, 2009, p. 287). These non-target language units can vary in length from a single word to a whole sentence or longer and are inserted within a single utterance in the target language. The example in (4), taken from Llama (2008), provides an occurrence of a code-switch (in italics). When describing the picture of a man making a funny face while reading a book, participant A01 (where A stands for Anglophone) said the following:

A01: 'Me gusta eso […] porque es cómico y (laughs) *he looks like a geek* (laughs). No sé cómo se dice eso'.

It becomes evident that, when confronted with a lexical gap, A01 resorted to her L1 instead of trying to use the target language. For this very reason, some researchers like Ringbom (1987) do not regard language switches as true instances of CLI. Similarly, Ecke (2015) sees a difference between potentially unintentional one-word switches and deliberate (usually longer) ones, which tend to belong to the speaker's communication strategy repertoire (affective or metacognitive comments, appeals for help, etc.). Lexical inventions, on the other hand, constitute an attempt on the part of the learner to communicate in the TL by modifying a given word so it sounds and/or looks as if it belonged to it. Technically speaking, then, a lexical invention is a non-target "lexeme which is morpho-phonologically adapted to the target language but which is never used by native speakers" (Dewaele, 1998, p. 471).

Based on personal experience and observation, we will add at this point that native speakers of a given language who live immersed in an L2 / L3 setting may at times use lexical inventions in their own L1 similar to those of learners. It is likely that more restrictions apply in their case than in the case of L2 / L3 learners, and that they are more selective in their word innovation. It can be that resorting to the use of lexical inventions responds to different needs in L3/L2 learners vis-à-vis L1 speakers in a non-L1 setting. It could even be ventured that many, if not most, lexical inventions used by one group would not necessarily be used by the other, and vice-versa. Moreover, lexical inventions in learners may be a one-time occurrence or particular to a given learner or conversation, whereas lexical inventions in L1 speakers living abroad seem to be more recurrent and often shared by a group, and its use is rather intentional. Due to the lack of supportive data, we will not elaborate further on this idea, but we believe this observation calls

for a rephrasing of Dewaele's (1998) definition so that native speakers are not totally excluded from it. What if, for the time being, we said that lexical inventions are "lexeme[s] which [are] morpho-phonologically adapted to the target language but which [are] never used by native speakers" living in an L1 context?

We now turn to present a few examples of lexical creations from both types of speakers. Let us first consider the invention *frisado* (curly), created by a Francophone participant (Llama, 2008) who added the ending -*'ado'* that corresponds to a Spanish past participle to a French verb root (*friser,* to curl) to form an adjective (intended word: *rizado*, curly). And now, let us consider inventions like *depaner* or *reusiu*, often used by native speakers of Brazilian Portuguese (BP) who live in Montreal while communicating among themselves in BP. *Depaner* is a phonological adaptation of the French word *dépanneur* (convenience store), and is commonly used in sentences like: *To indo no depaner* (I am going to the convenience store). More similar to the example above is *reusiu*, an invention used to express that someone has done well. It comes from the French verb *réussir* (to succeed) and carries the bound morpheme *–iu*, typical ending of Past Tense third person singular forms for –ir Portuguese verbs.

The fact that we keep using the term lexical invention may convey the false impression that it is the only or the most wide-spread term used to refer to this phenomenon. On the contrary, a quick glance at the literature reveals that the different authors have employed a varied range of labels to designate it. Here are some examples: "lexical invention" (Dewaele, 1998; Tremblay, 2004), "lexical innovation" (Singleton, 1987), "lexical error" (Ecke, 2001), "morphological interlanguage transfer" (De Angelis & Selinker, 2001), "word construction attempts" (Lindqvist, 2010), "hybrid", "blend" and "relexification" (Ringbom, 1987), and "foreignising" (Cenoz, 2001, a term that seems to have been borrowed from Poulisse, 1990, who used it in an SLA

context).

Since they undergo adaptations that result in inter- and intralingual blending, these non-words are a useful tool for exploring lexical CLI. In consonance with this investigation's aims, studies on lexical inventions within TLA can be divided into two main groups: those whose findings point to the L2 as the preferred supplier language for word construction attempts (Dewaele, 1998), and those in which it is argued that typology is a stronger predictor for lexical influence (Cenoz, 2001; Llama, 2008; Rossi, 2006; Tremblay, 2006). An alternate division could be made if we were to consider the language combination studied in each particular investigation, in which case we could talk about: i) studies with a predominant Romance mix (De Angelis, 2005a: L1 Canadian French, L2 English / Spanish, L3 Italian; Llama, 2008 and Rossi, 2006: L1 Canadian English or French, L2 Canadian French or English, L3 Spanish; among others); ii) studies with a predominant Germanic mix (Dewaele 1998: L1 Dutch, L2 English, L3 French; Tremblay, 2006: L1 Canadian English, L2 Canadian French, L3 German; among others); iii) studies involving at least one language that is neither of Romance nor of Germanic origin (Cenoz 2001: 2L1 Spanish and Basque, L3 English; Singleton & O'Laoire, 2006: L1 English, L2 Irish Gaelic, L3 French; among others).

As telling as studies from all aforementioned three groups could be, reviewing all of them in detail would result in a lengthy literature review. In order to keep the scope manageable and narrow, we will mainly concentrate on studies that are immediately related to ours because they look at the exact same or similar language combinations, and only offer glimpses of conclusions from less related studies, when considered pertinent.

Moreover, in the previous chapter (devoted to L3 syntax), as well as in the upcoming one (devoted to L3 phonetics / phonology), we included a brief literature review of L2 studies

pertaining to the selected feature in each of them: relative clause attachment preferences in the case of syntax, and voice onset time in the case of phonetics/phonology. It will become evident, once the research questions and hypotheses are formulated, that it is crucial to know if L2 learners in previous studies were able to depart from L1 patterns in the L2, and to what extent, based on earlier evidence, we could expect our participants to exhibit (near-)native behaviour in their first non-native language. Only if they display different patterns in the L1 and the L2, will it be reasonable to envisage the L2 as a potential source language. Therefore, besides presenting tendencies in SLA studies, we will also be providing L1 and L2 data from our trilingual groups regarding those two features. Doing so will not only allow for comparison with previous work, but will also provide us with a more precise picture of what our informants bring to the table during L3 production. Not to mention the fact that learning an L2 could have had an impact on L1 RCA tendencies and VOT values, and this needs to be verified as well.

However, in the case of lexical inventions, whether and how our participants produce lexical inventions in their L2 (and less probably in their L1) does not necessarily determine how they will use their previously-known language to create a lexical innovation when struggling to retrieve the word they actually need in their L3. For that reason, no review of SLA studies on lexical inventions will be offered. Instead, the two studies that are considered to be seminal in this area will be included at the very beginning of the following sub-section.

3.1.1. Lexical inventions in TLA

3.1.1. Two seminal studies: Ringbom (1987) and Williams and Hammarberg (1998)

Ringbom (1987) is not only one of the earliest but also one of the most comprehensive studies on lexical CLI in trilinguals. Conducted in Finland, his work deals with the learning of English as an

L3 by either L1 Finnish-L2 Swedish or L1 Swedish-L2 Finnish bilinguals. Swedish is a minority language in Finland and it is taught in schools. Therefore, native speakers of Finnish have undergone formal learning of Swedish, while native speakers of Swedish living in Finland tend to be competent speakers of L2 Finnish who have learnt the L2 in a more naturalistic way.

In 1987, Ringbom examined around 11,000 English essays written by Finnish students (L1 Finnish/Swedish) as part of a national exam. Besides identifying instances of transfer in their vocabulary, he developed a taxonomy that allowed for their classification along a continuum that has transfer of meaning on one end and transfer of form at the other. Ringbom uses the term lexical transfer to refer to transfer of meaning, a category he subdivides in loan translations, semantic extension and cognates (in the case of false friends). Opposed to lexical transfer, we find borrowings, which he subdivides in hybrids, blends and relexifications as the first sub-category, and complete language shifts as the second. For a detailed report and examples of each category and subcategory, please see Ringbom, 1987 (p. 117). The author acknowledges that lexical transfer and borrowings are not clear-cut categories, and that the learner hardly ever relies on form or meaning alone.

Ringbom's taxonomy is key because it is believed that semantic transfer is only possible from the L1 (Odlin, 1989), or from a highly automatized L2 (Ringbom, 1987; 2001). In fact, this assumption seems to be backed by several studies (Möhle, 1989; Schmidt & Frota, 1986; Singleton, 1987). In contrast, transfer of form is a more superficial process, and may come from languages learners are not particularly proficient in. Ringbom's (1987) framework of lexical errors has been a point of departure for subsequent investigations (Llama, 2008; Tremblay, 2004; among others), and an adaptation of his first sub-category of borrowings (which includes hybrids, blends and relexifications) will be employed in this study. A more detailed account of

the different types of borrowings will be provided when explaining the data analysis.

But what did Ringbom (1987) find with regard to lexical production in the written data of his participants? On the one hand, his L1 Finnish speakers drew extensively on their L2 Swedish, and their errors mainly belonged to the borrowing category (i.e., transfer of form). On the other, and despite living in their L2 environment and being very proficient in their L2, his L1 Swedish speakers rarely resorted to Finnish and relied more heavily on their L1. Most importantly, whenever there was transfer of meaning, it happened from L1 Swedish. These findings are in agreement with Ringbom's aforementioned assumption, and also led him to report that typology was at play, since a closer typological relationship between English and Swedish, both Germanic languages, would help explain a higher dependence on Swedish by both groups to the exclusion of Finnish (a Finno-Ugric language).

Unlike Ringbom's, Williams and Hammarberg's (1998) findings seem to point to L2 status as the variable that predicts CLI in TLA. In fact, their seminal case study is one of the most cited works in this domain, and a key one among those backing the predominant role of the L2 as a CLI source, not only for lexical but also for phonological production, at least at the early stages of L3 acquisition. This longitudinal investigation draws on data collected over a period of two years from one of the co-authors, a native speaker of English who, after leaving in Germany for an extended period of time, had acquired near-native proficiency in her L2 German. Data collection started when she moved to Sweden, where she starting learning Swedish as an L3. Based on their results, the authors claimed a division of roles for the PALs, according to which the L1 would play a more instrumental function (i.e., served to facilitate communication in the form of metalinguistic comments, help requests, etc.), whereas the L2 would act as the default supplier for lexical construction attempts.

The study also offered preliminary evidence that the L2 could have an impact on L3 pronunciation, since some native speaker judges determined the informant sounded like a German speaker in Swedish. It was reported that exposure to the L2 in an L2 context seems to increase the amount of L2 influence on the L3 (also claimed by Ringbom, 1987, and Vildomec, 1963), but that over time, as L3 proficiency increased, the L3 took over the role of supplier for lexical production, while her pronunciation showed more of an L1 influence.

Some of their claims, however, need to be taken with certain caution for several reasons. Firstly, it is a case study, which renders the generalization of findings problematic. Secondly, with regards to pronunciation, no acoustic analysis was conducted, and any assertions in this respect are subjective, since they are based on impressionistic judgements. Thirdly, in which can be deemed a double-edged sword, all languages involved are of Germanic origin, and the L2 is close, if not the closest, to the L3. On the one hand, this study adds to the body of work that reports strong effects of a similar L2 on the L3 in triads where typological distance and L2 status are entangled. Some of those studies actually include a distant L1 (either from a different linguistic family, as in Wei, 2006: L1 Chinese, L2 English, L3 German; or otherwise less related, as in Sikogukira, 1993: L1 Kirundi, L2 French, L3 English), with an unfortunate result: the question of the primacy of typology over L2 status is left unanswered. On the other hand, Ecke (2015) argues in favour of exploring the foreign language effect issue employing related language triads, such as William and Hammarberg's case study, for they could actually expose the potential primacy of the L2 status variable, not over the typology factor but over the L1. We will now move on to review a sample of L3 lexical studies that can offer some insights into what happens when typology and L2 status are teased apart, and whether the L2 is more determinant in other cases of same-family language triplets.

3.1.2. Studies of lexical inventions in TLA: A selection

In order to disentangle the two factors under investigation, Rossi (2006) resorted to a mirror-image experimental design. Accordingly, she divided her participants so that the L2 would be typologically closer to the TL for one group (L1-English, L2-French, L3-Spanish), and more distant for the other (L1-French, L2-English, L3-Spanish). As it turned out, in most cases a French word served as a base for L3 lexical inventions for Anglophones and Francophones alike. This finding is in disagreement with Williams and Hammarberg's suggestion that the L2 supplies most of the material for L3 word construction.

In addition, the author observed that, when the source was an English word, it had a cognate in French, as in the example *poqueta* (lexical invention taken from Rossi's corpus, p. 99), from *pocket* (En.), but see also the French word *poche*. According to the Online Etymology Dictionary, the word pocket comes from *pokete*, a diminituve of Old North French *poque*, which in turn comes from *pokka*, the word for bag in Frankish, a Germanic language. Such an invention, would be an exception rather than the rule, and other researchers before Rossi, namely Singleton (1987), had already remarked that English-based inventions tend to have Romance cognates that can be traced to a Romance root, as in the example *constructir* (another invention from Rossi's corpus, p. 99), from *construct* (English), *construire* (French), *construere* (Latin), as well as eight out the nine English-influenced innovations reported by Singleton in his case study (1987). Nonetheless, towards the end of her conclusions, Rossi makes an observation that cannot go ignored: her Anglophone participants used English more than her Francophone participants did, which she interprets as the L1 strengthening the effect of typology in the case of Francophones, and weakening it in the case of Anglophones.

In a very similar study, Llama (2008) set out to explore the relative influences of typology and

L2 status by examining lexical inventions as produced by two groups of learners of Spanish as an L3. Just as was the case in the investigation above, Anglophones who spoke L2 advanced French were compared to Francophones with an advanced L2 English. They were recorded performing a picture description task, which allowed for the collection of 196 lexical inventions. Due to the similarities (same participant profile, same group sizes, same language combination, comparable tasks) across both studies, Llama's results should be expected to resemble Rossi's. And in point of fact, they do: when creating L3 words, the Anglophone group resorted to French over 80 % of the time, whereas the Francophone group's use of their L1 went beyond 90%. Again, both groups relied on the typologically closer language, even more so if the closest language was the L1.

Another study that reports an overriding effect of typology[2] when in competition with L2 status is that of Cenoz (2001). She analyzed the lexical production (language switches and inventions) of 90 elementary and high school students who were either Basque-dominant, Spanish-dominant or balanced Basque-Spanish bilinguals learning English as an L3. As it turned out, her participants did not create many lexical inventions (16 out of 198 transferred terms), and when they did, they used Spanish as the sole source language.

A slightly different transfer pattern emerged from an experiment by Tremblay (2006). Her participants, 13 native speakers of English who were learning German as an L3, were divided into three groups based on L2 proficiency and amount of exposure to their L2, French. The groups can be described as follows: i) low L2 proficiency + low L2 exposure, ii) high L2 proficiency + low L2 exposure, and iii) high L2 proficiency + high L2 exposure. Her findings

[2] Although Spanish and English come from different language families, the author claims that they are closer to each other than they are to Basque, a non-Indo-European language. Moreover, since Basque is a highly inflected language, which has been defined as ergative and agglutinative (Saltarelli, 1988; in Cenoz, 2001), it can be perceived by these bilinguals as less transferrable to English than Spanish.

show a marginal L2 influence on the L3 lexical production of the low proficiency group. As for the high proficiency groups, she observed traces of the L2 in slips of the tongue in the L3, but only those informants with high L2 exposure made some use of French to create lexical inventions and code-switch. The others seemed to take little advantage of their L2 knowledge for their lexical construction attempts or even to code-switch. Generally speaking, and contrary to Tremblay's hypothesis, all groups resorted to the L1 as the main supplier language for both inventions and switches, which points to typology as a stronger predictor, in this case regardless of proficiency in the L2. However, it is worth to highlight that a higher level of L2 proficiency did translate into a higher percentage of L2 use. In light of her data, Tremblay concluded that there was a tendency for the L1 influence to decrease in favour of the L2, at least in the following scenario: i) as proficiency in the L2 increases, ii) given there is also considerable exposure to the L2, and iii) even if the L2 is in competition with a typologically closer L1.

Although the typological effect cannot be denied, Tremblay's study seemed to somewhat make a case for L2 status. Stronger evidence in favour of the L2 is offered by Dewaele (1998), who compared learners of French as an L2 (n= 32) vs. an L3 (n= 7). Let us recall that participants from both groups spoke Dutch as their L1 and had English as their other non-native language. In his results, the author reported a significant difference in source language for L2 versus L3 learners: whereas the L2 French speakers created more L1 Dutch-based inventions, the L3 French informants relied more on their L2 (English). Accordingly, Dewaele contended that the L2 was more activated than the L1 during oral lexical production in the L3.

It has to be noted, however, that although French and English do not belong to the same linguistic family, English is a semi-Romance language with regards to lexis (Gachelin, 1990). Therefore, French and English share more cognates than do French and Dutch, and typology and

L2 status could be considered to be somewhat confounded in this study, as was the case with Williams & Hammarberg's (1998). While Dewaele was expecting his L1-Dutch/L2-French/L3-English speakers to use English as a source language, they may have failed to do so due to an L3 proficiency issue. It is possible that their English was too low for this language to cause backward transfer and override the influence from the L1.

A sketch of findings pertaining to the two factors under investigation within the lexical domain will be provided at the outset of Chapter 5. For the time being, we turn to the last domain addressed in this study.

4. THE ACQUISITION OF L3 PHONOLOGY

More often than not, L3 phonology has been considered as an understudied domain (Cabrelli Amaro, 2012; Gut, 2010), and with reason. Since the establishment of TLA as a field in its own right, studies touching upon L3 phonetics / phonology have lagged behind those devoted to L3 lexis, initially the most studied sub-field, and L3 syntax, an area which soon experienced rapid growth. This trend in attention is now reversing and, thanks to the upsurge it has experienced in recent years, this aspect of TLA is gradually overcoming its Cinderella status, which has been passed on to pragmatics.

L3 phonology studies usually turn to L2 work for inspiration and as a basis upon which to develop. Therefore, the fact that L3 phonological research mirrors SLA tendencies in more ways than one should come as no surprise. On the one hand, there have been reports of a lack of balance between investigations focused on production vs. those focused on perception (Cabrelli Amaro & Wrembel, 2016), with the scale tipped in favour of production studies. This bias had already been reported in previous overviews of SLA phonology research (Gut, 2009). On the other hand, TLA researchers have given more attention to segmental than to suprasegmental properties, as tends to happen in SLA (Gut, 2009). Moreover, among the limited number of L3 phonetic / phonological issues that have been investigated so far, we find the two most frequently explored by SLA authors, namely VOT (TLA: Llama, Cardoso, & Collins, 2010; Llama & López-Morelos, 2016; Sypiańska, 2013; Tremblay, 2007; Wrembel, 2013; Wunder, 2011) and vowels (TLA: Blank & Zimmer, 2009; Kamiyama, 2007; Kopečková, 2015; Lechner & Kohlberger, 2014; Missaglia, 2010; Sypiańska, 2016). Since VOT is our focus of investigation, previous L2 and, to a greater extent, L3 work pertaining to this topic will be reviewed towards the end of this chapter.

In their state-of-the art overview of the field, Cabrelli Amaro and Wrembel (2016) list four general questions L3 phonology research has addressed so far, and which revolve around the following issues: i) the so-called bilingual advantage, ii) the source and / or iii) directionality of transfer, and iv) the developmental path of acquisition of an L3 sound system. This study will add to the body of work devoted to the source of transfer, and will focus on forward transfer from the L1 and L2 to the L3, initially disregarding any effect of the L3 on the previously learnt languages. The likelihood of reverse or regressive CLI taking place has been dealt with and attested in other areas of language. For instance, when talking about CLI at the semantic and conceptual level, Jarvis and Pavlenko (2008) describe transfer as not being a "one-way street". Whereas part of the scarce studies that have looked into L3 influence on L2 speech report no findings to such effect (Cabrelli Amaro, 2013; Gut, 2010), at least a couple of them present data suggestive of a greater L3 impact on a native-like L2 sound system than on L1 speech production (Cabrelli Amaro & Rothman, 2010; Cabrelli Amaro, 2016; Liu, 2016[3]). This led to the proposal of the Phonological Permeability Hypothesis (Cabrelli Amaro, 2010, 2013, 2016), according to which "a late-acquired L2 is more vulnerable to L3 influence than an L1" (Cabrelli Amaro & Wrembel, 2016), and opens up a new venue for L3 phonology research. It is not, however, the route chosen for this study.

As seen in other chapters above, when delving into CLI sources, it is not uncommon for studies dealing with L3 lexis and syntax to test the relative influences of L2 status and typology in determining (if/or) which PAL will become the main contributor of influence. The role of typology, however, is not as explored in L3 phonology, at least not through a similar lens. It has been expected to boost positive L2-to-L3 transfer (Gut, 2010; Marx & Mehlhorn, 2010), but has

[3] It is worth noting that while Liu only reports transfer from the L3 on the L2 with regards to production, her findings also show regressive transfer from the L2/L3 on L1 perception.

never been reported as being a decisive factor in causing CLI in L3 pronunciation. The initial disregard towards the L2 as a source of phonological influence or towards typology's role in promoting it could be due to the fact that, generally, the L1 seems to be regarded as the true Trojan horse in the acquisition of all sound systems beyond the L1. Despite having found some "reliance on L2 settings […] at an initial stage when the phonetic form of L3 is too unfamiliar to master" (p. 84), Hammarberg (2009) concludes that the L1 influence resurfaces as L3 proficiency increases. Furthermore, due to the learner's established L1 neuro-motor routines, he believes it constitutes a basic constraint on articulation. Several existing investigations, especially those conducted early on, are in line with such conclusion, and have claimed a predominant effect of the L1 on the L3 (Llisterri & Poch, 1987; García Lecumberri & Gallardo del Puerto, 2003; Ringbom, 1987).

Notwithstanding, in line with Bardel and Falk's assertions that the L2 can act as a prevailing source of influence in L3 syntax, a number of recent studies have shown that non-native languages can also considerably impact a developing L3 sound system (Kamiyama, 2007; Llama et al., 2010; Tremblay, 2007; Wrembel, 2010). Since at least three of those studies focus on VOT, we further discuss this possibility in the last sub-section of this chapter. An alternate finding increasingly reported in the TLA literature is the presence of combined transfer, understood as the interaction of two languages or more which concur in influencing the target one, and including language universals. Examples of combined CLI are provided by Benrabah (1991), who found that his Algerian Arabic-French bilinguals transferred L2 French vowels and L1 Arabic consonants to their L3 English; Pyun (2005), who found evidence of phonological knowledge in L3 Swedish traceable to phonological rules from L1 Korean, L2 English and inter-rules between all phonological systems; and Blank and Zimmer (2009), who reported hybrid

vowel production in the L3 English of an L1 Brazilian Portuguese / L2 French speaker. Studies reporting combined CLI with regard to L3 VOT will be discussed more extensively further below.

As a consequence of having taken the back seat to L3 syntax during the first decade of the 21st century, the theoretical foundations for L3 phonology are being shaped at a slower pace, "which has implications for the undertaken attempts at modelling" (Wrembel, 2015, p. 57). Often, L3 phonological studies have been carried out without ascribing to or probing any particular models (Kopečková, 2014; Llama, Cardoso & Collins, 2010; Llisterri & Martínez-Daudén, 1991). Alternatively, authors have resorted to Optimality Theory (Cabrelli Amaro, 2013), or rather established models of L2 speech perception / production such as Flege's (1995) Speech Learning Model (Sypiańska, 2016a) or Best's (1994, 1995) Perception Assimilation Model to frame their research. A third option has been to take L3 morphosyntax models as a steppingstone, and to assess their applicability to L3 phonology data (Cabrelli Amaro, 2013; Wrembel, 2016), which is one of the aims of the present work.

Having addressed the status of this sub-field within TLA, the main research questions that underpin L3 phonology work, the most investigated segments, and the lack / need of development of models of L3 speech, we now move on to portraying the phenomenon selected herein by providing its description, and presenting previous SLA and TLA findings that have paved the way for this study.

4.1. Voice onset time

If we were to consider the number of stop categories that characterise their sound inventories, English, Spanish and French all belong to the two-category group, as per Lisker and Abramson's

language classification (1964). This basically means the languages we have selected display two sets of stop consonants that contrast in voicing: /b d g/ being the voiced set, and /p t k/ the voiceless one. Despite this apparent similarity, the phonetic realisation of stops, and of interest to this study of voiceless stops, varies from Spanish and French to English. According to Yavaş (2009), what best accounts for such difference is voice onset time (VOT) or "the time interval that marks release [of the stop] and the onset of periodicity that reflects laryngeal vibration [for vowel production]" (p. 422), to put it in the words used by Lisker and Abramson (1964) when they coined the term.

When placed along a VOT continuum, Spanish and French voiceless stops are expected to fall within the 0 to 30 ms range associated with short lag, whereas typical VOT values for their English counterparts typically exceed 60 ms, occupying the extreme of the continuum labelled as long lag (as depicted in Figure 2). This divergence in lag patterns can result in another distinction in terms of presence (in long-lagged stops) vs. absence (in short-lagged stops) of aspiration, a feature typically described as a burst of air noticeable on the release of /p t k/ in stressed onset position (Avery & Ehrlich, 1995) in the case of English. As will become evident in the section devoted to data analysis (Chapter 6, section 1.4), bringing aspiration into the picture may allow for a more subtle understanding of the differences across languages and their interplay. In this spirit, Cho and Ladefoged (1999) established four categories for voiceless stops that go from unaspirated (VOT of up to 30[4] ms) to highly aspirated (VOT of over 90 ms). Since we will be resorting to degrees of aspiration in our analysis, the implications of this categorisation will be dealt with in due course.

[4] Based on reports from studies on the perception of aspiration, we will be establishing a higher cut-off for unaspirated stops, as will be explained in Chapter 6.

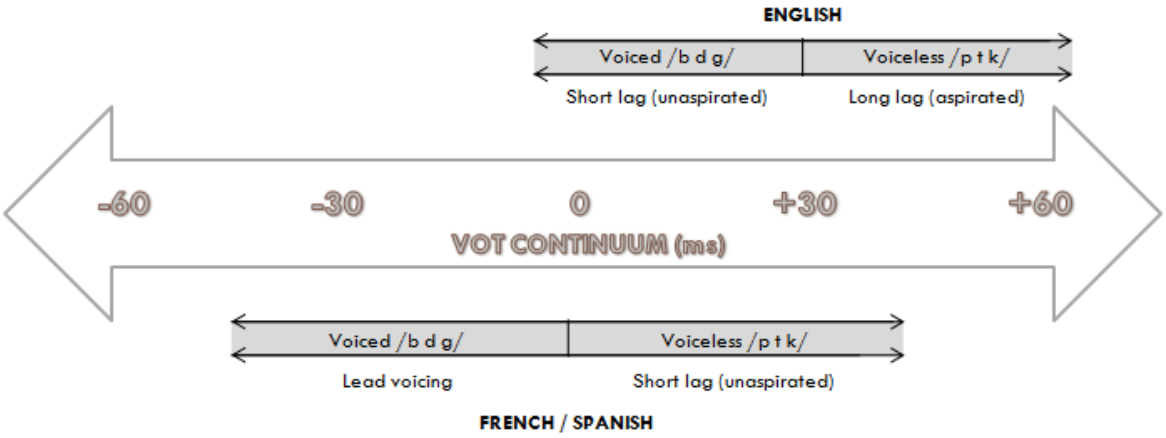


Figure 2. *Schematic depiction of the relationship between English versus Spanish and French stops (adapted from Llama, Cardos, & Collins, 2010).*

4.1.1. L2 acquisition of VOT

Studies on the acquisition of L2 VOT patterns are not in short supply, and thus a comprehensive review would require considerable space. Given that there are already several L3 VOT studies from which to build on, it seems reasonable to offer a bird's eye view of VOT within SLA and concentrate on TLA work. Therefore, what follows is a brief account of a selection of investigations that can help the reader understand what our Francophone and Anglophone participants, after having learnt English and French as their L2s, may bring to the table at the time of learning Spanish as an L3.

Countless are the investigations into the phonological acquisition of bilinguals who speak language pairs that differ in VOT patterns. Their focus has often been placed on comparing the participants' production and / or perception of VOT with the aim of determining whether the different types of speakers / learners (simultaneous vs. sequential bilinguals, for example) develop two separate systems or employ a shared range of values for both languages. Transfer of L1 VOT patterns to the L2 seems to be a common scenario with learners at lower levels of

proficiency (Flege, 1987). But what happens with more proficient L2ers?

Research has indeed revealed that more proficient learners tend to depart from L1 values and approach (or even reach) native-like ones in their L2 with varying degrees of success. Some speakers produce L2 voiceless stops with values that are intermediate between those of monolinguals of their L1 and their L2, that is, with a compromise or hybrid VOT (Caramazza et al., 1973; Flege & Eefting, 1987; Flege, 1991; Gurski, 2006; Laeufer, 1996). Yet others exhibit rather monolingual-like VOT patterns that need not always be identical to monolingual productions. To illustrate this statement, let us consider two studies: one by Sundara, Polka and Baum (2006), and the other by MacLeod and Stoel-Gammon (2009). In the former, the authors investigated the production of voiced /d/ and voiceless /t/ by adult bilingual and monolingual speakers of Canadian English and Canadian French who, much like our participants, were exposed to their two languages as children and used both regularly as adults. Sundara and colleagues (2006) reported monolingual-like contrasts for both stops in French, but only for the voiceless stop in English, which can be interpreted as native-like achievement for three out of the four targeted sounds. In the latter, MacLeod and Stoel-Gammon focused on four stops, voiced /b d/ and voiceless /p t/, as produced by the same type of population. Similar to Sundara et al. (2006), these researchers observed their participants maintained monolingual-like contrasts for all French stops and English voiceless stops, but not for English /b d/. These findings bring to light two ideas pertinent to our work. On the one hand, and despite reports that attaining native-like VOT is hardly ever possible (Caramazza et al., 1973; Díaz-Campos, 2004; Fellbaum, 2006), they provide proof of such an achievement for voiceless stops in L2 Candian English and Candian French. On the other, they underscore the notion that French voiced stops can be easier to learn than English ones.

Based on Sundara et al. (2006) and MacLeod & Stoel-Gammon's (2009) reports, learning to aspirate (when going from French to English) or to de-aspirate (when going from English to French) appear to pose a similar challenge, or lack thereof. Their informants seem to have trouble with CE voiced stops, but neither with French nor English /p t/. If we were to draw on Eckman's (1977) Markedness Differential Hypothesis (MDH), however, we could have probably predicted more difficulty for French speakers in learning to aspirate in English than for Anglophones to suppress aspiration in French, given that a language that contains aspirated stops is expected to contain non-aspirated ones as well. In fact, /p t k/ are typically unaspirated in English when preceded by /s/, as represented in the classic example pin [pʰɪn] vs. spin [spɪn] (where the superscripted h represents aspiration). Thus, English speakers already produce non-aspirated voiceless stops in their L1, albeit in different contexts.

The advantage predicted for Anglophones in this respect has been disproved in a number of investigations like Díaz-Campos' (2004) and Fellbaum's (1996), just to mention a couple. Both authors reported results according to which their L1 English-speakers' VOT fell outside the typical Spanish range in their production of L2 /p t/. In addition, Fellbaum also collected data from L1 Spanish-speakers learning English as an L2. Her Hispanophones, who were immersed in their L2 setting, were more successful at approximating native-like values in their L2, but still differed from English monolinguals. Putting the language combinations (English and French on the one hand, English and Spanish on the other) aside, the main difference between Sundara et al.'s (2006) and McLeod and Stoel-Gammon's (2009) works vis-à-vis Díaz-Campos' (2004) and Fellbaum's (1996) projects is the age-of-onset of L2 acquisition, with younger learners in the French studies. Nonetheless, failing to aspirate as a native speaker of English when your L1 is a Romance language, or to suppress aspiration like a native speaker of Spanish or French when

your L1 is English, is not a hurdle one can attribute exclusively to adult learners. In a classic study on bilingual VOT, Caramazza et al. (1973) noted that even Francophones who had started learning English before the age of seven produced stop consonants with values that differed from those of English and French monolinguals. Although there was an upward shift towards English VOT patterns, their informants still fell short of producing native-like stops in their L2.

Given that my participants are Francophones and Anglophones who have attained a high level of proficiency in their L2 English / French, which they started learning in primary school, it could be assumed that they have either approximated or achieved native VOT durations in their L2, which could have in turn led to a modification of their L1 values, as has been shown to happen in previous studies (Sypiańska, 2013; Waniek-Klimczak, 2011).

4.1.1. L3 acquisition of VOT

With at least eight studies focusing on L3 VOT production, it can be said that this strand of L3 phonological research has received a good deal of attention, and that VOT can be regarded as a common tool to explore CLI in the acquisition of L3 phonology (Bandeira & Zimmer, 2012; Llama, Cardoso, & Collins, 2010; Llama & López-Morelos, 2016; Sypiańska, 2013; Tremblay, 2007; Wrembel, 2011, 2015; Wunder, 2011). Among the reasons that may have contributed to spur interest on VOT among SLA and TLA researchers, we find repeated suggestions that it is correlated with degree of foreign accent (Nathan, Anderson, & Budsayamongkon, 1987; Riney & Takagi, 1999), and the fact that the precise nature of its acoustic measurements enables to report quantifiable differences among the languages involved.

Those eight studies feature a variety of data collection methods, bilingual profiles, and language triads under investigation. Two of them focus on children and teens who are bilingual speakers of

a heritage (Spanish; Llama & López-Morelos, 2016) or a community language (Pomeranian German; Bandeira & Zimmer, 2012) other than the language of instruction they are exposed to at school. Their linguistic profiles diverge from those of our participants. In the case of Bandeira and Zimmer, the language selection (L1 Pomeranian German, L2 Brazilian Portuguese and L3 English) and the data collection instruments (a story-telling task and a tic-tac-toe game) are different as well. Thus these two experiments will not receive any further attention at this point.

In contrast to those two studies, Llama et al. (2010) is of utmost relevance here. As a matter of fact, this subsection of the present study draws on it and aims at addressing at least one of its main limitations: the lack of L1 data. It is relevant to further discuss the exact similarities and differences between both studies. They both employ a mirror design involving two groups of adult learners of L3 Spanish which consist of either L1 English-L2 French or L1 French-L2 English sequential bilinguals. With one more participant per trilingual group in the replica than in the original study, the increase is not substantial enough to represent a divergence between both experiments. Another subtle, yet potentially decisive, difference is the level of L3 proficiency, which is higher in the second study. This could have led to a better mastery of the L3 feature and yield fairly different results. In terms of data collection methods, the lists employed herein are shorter, and balanced in number of items across the three languages (30 each). Conceived as a means to assess the degree to which their participants had learnt to aspirate or de-aspirate in their L2, the L2 lists (42 items each) in Llama et al. (2010) were shorter than the L3 list (60 items), and even then, they were all longer than those used in the present study. Despite some overlap, shortening the lists allowed for the exclusion of certain items such as cognates across all languages like *taxi* or *taco*. In addition, some items were not retained but rather replaced by new ones on the basis of syllable complexity: words like cor-to (CVC) were

substituted by others like co-do (CV). Not only was the informants' L1 not tested, but there was also a lack of control groups, so the English and French monolingual reference values were taken from the literature. While we still resort to literature values as a landmark, in this study we will provide measurements of L1 English and L1 French in trilinguals and in functional (as defined on page 68) monolinguals as well.

Inserted into a project that mainly sought to determine the relative influences of L2 status and typology on L3 lexical production (Llama, 2008), the L3 VOT study was molded to pursue the same research quest. With L3 patterns that closely resembled those obtained for the L2, especially in the case of the Anglophone group, the authors concluded that the L2 had had more of an impact on the L3 than the L1. However, the participants' L2 values were somewhat intermediate between L1 and L2 typical monolingual durations for English and French, which suggests an effect of the L1 on the L2 to begin with. Besides comparing VOT means, as is the standard in this type of research, Llama et al. (2010) also looked at percentages of aspirated vs. non-aspirated stops in the data, and found a rather balanced percentage of English-influenced (aspirated) and French-influenced (non-aspirated) in the voiceless consonant production of their informants. In their concluding remarks, they justify this finding by suggesting a potential retention of L1 phonetic features when speaking in a non-native language. While on the surface there was a clear reliance of the L3 on the L2, the fact that the L2 was already impacted by the L1 is also on the table, and could be interpreted as combined CLI.

Similarly to Llama and colleagues (2010), and closely related to their investigation, we find the studies by Tremblay (2007), whose participants share with Llama et al.'s the same background languages, and Wunder (2011), who focuses on Spanish as an L3. Along the lines of the experiment we have just reviewed, Tremblay claimed a predominant L2 effect in the production

of L3 Japanese voiceless stops by her L1 English-L2 French bilinguals. Three out of her four participants were able to shorten their VOT values when speaking in L2 French, but not enough to fully conform to native norms. It so happens that Japanese values are in between those of English and French, and therefore producing a hybrid VOT, as it seems is the case for these participants in their L2 French, would result in target-like measurements in Japanese. The informants did produce strikingly similar patterns in their L2 French and L3 Japanese, and Tremblay put forward two possible explanations for this result. According to the first one, CLI from the L2 would be responsible for the way in which her participants produced L3 Japanese stops. Given that they were beginner learners of Japanese, this explanation agrees with previous reports that L2 status prevails at the early stages of L3 phonological acquisition. The second explanation is a purported acquisition of Japanese values due to their enhanced abilities as experienced language learners. In her conclusion, Tremblay clearly opts for the first possibility. Much like we contended in the previous paragraph, her results do point to an L2-to-L3 transfer strategy, with the caveat the L2 seemed to be already influenced by the L1, which could help one argue in favour of combined CLI being at play.

That was exactly Wunder's (2011) claim in view of her results. Not fully convinced that it was L2 status rather than combined CLI which explained the L3 values obtained by Llama et al. (2010) and Tremblay (2007), Wunder designed a study to further shed light on this issue. In order to do so, she recruited eight L1 German – L2 British English speakers, who were either high beginner or advanced learners of L3 Castilian Spanish. Instead of presenting her participants with word lists, the author selected a short text as part of a read-on-your-own task, which yielded rather mixed results. With L3 VOT means that fell in between those of L1 German and L2 English, Wunder explained that "some CLI from the L2 existed, but a prominent L1 effect was

also detected" (p. 122). She adds that the limited number of participants prevented her from creating two separate groups according to L3 proficiency. Let us not forget that in their case study, Hammarberg and Williams (1993) had reported a clear shift in source language when comparing the early (L2 influence) and the more advanced stages (L1 influence) of L3 phonological acquisition. All in all, Wunder interpreted her results as contradicting rather than corroborating findings of a prevailing L2 status effect, and pointing instead to the presence of combined CLI in her data.

These eight L3 VOT studies could lend themselves to various classifications: according to languages in focus, tasks performed, context of acquisition, or types of learners for example. At this point, however, we am going to sort them in terms of reported results, in which case we end up with three main categories: i) studies that claim a predominant L2 effect (Llama et al., 2010; Tremblay, 2007); ii) studies that report combined CLI (Sypiańska, 2013; Wrembel, 2011, 2015; Wunder, 2011); iii) studies that report a predominant L1 effect (Bandeira & Zimmer, 2012). It is worth mentioning here that in many of those experiments, the authors generally suggest their mixed results may be explained in more than one way: L2 status or combined CLI (Llama et al., 2010), combined CLI or L1 effect (Wunder, 2011). Moreover, Sypiańska (2013) reported not only combined CLI towards the L3, but also regressive transfer from English on both the L1 Polish and the L2 Danish.

For a brief summary of the role of the two factors under investigation in the acquisition of L3 phonetics / phonology in general, and L3 VOT in particular, and how they fit into the bigger picture of the acquisition of other L3 sub-areas and features, refer to the first paragraphs of the next chapter.

5. THE STUDY

This chapter is mainly devoted to detailing the design and implementation of this study. In the different subsections we discuss the participants, the different instruments and the testing procedure. However, before turning to the study's design, we will provide the reader with two things: i) a brief interim summary of how the reviews of topics and features addressed in Chapters 2, 3 and 4 contribute to the understanding of the relative influences of the two factors under investigation in TLA; and ii) the research questions tackled herein, followed by their corresponding hypotheses and predictions.

5.1. Motivating the study: An interim summary of the role of typology and L2 status in the acquisition of L3 syntax, lexis and phonology

Admittedly we have claimed that the central aim of this study is to explore the presumed rivalry between typology and L2 status. A peek at the growing L3 body of work, an examination of L3 transfer models, and widespread statements (like the one we quoted on page 31) by prolific L3 authors like Sánchez (2011) all agree with this objective. But that is when we look at the big picture. Let us consider, instead, the take-home messages we get: i) when we look at all areas combined; and ii) restrict the focus of the literature review within each of the areas.

Certainly, the strongest support for typology comes from lexical studies, but here are the caveats: i) typology has more of an impact when transfer of form is involved, whereas transfer of meaning comes either from the L1 or a highly automatized L2, regardless of the typological relationship of both PALs with the L3; ii) the L1 should be considered as a factor in the mix, as it can lessen the impact of typology, that is, if the typologically closer language is the L2, there seems to be less (facilitative /) negative transfer to the L3 than if it were the L1. Given that most

studies on L3 lexis focus on transfer of form and / or code-switches, there could be a bias towards typology that needs to be taken into account.

In contrast, typology is hardly ever mentioned as a factor in phonological investigations. Some studies seem to point to the L2, although this claim needs to be taken with caution, for the L2 effect on pronunciation has been reported to fade over time. It may, nonetheless, not fade completely and could be coupled with the L1, an ever-present Trojan horse, to cause combined CLI. In fact, as was the case of typology in lexical studies, an overwhelming majority of L3 phonological work backs the presence of a mix of the L1 and the L2 in L3 pronunciation. It has been speculated that the segments under investigation in this domain may lend themselves to show combined effects more than linguistic elements in other areas. It could also be the case that, in analyzing the data, instances of influence from a mixed source are usually omitted from the final data set in other domains. This is often the case with lexical inventions that could come from either background language, which have been excluded from a series of studies (Llama, 2008). All data considered: Would a combined effect be reported in lexical studies as well?

As per L3 morphosyntax studies, they represent the group that throws more contradicting results with regards to the issue at hand. One crucial detail in making the scale tip to one side (typology) or the other (L2 status) is whether the learner is learning a second Romance language or a second Germanic language. If Romance languages outnumber other languages in the mix, chances are typology is going to determine the source of influence. If Germanic languages prevail, it is often the L2 that becomes the default influence supplier. Not enough research has been conducted on learners who speak languages from three different families to make an informed prediction. We can, nonetheless, offer some insights that could complicate matters further for typology. In two out of three cases where three non-related languages are involved the L1, and not the assumed

closest language, became the preferred source of CLI. Example 1, Jin's (2009) participants transferred mainly from L1 Chinese to L3 Norwegian, to the detriment of an apparently closer L2 English. Example 2, Hermas (2014) reported more influence from L1 Arabic into L3 English, even though the L2 French could be judged as typologically closer. For a counterexample, we can refer to Kulundary and Gabriele (2012), who found that the L1 Tuvan remained neutral, whereas the L2 Russian exerted a stronger influence on the L3 English of their informants. It so happens that English and Russian display syntactic similarities with regard to the issue that was being investigated. Unfortunately, this study is one more case where typology and L2 status are confounded.

One thing that becomes evident from the bringing together of all three subareas is that the wealth of studies currently addressing CLI in multilingualism are so diverse that it often becomes complicated to compare them to each other. Although we do not come even close to tackling all the red flags we raise in the paragraphs above, what follows is an effort to look at the same matter, from the same standpoint, focusing on the same variables, and within the same population sample in three domains that tend to be considered separately.

5.2. Research questions and hypotheses

5.2.1. Research questions

The general overarching research question this study is intended to answer is: Which is a stronger predictor in the selection of a source language for CLI in the acquisition of L3 Spanish: typology or L2 status?

In light of the different literature reviews we have offered in previous chapters, it can be anticipated that we will be putting forward divergent hypotheses for the three domains under

investigation. Accordingly, we are going to split the general question into three, as follows:

1. Which is a stronger predictor in the selection of a source language for syntactic CLI in the acquisition of L3 Spanish: typology or L2 status?
2. Which is a stronger predictor in the selection of a source language for lexical CLI in the acquisition of L3 Spanish: typology or L2 status?
3. Which is a stronger predictor in the selection of a source language for phonetic CLI in the acquisition of L3 Spanish: typology or L2 status?

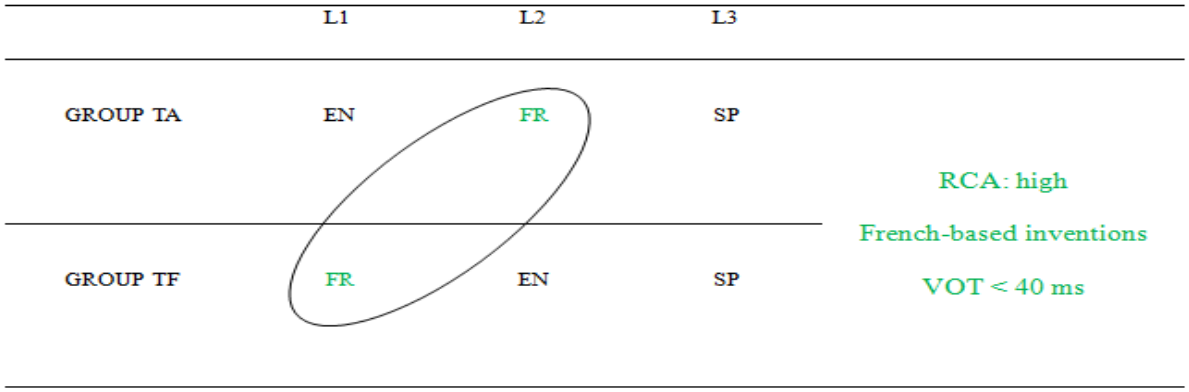
5.2.2. Main hypotheses

Taking into consideration the way in which the research questions are worded, two main hypotheses come to mind:

1. Hypothesis one: typology is the main predictor

In this case, participants from both experimental groups will display a preference for high attachment in the case of the ambiguous RCA sentences, will create lexical inventions mostly traceable to French words, and will produce VOT with French-like values (as per the cut-offs established further below in the data analysis section), as detailed in Table 1.

Table 1. *Hypothesis 1: Expected results if typology is the main predictor*



Taking into consideration previous research on each of the domains in general, and each of the linguistic elements in particular, we predict that this hypothesis will be verified in the case of questions 1 and 2, and falsified in the case of phonetics.

2. Hypothesis two: L2 status is the main predictor

In this case, participants from Group TA (trilingual Anglophones, L1 English-L2 French) will display a preference for high attachment in the case of the ambiguous RCA sentences, will create lexical inventions mostly traceable to French words, and will produce VOT with French-like values (as per the cut-offs established further below in the data analysis section), whereas participants from Group TF (trilingual Francophones, L1 French-L2 English) will display a preference for low attachment in the case of the ambiguous RCA sentences, will create lexical inventions mostly traceable to English words, and will produce VOT with English-like values (as per the cut-offs established further below in the data analysis section), as portrayed in Table 2. Based on previous findings, we predict our findings will either fully or partially support this hypothesis in answering question 3.

Table 2. *Hypothesis 2: Expected results if L2 Status is the main predictor*

	L1	L2	L3	
GROUP TA	EN	FR	SP	RCA: high French-based inventions VOT ≤ 40 ms
GROUP TF	FR	EN	SP	RCA: low English-based inventions VOT ≥ 61ms

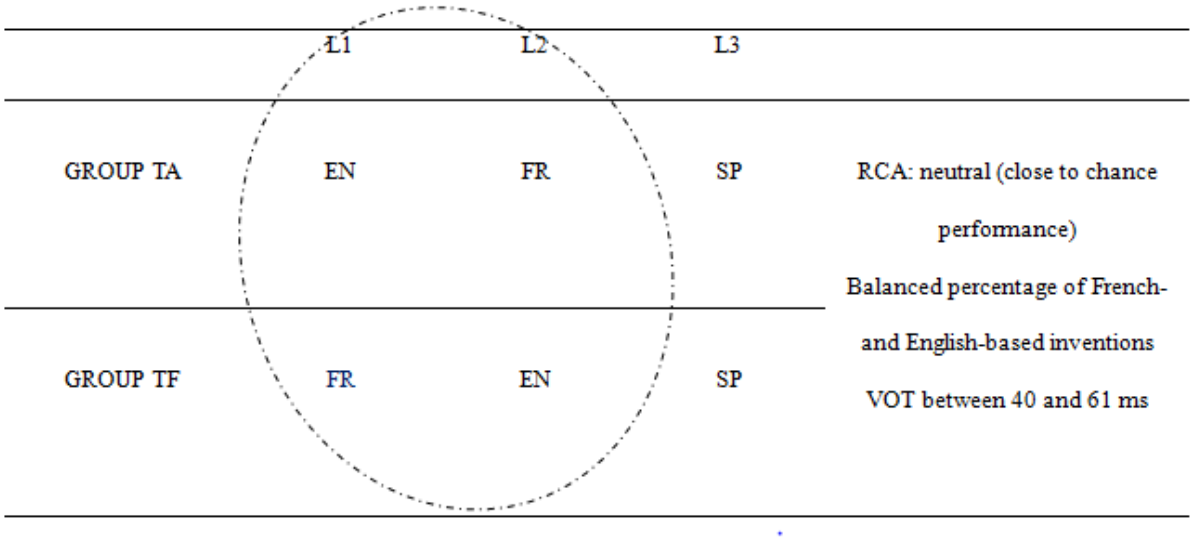
5.2.3. Additional potential outcomes

Drawing from some insights offered by the reviews of the literature presented earlier, several alternative outcomes cannot be overlooked. As exhaustive as we would like to be in considering other scenarios, we will limit ourselves to those we believe to have a chance to occur, and we will call them potential outcomes. Should our results reveal an unpredicted finding, it will be accounted for in the discussion section.

1. Potential outcome 1: combined CLI obtains

It is possible that no clear pattern emerges from the data, and that attributing the role of default supplier of CLI to one of the two PALs is not a straightforward matter, which is the scenario contemplated in Table 3.

Table 3. *Potential outcome 1: Expected results if combined CLI obtains*



This outcome is rather likely in the case of question 3, where most L3 voiceless stops could be produced with an intermediate value indicative of an underlying influence of the L1 on the L2. In addition, we could find attachment preference percentages that do not show a clear tendency to

associate the RC neither to the low nor to the high attachment site. Lastly, participants could be resorting equally to English and French words in order to create inventions in Spanish.

2. Potential outcome 2: the L1 is the main predictor

In this case, participants from Group TA will display a preference for low attachment in the case of the ambiguous RCA sentences, will create lexical inventions mostly traceable to English words, and will produce VOT with English-like values (as per the cut-offs established further below in the data analysis section), whereas participants from Group TF will display a preference for high attachment in the case of the ambiguous RCA sentences, will create lexical inventions mostly traceable to French words, and will produce VOT with French-like values (as per the cut-offs established further below in the data analysis section), as indicated in Table 4.

Table 4. *Potential outcome 2: Expected results if the L1 is the main predictor*

	L1	L2	L3	
GROUP TA	EN	FR	SP	RCA: low English-based inventions VOT ≥ 61 ms
GROUP TF	FR	EN	SP	RCA: high French-based inventions VOT ≤ 40 ms

3. Potential outcome 3: target-like behaviour is displayed

Since we are dealing with high-intermediate to advanced learners, we could find that for the most part the linguistic properties under investigation have been acquired, in which case participants will approximate our control groups' behaviour. Our Spanish monolingual controls are expected to attach high, and produce voiceless stops with a VOT that falls under 40 ms (as per the cut-offs to be established further ahead), as shown in Table 5. Please note that no control data was collected for lexical inventions, as will be justified later in this chapter.

Table 5. *Potential outcome 3: Expected results if participants approximate native-like norms*

	L1	L2	L3	
GROUP TA	EN	FR	SP	RCA: high Target words / Spanish-based inventions VOT ≤ 40 ms
GROUP TF	FR	EN	SP	

5.3. Participants

5.3.1. Experimental groups

For the present study, two experimental groups were recruited. The first group, henceforth Group TA (trilingual Anglophones), consisted of 12 L1 Canadian English (CEn) speakers with an advanced knowledge of Canadian French (CFr), their L2. The second group, henceforth Group

TF (trilingual Francophones), was made up of 12 L1 CFr speakers with an advanced knowledge of CEn, their L2. All of them were high intermediate to advanced learners of Spanish, their L3. Their linguistic profile is summarized in Table 6. Informants were recruited either at different colleges and universities in Montreal and Ottawa, or through the organizers of two Spanish conversation clubs in the Ottawa-Gatineau region. As such, they did not form as homogeneous a group as desired, especially in terms of age. Note that the age range was 19 to 62 (mean age= 28.2, SD= 13.5) for participants in Group TA, and 20 to 56 (mean age= 42.7, SD= 15.2) for those in Group TF. All of them signed a consent form in their L1, and received a monetary compensation for their time.

In order to be included in the two main experimental groups, the recruited candidates needed to meet three main criteria: i) they were not simultaneous bilinguals (i.e., they had not learnt both English and French as two L1s), ii) they were more proficient in their L2 than in their L3, and 3) they had no knowledge of any languages besides English, French and Spanish.

5.3.2. Control groups

In our increasingly multilingual world, monolinguals are becoming outnumbered by speakers of at least two languages, and therefore informants who have never studied and do not use a second language are rare to come by. Within Canada, this is particularly true in Ontario and Quebec, the two provinces where data collection was carried out. As a result, our three control groups are made up mostly of functional monolinguals, that is, of speakers who live in an L1-dominant environment, interact in their L1 as part of their daily routine, and are seldom exposed to other languages. For the most part, they have had some formal instruction in a second language but hardly ever use it, and do not feel comfortable when they have to engage in conversation in their

L2. Crucially, they have never lived in a setting where their L2 is the community language. This applies to a greater extent to participants in the Spanish control group, henceforth Group MS (Spanish monolinguals), which was composed of 14 informants aged between 19 and 38 years (mean age= 26.8, SD= 6.8). They were recruited in a small town in a monolingual region of Northern Spain, and are therefore native speakers of Castilian Spanish (CSp).

Participants in the monolingual Anglophone group, henceforth Group MA (*n*= 7), were recruited mainly in Ottawa, where they currently live, although they may have been raised in other English-speaking Canadian provinces. Their mean age was 48.6 (SD= 13.1). For their part, informants in the monolingual Francophone group, henceforth Group MF (*n*= 7), were recruited in two small towns in the province of Quebec. Their mean age was 40.3 (SD= 18.8). As previously suggested, they indicated a low level of L2 proficiency and did not consider themselves bilingual.

Table 6. *Language profiles of participants in our control and experimental groups*

Group	*n*	L1	L2	L3
TA	12	CEn.	CFr. (Ad.)	Sp. (In-Ad)
TF	12	CFr.	CEn. (Ad.)	Sp. (In-Ad)
MS	14	CSp.	En. (Be.)	x
MA	7	CEn.	CFr. (Be.)	x
MF	7	CFr.	CEn. (Be.)	x

5.4. Instruments

Among the instruments used for data collection, some were devised for this experiment (picture

naming tasks, content questions tasks), others were adapted from previous studies (language background questionnaire, reading lists), and yet others were taken from the web (proficiency tests). Their aims and characteristics are described throughout this section and, except for the proficiency tests, the materials themselves can be found as appendixes.

5.4.1. Language background questionnaire

The language background questionnaire (LBQ) was included in order to obtain information on the participants' language acquisition history and use. It was taken, with minor modifications, from the Language Acquisition Research Lab (LAR Lab) at the University of Ottawa, and has been used by a series of members in a number of studies. This questionnaire was key in ensuring the informants' suitability for participation, since they were asked to state the number of languages they spoke and the order in which they were acquired. In addition, it provided us with a self-assessment of proficiency in the participants' non-native languages.

5.4.2. Proficiency tests

The second measure of proficiency in the participants' L2 and L3 was obtained via a set of standardised grammar tests readily available on-line. In fact, they are the on-line version of the placement tests used by the University of Oxford Language Centre (which can be found here: http://www.lang.ox.ac.uk/tests/index.html). They seemed particularly appealing for this type of study because: i) they were quick to administer and less demanding than other available proficiency tests, ii) they were comparable to each other, as they shared the same format (50 multiple choice questions) and came from the same source, iii) they were easy to mark, and iv) results were easy to interpret. The main argument against using them could have been that they

privilege the European varieties of English, French and Spanish. Fortunately, none of the participants seemed taken aback by that fact.

5.4.3. Picture naming tasks

For their first experimental task, participants were asked to engage in a picture naming task, devised to elicit lexical inventions. It is common in works on L3 lexis to gather data through open-ended or semi-guided interviews, the (re)telling of a story or even picture descriptions, the latter being my choice of task for a previous study (Llama, 2008). While it proved to be a successful method in terms of number of collected lexical inventions, many of them had an ambiguous source, that is, they could be traced both to an English and to a French word. Let us consider for example the invention "cuple" (target word: *pareja*), adapted from the word "couple", a cognate in English and French. Data of this sort does not help answer our research question in a straightforward manner. Hence, this time around it was decided to employ a more controlled task that: i) offered clear opportunities of collecting inventions traceable to just one previously known language, and ii) limited the range of potential inventions, increasing comparability across participants' productions.

Participants were presented with 40 carefully selected pictures displayed, one at a time, on a computer screen through a web application that was created ad hoc and runs on Wamp Server. They were asked to provide the name for the object they saw, as well as the preceding indeterminate article. Each picture depicted a single object, was preceded by the question *¿Qué es esto?* (*Que'est-ce que c'est?,* in the case of the French task, and *What is this?*, in the case of the English one), and followed by *Es*, *C'est* or *It is* and two blanks, as shown on Figure 3.

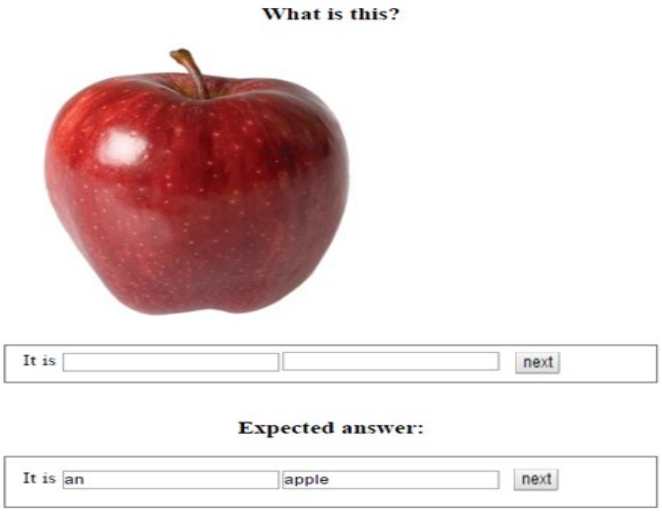


Figure 3. *Sample screen capture from the picture naming task*

The same images were used in the different versions, one per language, of this task. Participants were asked to name all pictures and were given an example, immediately after reading the instructions. The object names belong to one of five categories, depending on whether they are cognates or non-cognates across all three languages, in two languages only, or in none, as detailed in Table 2, where grey cells indicate cognate status.

Given that we targeted words that had a particular (non-)cognate status, and that we also included nouns with matched and mismatched gender in Spanish and French (see example 1 in Table 7), the choice of words at our disposal was rather limited, hence we were unable to control for word frequency. Therefore, and although the program measured and collected response times, they will not be analyzed at this point. Even though the frequency issue would complicate matters should we want to look into reaction times, it could work to our advantage for the purposes of this study, the rationale behind this argument being that not all words should be unknown or hard to guess (to keep frustration levels low), but not all of them can be easy (so we can ensure some guessing on the part of the informants, which may lead to inventions).

Table 7. *Itemized list of tokens for the picture naming task*

	CONDITION	ENGLISH	SPANISH	FRENCH
1.	Non-cognates	a grape	una uva	un raisin
2.	Cognates across all 3 languages (triplets)	a tomato	un tomate	une tomate
3.	Cognates English-French	a cage	una jaula	une cage
4.	Cognates English-Spanish	a curtain	una cortina	un rideau
5.	Cognates French-Spanish	a tree	un árbol	un arbre

Needless to say, the most relevant category of all is 5, while categories 2 and 3 could lead to a facilitative effect of English over French or vice-versa, and categories 1 and 4 will not yield useful inventions, should they occur. For a list and classification of all 40 selected words, please refer to Appendix A.

5.4.4. Comprehension questions tasks

In order to assess CLI at the syntactic level, participants completed an elicited production task by answering a set of questions that targeted either RC attachment preferences (as in 1) or clitic placement (as in 2). On the one hand, the answers to questions like (1) provided us with preference tendencies for each of the groups in each of their language(s). On the other hand, questions like (2), which acted as distracters, were aimed at eliciting clitics in order to analyze their placement. Note that the intended answer to question (2) was: "La ha guardado en el frigorífico". In order to encourage the production of clitics, participants were instructed to provide full sentences. In addition, and anticipating they could repeat the NP as an avoidance strategy, they were told to replace the parts of the sentence that appeared crossed out by an

equivalent element.

1. Someone shot the maid of the actress who was on the balcony.

Who was on the balcony?

2. Alberto ha guardado la tarta de queso en el frigorífico.

¿Qué ha hecho Alberto con ~~la tarta de queso~~?

There were two example questions at the beginning of the task. As for the total number of experimental items and distracters, we created three types of RCs, for a total of 24 tokens, and three conditions for clitics, for a total of 12 items. It may seem short, but we have to keep in mind that the participants completed several tasks, and it was important to avoid fatigue.

In this respect, it is pertinent to recall that the two L3 studies targeting RCA preferences had only eight (as is the case here) and ten ambiguous sentences respectively. In Rothman's (2010) study, all ten ambiguous sentences were joined with the preposition *of* (NP1-of-NP2, as in 3), whereas in Rah's (2010) study, the two NPs were connected with the preposition *of* in some sentences, and with *with* (NP1-with-NP2), in others. Previous studies have shown that the preposition *with* may not cause ambiguity, and that low attachment is preferred cross-linguistically if the two possible antecedent NPs are joined by this preposition (Carreiras & Clifton, 1999; Gilboy, Sopena, Clifton, & Frazier, 1995). Although it is not uncommon to include this type of item in L2 RCA studies, and given that they may confound our findings by creating a bias for low attachment, no items with *with* were included in our task.

Besides ambiguous sentences (as in 3), among the items we can find RCs where either high or low attachment is forced, half of the time via gender (pragmatically, in the case of English) and the other half via number agreement (as can be seen in examples 4 and 5). The exact number of tokens, their description, and some examples are provided in Table 8. It needs to be said that

Table 8 does not reflect the nature of the task, but rather the type of answers that could be elicited by its means.

Table 8. *Itemized list of tokens for the comprehension questions task*.

RC		CLITICS	
8	**Ambiguous NP1-of-NP2**	**4**	**Main verb**
(3) Alguien disparó a la criada del actor que estaba en el balcón.		(6) Juan la comió.	
8	**Non-ambiguous NP-of-NP2 (low attachment forced)**	**4**	**Auxiliary**
(4) Alguien disparo a la criada de los actores que estaban en el balcón.		(7) Juan la ha comido.	
8	**Non-ambiguous NP1-of-NP2 (high attachment forced)**	**4**	**Restructuring contexts**
(5) Alguien disparó a la criada de los actores que estaba en el balcón.		(8) Juan la va a comer. (9) Juan va a comerla.	
24	Total	**12**	

Items intended to elicit attachment preferences were created specifically for this experiment. The Spanish sentences were created first, inspired by examples found in previous studies, such as that of Fernández (2003). Then came the sentences in English and French, which were very similar to but not a translation of the Spanish ones. The complete set of sentences for each language can be found in Appendix B. Unlike was the case for RCA items, those for clitic placement testing were taken and adapted from a grammaticality judgment task used in a previous, longer study (Llama, 2013). In that previous experiment there were four conditions, main verb (6), auxiliary (7),

restructuring contexts (8, 9), and causatives, of which we have kept the first three. The task includes four questions targeting each of the conditions. Again, the number and description of clitic tokens are shown on Table 8.

5.4.5. Word Lists

Three word lists (Appendixes C, D, E) were developed for the third experimental task. This is a commonly used method of gathering VOT measures in a controlled fashion, both in L2 (Flege, 1991; Yavaş & Wildermuth, 2006) and in L3 studies (Tremblay, 2007; Wrembel, 2014). The lists employed by Llama, Cardoso, and Collins (2010) were taken as a point of reference, and modified based on previous experience. Once adapted, our lists consisted of: i) disyllabic or monosyllabic, ii) real words, that iii) contained a "voiceless stop + vowel" sequence in iv) stressed, onset position. It is important to note that, to ensure the comparability of this instrument across the three languages, most French words were monosyllabic (unlike English and Spanish words, which were mainly disyllabic). This was done to force the lexical stress to fall on the initial and targeted syllable, and not on the last one, as is characteristic of French.

In total, each list contained 34 stimuli: ten /p/-, ten /t/ -, ten /k/- initial words, and four training items, which met the same criteria as the experimental tokens, except for the fact that they started with consonants other than voiceless stops. To ensure that all tokens were produced in isolation, they were presented on a computer screen, one word at a time, as part of a PowerPoint presentation. The interviewer was responsible for changing the slides and deliberately created a pause in between stimuli. The 30 target words were randomized with the aid of the generator at www.random.org, and followed the four training items.

5.5. Procedure

For the experimental groups, the data collection took place at the LAR LAB, at the University of Ottawa, or a study room at HEC, the business school of the *Université de Montréal*. Participants from the control groups were tested in a quiet environment of their convenience. Initially, the idea was to meet with participants on three separate occasions, one per language. For practical reasons, however, and in order to prevent withdrawals from the study, informants were tested over the course of two sessions instead. All interviews were conducted by a native speaker of Castilian Spanish for whom English and French are her second and fourth languages respectively.

The first session was always held in L3 Spanish, with the exception of the consent form and the LBQ, which participants filled out in their L1 during the first few minutes. The first half of the second session was devoted to the tasks in the L2, and the second half to the L1 tasks. Each session lasted about one hour.

Aside from the consent form and the LBQ, similar steps were followed in each data collection session. Firstly, the interviewer created some small talk in the language about to be tested. Secondly, and in the case of the L3 and the L2, the participants took the proficiency test as their first task. Thirdly, the participants completed the experimental tasks, namely and in this order, the picture description task, the content questions task, and the reading of the list. To sum up, during the first session, participants filled out the consent form and LBQ in their mother tongue, then took a Spanish proficiency test and completed all the L3 experimental tasks. During the second session, they followed the same procedure twice (proficiency test + experimental tasks), once in their L2, and once in their L1. The reading of the lists was audio recorded using a Zoom H4n Handy Digital Recorder and saved as 16 bit mono files at 44.1 kHz sampling.

6. DATA ANALYSES AND RESULTS

The current chapter provides an account of how the various sets of data were coded, followed by an objective report of results for the proficiency tests, the comprehension questions tasks, the picture naming exercises, and the reading of the word lists. Except for the picture naming tasks, for our experimental data we will be presenting results both from our control and trilingual groups, and we will do so in the following order : L1 data from monolinguals and trilinguals, L2 data from trilinguals, and L3 data from trilinguals. This will allow us to establish how close our trilinguals compare to monolinguals of their L1, and their L2. It will also allow us to trace their L3 performance to the L1 or the L2, if applicable.

6.1. Proficiency Tests

By measuring our participants' L2 and L3 proficiency, we wanted to check whether or not all of them were advanced speakers of their L2s, so that their main non-native languages had a fair chance of competing with their L1s in becoming a source of influence for the L3. It was also important to determine that they were less proficient in their second non-native language, so that we could confidently declare Spanish as the L3 not only in order of acquisition but also with regards to proficiency.

The Oxford Placement tests were one of two measures of proficiency employed in this study. Recall from Chapter 5 that participants had been asked, as part of the LBQ, to self-rate their proficiency in their L2 and their L3. In fact, they assigned themselves one of five levels (beginner, intermediate, advanced, near native and native) for each of the four skills (oral production, oral comprehension, reading, and writing). In going over these proficiency self-reports and when comparing them to the tests scores, we found several mismatches at the

individual and group levels[5]. Therefore self-assessments were disregarded, and participants were classified based only on the scores obtained via the standardized proficiency tests they took. For an example of a mismatch at the individual level, the reader can check participant TA11 (Table 9, right below), who considered him/herself as a native speaker across all skills in French, but only scored 34 out of 50 in the proficiency test. According to the interpretation of scores provided by the Oxford University Language Center, a score of 34 corresponds roughly to an intermediate level, which is far from a native-like command of the language in question. In addition, a comparison between participants TA08 and TA03 (Table 4) uncovers a mismatch at the group level: whereas TA08 believes to be an advanced speaker, reader, listener and writer of French when his/her actual score is 31 (intermediate), TA03 alternates between intermediate and advanced self-ratings, while his/her score, 46, places him/her at the upper intermediate / proficiency level. Table 9 (where OP, OC, RE, and WR correspond to oral proficiency, oral comprehension, reading and writing) provides a summary of self-ratings and test scores for Groups TA and TF respectively.

Table 9. *Proficiency self-ratings and test scores per participant and non-native language.*

	L2					L3				
	Self-ratings				Test	Self-ratings				Test
Participant	OP	OC	RE	WR	score	OP	OC	RE	WR	score
TA01	adv	adv	adv	adv	39	adv	adv	adv	adv	37
TA02	nat	nat	nat	nat	43	beg	int	int	beg	37
TA03	int	adv	adv	int	46	int	int	int	int	38
TA04	nat	nat	nat	nat	47	int	adv	adv	int	39
TA05	nat	nat	nat	nat	45	beg	beg	int	int	24

[5] Admittedly, self-assessing one's proficiency can be a rather subjective process, and we failed to provide participants with a set of guidelines.

TA06	nnat	nnat	adv	adv	40	adv	adv	adv	int	30
TA07	adv	adv	adv	adv	44	int	int	int	int	36
TA08	adv	adv	adv	adv	31	adv	int	int	int	31
TA09	nnat	nnat	nnat	nnat	43	adv	adv	adv	adv	38
TA10	nnat	nnat	nnat	nnat	43	adv	int	adv	adv	44
TA11	nat	nat	nat	nat	34	int	int	int	int	31
TA12	nat	nat	nat	nat	50	adv	adv	adv	adv	40
TF01	nnat	nnat	nnat	nnat	42	int	adv	adv	int	36
TF02	adv	nnat	adv	adv	42	int	adv	int	int	35
TF03	nnat	nnat	nnat	nnat	46	int	int	int	beg	32
TF04	nnat	nnat	nnat	nnat	42	int	int	int	int	30
TF05	nnat	nnat	nnat	nnat	43	adv	adv	adv	adv	43
TF06	nnat	nnat	nnat	nnat	48	int	adv	int	int	27
TF07	adv	adv	adv	int	36	int	int	int	beg	29
TF08	adv	adv	adv	adv	46	int	int	int	int	29
TF09	nnat	nnat	nnat	nnat	45	adv	adv	adv	adv	43
TF10	nnat	nnat	nnat	nnat	42	adv	adv	adv	int	38
TF11	nnat	nnat	nnat	nnat	41	adv	adv	adv	adv	34
TF12	adv	adv	adv	adv	37	adv	adv	adv	adv	39

Test scores can be interpreted in two different ways, as per the cut-offs established by the Oxford University Language Center. For detailed information on both interpretations see Figure 4 (where LSAR stands for Languages for Study and Research, and OPAL is the acronym for Oxford Program in Languages), which contains scoring information taken from their webpage.

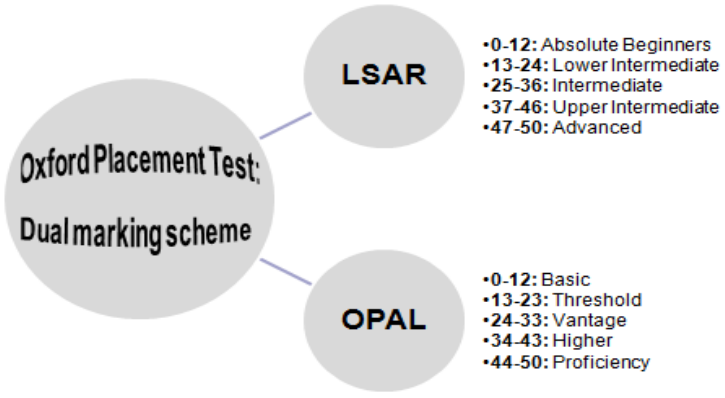


Figure 4. *Levels corresponding to the proficiency test scores (information taken from http://www.lang.ox.ac.uk/tests/tst_placement_spanish.html).*

To determine to what extent our participants fitted our language requirements, we classified participants according to the OPAL's marking scheme. A quick look at Tables 9 (above) and 10 (further below) reveals Group TF is more homogeneous in terms of L2 proficiency. With the lowest L2 score, participant TA08 is actually below the level we expected for the strongest non-native language. Nonetheless, s/he was retained for several reasons. In the first place, s/he completed the French tasks without much effort and the interviewer did not perceive a marked difference in proficiency with respect to other participants. Secondly, despite having scored similarly in French and Spanish, s/he did seem more confident while completing the L2 tasks. Lastly, it was an incredible challenge to find informants with the desired profile and who were willing to participate, and it was decided to finally include her/his data in the analysis, despite the fact that this can become one of the study's drawbacks. When it comes to L3 Spanish, the Anglophone group is again slightly less homogeneous, since both the highest (44) and lowest (24) scores come from Anglophone participants. Generally speaking, informants are less proficient in the L3 than in the L2, as can be seen from Table 5, but still high intermediate to advanced Spanish learners, which corresponded to the desired profile. The mean scores per experimental group and non-native language, along with their corresponding standard deviations, are reported in Table 10.

Table 10. *Mean scores per experimental group and non-native language*

Group	L2		L3	
	Mean	SD	Mean	SD
TA	42.1	5.4	35.4	5.4
TF	42.5	3.5	34.6	5.4

6.2. Relative clause attachment preferences

We will now describe the analysis procedure followed for the data from the comprehension questions task, and how the results it yielded answer Research Question 1. The underlying assumption when designing the task was that trilinguals should display attachment preferences similar to monolinguals of their first and second languages, and that they would transfer their L1 or L2 preferences to the L3. Before we present the results from our experimental groups, we will report the attachment preferences displayed by our control groups. Then, we will compare our monolinguals' preferences to those reported in the literature, and our trilinguals' production to that of our monolinguals.

Statistically speaking, for two sets of data (syntactic, and phonetic) the two experimental groups were compared to each other using Wilcoxon rank-sum tests, and the experimental groups to the monolingual groups using Kruskal-Wallis tests. Initially, the alpha value was set at 0.05. For three-way comparisons, it needed to be Bonferroni adjusted to 0.016. We decided to use non-parametric tests for comparisons because of the small sample sizes within each group. However, their parametric counterparts were also run for sensitivity analysis purposes. The t-tests and the ANOVAS employed on the side of the Wilcoxon rank-sum tests and the Kruskal-Wallis tests yielded very similar outcomes, which speaks to the robustness of our results.

6.2.1. Data Analysis Procedure

As discussed in the Methodology section, the task intended to collect data for the analysis of RCA preferences consisted of 36 questions, 12 of which were distracters. The remaining 24 items included eight ambiguous sentences, and 16 relative clauses that provided disambiguating information, forcing either high or low attachment. All 24 RCA items were coded as high or low,

and percentages were calculated for each attachment site. It becomes evident that only the eight ambiguous ones will help us answer our question, and the statistical tests were only ran on that set of responses. For the most part, it was expected that participants would make use of the disambiguating gender (pragmatic in the case of English) and number cues to provide the correct answers regarding the 16 items for which attachment was forced.

6.2.2. L1 Attachment preferences

6.2.2.1. L1 Spanish

A total of 336 responses were gathered from the Spanish monolingual group, of which 112 corresponded to the ambiguous questions, and 224 to forced conditions (56 forced-low gender, 56 forced-low number, 56 forced-high gender, and 56 forced-high number). As shown in Figure 5, having chosen NP1 slightly over 74% (74.1), and NP2 almost 26% (25.9) of the time, this group clearly prefers to attach high. This finding is in line with most studies conducted on Spanish RCA preferences. As it turns out, these participants did pick high attachment significantly more than low (p= 0.003921). Moreover, participants made no mistakes in the two forced-high conditions, but provided the wrong answer (high instead of low) in 17.8% of the cases when the attachment was forced via gender, and 8.9 % of the time when number was used to force attachment, as illustrated in Figure 5. Please note that, in Figures 5 through 13, the darker column represents the high option in each set (orange for ambiguous sentences, green for forced low attachment, burgundy for forced high attachment), and that we will only focus on the two left-most bars (dark and light orange) to answer our research question.

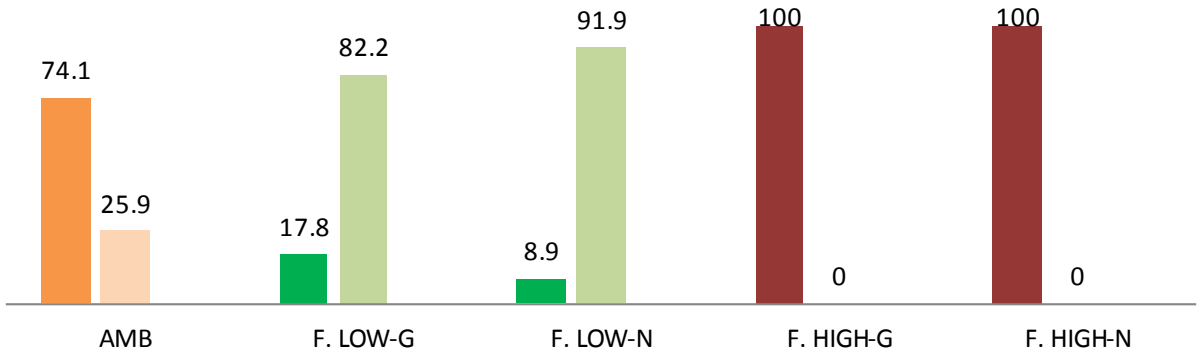


Figure 5. *Group MH percentages of high and low attachment preferences across conditions*

6.2.2.2. L1 French: Group MF (monolingual data)

With half the number of participants than the previous group, only 54 answers in relation to ambiguous RCs were collected. Two answers had to be disregarded because the participants failed to attach the RC to one of the potential host NPs. An additional 112 responses were gathered for the remaining conditions (28 forced-low gender, 28 forced-low number, 28 forced-high gender, and 28 forced-high number). As shown in Figure 6, the percentage of high attachment choice (87%) is higher for this group than for Spanish monolinguals. The statistical analysis uncovered a significant difference between the MF group tendency to attach high or low (p= 0.0206). For the second time, our control group confirms previous preferences reported in the literature. It is worth highlighting here that most studies on French RCA preferences have been carried out with speakers from France. As valuable as those studies can be for us, it was crucial we recruited functional monolinguals of Quebec French, in the event they did not mirror the tendencies usually found in previous experiments.

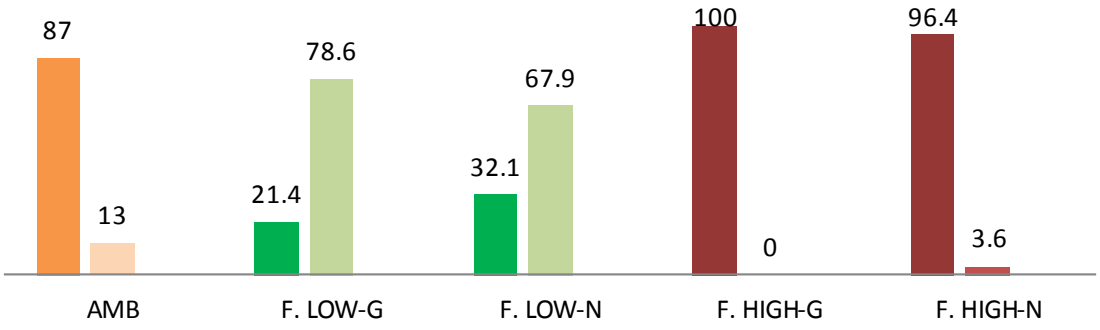


Figure 6. *Group MF percentages of high and low attachment preferences across conditions*

Also displayed in Figure 6 are the percentages for low attachment, both forced via gender and number agreement, as well as for high attachment, again when forced, or disambiguated, via gender and number agreement. Similarly to Spanish monolinguals, the forced low conditions triggered some wrong answers. However, unlike the previous group, gender seemed to work as a better cue than number. That is, there was a higher number of errors in the forced-low conditions, which may suggest a natural tendency to prefer high attachment.

6.2.2.3. L1 French: Group TF (trilingual data)

Do our trilingual Francophones' tendencies pattern with those of their monolingual counterparts? Let us look at the ambiguous condition first. They provided 95 [6] responses, of which 60% went to the low option[7], as indicated in Figure 7. This clearly contrasts with monolingual preferences (only 13% low). When discussing the preferences in French for Group TA, we will see that this has turned to be significantly different for the monolingual and trilingual groups, which points to the fact that these trilinguals do not behave like monolinguals of their L1. When faced with

[6] One answer was invalid because the participant did not attach the RC to either NP.
[7] For a full account of significant vs. non-significant differences in English and French across groups, please refer to Table 11 on page 92.

disambiguated RCs, trilinguals seem to make better use of both gender and number cues in the forced-low conditions, as reflected by a lower error percentage in the forced-low gender (10.4 % vs. 21.4 for Group MF), and particularly in the forced-low number (6.25% vs. 32.1% for Group MF) categories. These numbers can be interpreted as trilinguals not being so inclined to choose the high attachment site, or as paying more attention to linguistic cues. For ease of comparison, there is a table in which we report all percentages for all groups, languages and conditions as Appendix I.

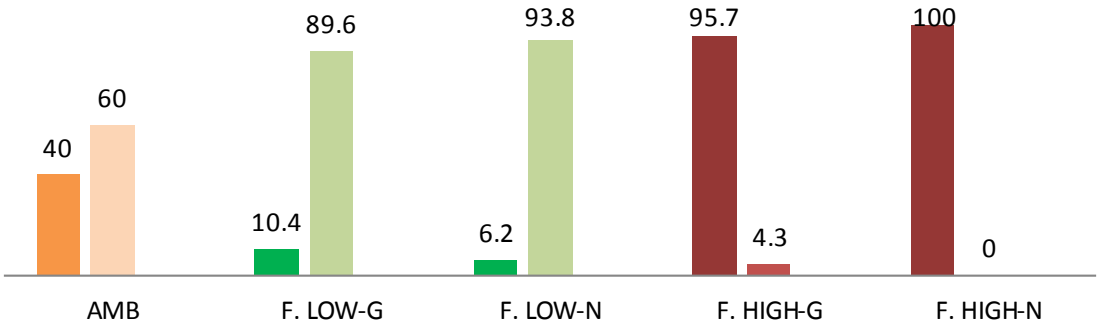


Figure 7. *Group TF percentages of high and low attachment preferences across conditions in their L1 (French)*

6.2.2.4. L1 English: Group MA (monolingual data)

Given that the English and French control groups have an equal number of participants, the amount of collected answers is the same: 56 for the ambiguous condition, and 28 for each (sub-) category in which attachment is forced. Overall, these seven functional English monolinguals interpreted that the RC modified NP2 in almost 70% (69.6) of the cases, as portrayed by the left-most bars (dark and light orange) in Figure 8.

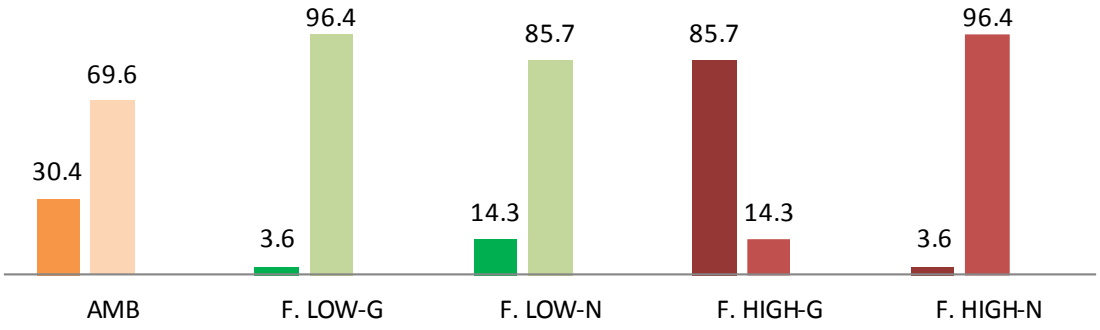


Figure 8. *Group MA percentages of high and low attachment preferences across conditions*

In essence, they too behaved as expected for monolingual speakers of English, and their numbers do go in the right direction and offer somewhat further support claims from most previous work. However, they did so slightly less convincingly than their French- and Spanish-speaking counterparts, and their preference for low over high proved not to be statistically significant (p= 0.07314).

In addition, while monolingual Hispanophones and monolingual Francophones clearly made more mistakes in the forced-low condition, which could be easily explained by the fact that they were being forced to go against the expected natural tendency for them, the errors produced by monolingual Anglophones across both forced conditions are harder to interpret. Since English does not have grammatical gender, and we forced attachment pragmatically, it may be that some sentences were less successful than others in creating an unambiguous link to only one attachment site. It has to be reported that more than one participant made comments about some sentences. One in particular received more comments than others, namely "The detective followed the wife of the tycoon who was seven months pregnant". Comments were along the lines of "For me, it is the tycoon who is pregnant, but what makes sense is to answer that the wife was". This makes us wonder whether other pragmatic cues were less "forcing" than a

pregnancy, and may have led to unexpected answers in a higher proportion than gender cues in the French and Spanish tasks.

6.2.2.5. L1 English from Group TA (trilingual data)

Again, we need to ask ourselves to what extent our trilingual Anglophones mirror their monolingual counterparts' preferences regarding RCA. While Group MA's tendencies were not as marked as Group MF's and Group MH's, our monolingual Anglophones, having opted for the low attachment site 69.3% of the time, still displayed the preference most consistent with reports from the literature. This result was almost replicated in our trilingual data. In fact, in 69 out of their 96 responses, trilingual Anglophones opted for linking the RC to NP2, which translates into a 71.9 % preference for low. Their performance in English is compared to those of the monolinguals and trilingual Francophones in the upcoming sub-section (also, see Table 11). With regard to the forced conditions, they outperformed their monolingual counterparts, producing no errors when forced to attach low, and a low percentage of mistakes (2%) in both conditions in which they were forced to attach high. A full account of this group's percentages is displayed in Figure 9.

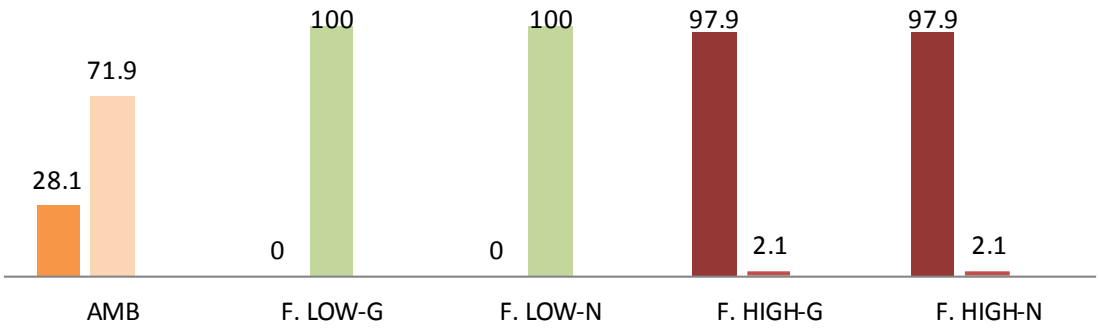


Figure 9. *Group TA percentages of high and low attachment preferences across conditions in their L1 (English)*

6.2.3. L2 Attachment preferences

Let us now turn to the attachment preferences of our experimental groups in their respective L2s. The data we are about to present are key in two main ways. First, they will reveal whether our participants display different trends for their two strongest languages, leaving the door open for transfer from just one of them. Second, if the strategies are in fact language-dependent, they will allow us to determine to what extent each group behaves in their L2s like monolinguals of those languages.

6.2.3.1. L2 French: Group TA

The French comprehension questions task served to elicit a total of 288 responses from our trilingual Anglophones: 96 belong to the ambiguous condition, and 192 to the forced conditions (48 forced-low gender, 48 forced-low number, 48 forced-high gender, and 48 forced-high number). As reported earlier, our French monolinguals had shown a clear preference for high attachment (87%). This was not, however, the case for our trilingual Francophones (Group TF), who seemed to prefer to attach low (60%).

In the case of group TA, there is a slightly greater tendency to prefer low. However, the percentage (58.3), very similar to their Francophone counterparts, makes it hard to tell whether our trilingual groups actually have a preference at all in French. In fact, the difference between trilingual groups was not at all significant (p= ~ 1), but when compared to the monolingual group, their behavior was shown to be significantly different (p= 0.006234). Surprisingly, they show a tendency to outperform French monolinguals with regard to forced attachment in the low condition when the cue is gender (14.6% of mistakes, as opposed to 21.4 by monolingual Francophones, and 10.4% by trilingual Francophones). For a graphical representation of all of

their percentages, please see Figure 10.

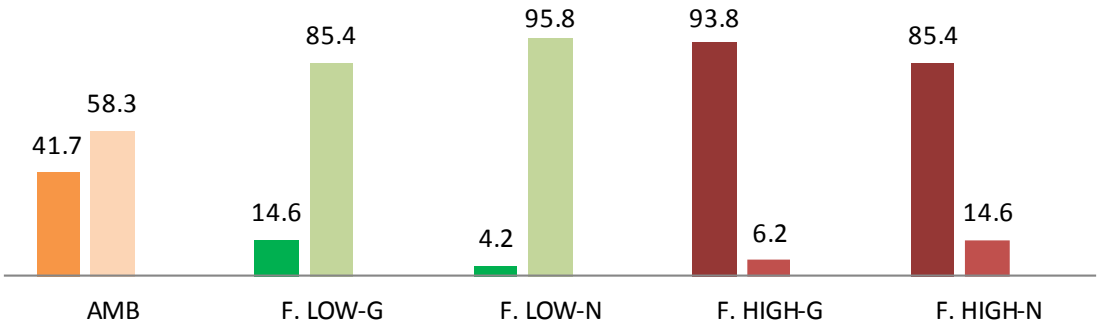


Figure 10. *Group TA percentages of high and low attachment preferences across conditions in their L2 (French)*

This could be interpreted as them having a slight preference for low, or as paying more attention to linguistic cues in general. Moreover, they also outperformed trilingual Francophones when the cue was gender (4.17% of mistakes, as opposed to 32.1 by monolingual Francophones, and 6.25 by trilingual Francophones). Conversely, their performance was poorer in the high condition in comparison to the two groups of French native speakers.

6.2.3.2. L2 English: Group TF

Like Group TA in French, our trilingual Francophones produced a total of 288 responses in English, of which 96 belong to the ambiguous condition, and 191 to the forced conditions (please note that one participant provided an invalid answer for one of the items in the high-forced number sub-category). Recall that our English monolinguals, as expected, did display a tendency to attach low (69.6%). In addition, our trilingual Anglophones replicated this tendency with almost the exact number (71.9%). Although the percentage drops slightly for Group TF, our trilingual Francophones appear to align with the other two groups by choosing to associate the

RC with the second NP (low) in 62.5 % of the cases, as evidenced in Figure 11.

When it comes to the forced conditions, this group is consistently outperformed by trilingual Anglophones across the board, but not in all sub-conditions by monolingual Anglophones. For a detailed comparison across groups, please refer to Appendix I.

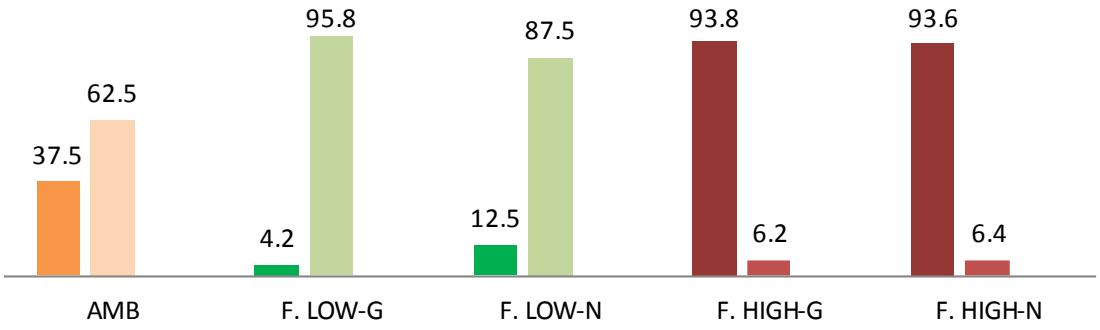


Figure 11. *Group TF percentages of high and low attachment preferences across conditions in their L2 (English)*

6.2.3.3. Interim summary of L1 and L2 preferences in English and French

Before moving on to the Spanish data, we will summarize all French and English data together to clearly show how our experimental groups compare one to the other, and to each of the monolinguals groups of their respective L1s and L2s. All French and English percentages for high and low relating to our crucial condition, ambiguous RCs, are compiled in Table 11, where dark grey cells correspond to monolingual values and three-group comparisons, light grey cells to L1 values from trilingual groups, and white cells to L2 values, and comparisons between experimental groups only.

Table 11. *Control and experimental groups' preferences in French and English for the ambiguous condition*

	Group MF		Group TF (L1)		Group TA (L2)		
Language	H (%)	L (%)	H (%)	L (%)	H (%)	L (%)	*p*
French	87	13	40	60	41.7	58.3	~1.0 0.006234
English	30.4	69.6	37.5	62.5	28.1	71.9	0.5144 0.7706
	Group MA		Group TF (L2)		Group TA (L1)		

p= 0.05 (two-group comparison, white cells)
p = 0.016 (three group comparison, dark grey cells)

As evidenced by Table 11, no significant difference can be reported between experimental groups in either language, and across experimental and control groups for English. In contrast, our experimental groups behave significantly different from our French monolinguals.

6.2.4. L3 Attachment preferences

To a greater or lesser extent, both experimental groups have so far shown a preference to attach the relative clause to the second NP (low), and they have done so for their L1s as well as for their L2s. It is true that preferences in L1 and L2 French are less marked than preferences in English. In fact, the preference for low in the L2 French of Group TA and in the L1 French of Group TF is not far from chance performance. Potential explanations for these findings, as well as whether they add further proof or contradict previous reports for bilinguals, will be provided in Chapter 7. For now, we could predict that, since both groups in both languages tend to attach low, this parsing strategy will be transferred to their L3.

6.2.4.1. L3 Spanish: Group TF

A total of 288 responses in Spanish were gathered from Group TF: 93 correspond to the ambiguous condition, and 191 to the forced conditions (please note that we discarded three invalid answers from the ambiguous set, and one from the forced-low number sub-condition). Recall that our Spanish monolinguals exhibited a high-attachment preference (Figure 5), which is indeed typically attributed to native Spanish speakers. Our trilingual Francophones chose the high NP in 40.9% of the cases, as shown by the dark orange bar in Figure 12, which means that overall they prefer low attachment (59.1%). This tendency is slightly weaker than (and close to) those in their L2 English (62.5%), and their L1 French (60%). With regards to the forced conditions, they seem to find gender cues less helpful than number agreement cues, as evidenced by the error percentages shown in Figure 12, and reported in Appendix F.

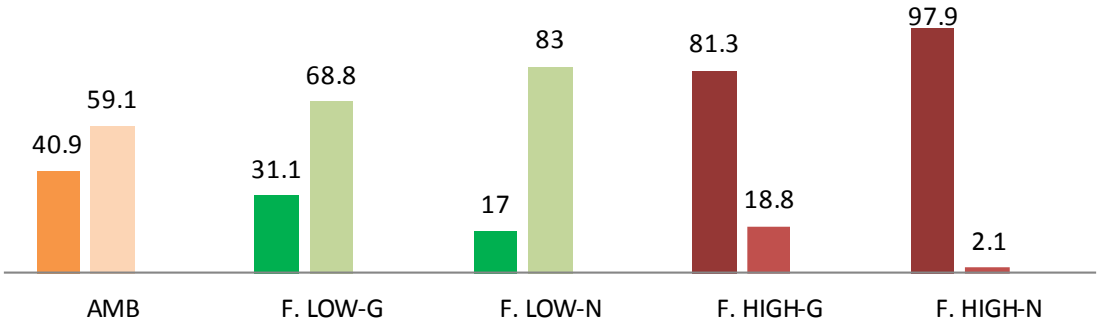


Figure 12. *Group TF percentages of high and low attachment preferences across conditions in their L3 (Spanish)*

Despite this trend to associate the RC to NP2, the Wilcoxon signed-rank sum tests failed to uncover a significant difference in favour of low attachment (p= 0.2691 for French, p= 0.1982 for English, and p= 0.3948 in Spanish), which may indicate that regular exposure to languages with opposing attachment preferences may have led to a neutralized strategy that is being applied in the L1, the L2, and the L3. That said, given the slight preference for low, and because low is

considered to be the attachment of preference in English rather than French, we argue for the presence of regressive transfer, to a certain extent, towards their L1 from extensive exposure to English. In turn, this predisposition to opt for low seems to be passed on to the L3.

6.2.4.2. L3 Spanish: Group TA

With no invalid answers for the ambiguous RCs, we gathered a total of 96 answers corresponding to that condition, and 191 corresponding to the forced ones. Similarly to our Spanish monolinguals (although in a lower proportion), and in contrast to Group TF, our trilingual Anglophones' percentages were higher for the high attachment option (55.2%) than for the low one, as indicated by the dark orange bar in Figure 13, but very close to chance performance. In their case, the Wilcoxon signed-rank sum tests uncovered a significant preference for low for English only (p= 0.007722), and neither for French (p= 0.5893), nor for Spanish (p= 0.2447). When it comes to the RCs containing disambiguating information, trilingual Anglophones are less sensitive to gender cues than trilingual Francophones, which in turn were less sensitive than Spanish monolinguals, as can be seen by the percentages of error reported Figure 13, and in Appendix F.

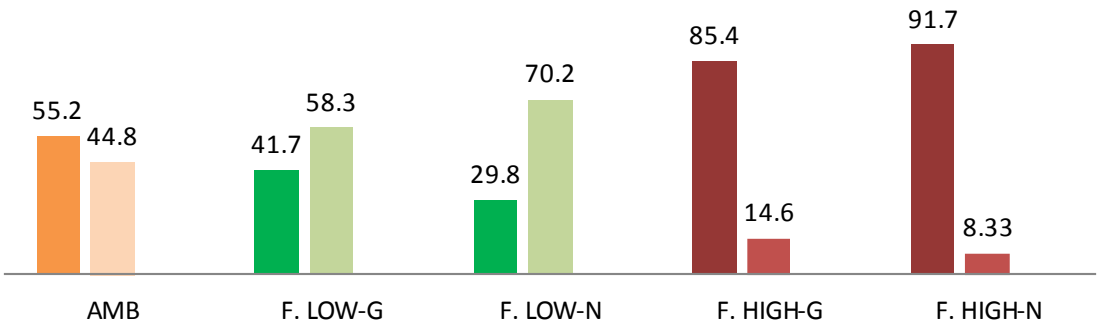


Figure 13. *Group TA percentages of high and low attachment preferences across conditions in their L3 (Spanish)*

6.2.5. Further analysis of Group TF

Unlike Group TA, Group TF shows a non-native preference in the attachment to RCs in their L1 French. We hinted above that this may be due to extensive, immersed exposure to the L2. However, not all of our trilingual Francophones live in an L2 context, i.e. six of them live in a rather bilingual but French-dominant city, Montreal.

In an effort to better untangle the effects of exposure in a non-native immersion situation, we will further sub-divide our experimental Group TF as follows: Group TFO (Ottawan trilingual Francophones) and Group TFM (Montreal trilingual Francophones). Given that, in order to answer our Research Question 1, we only need to focus on the ambiguous condition in Table 12 we report high- and low-attachment percentages for that condition alone.

Table 12. *Group TF percentages of preferences per language for the whole group, and for each sub-group according to their place of residence*

	L1 FRENCH		L2 ENGLISH		L3 SPANISH	
	H (%)	L (%)	H (%)	L (%)	H (%)	L (%)
Group TF	40	60	37.5	62.5	40.9	59.1
Group TFM	50	50	56.25	43.75	59.6	40.4
Group TFO	29.2	70.8	22.5	77.5	21.8	78.2

As indicated in Table 12 (and in Appendix F), Francophones living in an English-dominant context diverge in RCA preferences from those living in a French-dominant one. For the most part, Francophone Ottawans employ an English-like strategy not only in their L2 English, but also in their L1 French (backward influence), and their L3 Spanish. In turn, Francophone Montrealers tend to exhibit less clear-cut tendencies in all three languages, which lean more

toward high attachment in the L2 and the L3. As previously stated throughout this section, these findings will be further discussed in the Discussion chapter.

6.2.6. Answer to Research Question 1

Our results do not confirm our hypothesis 1 that typology would have a stronger impact on how syntactic parsing strategies would get transferred from French, irrespective of order of acquisition, to L3 Spanish. This hypothesis was based on predictions by the TPM, and on a series of previous findings according to which studies on the acquisition of syntactic properties in a Romance-Germanic-Romance (or Germanic-Romance-Romance) scenario hardly ever fail to show a Romance-to-Romance transfer pattern. One of those studies (Rothman, 2010) even reported evidence of a typological effect for RCA preferences from L2 Spanish to L3 Brazilian Portuguese in a group of L1 English speakers. With the aim of shedding light on our puzzling outcomes, and on how they actually diverge from his, we will elaborate on the differences between his study and ours in Chapter 7. As a matter of fact, our study does not even confirm our alternative hypothesis that, should typology be overridden, it would be by the L2, in agreement with predictions by the L2 Status Factor Model. In truth, the question became irrelevant as soon as the preferences for L2 RCA (especially for Group TA) were revealed. At this point, we could argue that our findings are partially consistent with our potential outcome 2 (the L1 as the main source of transfer), but only for Group TF. In our discussion, we may need to resort to accounts from bilingual sentence comprehension research that point to the language of exposure as determining the processing strategy ultimately employed (Dussias & Sagarra, 2007).

6.3. Lexical inventions

Picture description tasks (Llama, 2008) or the re-telling of a story or event (Tremblay, 2004) are common elicitation tools in studies on lexical inventions. Other more controlled tasks, such as a translation exercise (Bois, 2013), have also been employed in the past. In our opinion, translation tasks could privilege the activation of one language over the other, whereas describing a set of pictures or telling a story gives the researcher no control over the cognate-status of the words used as a base for the lexical inventions produced. This could result in a high number of inventions not having a clearly identifiable source (Llama, 2008), especially in cases for which English and French, or even English, French and Spanish share a cognate. For that reason, and as detailed in Chapter 5, we opted for a task that would allow us to prompt participants with images whose names belonged to several cognate-status categories across the L1, the L2, and the L3.

6.3.1. Data Analysis Procedure

At the time of completing the tasks, participants were discouraged to leave any blanks unfilled. Therefore, we were expecting to collect a sample of 960 words, 480 per experimental group. However, this was not the case. In fact, our trilingual Anglophones skipped 23 answers, and our trilingual Francophones, an additional 23, which left us with a total of 914 words. Despite what seems an equative amount of non-answers across groups, participant TA11 is responsible for 14 of them.

Those 914 words were narrowed down in subsequent rounds, as we are about to explain. In the first place, we separated hits from misses. An answer was considered a hit when participants produced the target word, a synonym or even a valid, related, real word in Spanish, as in *dedo* (finger) instead of *uña* (nail). Secondly, among the misses, we discarded any words that seemed

to be a switch[8], due to the fact that they had not undergone any modifications, were not adapted to the orthography of Spanish, nor were an invention, as in *brosse* (French for "brush"). Thirdly, we excluded from the statistical analysis any words with a target-language base, as for example *barredor,* roughly translated as sweeper, which is not the real word for broom in Spanish, but comes from the verb *barrer* (to sweep). Fourthly, two complete categories, that of triple cognates, and the one that included cognates in English and French but not in Spanish, were not taken into consideration for obvious reasons.

In the end, we considered for analysis words coming from categories 1, 4, and 5, as per Table 2 (pages 83-84): non cognates, cognates in Spanish and English to the exclusion of French, and cognates in Spanish and French to the exclusion of English.

At eight words per category, in theory this task could have yielded 24 inventions per participant. However, it needs to be reported that one word in the non-cognate set ended up being reclassified. We are talking about *chaleco* (vest). While it was expected that it would activate either the word "vest" in English or *gilet* in French, the French data collected from our experimental groups revealed that most of our participants considered the image to be a *veston*. This renders the word a cognate in English and French, and prevents us from identifying a clear base language in any related inventions.

We ended up with a corpus of 60 inventions to be submitted to analysis: 19 from Group TF, and 41 from Group TA. They were coded as English-based, as in "drapas" (target: c*ortina*; French: *rideau*, English: drapes), and French-based, as in "balador" (target: *escoba*, French: *balai*, English: broom). It is worth noting that sometimes, although a cognate was available from either

[8] For the purposes of this study, we understand by switch a word that has not been modified from its original form in the source language, i.e. the participant has switched to another language instead of trying to answer in Spanish.

English or French, as was the case of "curtain" (*cortina*), participants seemed to activate a different word (drapes). In addition, we checked that in the "cognate in French" category, inventions were truly French based, and that in the "cognate in English" category, inventions were truly English based. There were some mismatches, as we report in Tables 13 and 14.

6.3.2. Lexical inventions from Group TF

Our trilingual Francophones produced a total of 19 lexical inventions with an identifiable source. A summary of inventions per category, and source is presented in Table 13.

Table 13. *Total production of lexical inventions with an identifiable source from Group TF*

Category	Non-cognates		French-Spanish		English-Spanish	
	EN	FR	EN	FR	EN	FR
Source	1	8	0	6	0	4
Total	9		6		4	

Out of the category that allowed for the true competition between an English and a French word, only one out of eight inventions has an English origin. When French shared a cognate with Spanish and English did not, our Francophones used the French base 100% of the time. In contrast, when English and Spanish shared a cognate but French did not, our Francophones still resorted to French (four out of four, or 100%) and not to English to create a lexical invention in Spanish.

It is evident that the very small sample prevented us from performing any statistical analysis to

uncover a potential significant difference in the use of English vs. French. However, in a proportion of one (5.3%) to 18 (94.7%) in favour of French, the data seems to point to a clear advantage for the closest language to the L3, typologically speaking.

6.3.3. Lexical inventions from Group TA

Our trilingual Anglophones produced a total of 41 lexical inventions with a clearly identifiable source. A summary of inventions per category, and source is presented in Table 14.

Table 14. *Total production of lexical inventions with an identifiable source from Group TA*

Category	Non-cognates		French-Spanish		English-Spanish	
	EN	FR	EN	FR	EN	FR
Source	2	11	1	21	2	4
Total	13		22		6	

Within the non-cognate category, we have again a higher percentage of French-based than English-based inventions. Although not reaching 100% this time, whenever a French cognate was available, it tended to be used (21 out of 22 times) to the detriment of a potential English competitor. As for the English-Spanish cognate condition, Anglophones make a higher use of the English cognate than did the Francophones, but in the end French words still trump English cognates.

6.2.4. Answer to Research Question 2

Our results do seem to confirm our hypothesis 1 that typology would have a stronger impact on the creation of lexical inventions in Spanish, as corroborated by a higher reliance on French by both groups alike.

6.4. VOT

As mentioned in Chapter 4, this section of the study is a partial replica of Llama et al.'s 2010 study. Here is a quick overview of the main changes in this replica: i) the inclusion of L1 data from experimental and control groups, ii) the shortening of the testing instruments, and iii) a slightly different profile regarding the experimental groups. Whereas Llama et al. (2010) tested intermediate learners of L3 Spanish living in Montreal, we interviewed participants at an overall higher level of Spanish who lived either in Ottawa (as was the case of the whole Anglophone group, and six of the Francophones) or in Montreal (the remaining six Francophones).

6.4.1. Data Analysis Procedure

In addition, we will be introducing some novelties regarding data analysis, namely a three-way classification of degrees of aspiration, as opposed to the aspirated-unaspirated distinction reported in the original study. Before doing so, however, we will report VOT means for the L1s, L2s and L3s of all groups, as applicable, for ease of comparison with previous studies.

The program PRAAT 5.3.78 (Boersma & Weenink, 2014) was used to perform the acoustic analysis of a total of 1,797 tokens. As is standard in the literature, VOT measurements correspond to the interval between the stop burst and the beginning of regular vocal fold vibration for the production of the following vowel. The values corresponding to such interval

are reported in milliseconds (ms).

We initially included combinations of /p t k/ + low, mid and high vowels, as can be seen in Appendixes C, D, and E. However, /t/ tends to affricate in Canadian French when followed by a high vowel, which results in the lengthening of VOT. For purposes of consistency, we excluded from the analysis not only those problematic /t/ combinations, but all "voiceless stop + high vowel" sequences, which left us with six /p-/, six /t-/, and six /k-/ tokens per participant and language. In very rare cases, certain tokens were excluded from the final analysis due to either mispronunciation or an unclear waveform.

Given that we are trying to explore the interplay among our participants' phonological systems, we need to clearly establish what values will be considered as being English-like, and which as French- and Spanish-like. Moreover, since many studies claim to have found hybrid or intermediate values in bilingual and multilingual speakers, we should make an attempt to operationalize what an intermediate value is. The main difficulty lies in the fact that VOT studies report mean durations but, to our knowledge, a clear definition of intermediate tends not to be provided.

Admittedly, despite having made our decisions based on the literature (Bandeira & Zimmer, 2012; Cho & Ladefoged, 1999; Lisker & Abramson, 1964; Lindblad, 1998, in Johansson, Horne, & Strömqvist, 2001), there is a certain arbitrariness in how our cut-offs have been established. Firstly, we draw on Cho and Ladefoged's (1999) description of velar stops, according to which an arbitrary line at 50 ms could separate aspirated from unaspirated stops. Given that there are some perception studies (Lindblad, 1998, in Johansson, Horne, & Strömqvist, 2001) that have established the threshold for aspiration to be perceived at 40 ms, and in order to accommodate velar stops as much as possible, we propose a first cut-off for unaspirated stops at 0-40 ms.

Secondly, we turn to Lisker and Abramson's (1964) claim that English [p^h, t^h, k^h] occupy the +60 to +100 ms range of the VOT continuum to propose a second cut-off, for aspirated voiceless stops, at 61 ms and over. The range that lies in between, 41 to 60 ms, will correspond to our semi-aspirated or intermediate category. To our knowledge, one previous study (Bandeira & Zimmer, 2012), mentions Cho and Ladefoge's (1999) four-way classification (there is a highly aspirated category for plosives exceeding 100 ms) as a convenient tool to explain VOT transfer between languages with strong vs. no aspiration. In the end, however, they only report VOT means.

In the following pages, we will be reporting: i) mean VOTs and degrees of aspiration for L1 data, ii) for L2 data, and iii) for L3 Spanish data. The relevant comparisons to control data and to the values reported in the literature will be included as applicable. As was the case for syntactic data, we performed non-parametric tests in order to reveal any significant differences regarding VOT production across our groups, namely Wilcoxon tests for comparisons between two groups, and Kruskal Wallis tests when three comparisons were being made. Initially, the alpha value was set at 0.05. For three-way comparisons, it needed to be Bonferroni adjusted to 0.016.

6.4.2. L1 VOT values

6.4.2.1. L1 Spanish

The Spanish word list yielded a total of 252 tokes for analysis from Group MH. Means produced per stop (/p/=15.13, /t/= 18.35, /k/=31.03) are in line with monolingual values from previous studies. A graphical representation (Figure 14) will be provided, together with English and French monolingual values on page 110. In the meantime, Table 15 presents our means (grey cell) alongside those reported by Rosner, López-Bascuas, García-Albea and Fahey (2000) and

Poch (1984), also for Castilian speakers. It has to be noted that, in their study, Rosner and his colleagues compared the Castilian variety with data from Guatemala, Peru and Venezuela, as reported by Williams (1977). While there may be some differences in means across varieties, the key piece of information here is that all reported means for Castilian, Guatemalan, Peruvian and Venezuelan voiceless stops fall within the range corresponding to unaspirated stops. Therefore, higher means in the Spanish production of our experimental groups should not be traced to exposure to the Spanish spoken in a particular country, but rather to exposure to (an) aspirating language(s).

Table 15. *Mean VOT (ms) for monolingual speakers of Castilian Spanish*

/p/	13.10	17.18	15.13
/t/	14	19.75	18.35
/k/	26.50	29.01	31.03
	Rosner et al. (2000)	Poch (1984)	Group MS

As explained in the previous section, each group's acoustic measurements were also used to code each token as aspirated, semi-aspirated or non-aspirated. Surprisingly, we found slightly aspirated stops in the production of some of our Spanish monolinguals. It has to be acknowledged, nonetheless, that semi-aspiration has already been reported for other non-aspirating languages, such as Brazilian Portuguese (França, 2011; Reis & Nobre-Oliveira, 2008; Schwartzhaupt, 2012). A full account of degrees of aspiration in the voiceless-stop production of our Spanish control group is provided in Table 16.

Table 16. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group MS*

	MEANS	PERCENTAGES		
		aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	15.13	0	1.19	98.81
/t/	18.35	0	0	100
/k/	31.03	0	11.9	88.09

6.4.2.2. L1 French: Group MF (monolingual data)

The 126 tokens obtained from Group MF via the reading of the French word list yielded the following means per stop: 19.33 ms for /p/, 23.81 ms for /t/, and 43.85 ms for /k/. Again, these means are portrayed in Figure 14, further below. These values are without a doubt higher than expected in the case of the velar stop. A classic study often cited as reference for Quebec French is that of Caramazza and colleagues (1973), in which the mean for /k/ in Montreal is 32 ms. However, a more recent study by MacLeod and Stoel-Gammon (2009) reports higher values than we do. Note that MacCleod and Stoel-Gammon did not test /k/. It may be the case that, as monolingualism decreases, voiceless stops means increase in Montreal, where contact with English is ubiquitous. To a lesser extent, this trend may be spreading all over the Province of Quebec. In Table 17, we provide our means as well as means from the two studies we have just cited.

Table 17. *Mean VOT (ms) for monolingual speakers of Canadian French*

/p/	18	35	19.33
/t/	23	35.8	23.81
/k/	32	---	43.85
	Caramazza et al. (1973)	MacLeod & Stoel-Gammon (2009)	Group MF

How do these values translate into degrees of aspiration for our Francophone control group? We already find a drop in non-aspirated production, semi-aspiration spreads to a completely unaspirated category in Spanish, bilabials, and experiences a sharp increase in velars. The most surprising finding is, nonetheless, the presence of fully aspirated stops, as evidenced by the percentages reported for /k/ in Table 18.

Table 18. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group MF*

		PERCENTAGES		
	MEANS	aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	19.33	0	2.38	97.62
/t/	23.81	0	2.38	97.62
/k/	43.85	7.14	52.38	40.48

6.4.2.3. L1 French: Group TF (trilingual data)

We elicited a total of 216 tokens for analysis from Group TF. At 23.33 ms, their mean for /p/ is rather similar to Group MF. In fact, it is also close to the one reported by Caramazza et al. (1973), and lower than MacLeod and Stoel-Gammon's (2009). As the place of articulation moves further back, the mean increases to 34.37 ms for /t/ and 51.05 ms for /k/, the highest mean reported here for French so far. These values, along with French means from the control group and the other experimental group are graphically represented in Figure 15, in the upcoming sub-section.

As per their degrees of aspiration, we can see how not only /k/ but some instances of /t/ are being fully aspirated by this group, as revealed by the percentages reported in Table 19.

Table 19. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TF*

		PERCENTAGES		
	MEANS	aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	23.33	0	9.72	90.28
/t/	34.37	5.63	18.33	76.04
/k/	51.05	29.17	48.61	22.22

6.4.2.4. L1 English: Group MA (monolingual data)

As was the case with the French monolingual group for French, 126 tokens were obtained from Group MA via the reading of the English word list, which resulted in the following means: 74.57

ms for /p/, 85.08 for /t/, and 89.2 for /k/. When compared to reference values from the literature for Canadian English (Caramazza et al., 1973; Neary & Rochet, 1994), as we do in Table 20, it becomes obvious that our monolinguals consistently produce higher values across the board.

Table 20. *Mean VOT (ms) for monolingual speakers of Canadian English*

/p/	62	68	74.57
/t/	70	74	85.05
/k/	90	79	89.02
	Caramazza et al. (1973)	Neary & Rochet (1994)	Group MA

Moreover, in their production we find no instances of unaspirated stops, and very few semi-aspirated ones, as expected. For a summary of their percentages of aspirated and semi-aspirated voiceless stops, check Table 21. In sum, data from our monolingual Anglophones is in line with results from previous studies as well as with descriptions from the literature (Lisker & Abramson, 1964). Taken together, the means and the percentages seem to validate the 61+ ms cut-off established earlier.

Table 21. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group MA*

	PERCENTAGES		
MEANS	aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)

/p/	74.57	85.71	14.29	0
/t/	85.05	95.12	4.88	0
/k/	89.02	92.68	7.32	0

6.4.2.5. L1 English: Group TA (trilingual data)

We turn now to the last batch of L1 data. It has been shown in previous paragraphs that trilingual Francophones somewhat departed from monolingual-like French values in that their production displayed a higher percentage of aspiration for velars, and even full aspiration in some alveolars, which was absent in Group MF.

Will trilingual Anglophones present a similar trend in the opposite direction? A glance at their means, /p/ = 61.7 ms, /t/ = 72.1, /k/ = 75.6 ms, makes us suspect so. These means will be graphically displayed along other English values in Figure 15, further ahead.

Despite at least a 10 ms drop per stop with regard to our control group, participants in TA seem to replicate quite nicely means reported elsewhere in the literature, as shown in Table 22.

Table 22. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TA in their L1 (English)*

		PERCENTAGES		
	MEANS	aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	61.7	47.22	37.72	18.06
/t/	72.1	79.16	18.06	2.78
/k/	75.6	91.94	7.32	0

However, their percentages of aspiration, semi-aspiration and no aspiration relating to their voiceless stop production show some deviation from native norms, mainly with regard to /p/.

6.4.2.6. Interim summary of L1 VOT values

Up to now, we have shown how, for the most part, our monolingual groups do produce VOT patterns consistent with previous values reported in the literature for speakers of their respective languages. What is worth noting, however, is the presence of a few aspirated, and over 50% semi-aspirated productions of /k/ in our control Francophone group. In Figure 14, we present a graphical illustration of the exact means obtained from our control groups, which can serve as baseline and point of reference for all the remaining VOT data.

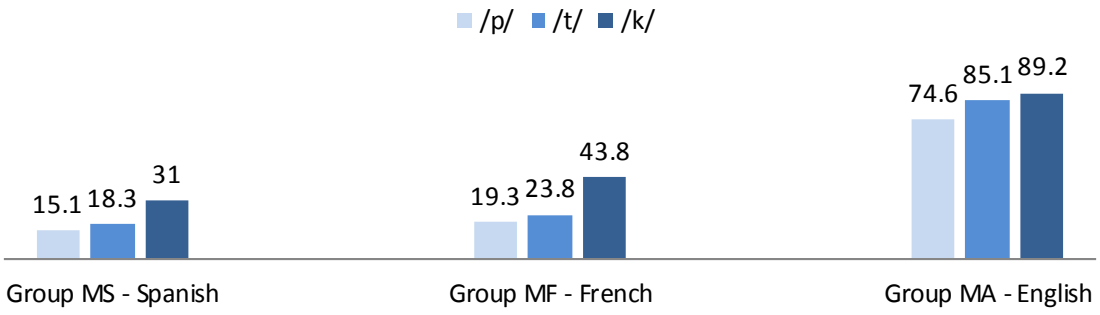


Figure 14. *Mean VOT (ms) in the voiceless stops of monolingual speakers of Castilian Spanish (MS), Canadian French (MF), and Canadian English (MA)*

We have also shown how our participants, who make regular use of their first two languages, and have attained an advanced level of their L2, tend to display slightly higher values in L1 French and slightly lower values in L1 English in contrast to those produced by their monolingual counterparts. This comparison is depicted in Figure 15.

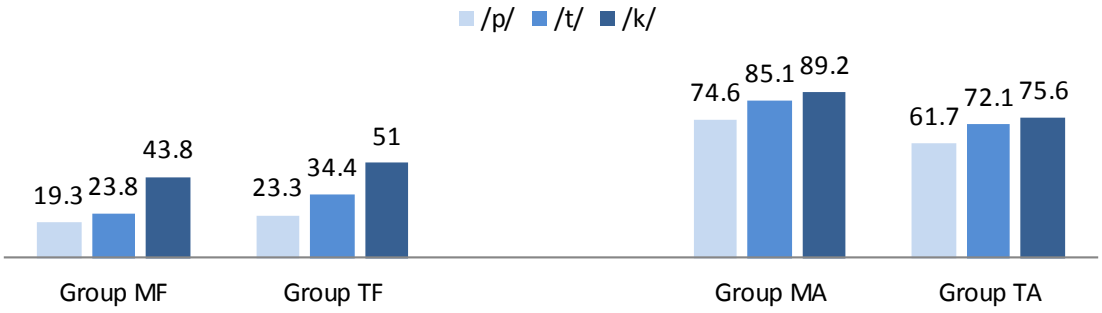


Figure 15. *Mean VOT (ms) in the voiceless stops of speakers of L1 Canadian French (monolingual, MS, and trilingual, TS) and L1 Canadian English (monolingual, MA, and trilingual, TA)*

6.4.3. L2 VOT values

6.4.2.1. L2 French

The French word list yielded a total of 214 (plus two excluded) tokens for analysis from Group TA. Their means per stop are as follows: /p/=45.9, /t/= 53.28, /k/=59.72. They have clearly departed from French native norms, and all means are now over the 40 ms threshold after which aspiration is perceivable. In fact, as can be observed in Table 23, we find instances of fully aspirated segments even for /p/. Nonetheless, we also find target-like productions for each voiceless stops.

Table 23. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TA in L2 French*

	MEANS	PERCENTAGES		
		aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	45.9	26.39	30.56	43.05
/t/	53.28	42.86	22.86	34.28
/k/	59.72	27.78	27.78	20.83

6.4.2.2. L2 English

Exactly like the French word list for Group TA, the English list yielded a total of 214 (plus two excluded) tokens for analysis from Group TF. Except for an increase of roughly 7 ms for velars, their means per stop resemble those of trilingual Francophones in L2 English: /p/= 41.7, /t/= 54.16, /k/= 66.5. In Table 24, we report percentages of aspiration, semi-aspiration and non-aspiration similar to those from the other experimental group.

Table 24. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TF in L2 English*

	MEANS	PERCENTAGES		
		aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	41.7	18.06	33.33	48.61
/t/	54.16	34.72	38.89	26.39
/k/	66.5	65.71	28.57	5.72

6.4.2.3. Interim summary of L1 and L2 VOT values

Statistically speaking, when it comes to L1 and L2 French, no significant differences are found per stop between experimental groups (p= 0.132 for /p/, p= 0.2403 for /t/, and p= 0.9372 for /k/). However, the Kruskal Wallis test points to a significant difference between the experimental and control groups in relation to /p/ (p= 0.001401) and /t/ (p= 0.000805) but not to /k/ (p= 0.08779).

Similarly, when it comes to L1 and L2 English, no significant differences are uncovered by the Wilcoxon tests per stop between experimental groups (p= 0.2403 for /p/, p= 0.1797 for /t/, and p= 0.3939 for /k/). Whereas the Krukal Wallis tests did show significant differences between the experimental group and our controls for /p/ (p= 0.001379), /t/ (p= 0.0008857), and even for /k/ (p= 0.002638).

6.4.3. L3 VOT values

6.4.3.1. L3 Spanish: Group TF

Their L1 production is characterized by a subtle increase in means with respect to monolingual Francophones, which indicates they do not conform to monolingual norms 100% of the time, but still pattern with them in a fairly consistent manner. Their L2 English values, however, fail to reach monolingual standards. How do they fare in L3 Spanish?

The Spanish list helped us elicit 215 (plus one mispronounced) tokens for analysis, from which we obtained the following means: /p/= 19.33, /t/= 26.36, /k/= 44.44. Especially in the case of the bilabials, these trilingual Francophones do approximate Spanish monolingual values. Crucially, they are able to inhibit aspiration in much of their production, as indicated by the percentages of aspirated, semi-aspirated and unaspirated tokens in Table 25.

Table 25. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TF in L3 Spanish*

		PERCENTAGES		
	MEANS	aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	19.3	0	1.4	98.6
/t/	26.4	0	6.9	93.1
/k/	44.4	7	54.9	38.1

In Figure 16 we provide an illustration of Group TF's L3 Spanish, L2 English and L1 French means, in this order. Please note that the left-most group of bars represents Spanish monolingual

values, which have been included for ease of comparison.

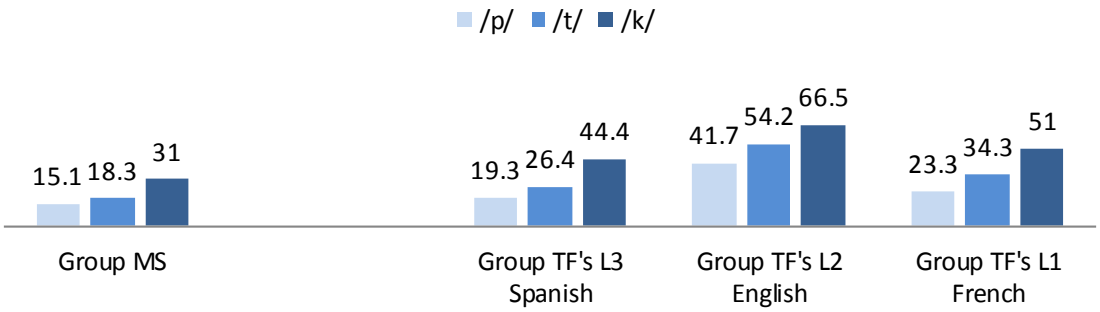


Figure 16. *Mean VOT (ms) in the voiceless stops of Group TF in their L1, L2, and L3*

6.4.3.2. L3 Spanish: Group TA

Mirroring Group TF's performance but in the opposite direction, Group TA's L1 production is characterized by a subtle decrease in means with respect to monolingual Anglophones, which indicates they do not conform to monolingual norms 100% of the time. Nevertheless, it can be said that they still pattern with their monolingual counterparts. As was the case with the previous experimental group, their L2 values, do not reach French monolingual standards.

In Spanish, we elicited 216 tokens for analysis, from which we obtained the following means: /p/= 32.75, /t/= 38.82, /k/= 52.5. Although they have achieved a further reduction of means if compared to their L2, they deviate from monolingual Spanish norms more than the previous experimental group. Crucially, they still produce fully aspirated voiceless stops across the board, as indicated by Table 26. Having said that, their percentages of non-aspiration are particularly high for /p/, and over 50 % for /t/, which indicates target-like production in a considerable amount of their sample. The Wilcoxon tests did not throw any significant differences per stop between control groups (p= 0.132 for /p/, p= 0.2403 for /t/, and p= 0.3095 for /k/). The Kruskal Wallis that compared the experimental with the control group pointed to significant differences

in the case of /p/ (p= 0.001441) and /t/ (p= 0.0001493), most likely traceable to Group TA, but not in the case of /k/ (p= 1.985).

Table 26. *Mean VOT (ms) and percentages of aspirated, semi-aspirated and unaspirated voiceless stops for Group TA in L3 Spanish*

	MEANS	PERCENTAGES		
		aspirated (61+ ms)	semi-aspirated (41-60 ms)	unaspirated (0-40 ms)
/p/	32.75	13.88	18.06	68.06
/t/	38.82	12.5	30.6	56.9
/k/	52.5	37.5	30.6	31.9

In Figure 17 we provide an illustration of Group TA's L3 Spanish, L2 English and L1 French. Again, the left-most group of bars represents Spanish monolingual values.

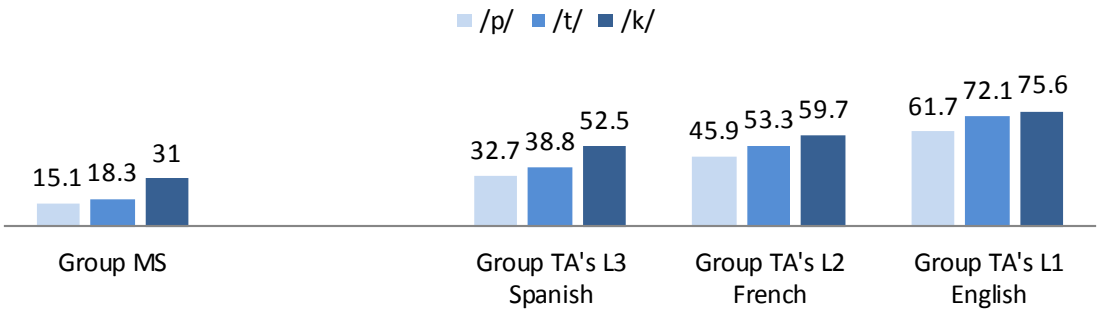


Figure 17. *Mean VOT (ms) in the voiceless stops of Group TA in their L1, L2, and L3*

6.4.5. Answer to Research Question 3

Our results do not allow us to answer our Research Question by clearly resorting to either factor, typology or L2 status. Their potential relative influences will be further discussed in the upcoming chapter. For now, we turn to our potential outcome 1, according to which combined CLI obtains, as the most accurate answer for Group TA (they have retained some aspiration from their L1 in their L2, and in their L3). This finding is consistent with results from previous studies, as already mentioned in Chapter 4. An L1 effect is more evident for Group TF.

7. DISCUSSION AND CONCLUSION

In this work, we have echoed suggestions in the literature to undertake the joint study of several L3 domains with the same group of participants (Bardel & Falk, 2010; Llama, 2008). In order to do so, and in search of a common thread, we turned to three recently developed models of multilingual transfer that stem from the area of L3 (morpho)syntax, extending to and testing their predictions on lexical and phonetic data as well. Moreover, we chose as our target population high-intermediate to advanced learners of the L3, when more often than not those models have been tested at the early and low(er)-intermediate stages of the acquisition process.

Undeniably, this dissertation is made up of three experiments that could function and have been addressed separately throughout most of this work. For the sake of convenience, we proceed to review our findings per research question, and to interpret them in light of the existing literature regarding each topic. Obvious differences aside, in our final summary, we also attempt to establish a comparison of the relative effects, if any, of both factors under investigation with regards to syntactic processing, lexical inventions and VOT at the advanced levels of L3 Spanish.

7.1. Research question # 1

At the outset of Chapters 2, 3, and 4 we offered both an overview of the relevant results pertaining to this L3 sub-field, and a review of previous SLA and TLA findings in relation to the linguistic item under focus. In light of the general findings yielded by the bulk of L3 syntax research, and backed by the main L3 morphosyntax models, we decided to frame our question in terms of the two most referred to factors in previous L3 syntactic studies. The survey of results from bilingual RCA preferences mainly points to language dominance and, crucially, to long-

term exposure to a particular language as the key predictors for the adoption of a high or low processing strategy as far as this type of ambiguity is concerned. We noticed, however, that these findings came from late L2 learners who had moved to the L2 context during adulthood (Dussias, 2003 ; Dussias & Sagarra, 2007), and were exposed to only one of their languages on a regular basis. With alternate accounts suggesting that regular exposure to both languages can result in native-like parsing in the L1 and the L2 (Blattner, 2007), and more recent studies on early bilinguals / heritage speakers providing proof of two distinct attachment strategies in Spanish and English (Jegerski, Keating, & VanPatten, 2014 ; Jegerski, VanPatten, & Keating, 2016; Valenzuela, Borg, Klassen, & Zamuner, submitted), we were encouraged to extend this line of research to trilinguals raised in bilingual cities like Ottawa and Montreal. Our trilinguals had started learning their second language at around the age of seven, and are exposed to at least their two dominant languages as part of their daily routines.

Moreover, the two previous studies on L3 RCA preferences seemed to generate contradicting outcomes : i) language dominance and an L2-to-L3 transfer pattern (Rah, 2010), vs. ii) influence from the typologically closest language to the L3, regardless of order of acquistion (Rothman, 2010). Because of a more similar language combination, we opted for Rothman's study as a reliable indicator of what our results might be, and predicted that our participants would show a clear preference for high attachment in Spanish, an outcome consistent with CLI from French.

It became evident in Section 6.2 that our hypothesis had not been confirmed. Our trilingual Anglophones, living in an English-dominant environment, displayed English-like preferences in their L1. In a less convincing manner, they also prefered to attach low in French. Nonetheless, we see a trend to depart from their L1 attachment strategy in favour of a more neutral choice, which intensifies in the case of Spanish to the point that, in their L3, they opted for attaching

high, although by a minimal difference with regards to low. It is possible that, being exposed to French on a regular basis has had a facilitative (as in not as clear English-like preferences) effect on how these trilinguals parse their L2 /L3. Let us not forget that this exposure happens in an English-dominant context, which may explain why there is no clear switch to L2 preferences, and no strong regressive influence.

In addition, if we forget about the high-low distinction, their numbers are more similar in French and in Spanish than in these two languages and English. Could this be loosely interpreted as a tendency for French and Spanish to be parsed similarly? Even if this were the case, which would indicate that typology is indeed at play, the fact that our Anglophones could be displaying more similar percentages in Spanish and French does not fully confirm our initial hypothesis, because this language also represents our second factor under investigation : the L2 effect. To truly answer our RQ1, we need to understand what happened in the experimental French Group results.

Our initial analysis of their results showed a slight low-attachment preference for all languages alike. With percentages around 60%, the preference is not marked, but would to a certain degree confirm previous findings for late L2 learners: a single strategy determined by the language in which the participants are immersed is applied across the board, irrespective of whether it is their L1 or their L2 (and in our case also their L3). Because their choice in Spanish resembles their choice in French, we could claim that typology does play a role. However, it also resembles their behaviour in English, which downplays this interpretation.

The fact that half of our TF group lived in an L2 context, while the other half lived in an L1 environment, gave us the opportunity to further explore the effect of exposure. Granted, this divided our already small sample size, but we can still gain valuable insights from this exercise.

Once divided, and seeing the overwhelming preference for low attachment in the Ottawa Francophone group, we contend the language-of-exposure account is confirmed. But, why have the preferences of the Montreal group remained rather neutral ? Should they not be overwhelmingly choosing high ? We would like to argue that Montrealers may be more exposed to English than Ottawans to French. Or at least, they may be exposed in a more intense and / or meaningful way. It became evident, from the LBQ and through conversations during testing, that at least two participants had studied in an English university in Montreal, and lived in an English neighborhood. These participants consistently chose low, which may have skewed our results. It also suggests a mismatch between place of residence and assumed main language of exposure. Unfortunately, our LBQ does not allow us to effectively determine how intense each participant's exposure is to each of their languages. This prevents us from further elaborating in this direction, and from strongly concluding we have found an undeniable explanation for our results.

To conclude this section, we offer four potential explanations as to why our results failed to replicate Rothman's (2010), which are : i) the type of bilingual that took part in the study, ii) the type of (long-term) exposure to their different languages, iii) a typological relationship that is not as close between French and Spanish as it is between Spanish and Brazilian Portuguese, and iv) the fact that Spanish and Brazilian Portuguese seem to have been learnt in adulthood in Rothman's study, and may resemble each other in their acquisition process more than French and Spanish in the case of our participants.

7.2. Research question # 2

In contrast to question 1, the data from our picture-naming task offers a rather straightforward answer to our RQ #2. Participants from both groups resorted to French more often than to

English in search for a base to create a lexical invention in Spanish. This was also true even when an English cognate was available as a competitor to a non-cognate French word. We interpret this as further proof of typology as the determinant factor in the selection of a source language for transfer in overcoming a lexical gap in the L3. We understand that the small size of our sample limits the strength of this finding. Nonetheless, having designed a task to elicit lexical inventions that allows to play with different cognate status across languages, and putting them to the test, is a contribution of this study, and we believe this is a path worth pursuing in future L3 lexical research.

This outcome is consistent with reports from a series of L3 lexical studies, according to which typology is indeed the crucial factor in promoting lexical CLI in TLA (Bois, 2013; Llama, 2008; Möhle, 1989; Ringbom, 1986; Rossi, 2006; Singleton, 1987). With such uneven number of inventions across groups, we are cautious in claiming that our findings also add further proof to what Rossi (2006) called the "L1 effect"[9]. Since we tend to see typology and L2 status as competitors, it could be expected that when they coincide in one language, their effect intensifies. This could have translated in a higher use of French by the Anglophone Group, and crucially, in a more even use of both languages by the Francophone Group. In fact, it tends to be the opposite, and Anglophones seem to use more English than their Francophone counterparts (Llama, 2008; Rossi, 2006). As per previous studies with larger lexical inventions pools, a typologically distant L1 seems to weaken the effect of a typologically closer L2. By the same token, a typologically close L1 seems to reduce transfer from a typologically distant L2. Our results could be reflecting that scenario. Unfortunately, the number of total inventions is so much

[9] By "L1 effect" Rossi means that the L1 reinforces the effect of typology if the L1 and the L3 are typologically close, and reduces it when they are typologically distant, which translates into more influence from French for Group TF, and less for Group TA.

higher in the Anglophone group that it is hard to tell whether a higher reliance on English is simply caused by the fact that, in a larger sample, English just had a higher chance to play a role.

7.3. Research question # 3

This last question had been answered in a previous, similar study (Llama et al., 2010) as follows : participants from both groups seemed to produce similar VOT means in their L2s and L3, which was interpreted by the authors as an L2-to-L3 transfer pattern. They claimed, however, that their data did not provide an unambiguous answer to their research question, and that their informants appeared to have retained some L1 phonetic traces in their L2. Their second explanation for their findings was combined CLI: the values achieved in the L2 were influenced by their L1, in turn this already-influenced L2 had an impact on perfomance in the L3. It needs to be noted that this double interpretation of results is not uncommon in L3 VOT studies (Tremblay, 2007; Wunder, 2011). Having employed very similar instruments, and tested participants with a relatively comparable profile, do our results help shed more light on their findings ? Can we answer this RQ in a more conclusive manner ?

Let us consider results from our Anglophone Group first. They did, although with lower values than their monolingual counterparts, produce monolingual-like means in their L1. In truth, we found in their report of degrees of aspiration, the presence of unaspirated bilabials, and to a lesser extent, alveolar stops, which points to French influence on their English. However, their mean VOT values were on the high side for their L2, and departed from French native norms (as per comparisons both to the reference values in the literature and to our control group). Nonetheless, there was a trend in the right direction, as evidenced by the production of target-like unaspirated tokens (see percentages reported in Table 23). To our surprise, their mean VOT dropped even

more in their L3 Spanish. Although their L3 values are closer to those of their L2, they are no longer as similar as those reported for the L2 and L3 of the Anglophones in Llama et al. (2010). Because our participants are more proficient in Spanish, it could be that, as suggested by Hammarberg and Hammarberg (1993), the initial L2 influence fades over time and as proficiency increases in favour of influence from the L1 and/or from the L3 itself. The presence of aspiration could be interpreted as the retention of L1 phonetic traits, and the mean drop in L3 values as partial acquisition of target norms.

In the case of our Francophone Group, the French word list yielded L1 values that closely approximate those of our Francophone monolingual controls. In contrast to Anglophone controls (for which we found no unaspirated production), our French monolinguals did produce some fully-aspirated tokens of [k^h]. We believe this finding to be consistent with results from our Spanish monolingual group, and from recent studies on monolingual Brazilian Portuguese. There may be a trend for velar values to increase in non-aspirated languages, even in the absence of meaningful contact/exposure to an aspirating language. As was the case with Group TA, for the L2, there is a trend in the right direction, but they fail to reach native-like production in English. To our surprise, we see a further drop in L3 values from the L1 French, which brings them very close to target-like Spanish norms. The seemingly opposite trends in English (towards aspiration) and in Spanish (towards non-aspiration), make us conclude that there is no clear L2 effect in these data. It could be, as claimed in the previous paragraph, that the L2 effect has faded, or that they have succesfully acquired (at least for the most part) VOT for voiceless stops in Spanish.

There are two findings that, in our opinion, deserve further attention: the failure to replicate Llama et al.'s (2010) findings, and the drop in aspiration in the L3 Spanish of our Anglophone participants with regard to their L2 French. We have anticipated a potential reason behind the

contradicting results from our study and the one we were trying to replicate: the increase in L3 proficiency. We want to add to that, for the most part, participants from the previous study were recruited at Montreal cegeps[10] and universitites, had never travelled to Spanish-speaking countries, and did not seem to associate with Hispanophones as part of their social lives. On the contrary, our participants were older, most of them had been to Spanish-speaking countries, participate in Spanish-conversation clubs in which native speakers also take part, and/or have regular contact with native Spanish speakers. We believe that real, significant exposure to Spanish has contributed to a higher achievement in the production of Spanish voiceless stops.

As to why our Anglophones are better at "de-aspirating" in Spanish than in French, we believe that language exposure can also provide a plausible explanation in this respect. English and French are in constant contact in Ottawa and Montreal, and it is reasonable to assume that our informants are exposed to somewhat accented English or French on a regular basis. In addition, the acquisition of VOT patterns in Spanish may be easier than in Quebec French.

7.4. Summary of findings

As it turns out, except for the lexical task, our research questions could not be answered in terms of the two factors under investigation. In the case of our first question, we believe it is the nature of the phenomenon that may have rendered difficult the interpretation of our results as being caused by either variable. Instead, context of exposure was revealed as an important detail we should have controled for. While our results did not confirm the predictions cast by the TPM, we

[10] Cegeps (French acronym for *collège d'enseignement general et professional*) are Quebec post-secondary education institutions similar to community colleges in English-speaking provinces in Canada. It has to be noted that cegeps are compulsory for those students that wish to attend university in Quebec.

cannot claim that such predictions are not valid for syntactic properties per se, rather than for syntactic processing, which was the phenomenom studied in our case. The main finding regarding L3 phonetics was an underlying presence of L1 traits in the L2 and the L3 of our participants. In the case of the Anglophone Group, this meant not being able to fully deaspirate in the two non-native languages. A higher presence of aspiration in the L2 data may be indicative of exposure to somewhat English-accented French. In the case of the Francophone Group, the L1 effect translated into the approximation to Spanish-native values. Although a typological effect is not the most obvious answer inferrable from the data, we believe that having learnt French had a positive influence in the acquisition of Spanish VOT for both groups.

In a general sense, it seems that at more advanced levels of proficiency typology is still a more determinant factor than the L2 in relation to lexis, or at least, in relation to lexical inventions, as claimed by several previous studies in which authors employed other eliciting methods with intermediate learners. The role both of typology and L2 status seems to take a secondary place with regard to RCA preferences in favour of context of use and exposure, at least for speakers who have been raised in contexts where they get regular exposure to two languages. This finding may not be generalizable from syntactic processing preferences (for which grammaticality does not come into play, and is never discussed in language classrooms) to syntactic properties per se (which are governed by a set of grammatical rules, and are often taught in language classrooms). While the role of typology is not normally discussed in L3 phonological research, it may have had a subtle, facilitative effect on our Spanish VOT values. However, it seems that neither the typological nor an L2 effect are the most plausible explanations for our results. Instead, we contend the L1 has an effect on the extent to which L2 and L3 values approximate native norms. But to be better understood, this L1 effect needs to be coupled with exposure.

7.5. Contribution

In our opinion, we have made several contributions to the field of L3 acquisition in each of the sub-domains and, in passing, to research on RCA preferences, and lexical inventions. As per the organization of content we have followed so far, we detail our main contributions as pertaining to the realms of research on RCA, lexical inventions, and VOT.

To our knowledge, most published work on RCA preferences in French has been carried out on French from France, leaving the door open for other varieties to contradict existing results. An exception to this statement, would be a study by Fernández, Fodor, de Almeida, Bradley, and Quinn (2003). Since their aim was to explore the role of prosodic boundaries and RC length on a potential bias to attach high cross-linguistically, we argue that their data did not compare to previous studies on European French. Therefore, having collected Quebec French data, no matter how small the sample, we are contributing to this topic by providing proof in favour of the same tendency being displayed for both varieties. With regard to L3 RCA preferences, we are the third study to be conducted on the issue. Our contribution lies on the fact that we are providing data for a previously untested language combination. With regards to L3 lexis, and as discussed elsewhere, our main contribution comes from the introduction of a task that allows for the gathering of lexical inventions while giving the researcher some control over the potential sources participants may draw from. We have also discussed at lenght the contributions our study has made by partly replicating the L3 VOT study, so we will not repeat them here.

7.6. Limitations and future research

Whereas, at least in the last section of the study, we made it a point to address some limitations of a previous study, we get to report some limitations of our own. Out of the three that we will be

discussing, two pertain to our groups. It goes without saying that the number of participants per group was far from ideal. We have to acknowledge that we would have liked to have a minimum of 30 participants per experimental group at the time of running our statistical analysis. It has to be mentioned that we did test more candidates than we report here, but not all of them were retained as participants.

A second limitation regarding our participants is the lack of group homogeneity. This is a common complaint among L3 researchers, and one of the biggest challenges in the field. We were glad to be able to turn this limitation into a positive happenstance. In the end, having tested Francophones from two different cities (crucially two cities believed to provide different language immersion opportunities) allowed us to take a peak into the role of language exposure, a variable we had not considered initially.

The third limitation pertains to the testing procedure. We collected the L3 data in the first testing session. A second testing session, that usually took place a week after the first, was devoted to the L2, and then the L1 tasks. In our opinion, this could have led to a high activation of the L2 during L1 testing, and to enhance regressive transfer into the L1. Ideally, participants should have met with the interviewer in three separate occasions. But this increased the risks of participants withdrawing from the study.

In making suggestions for future research, we could first take into consideration the three limitations reported above. As much as possible, future studies should include larger, more homogeneous groups, and arrange one testing session per language studied. Have we had larger groups, we would have also considered testing the L1 before the L2 in half of our participants. In a different vein, we could make suggestions as to how further explore our three linguistic items, or what to study next. With regards to L3 syntax, we suggest choosing a different topic to further

test the L3 transfer models. With regards to L3 lexis, we think our task can be improved and fine-tuned. While controlling for word length and frequency, as well as for gender (mis)matchings between Spanish and French seems like a tall order, we see potential in using a similar task in a timed version. In fact, we collected reaction times from our participants' responses, but the lack of control for the three issues we have just mentioned, make the reaction times in our data hard to compare and interpret. It is nonetheless a good starting point that can help investigate the effect of cognates in lexical construction attempts, and in provinding insights into the acquisition of L3 grammatical gender by French-dominant, and English-dominant bilinguals. With regards to L3 phonology, it is our intention to further explore our data set by adding speech rate as a variable. As per suggestions for other researchers, we make Llama et al.'s (2010) words our own and suggest shifting the focus of study to segments other that VOT, to uncover a potential different interplay between these trilinguals' three languages.

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APPENDIX A: Picture naming task: Experimental items per condition

		SPANISH	ENGLISH	FRENCH
DIFFERENT IN ALL 3 LANGUAGES	mg* - M	1.un lápiz	a pencil	un crayon
	mg - M	2.un chaleco***	a vest	un gilet
	mg - F	3.una ventana	a window	une fênetre
	mg - F	4.una campana	a bell	une cloche
	mmg** - M	5.una uva	a grape	un raisin
	mmg - M	6.una escoba	a broom	un balai
	mmg - F	7.un reloj	a watch	une montre
	mmg - F	8.un vestido	a dress	une robe
COGNATES ACROSS ALL 3 LANGUAGES TRIPLETS	mg - M	9.un volcán	a volcano	un volcan
	mg - M	10.un desierto	a desert	un désert
	mg - F	11.una bomba	a bomb	une bombe
	mg - F	12.una blusa	a blouse	une blouse
	mmg - M	13.un tomate	a tomato	une tomate
	mmg - M	14.un planeta	a planet	une planète
	mmg - F	15.una nariz	a nose	un nez
	mmg - F	16.una máscara	a mask	un masque
COGNATES SPANISH - FRENCH ≠ ENGLISH	mg - M	17.una lengua	a tongue	une langue
	mg - M	18.una luna	a moon	une lune
	mg - F	19.un árbol	a tree	un arbre
	mg - F	20.un codo	an elbow	un coude
	mmg - M	21.una nube	a cloud	un nuage
	mmg - M	22.una uña	a nail	un ongle
	mmg - F	23.un cuerno	a horn	une corne
	mmg - F	24.un cinturón	a belt	une ceinture
COGNATES SPANISH - ENGLISH ≠ FRENCH	mg - F	25.una piña	a pineapple	une ananas
	mg - F	26.una toalla	a towel	une serviette
	mg - M	27.un mono	a monkey	un singe
	mg - M	28.un sofá	a sofa	un canapé
	mmg - M	29.un plato	a plate	une assiete
	mmg - M	30.un mapa	a map	une carte
	mmg - F	31.una cámara	a camera	un appareil-photo
	mmg - F	32.una cortina	a curtain	un rideau
COGNATES ENGLISH - FRENCH ≠ SPANISH	mg - M	33.un espejo	a mirror	un miroir
	mg - M	34.un jarrón	a vase	un vase
	mg - F	35.una zanahoria	a carrot	une carotte
	mg - F	36.una jaula	a cage	une cage
	mmg - M	37.un sobre	a envelope	une enveloppe
	mmg - M	38.un cepillo	a brush	une brosse

	mmg - F	39.una pareja	a couple	un couple
	mmg - F	40.una cebolla	an onion	un oignon

*mg = matching gender (words under this label share the same gender in Spanish and French)
**mmg = mismatching gender (words under this lable have opposing genders in Spanish and French)
***The French word participants associated to corresponding image we chose for chaleco was veston. Therefore, this word no longer belongs to this category. Once reclassified, it goes to the last category, and should be listed together with espejo and jarron.
Pink cells indicate non-cognate status and matching gender
Red cells indicate non-cognate status and mismatching gender
Light green cells indicate cognate status and matching gender
Dark green cells indicate non-cognate status and mismatching gender

APPENDIX B: Comprehension questions task: Experimental items per condition

8 AMBIGUOUS SENTENCES			
SP	1	a	En la fiesta, Roberto conoció a la novia del dentista que vivió dos años en Rusia.
EN		b	While in New York, Jim ran into the assistant of the attorney that was born in Nicaragua.
FR		c	Pendant ses vancances, Louise a visité le frère de son copain qui parle chinois couramment.
SP	2	a	El periodista entrevistó al marido de la actriz que llegó tarde a la cena de la gala.
EN		b	An armed robber shot the sister of the singer that loved superhero movies.
FR		c	Maude a recontré l'ami du voisin qui a eu un accident au mois de janvier.
SP	3	a	El domingo pasado Ana peinó a la hermana de la vecina que se operó la nariz.
EN		b	Last summer Erika married the cousin of the neighbour who won the lottery.
FR		c	L'an dernier, Luc a divorcé de la cousine du prêtre qui a grandi à Tokyo.
SP	4	a	Marisa saludó al cliente del abogado que se fumó un cigarro dentro de la sala.
EN		b	Elizabeth dated the friend of the neighbour who had a blue car.
FR		c	Ma mère a reconnu la femme du pédiatre qui a survécu au cancer.
SP	5	a	Un perro mordió a la sobrina de la profesora que llevaba una falda de flores.
EN		b	A cat scratched the pupil of the teacher that was carrying a large backpack.
FR		c	Un chien a suivi la fille de l'homme qui a les cheveux blonds.
SP	6	a	Alguien secuestró a la hija del político que estaba de vacaciones en Italia.
EN		b	Someone assaulted the assistant of the movie director that was staying at our hotel.
FR		c	Quelqu'un a tué la bonne de l´acteur qui était sur le balcon.
SP	7	a	Andrea besó al primo del bailarín que tenía un paraguas en la mano.
EN		b	Melanie hugged the friend of the lady that always goes to church on Sundays.
FR		c	L´avocat a défendu l´ami du politicien qui s´était marié avec une femme danoise.

SP	8	a	El chico fotografió al entrenador del atleta que lloraba desconsoladamente.
EN		b	The nurse stared at the patient of the doctor that was reading a German newspaper.
FR		c	L'infirmière a soigné le fils du pilot qui supporte les Canadiens de Montréal.
	4 FORCED LOW ATTACHMENT - GENDER		
SP	9 ms	a	El presidente saludó a la mujer del embajador que estaba vestido de gris.
EN		b	The prison guard searched the wife of the prisoner that had crazy sideburns.
FR		c	La police a arrêté la soeur du gérant qui était boxeur amateur.
SP	10 mp	a	La enfermera tranquilizó a las madres de los niños que quedaron sordos tras la explosión.
EN		b	The reporter photographed the wives of the actors that were nominated for Oscars.
FR		c	Le journaliste a recherché les fiancées des joueurs de tennis qui étaient ravis après le tournoi.
SP	11 fs	a	La policía encontró al abuelo de la niña que estaba dormida en un banco del parque.
EN		b	The priest ignored the godfather of the baby girl who was wearing a beautiful christening gown.
FR		c	Le psycologue a parlé au mari de la chanteuse qui semblait dépressive.
SP	12 fp	a	Tomás conoció a los maridos de las empresarias que estaban enfadadas tras la reunión.
EN		b	Janet welcomed the fathers of the girls that were auditioning for prima ballerina.
FR		c	Un fou a blessé les gardes du corps des princesses qui étaient assises à l'ombre.
	4 FORCED LOW ATTACHMENT - NUMBER		
SP	13 ms	a	El policía interrogó a los hombres de confianza del político que estaba en la cárcel.
EN		b	The deputy PM gathered the advisors of the prime minister that was hospitalized for pneumonia.
FR		c	Le juge a reprimandé les avocats du comte qui a mangé dans la salle du

			tribunal.
SP	14 mp	a	El ladrón hirió a la hija de los marqueses que gritaron al ver la sangre.
EN		b	The hotel director met with the guide of the tourists who were very unsatisfied.
FR		c	Charlotte a critiqué le père des garçons qui hurlaient dans le couloir hier soir.
SP	15 fs	a	El camarero sirvió a las amigas de la famosa actriz que sonreía sin parar.
EN		b	The waiter greeted the aunts of the girl that was wearing a green coat.
FR		c	Olivier adore les secrétaires de la dentiste qui aime prendre du soleil au parc.
SP	16 fp	a	El fotógrafo escribió al representante de las modelos que viajaron a París.
EN		b	Chris befriended the aide of the detectives that were playing poker in the hotel room.
FR		c	Le banquier a embrassé la soeur des coifeuses qui travaillent au centre-ville.
4 FORCED HIGH ATTACHMENT - GENDER			
SP	17 ms	a	Alguien insultó al secretario de la directora que fue despedido por incompetente.
EN		b	The government deported the nephew of the first lady who moved to France as a young man.
FR		c	Marylène a remarqué le neveu de l'écrivaine qui était assis dans la première rangée.
SP	18 mp	a	Los invitados ignoraron a los guardaespaldas de las actrices que parecían preocupados durante la ceremonia de premios.
EN		b	The kidnappers tortured the husbands of the old women who had white moustaches.
FR		c	Le majordome a accueilli les invités des comtesses qui étaient très impolis.
SP	19 fs	a	Nadie reconoció a la novia del célebre escritor que estaba borracha al final de la fiesta.
EN		b	The detective followed the wife of the tycoon who was seven months pregnant.
FR		c	Jérôme s'est adressé à la secrétaire du psychiatre qui semblait être ennuyée.
SP	20 fp	a	El entrenador felicitó a las mujeres de los futbolistas que estaban muy orgullosas tras el partido.
EN		b	The mayor addressed the widows of the fishermen who were wearing black dresses.

FR		c	Le consul a salué les femmes des ambassadeurs qui étaient habillées en tenue de soirée.
4 FORCED HIGH ATTACHMENT - NUMBER			
SP	21 ms	a	Mi madre no soporta al hijo de los vecinos que tiene un Ferrari rojo.
EN		b	The show business mogul trusted the agent of the singers who was very charming.
FR		c	Le détective a interrogé le chauffeur des entrepeneurs qui voulait publier un livre.
SP	22 mp	a	El juez no recibió a los abogados del mafioso que llegaron con retraso.
EN		b	The little boy envied the sons of the prime minister who were on holidays in Honolulu.
FR		c	Un voleur a attaqué la fille des voisins qui travaille à l´aéroport trois jours par semaine.
SP	23 fs	a	El profesor llamó a la abuela de las niñas que estaba en la sala de espera.
EN		b	A strange man smiled at the nanny of the little girls who was standing beside a tree.
FR		c	Henri a parlé aux parents du chanteur qui étaient en train de manger dans le restaurant de l´hôtel.
SP	24 fp	a	Clara me presentó a las hermanas del cantante que volaron a Miami para el concierto.
EN		b	The maid hated the friends of the duke that were spending Easter in the mansion.
FR		c	Le docteur a examiné les filles de la serveuse qui portaient des boucles d´oreilles très originales.

APPENDIX C: Spanish word list

# Item	Alphabetical order	Randomized List A	Randomized List A	Randomized List B	Randomized List B
1	pala	28	copa	17	toro
2	pato	12	tarro	28	copa
3	pelo	21	cama	20	tuyo
4	pena	1	pala	5	piña
5	piña	24	queso	9	puño
6	piso	18	torre	26	quita
7	poco	9	puño	18	torre
8	pollo	7	poco	15	tina
9	puño	26	quita	22	casa
10	puro	29	cubo	12	tarro
11	talla	6	piso	27	codo
12	tarro	5	piña	13	tela
13	tela	15	tina	6	piso
14	tema	20	tuyo	29	cubo
15	tina	14	tema	24	queso
16	tiro	4	pena	2	pato
17	toro	19	tubo	11	talla
18	torre	30	cura	25	quinto
19	tubo	17	toro	1	pala
20	tuyo	8	pollo	7	poco
21	cama	23	queja	3	pelo
22	casa	22	casa	10	puro
23	queja	11	talla	14	tema
24	queso	13	tela	23	queja
25	quinto	3	pelo	16	tiro
26	quita	25	quinto	21	cama
27	codo	2	pato	30	cura
28	copa	27	codo	8	pollo
29	cubo	16	tiro	4	pena
30	cura	10	puro	19	tubo

APPENDIX D: English word list

# Item	Alphabetical order	Randomized List A	Randomized List A	Randomized List B	Randomized List B
1	parrot	28	copper	17	toddler
2	puppy	12	tummy	28	copper
3	penny	21	cabbage	20	tooth
4	pepper	1	parrot	5	pillow
5	pillow	24	kettle	9	poodle
6	pity	18	topping	26	kitten
7	pocket	9	poodle	18	topping
8	polish	7	pocket	15	tickle
9	poodle	26	kitten	22	cuddle
10	pool	29	cookie	12	tummy
11	tacky	6	pity	27	cocky
12	tummy	5	pillow	13	teller
13	teller	15	tickle	6	pity
14	tenant	20	tooth	29	cookie
15	tickle	14	tenant	24	kettle
16	tipping	4	pepper	2	puppy
17	toddler	19	toonie	11	tacky
18	topping	30	cooler	25	killer
19	toonie	17	toddler	1	parrot
20	tooth	8	polish	7	pocket
21	cabbage	23	kennel	3	penny
22	cuddle	22	cuddle	10	pool
23	kennel	11	tacky	14	tenant
24	kettle	13	teller	23	kennel
25	killer	3	penny	16	tipping
26	kitten	25	killer	21	cabbage
27	cocky	2	puppy	30	cooler
28	copper	27	cocky	8	polish
29	cookie	16	tipping	4	pepper
30	cooler	10	pool	19	toonie

APPENDIX E: French word list

# Item	Alphabetical order	Randomized List A	Randomized List A	Randomized List B	Randomized List B
1	pas	28	corde	17	thon
2	patte	12	tasse	28	corde
3	pêche	21	cadre	20	tout
4	père	1	pas	5	pile
5	pile	24	quête	9	poudre
6	pipe	18	tort	26	quitte
7	poche	9	poudre	18	tort
8	pomme	7	poche	15	tique
9	poudre	26	quitte	22	canne
10	pour	29	cou	12	tasse
11	tache	6	pipe	27	coq
12	tasse	5	pile	13	terre
13	terre	15	tique	6	pipe
14	tête	20	tout	29	cou
15	tique	14	tête	24	quête
16	tir	4	père	2	patte
17	thon	19	touche	11	tache
18	tort	30	coût	25	quiche
19	touche	17	thon	1	pas
20	tout	8	pomme	7	poche
21	cadre	23	quelle	3	pêche
22	canne	22	canne	10	pour
23	quelle	11	tache	14	tête
24	quête	13	terre	23	quelle
25	quiche	3	pêche	16	tir
26	quitte	25	quiche	21	cadre
27	coq	2	patte	30	coût
28	corde	27	coq	8	pomme
29	cou	16	tir	4	père
30	coût	10	pour	19	touche

APPENDIX F: RCA preferences for all groups, languages and conditions

		AMB		FORCED LOW				FORCED HIGH			
				gender		number		gender		number	
		H	L	H	L	H	L	H	L	H	L
ES (L1)	**Group MS** (n=14)	74.1	25.9	17.8	82.2	8.9	91.9	100	0	100	0
ES (L3)	**Group TA** (n=12)	55.2	44.8	41.7	58.3	29.8	70.2	85.4	14.6	91.7	8.3
ES (L3)	**Group TF** (n=12)	40.9	59.1	31.2	68.8	17	83	81.2	18.8	97.9	2.1
FR (L1)	**Control** (n=8)	87	13	21.4	78.6	32.1	67.9	100	0	96.4	3.6
FR (L2)	**Group TA** (n=12)	41.7	58.3	14.6	85.4	4.2	95.8	93.8	6.2	85.4	14.6
FR (L1)	**Group TF** (n=12)	40	60	10.4	89.6	6.2	93.8	95.7	4.3	100	0
EN (L1)	**Control** (n=8)	30.4	69.6	3.6	96.4	14.3	85.7	85.7	14.3	3.6	96.4
EN (L1)	**Group TA** (n=12)	28.1	71.9	0	100	0	100	97.9	2.1	97.9	2.1
EN (L2)	**Group TF** (n=12)	37.5	62.2	4.2	95.8	12.5	87.5	93.8	6.2	93.6	6.4

APPENDIX E: VOT means for all groups, languages and voiceless stops

	ENGLISH			**FRENCH**			**SPANISH**		
	p	t	k	p	t	k	p	t	k
MA	74.57	85.08	89.2	--	--	--	--	--	--
MF	--	--	--	19.33	23.81	43.85	--	--	--
MS	--	--	--	--	--	--	15.13	18.35	31.03
TA	61.7	72.1	75.6	45.9	53.3	59.7	32.75	38.82	52.5
TF	41.7	54.2	66.5	23.33	34.37	51.05	19.33	26.36	44.44