El zapato, la chaussure, the shoe: The gender congruency effect in third language learners

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Abstract

Previous research has indicated the existence of a cross-linguistic *gender congruency effect* (GCE), wherein language learners demonstrate improved processing of nouns when the translation of the nouns in the L1 and L2 have congruent (i.e., the same) grammatical gender [e.g., *caja* (Spanish; box-F) and *boîte* (French; box-F)], as compared to when the translations have incongruent gender [e.g., *cama* (Spanish; bed-F) and *lit* (French; bed-M)]. However, the GCE remains unexplored in third language (L3) contexts and studies examining the GCE across language typologies are scarce. This study explores several models of third language transfer, representing wholesale and partial transfer models and chronological and typological models, and additionally examines whether gender can be activated in non-agreement contexts by Romance language speakers. A total of nine participants from two experimental groups [L1 English-L2 French (n=4) and L1 French-L2 English (n=3) learners of Spanish as an L3) and one control group (L1 English learners of Spanish as an L2, n=2) performed a translation task and a grammaticality judgement task. Participant response times were recorded to determine the presence and degree of the GCE in the tasks, with both noun phrases and bare nouns tested for gender effects. A GCE was observed, particularly for French-English-Spanish participants, indicating that linguistic information is available from at least the L1 for L3 learners. Agreement contexts were not necessary for participants to activate gender and demonstrate a GCE, in line with the idea that Romance speakers obtain gender information from readily-apparent morphophonological information. Overall, this study builds on a growing field investigating transfer to an L3, whether that transfer is wholesale or partial, and whether it is done based on typology or order of acquisition.

Keywords: *third language acquisition, grammatical gender, gender congruency effect, gender activation*

Lay Summary

How people learn languages has long been an important question within the field of linguistics. However, that question has often focused on how people learn *first* and *second* languages. Only recently have researchers begun to ask how people learn *third* languages.

The process of people using information from a language that they already know to learn a new language is called *transfer*. This study asks whether transfer to a third language is done by selecting just one language in its entirety for transfer and no other languages, or if language learners are able to (subconsciously) pick and choose pieces of the languages that they already know for transfer. It also asks if that choice is made based on the order that a person learned their language (for example, if they only have their first language available for transfer), or if that choice is made based on how similar the languages are.

The data in this study are preliminary, but they suggest that, at the very least, a third language learner can access their first language for transfer. It was also found that third language learners are able to use grammatical gender even if they are only presented with a noun and do not need to make it agree in gender with an article (e.g., *el, la*) or an adjective (*largo, pequeña*).

Resumen

Investigaciones anteriores han indicado la existencia de un efecto de congruencia de género interlingüístico (GCE), en el que los aprendices de idiomas demuestran un mejor procesamiento de los sustantivos cuando la traducción de los sustantivos en la L1 y la L2 tienen género gramatical congruente [es decir, el mismo género, p.ej. *caja.F* y *boîte.F* (francés; caja.F)], en comparación con cuando las traducciones no tienen género

incongruente [p.ej. *niebla.F* y *brouillard.M* (francés; niebla.M)]. Sin embargo, el GCE sigue inexplorado en contextos de tercera lengua (L3), y los estudios que examinan el GCE a través de tipologías lingüísticas son escasos. Este estudio explora varios modelos de transferencia de un tercer idioma, que representan modelos de transferencia total y parcial y modelos cronológicos y tipológicos, y además examina si el género puede ser activado en contextos sin necesidad de concordancia por hablantes de lenguas romances. Un total de nueve participantes de dos grupos experimentales [L1 inglés-L2 francés (n=4) y L1 francés-L2 inglés (n=3) aprendices de español como L3) y un grupo de control (L1 inglés aprendices de español como L2, n=2) realizó una tarea de traducción y una tarea de juicio de gramaticalidad. Se registraron los tiempos de respuesta de los participantes para determinar la presencia y el grado del GCE en las tareas, probando sintagmas nominales y sustantivos simples para analizar efectos de género. Se observó un GCE, particularmente para los participantes francés-inglés-español, lo que indica que la información lingüística está disponible al menos desde la L1 para los aprendices de L3. Los contextos de concordancia no fueron necesarios para activar el género y demostrar un GCE, según la idea de que los hablantes de lenguas romances obtienen información de género a partir de información morfofonológica fácilmente aparente. En general, este estudio se basa en un campo creciente que investiga la transferencia a un tercer idioma, ya sea la transferencia sea total o parcial, y si se realiza según la tipología o el orden de adquisición.

Palabras clave: *adquisición de tercera lengua, género gramatical, efecto de congruencia de género, activación de género*

Resumen lego

Cómo las personas aprenden idiomas ha sido durante mucho tiempo una pregunta importante dentro del campo de la lingüística. Sin embargo, esa pregunta frecuentemente se ha centrado en cómo las personas aprenden su *primer* y *segundo* idioma. Solo recientemente los investigadores comenzaron a preguntarse cómo las personas aprenden *terceros* idiomas.

El proceso en que las personas usan información de un idioma que ya conocen para apoyar a su aprendizaje de un nuevo idioma se llama *transferencia*. Este estudio pregunta si la transferencia a un tercer idioma se realiza seleccionando solo un idioma en su totalidad para la transferencia y ningún otro idioma, o si los aprendices de idiomas pueden (inconscientemente) elegir partes de los idiomas que ya conocen para transferir. También pregunta si esa elección se realiza en función del orden en que una persona aprendió su idioma (por ejemplo, si solo tiene su primer idioma disponible para la transferencia), o si esa elección se realiza en función de la similitud de los idiomas.

Los datos de este estudio son preliminares, pero sugieren que, como mínimo, un aprendiz de un tercer idioma puede acceder a su primer idioma para transferirlo. También se encontró que los aprendices de un tercer idioma pueden usar el género gramatical incluso si solo se les presenta un sustantivo y no necesitan hacer que concuerde en género con un artículo (por ejemplo, el, la) o un adjetivo (largo, pequeña).

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DEDICATION

To the late Dr. Eleanor Sweeney, who not only fostered my love of linguistics, but also helped me as a person and a student in more ways than she knew. *À chanter*.

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My grandfather taught me to ask "why?" at least seven times if I really want to understand something. These are my answers.

ABBREVIATIONS

BN	Bare noun
CEM	Cumulative Enhancement Model
EFS	The English-French bilingual learners of Spanish participant group
EPI	In glosses, used to denote epicene gender; that is, the provided form of the adjective is used for both masculine and feminine agreement
ES	The English monolingual learners of Spanish participant group
FES	The French-English bilingual learners of Spanish participant group
FS	The French monolingual learners of Spanish participant group
GCE	The gender congruency effect; unless otherwise specified, this refers to the cross-linguistic gender congruency effect
GJT	Grammaticality Judgement Task
L1	First language
L1P	L1 Privilege Model
L2	Second language
L2S	L2 Status Factor Model
L3	Third language
L3A	Third language acquisition
L_n	n^{th} language; used to refer in general to any language beyond the first
LPM	Linguistic Proximity Model
NP	Noun phrase
PAL	Previously acquired language
RT	Response time
SLA	Second language acquisition
TPM	Typological Primacy Model
TrT	Translation Task
UG	Universal Grammar

Chapter 1

INTRODUCTION

1.1 Introduction

This study investigates the cross-linguistic *gender congruency effect* (GCE) in French-English and English-French bilingual learners of Spanish as a third language. Two psycholinguistic tasks were employed in this study: a forward translation task, wherein participants translated bare nouns and noun phrases from English and/or French into Spanish, and a grammaticality judgement task, in which participants read a noun phrase in Spanish (which did and did not correctly agree in gender with a determiner and/or adjective) and decided if the phrase was grammatically correct or incorrect while response times (RT) and accuracy were measured. Sociolinguistic information was collected in a linguistic history questionnaire during the recruitment process to verify participant ability and in case non-behavioural factors became relevant later in data analysis.

This study was conducted to analyze the prominent extant theories of third language (L3) acquisition (L3A). Since around the beginning of this century, questions of what factors–particularly order of acquisition and linguistic typology–are most salient in L3 acquisition have been the focus of some debate and theorizing, albeit limited to relatively small circles of researchers. Only recently has L3A begun to grow in the amount of experimental and theoretical attention it receives. This study contributes to that growing field and provides further experimental evidence that may be used in determining the validity of the presented models. Further, this study finds a particularly relevant use in Canada, where bilingualism is held as a national value and is widespread as a result of educational policy; therefore, Canadians learning a

language besides the national languages, English or French, is likely a third language learner. Understanding and facilitating the processes of acquisition of a language is the primary goal of language teachers, and the data from this study could be applied and elaborated upon in applied linguistics contexts to better inform teaching practices.

1.2 Research Questions

This study focuses on three central research questions:

(1) Is a gender congruency effect observed with English-French and French-English bilingual learners of Spanish?

(2) Does the answer to (1) indicate a chronologically-dependent or typologically-dependent process of transfer in third language acquisition?

(3) If a GCE is observed in (1), are there observed differences in the GCE between bare nouns and noun phrases? I.e., is grammatical gender still activated even when a task does not require it?

1.3 Outline

This Major Research Paper is organized as follows: Chapter 2 explores the distinctions between different types of gender in language, the gender congruency effect, the role of grammatical gender in mental processing models, and the most prominent models on transfer in third language acquisition and concludes by outlining the predictions of each L3 transfer model in the context of this study. Chapter 3 explains the methodology used in the experiments of this study, and Chapter 4 describes the process of data analysis used and the results of the experiments. Chapter 5 closes the study by offering a discussion of the results and concluding remarks. References, in APA format, and two appendices, giving supplementary material from the experiments, are also provided.

Chapter 2

LITERATURE REVIEW

2.1 Gender: Grammatical and Social

The distinction between grammatical and social gender is important to this study, as these two linguistic phenomena are similar but behave rather differently in practice. To avoid additional confounds, this study focuses on grammatical gender. While social (or *semantic*) gender–that is, the societal identities that people take upon themselves, for example when they identify as a man, as a woman, or as nonbinary–is an interesting topic with much opportunity for research, especially alongside questions of gender-inclusive language and in binary-gendered languages like French and Spanish, it is not the feature studied here. Instead, *grammatical* gender is analyzed. Grammatical gender may also be called 'lexical gender' or 'noun class' (Dahl, 2011). The difference between semantic and lexical gender can be seen with words in Spanish like *abogad-o* (lawyer-M) and *abogad-a* (lawyer-F) and *trig-o* (wheat-M) and *harin-a* (flour-F). *Abogad-* can alternate to make semantic distinctions about the gender of the lawyer, but the gender of *trigo* and *harina* are lexically-carried traits of the words that cannot be altered without changing their meaning or rendering them non-words (e.g., *puert-o* port-M becomes *puert-a* door-F if its gender is changed, while *harino* and *triga* are non-words).

Hockett (1958) offers a relatively concise yet comprehensive definition of grammatical gender:

> Genders are classes of nouns reflected in the behavior of associated words. To qualify as a gender system, the classification system must be exhaustive and

must not involve extensive intersection: that is, every noun must belong to one of the classes, and very few can belong to more than one. (p. 231)

Under this definition, gender is a noun-specific property (but reflected on other words associated with the noun), must be able to be ascertained from the behaviour of those associated words, must apply to all nouns in a language, and must not permit more than a few cases of words belonging to multiple genders. From this definition, it can be observed that English has no grammatical gender; there is no case in English where words associated with nouns are altered based on some characteristic–be it morphological, semantic, or lexical–of the noun. In fact, the only hints of gender in English are seen in a few gendered pronouns ('*his* dog', '*her* house', 'give it to *him*', '*she* washed *herself*') and a handful of familial terms, occupational titles, and terms from animal husbandry that can alternate in gender: in masculine/feminine order: father/mother, executor/executrix, waiter/waitress, king/queen, duke/duchess, stallion/mare, rooster/hen, to name a few. Without a universal gender property for all nouns, as Hockett calls for, the gender system in English is at best limited and covert.

Meanwhile, in Spanish and French, gender is omnipresent. In Spanish, gender is typically marked at the ends of words. *-o* and *-a* are the typical, or *canonical*, masculine and feminine gender affixes, respectively, and they account for the wide majority of nouns (Harris, 1991). A few other suffixes are reliably feminine, like *-ión*, *-z* and *-d*, and some suffixes, like *-e*, are rather unpredictable. Most adjectives also end in an alternating *-o* or *-a*, though some are 'epicene,' meaning they are unalternating; such adjectives typically end in *-e*. There are a few exceptions to the standard rules of gender assignment in Spanish. For example, Greek-origin words like *mapa* (map), *tema* (theme/topic), and *planeta* (planet) are all masculine, and shortened versions of feminine words that surface with masculine affixes retain their feminine gender (e.g.,

foto, from *fotografía*). Articles and adjectives must agree with the noun they accompany in Spanish, as the Table 1 illustrates:

	Correct	**Incorrect**
All Canonical		
	1a. ***un barc-o roj-o*** a.M boat-M red-M 'a red boat'	***1b.*** ***<u>un-a</u> barc-o roj-o*** <u>a-F</u> boat-M red-M 'a red boat' ***1c.*** ***un-a barc-o <u>roj-a</u>*** a-F boat-M <u>red-F</u> 'a red boat'
Epicene Adjective		
	2a. ***el chic-o pacient-e*** the.M child-M patient-EPI 'the patient boy'	***2b.*** ***<u>la</u> chic-o pacient-e*** <u>the.F</u> child-M patient-EPI 'the patient boy'
	3a. ***la chic-a pacient-e*** the.F child-F patient-EPI 'the patient girl'	***3b.*** ***<u>el</u> chic-a pacient-e*** <u>the.M</u> child-F patient-EPI 'the patient girl'
***-e* Suffix Non-Canonical Nouns**		
	4a. ***el coch-e car-o*** the.M car-M.EPI expensive-M 'the expensive car'	***4b.*** ***<u>la</u> coch-e car-o*** the.F car-M.EPI expensive-M 'the expensive car'
	5a. ***un-a nub-e pequeñ-a*** a-F cloud-F.EPI small-F 'a small cloud'	***5b.*** ***<u>un</u> nub-e <u>pequeñ-o</u>*** <u>a.M</u> cloud-F.EPI <u>small-M</u> 'a small cloud'
Non-Canonical Adjective		
	6a. ***el método difícil*** the.M method-M difficult.EPI 'the difficult method'	***6b.*** ***<u>la</u> método difícil*** <u>the.M</u> method-M difficult.EPI 'the difficult method'
	7a. ***un-a tare-a difícil*** a-F task-F difficult.EPI 'a difficult task'	***7b.*** ***<u>un</u> tare-a difícil*** <u>a.M</u> task-F difficult.EPI 'a difficult task'
Non-Canonical Noun		
	8a. ***el reloj car-o*** the.M clock.M expensive-M 'the expensive clock'	***8b.*** ***<u>la</u> reloj car-o*** <u>the.F</u> clock.M expensive-M 'the expensive clock'
	9a. ***la miel sabros-a*** the.F honey.F tasty-F 'the tasty honey'	***9b.*** ***<u>el</u> miel <u>sabros-o</u>*** <u>the.M</u> honey.F <u>tasty-M</u> 'the tasty honey'

Table 1: *Glossed examples of correct and incorrect gender agreement in Spanish, using both canonical and epicene affixes, with incorrect parts of speech underlined.*

These examples are meant to demonstrate that it is only the noun which carries gender inherently; any gender agreement seen in determiners and adjectives in Spanish is

reliant upon the gender carried in the noun, even when the gender is reflected in ways that defy typical gender patterns, such as the epicene adjectives and nouns.

Similarly in French, nouns are either masculine or feminine and articles and adjectives must agree in gender with their corresponding noun. However, gender assignment is much more difficult to predict in French. There is no single paradigmatic reference for each gender in French like there is with the *-o* and *-a* of Spanish. While Lyster (2006) found that the gender of 80-81% of French nouns can be predicted with an accuracy of 90% or higher, his analysis included 400 distinct noun endings in French. This level of predictive reliability leads to French being classified as a gender-transparent language in relation to languages with no ability to predict the gender of nouns, but in comparison to Spanish the irregularities in the French gender system are much greater (more *opaque*). Interactions between these two languages, French and Spanish, can have several interesting results. Specific interactions between the genders of nouns in French and Spanish are discussed in the following section.

2.2 The Gender Congruency Effect

In its most general terms, the gender congruency effect can be defined as an observed facilitation of language processing (for example, in the form of faster response or reading times, greater accuracy, fewer ocular fixations on a stimulus, or higher amplitudes at N400 in electroencephalographic studies) for *congruent* or *homogeneric* nouns (i.e., nouns which have the same gender when translated into other languages) than for *incongruent* or *heterogeneric* nouns (i.e., nouns which do not have the same gender in other languages; Paolieri et al., 2020). This evaluation of congruency can be done both within a single language and across all the gendered languages of a language user. For example, the GCE was first observed in a monolingual setting by Schriefers (1993). Schriefers presented Dutch-speaking participants with an image for which they

would have to produce an adjective-noun phrase. This image was accompanied by a distractor word, with which they did not have to interact at all. Naming latencies for the phrase were observed to be slower when the gender of the distractor word was incongruent with the gender of the target word. A recreated example of the tasks in Schriefers is provided in Figure 1.

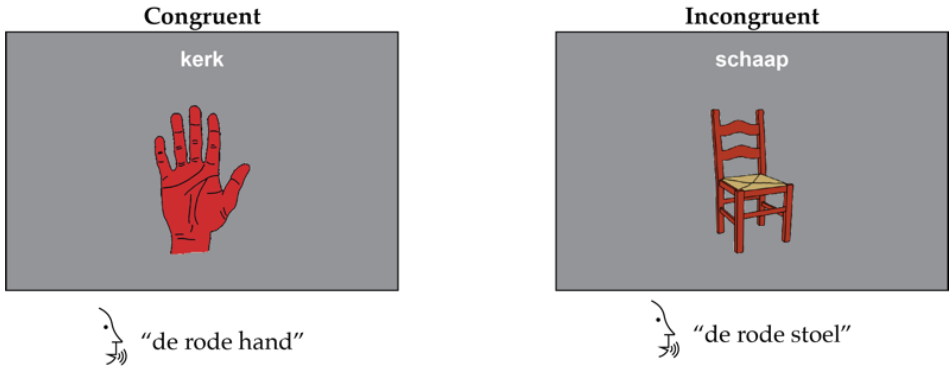

Figure 1: *A recreation of the stimuli in Schriefers (1993). The grey rectangle depicts what participants viewed on the screen, and the sentences below each screen are the desired response from the participants. "hand" (hand), "kerk" (church), and "stoel" (chair) all use the article "de" in Dutch, but "schaap" (sheep) uses the article "het", meaning "hand" and "kerk" are congruent, but "stoel" and "schaap" are incongruent. Participants used a variety of adjectives to create noun phrases in this study, but "rode" (red) is the only adjective displayed, for simplicity. Images are index 264 and 122, respectively, from Duñabeita et al. (2018).*

Paolieri et al. (2020), as one example, observed a *cross-linguistic* GCE when they had Catalan-Spanish bilinguals decide if a pair of Catalan and Spanish words were a valid translation equivalent. Participants were faster to respond, more accurate, and had a reduced N400 when the Catalan word and its Spanish translation were congruent compared to when the word pair was gender-incongruent.

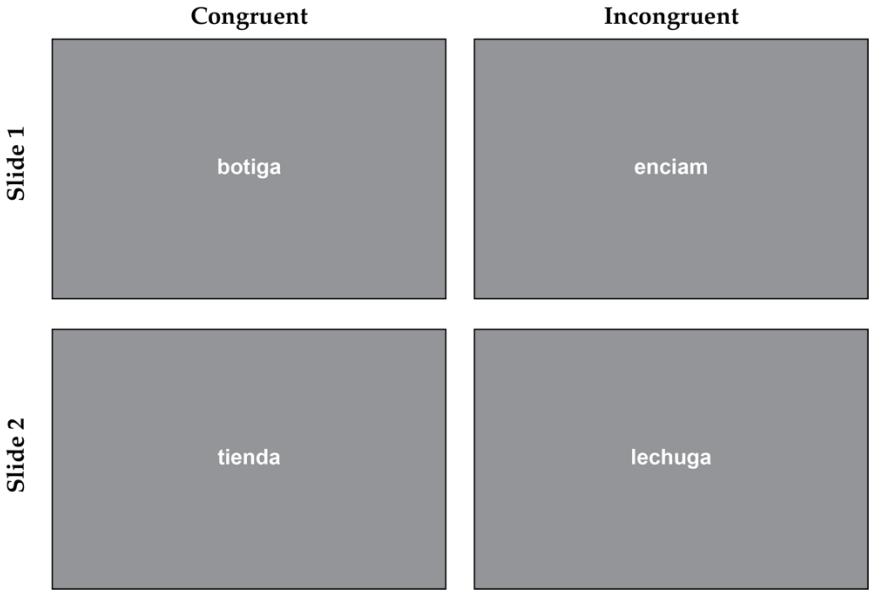

Figure 2: *A recreation of the stimuli in Paolieri et al. (2020). Participants were first shown the top slide, a Catalan word, and then the bottom slide, a Spanish word, and asked to decide if the second word was a valid translation equivalent of the first. In the congruent condition, "botiga" and "tienda" –both meaning "store"–are both feminine, but in the incongruent condition "enciam" is masculine while "lechuga" is feminine (both mean "lettuce").*

The GCE is considered valuable here because it indicates that a language user's languages are interacting with each other. Similar to Paolieri et al., the present study focuses on the crosslinguistic gender congruency effect, though it studies English, French and Spanish rather than Spanish and Catalan.

2.3 Activation and Selection of Gender by Bilinguals

Gender is a unique property of language in that it is not always readily apparent. The examples of French and Spanish given in section 2.1 demonstrate that for Romance languages, gender can be reflected morphophonologically, though ambiguous cases do exist. However, gender can also appear as a rather unpredictable phenomenon, as is seen in languages like German, Dutch, and Swedish. Whereas French and Spanish genders can mostly be deduced by apparent properties of their words, in Germanic languages there are few gender markers on a lemma itself and the few "rules" for deducing the gender of a word in these languages come with many exceptions. Because

of this, much of the process of learning the genders of Germanic nouns is done using agreement contexts such as sentences or noun phrases where gender is reflected in articles and adjectives. Thus, Romance language speakers treat gender as a more lexical property, not relying (at least as much) on agreement contexts, while Germanic speakers must treat gender syntactically (Sá-Leite et al., 2019). This presents an interesting question in understanding the processing and production of gender in bilinguals: do bilinguals always activate gender, even when gender agreement is not necessary? Specifically, when a bilingual retrieves a bare noun (BN) in their gendered languages (in the case of this study, Spanish and French), is there a mental process of gender activation even though no agreement is necessary?

Previous explorations of this question have settled on competing results, some arguing that agreement (e.g., in noun phrases, NPs) is necessary for gender activation (La Heij et al., 1998) and others still observing gender congruency effects even in bare nouns Paolieri et al., 2011). Sá-Leite et al. (2019) observe that this difference depending on phrase structure largely relies on the genetic family of the languages studied; recall that Germanic languages place gender on syntactic levels, so an NP is likely to be required in order to observe the GCE, while Romance languages hold gender lexically, so gender effects even without agreement can be observed. The researchers here make this distinction genetically, but it might be better understood as a typological distinction: gender-opaque languages hold gender syntactically, requiring agreement in NPs for the GCE to be observed, while gender-transparent languages hold gender lexically, allowing the GCE to be observed in BNs and NPs, agreement not being a critical aspect of gender activation.

2.4 Models of Third Language Transfer

As a corollary to the well-substantiated view that the languages are interconnected in the multilingual lexicon, it is understood that the properties of a multilingual's languages can impact their behaviour in their other languages. This phenomenon is referred to as *transfer*. To demonstrate the widespread, linguistically diverse, and cross-domain applications of transfer, the following studies are provided: transfer is reviewed extensively, in both phonological and morphosyntactic contexts throughout "Acquisition of Romance Languages," 2016, Yeung et al., n.d. explored transfer in a phonological, Sinitic context, and (Emerson et al., 2021) observed transfer in a Turkic context and a semantic-pragmatic domain. Understanding transfer is an especially useful tool for language teachers, who can better target and focus their teaching if they can predict which language features learners may be successful or struggle with, and it aids linguists in building models of bilingual acquisition. However, much of the evidence for transfer is from bilingual settings. Perhaps in some settings bilinguals represent the majority of the population, but plenty of trilinguals from across the globe raise the need for understanding transfer in third languages.

Puig-Mayenco et al. (2020) establish that, within third language acquisition (L3A) theory, there are four logical possibilities:

(1) Transfer does not occur;

(2) The L1 is the sole source of transfer;

(3) The L2 is the sole source of transfer, or;

(4) Both the L1 and the L2 are available for transfer.

(4) can also be further broken down into two possibilities:

(a) Both the L1 and the L2 are available for transfer, but only one is selected for transfer, or;

(b) Both the L1 and the L2 are available for transfer, both can participate in transfer simultaneously, but their properties are selected individually for transfer rather than wholesale selection of one language.

		Selection Criteria	
		Chronological	**Typological**
Degree of Transfer	**Wholesale**	(2) L1P (3) L2S	(4a) TPM
	Partial		(4b) CEM (4b) LPM (4b) Scalpel

Table 2: *Classification of the predominant L3 transfer models according to selection criteria and degree of transfer. The numbered claims are provided alongside the model names.*

A series of studies and models making the above claims, both directly and indirectly, have been published. These claims can be summarized by classifying them along two axes: degree of transfer and selection criteria. Degree of transfer refers to *how much* of a previously acquired language (PAL) is transferred to the third language; a PAL is either selected for transfer in its entirety, called *wholesale transfer*, or only certain features of a PAL are selected for transfer, called *partial transfer*. Wholesale transfer models would include claims (2), (3), and (4a), while partial transfer models include (4b). Selection criteria denotes the *reason* that a language is selected. Models can be classified along this axis as either *chronological* or *typological*. A chronological model is one which argues that selection is based on order of acquisition of the PALs; in the case of L3A, such a claim would be that either the first language or the second language is selected for transfer, corresponding to claims (2) and (3). A typological model is one which argues that selection is based on the typological (or *structural*) similarity between the features of the PAL and the third language, corresponding to claims (4a) and (4b). This study focuses on six of the predominant models of transfer to the L3: the L1 Privilege Model (L1P), the L2 Status Factor Model (L2S), the Typological Primacy Model (TPM), the Cumulative Enhancement Model (CEM), the Linguistic Proximity Model (LPM), and the Scalpel Model. In the following

subsections, each model's claims are discussed. Claim (1) is largely ignored; far too much data demonstrating the interaction of a bi/multilingual's languages interacting with and influencing each other exists, as seen in this literature review, the broader pool of language acquisition literature, and this study itself, to be able to agree to the claim that transfer does not occur. In fact, such claims of language learners as *tabulae rasae* can be argued to be harmful in language acquisition settings (particularly in English or French as a second language settings, where there is often a dire need to quickly learn the dominant language in order to gain access to school education and society at large), depriving them of critical linguistic resources from their previous languages as they attempt to learn a new language. Further, the field of generativism relies upon a Universal Grammar (UG) which all language users possess, with a strong implication that such a UG would be common to all of a language user's languages.

2.4.1 L1 Privilege Model

One of the more recent and direct elaborations of claim (2) is seen in Hermas's (2014) L1 Privilege Model. As the name suggests, this model argues that the L1, the native language, has a privileged–or even exclusive–role in transfer. Hermas's study evaluated null subject use and sentence order by L1 Moroccan Arabic–L2 French bilingual learners of English as a third language, with Arabic–English and French–English bilingual and English-monolingual control groups. The participants performed an acceptability judgement task (i.e., indicating if a single phrase is acceptable or not) and a preference task (i.e., choosing the preferable sentence out of two options) in English. In both tasks, the trilingual participants demonstrated Arabic-like subject-verb inversion and null expletive subjects, which are incorrect according to normative English grammar rules, leading Hermas to conclude that the L1 in its entirety is the source of transfer, both facilitative and non-facilitative.

2.4.2 L2 Status Factor Model

Opposite Hermas, Bardel and Falk (2007) claim that it is rather the second language that provides the basis for third language transfer. The authors studied post-verbal negation, a result of V2 structure in languages (i.e., the verb takes the second place in the main clause). The members of the studied groups spoke language combinations that were either (a) L1 [–V2] L2 [+V2] or (b) L1 [+V2] L2 [–V2], both groups learning either Swedish or Dutch as an L3, both being [+V2] languages. The [–V2] languages included English, Hungarian, Italian, and Albanian, and the [+V2] languages included Swedish, German, and Dutch. The data revealed that speakers of [+V2] L2s performed target-like ([+V2]) postverbal negation while speakers of [–V2] L2s maintained their L2-like preverbal negation in the [+V2] L3. The authors compare their results against the predictions of wholesale chronological and partial typological claims and find that the most plausible explanation would be for wholesale transfer of the L2 to the L3.

2.4.3 The Cumulative Enhancement Model

The earliest explicit elaboration of a typological model of L3 transfer is found in Flynn et al.'s (2004) Cumulative Enhancement Model, a partial transfer model. Drawing comparisons between their own data with L1 Kazakh–L2 Russian learners of English as an L3 and previous data from L1 Spanish–L2 English and L1 Japanese–L2 English bilinguals, the authors found that the L1 does not hold any kind of privilege in L3 acquisition: the Kazakh native speakers performed similarly to Spanish-English bilinguals, but radically different from the Japanese-English bilinguals. Japanese and Kazakh are left-branching, SOV languages while Russian, Spanish, and English are right-branching, SVO language. Regardless of the order in which the SVO/right-branching language was learned, and regardless of L2/L3 context, learners who had

previous experience with English-like syntax had statistically-identical performance. Overall, the CEM sees multilingual development as a cumulative process, where previous experience in a property facilitates transfer.

2.4.4 The Linguistic Proximity Model

The Linguistic Proximity Model (Westergaard et al., 2017) is perhaps an elaboration of the CEM. Like the CEM, the LPM is a typological, partial transfer model of L3 transfer. However, unlike the CEM, which proposes that new parameters in an L3 are learned as they would be in an L1 (i.e., no benefit and no harm from no experience), the LPM permits non-facilitative transfer, that is, worse performance than they would demonstrate otherwise. Participants included simultaneous bilingual Norwegian-Russian learners of L3 English, as compared to monolingual Russian speakers and monolingual Norwegian speakers as controls. Studying two language parameters, one with Russian-English parallels (adverb placement) and one with Norwegian-English parallels (subject-auxiliary inversion), the authors observed statistically-identical performance overall between the bilinguals and the control groups for each respective parameter and its English-like PAL, indicating partial, typologically-based transfer. However, between-condition (grammatical vs. ungrammatical) differences in performance for the bilingual learners compared to the controls suggested that negative (non-facilitative) influence from PALs can appear in some instances. Interestingly, this implies a simultaneous effect of two languages on one parameter.

2.4.5 The Typological Primacy Model

Rothman's Typological Primacy Model (TPM) has been elaborated in a growing programme of research and theorizing (2010, 2011, 2013, 2015). Like the CEM and LPM, the TPM sees transfer as a typologically-determined process. However, instead of permitting partial transfer, the TPM instead posits that language learners select only

one language (i.e., wholesale transfer) based on their psychotypological perceptions of the L3 at a very early state of learning. Centrally, Rothman argues that cognitive economy is the motivator of selecting a PAL for transfer to the L3. Rothman sees property-by-property evaluations of similarity (as would be seen in partial transfer models) too high of a cognitive investment. Instead, the TPM predicts that a learner evaluates the lexical, phonological, morphological, and syntactic similarity (in that order) between the PALs and the L3 and selects the most similar PAL for transfer once a certain threshold for similarity is met. While this wholesale selection may result in less accurate performance in the L3 than a partial model might allow for (thus allowing non-facilitative transfer), Rothman argues that keeping all PALs activated and ready to be evaluated during acquisition is too costly for the parser.

2.4.6 The Scalpel Model

The final model discussed is Slabakova's (2017) Scalpel Model. The Scalpel Model is essentially an elaboration of the Linguistic Proximity Model, being a partial transfer model based on typology and allowing non-facilitative transfer, but, critically, Slabakova offers additional factors that may impact transfer that are not considered in the other models. Like a scalpel, Slabakova argues, multilingual parsers can work precisely and gather enough information from previous linguistic experience to draw appropriately similar resources into the L3 for transfer. Scalpels cannot, however, cut through bone; some of these scalpel-resistant "organs" include processing complexity, misleading input, and construction frequency. Slabakova sees multilingual grammars as sufficiently sophisticated as to not require wholesale transfer, as the TPM argues, but still influenced by highly-personal experiential and cognitive variables.

2.4.7 Model Predictions

In order to make specific, testable predictions for each of these models in this experiment, it is necessary to first understand the general overview of the experiment and quantify the parameters of the models and the experiment: this study examines grammatical gender acquisition in Spanish as an L3 by L1 English–L2 French (EFS) and L1 French–L2 English (FES) bilinguals, as compared to monolingual English (ES) and monolingual French (FS) control groups. Specifically, it examines the *gender congruency effect*, which predicts that participants will demonstrate faster response times in experimental tasks when the gender of a Spanish noun and its translation in French share the same gender. Connecting the transfer discussed in the above models to this study, an observed gender congruency effect is taken as evidence of transfer.

The L1P model predicts that linguistic information in the L1 only is available for transfer to the L3, meaning that emerging trilinguals behave as if they never learned their second language, so the emerging trilingual group with L1 French will outperform (i.e., show a stronger GCE) the L1 English emerging trilinguals: EFS = ES, FES = FS, FES > EFS. Conversely, the L2S model predicts that only the L2 offers linguistic information for transfer, so the trilinguals' first language is disregarded and the group with L2 French will outperform the L2 English trilinguals: FES = ES, EFS = FS, EFS > FES. The CEM gives no regard to order of acquisition and rather predicts that any learner who has French in their linguistic repertoire will have equal access to French gender while learning Spanish gender: FS = EFS = FES > ES. The LPM would normally differ from the CEM in allowing non-facilitative transfer when both PALs offer competing bases for transfer, but in the studied language combination the only PAL with grammatical gender is French, so there is no other source for competing linguistic information to be transferred. Because of this, the LPM cannot predict any non-facilitative transfer in this

study and consequently its predictions do not differ from those of the CEM. Similarly, without an ability to identify non-facilitative transfer or experiential and cognitive factors that may be affecting transfer, the Scalpel Model cannot be distinguished from the CEM in this study. Finally, the TPM argues that learners will evaluate Spanish at an early point in their learning and decide if it is more similar to English or French, their PALs. Because Spanish and French are both Romance languages, they are highly similar at all levels proposed by Rothman: lexicon, phonetic inventory, morphology, and syntax. Thus, it is likely that French would be the selected PAL for transfer for both the EFS and FES groups. As this means that English is ignored in the process of transfer, the trilingual groups would perform similarly to the FS control group. The TPM also allows non-facilitative transfer, but again there is no source in the PALs from which competing grammatical gender information could lead to non-facilitative transfer. The TPM, like CEM, LPM, and Scalpel, predicts: FS = EFS = FES > ES. These predictions are summarized in Table 3.

Model	ES	FS	EFS	FES
L1P		+		+
L2S		+	+	
CEM		+	+	+
LPM		+	+	+
TPM		+	+	+
Scalpel		+	+	+

Table 3: *The predictions of the six L3 transfer models. Groups which are expected to demonstrate a stronger gender congruency effect are marked with a +.*

Unfortunately, none of the typological models can be distinguished from each other. Future research should use language combinations that allow for non-facilitative transfer (i.e., a gendered language in place of English) and should study multiple language properties, with some properties shared between the L1 and the L3 and others

shared between the L2 and the L3. For now, this study is able to, at the very least, distinguish between claims (2), (3), and (4).

2.5 Hypotheses

For convenience, the research questions of this study are repeated here:

(1) Is a gender congruency effect observed with English-French and French-English bilingual learners of Spanish?

(2) Does the answer to (1) indicate a chronologically-dependent or typologically-dependent process of transfer in third language acquisition?

(3) If a GCE is observed in (1), are there observed differences in the GCE between bare nouns and noun phrases? I.e., is grammatical gender still activated even when a task does not require it?

Given the consistent evidence for a GCE, especially in Romance languages (Sá-Leite et al., 2020), it is predicted that a gender congruency effect indeed will be seen in at least one of these language pairings; exactly which pairing depends on the L3 transfer model. The conflicting evidence for exclusively-L1 or -L2 transfer seems to indicate that neither L1P nor L2S is a probable model, leaving the typological models (CEM, LPM, TPM, and Scalpel) as the likely candidates (Hypothesis 2) and predicting that the FS, FES, and EFS groups will all demonstrate a relatively similar GCE (Hypothesis 1). And because of the apparent gender markers in Spanish morphophonology, it is predicted that the GCE will be observed in both bare nouns and noun phrases (Hypothesis 3). Concisely, the hypotheses are:

(1) The French monolingual learners of L2 Spanish and the L1 French–L2 English and L1 English–L2 French learners of L3 Spanish will all demonstrate similarly strong gender congruency effects.

(2) If Hypothesis 1 is true, it indicates a typological basis for L3 transfer.

(3) There will be no differences in the observed GCE between bare noun and noun phrase conditions. This indicates that Romance speakers still activate gender even if the task does not require it, due to the availability of morphophonologically-carried gender information in Spanish.

Chapter 3

Methodology

3.1 Participants

As a goal, a total of 30 adult participants were aimed to recruited for participation in this study. Participants belonged to one of four experimental or control groups:

(1) L1 English monolingual learners of Spanish as an L2 (ES; control)

(2) L1 French monolingual learners of Spanish as an L2 (FS; control)

(3) L1 English–L2 French bilingual learners of Spanish as an L3 (EFS; experimental)

(4) L1 French–L2 English bilingual learners of Spanish as an L3 (FES; experimental)

There were expected to be 10 participants in each of the experimental groups and 5 participants in each of the control groups. After recruitment and data processing, there were six participants included in the translation task (ES=1, EFS=2, FES=3) and nine participants included in the grammaticality judgement task (ES=2,EFS=4, FES=3). The Linguistic History Questionnaire (LHQ-3; Li et al., 2020) was administered to participants to determine their eligibility. The LHQ3 was completed in an online survey format (https://lhq-blclab.org/) for ease of data analysis, but the printable version of the LHQ3 is provided in Appendix A for reference. Further, participants with known hearing, vision, and cognitive impairments such as hearing loss, colour blindness and dyslexia were excluded from participation, though no participants reported any of these conditions. Participants were mainly recruited from the pool of undergraduate students at the University of Western Ontario. Students enrolled in Western's first- and second-year Spanish courses were eligible to receive a research participation mark for their participation in the study. French-language versions of the letter of information and consent, LHQ3, and the study materials were provided to French-speaking participants

on request. The informational content of these documents was identical regardless of the language and the French translations were verified by speakers and professors of the French language. All study materials were approved by the Western University Non-Medical Research Ethics Board (NMREB; project ID 121832).

3.2 General Procedure

After recruitment, obtaining informed consent, and completion of the LHQ3, participants completed two experimental tasks, first a forward translation task (TrT) and then a grammaticality judgement task (GJT). Both experimental tasks were completed in one session, lasting about 20 minutes. Participants located near Western University completed the experimental tasks in-person on Western's campus in a quiet room with the researcher. All other participants completed the experimental tasks with the researcher via Zoom. In in-person experiments, the researcher remained in the room with the participant while they read the instructions for the experiment and completed the practice tasks but left the room to avoid any potential nervousness from being watched while they performed the tasks. In Zoom experiments, the participant left the Zoom call to complete the task after completing training with the researcher on the call. Both experimental tasks were built in PsychoPy (Peirce et al., 2019), an open-source platform for creating experiments in the behavioural sciences, and run on Pavlovia, an online extension of PsychoPy that allows experiments to be run online.

3.3 Translation Task

In the translation task, participants were shown bare nouns (BNs; e.g., *shoulder*, *winter*, *porte, hiver*) and noun phrases (of the type article–(adjective)–noun in English and article–noun–(adjective) in French, with parentheses indicating that some noun phrases did not include an adjective; e.g., *the American butter, the lip, un bateau américain, la rivière*) and were asked to translate the stimuli, out loud, as quickly and accurately as

possible. Even though members of the ES control group theoretically are naïve to French, they were still administered the French phrases due to the prevalence of the French language in Canada and mandatory French classes in grade school. The data from the French stimuli in ES was later analyzed to ensure that these participants did not have any command of French.

There were 16 stimuli in each language, for a total of 32 stimuli. Roughly half of the stimuli (overall and by-language) had congruent French-Spanish gender and the other half had incongruent gender between Spanish and French. Within each language's set of stimuli, 4 were bare nouns, 4 were DetN phrases, and 8 were DetAdjN/DetNAdj phrases. Table 4 shows the breakdown of stimuli by language, French-Spanish gender congruency, phrase type, Spanish gender, and article type (only in NPs).

	Phrase Type	N *(n=8)*		DetN *(n=8)*			DetAdjN/DetNAdj *(n=16)*			
	Spanish Gender	Masc. *(n=4)*	Fem. *(n=4)*	Masc. *(n=6)*		Fem. *(n=2)*	Masc. *(n=8)*		Fem. *(n=8)*	
	Article Type			Def. *(n=4)*	Indef. *(n=2)*	Def. *(n=2)*	Def. *(n=5)*	Indef. *(n=3)*	Def. *(n=3)*	Indef. *(n=5)*
English	Congruent *(n=7)*	1	1		1		2	1		1
n=16	Incongruent *(n=9)*	1	1	2		1		1	2	1
French	Congruent *(n=7)*	1	1		1		2	1		1
n=16	Incongruent *(n=9)*	1	1	2		1	1		1	2

Table 4: *Summary of stimulus types*

All nouns and adjectives had canonical gender markers in their Spanish translation (i.e., masculine nouns were marked with an *-o* and feminine nouns were marked with an *-a*), all adjectives–both in the French stimuli and their target translation in Spanish–had alternating gender forms, and all nouns were inanimate, to avoid the intrusion of social gender. The lists of stimuli for both tasks are provided in Appendix B.

Within the experiment, the stimuli were presented in a random order, such that English and French stimuli were intermixed. The stimuli were presented in white text on a grey background with no other distractors. Participants viewed a blank screen for 2000ms between each stimulus and then were shown a fixation cross in the centre of the screen for 700ms. After another blank grey screen lasting 100ms, the participants simultaneously heard a tone (800Hz square wave lasting 250ms) while the stimulus appeared in the centre of the screen. The stimulus remained on the screen until the participant provided a verbal translation (including "no sé," "I don't know," "je ne sais pas," etc.) and pressed the spacebar to proceed to the next stimulus. An audio recording of the entire task was made on a Blue Yeti USB microphone. Response times in this task were obtained by uploading the audio files of each participant's session into Praat (Boersma & Weenink, 2023) and calculating the time elapsed between the onset of the 800Hz tone before each stimulus and the onset of the participant's voice for each response. Figure 4 provides a visual representation of this process. The tone is visible at the beginning of the highlighted TextGrid interval (the yellow block, representing the response time of 3132 ms), immediately followed by the participant's response, annotated in the TextGrid.

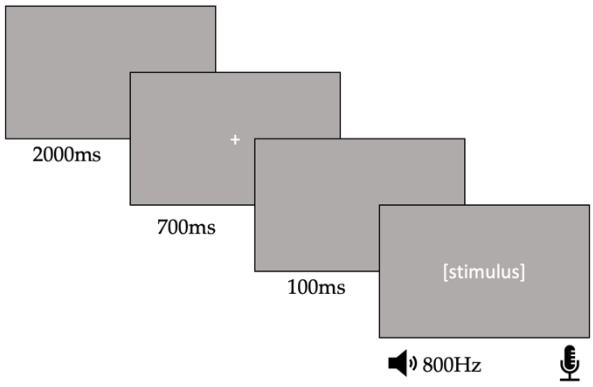

Figure 3: *Overview of the experimental layout of the translation task.*

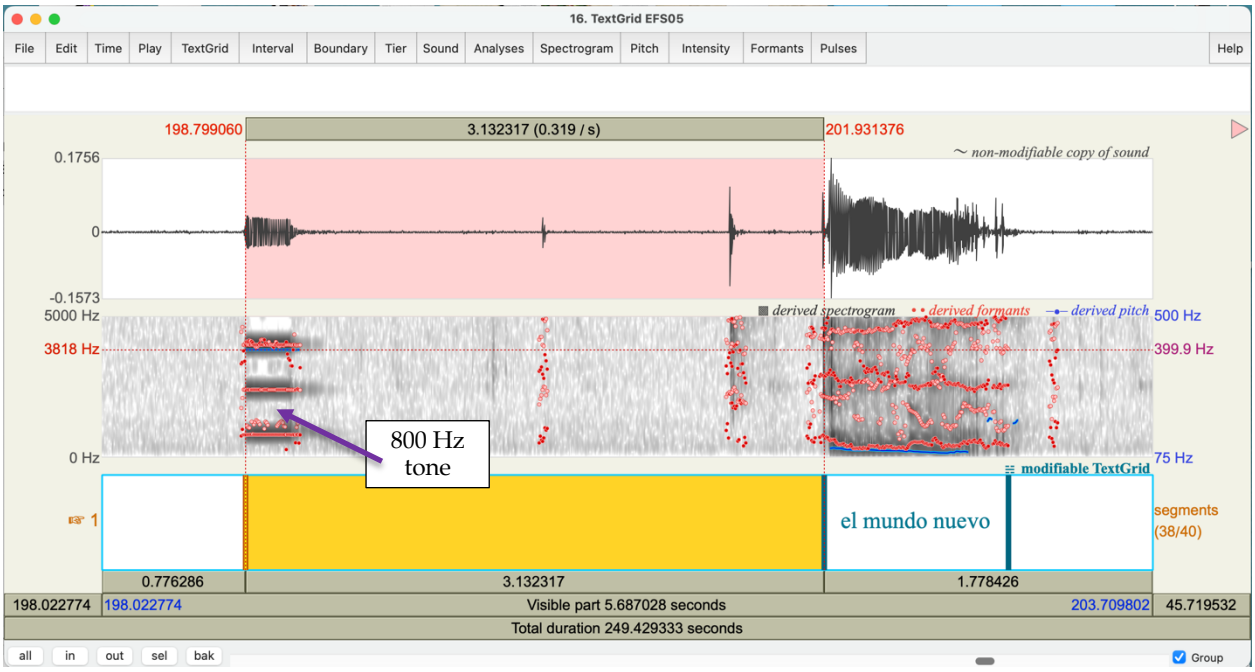

Figure 4: *Screenshot of the process of calculating response times for the translation task.*

Incorrect responses and "I don't know" responses were excluded from data collection. Slight differences in pronunciation (e.g., "inverno" instead of the correct "invierno") did not count as incorrect responses. In noun phrase conditions, responses were considered correct if the noun and at least one of the agreement conditions were correct. Errors in types of determiners (e.g., producing "el" the.M instead of "un" a.M) were not considered to be incorrect as long as they were produced using the correct gender. In general, this task allows gender processing to be analyzed in production settings and while working in a non-gendered language and a gendered language.

3.4 Grammaticality Judgement Task

After the translation task was complete, the researcher re-entered the room and began the grammaticality judgement task (GJT) with the participants. In this task, participants were presented with NPs in Spanish and were asked to indicate (through a key press) as quickly and accurately as possible whether the phrase was grammatically correct or incorrect. The GJT allows gender processing to be observed in a receptive

setting without the additional confounds of other languages, as occurs in the TrT as participants translate from the PALs into the target language, Spanish. 20 NPs were shown, with roughly equal distributions of homogeneric and heterogeneric nouns (in relation to their French translation), DetN and DetNAdj, correct and incorrect phrases, and, for the incorrect DetNAdj NPs, whether the incorrect gender was on the determiner, adjective, or both. Determiners were either a definite or indefinite article and, like the translation task, all nouns and adjectives used canonical gender. Incorrect phrases always had incorrect agreement on the determiner and/or adjective; nouns were never given the incorrect gender (e.g., *la mied-o* 'the.F fear-M' is a valid incorrect stimulus, *miedo* being the correct form of the noun; *mieda* would never be shown because it is not a word). In this sense, words like *puert-a* 'door-F' and *puert-o* 'port-M,' which are both real words and share their root but have different genders, were avoided for this task.

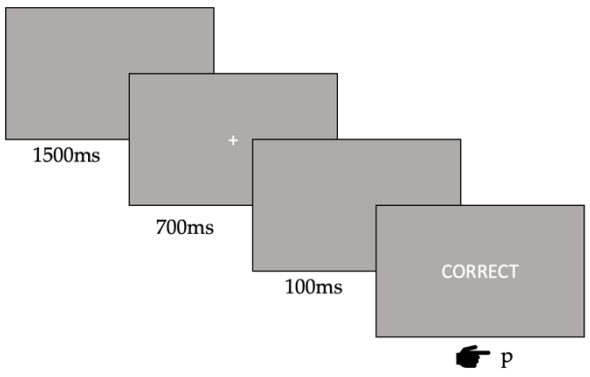

Figure 5: *Overview of the experimental layout of the grammaticality judgment task training set.*

Participants began with a training set to ensure they were pressing the correct keys. In this task, the p key was used to indicate correct phrases and the q key was used to indicate incorrect phrases. Participants were instructed to keep a finger on each of these two keys as they went through the task. In the first training exercise, they were shown a blank grey screen for 1500ms between each stimulus and then were presented with a fixation cross for 700ms. After another blank grey screen lasting 100ms, the word 'CORRECT' or 'INCORRECT' appeared on the screen, after which participants pressed the corresponding key. This repeated for ten stimuli, five 'CORRECT' and five

'INCORRECT,' presented in a random order. If the participant responded correctly for all ten training stimuli, they could then proceed to the next training session. If they did not respond correctly for all ten training stimuli, they repeated this initial training set until they answered all ten stimuli correctly.

The second training session was identical to the actual experiment. The layout was similar to the first training set, except the NPs were shown instead of the words 'CORRECT' or 'INCORRECT.' As in the translation task, the researcher remained in the room with the participant while they read the instructions and performed the training sessions, to allow them to ask questions and ensure they were completing the tasks correctly but left the room during the actual experiment to avoid making the participant nervous by monitoring their performance. Response times were obtained by calculating the time between the onset of the stimulus on the screen and the key press.

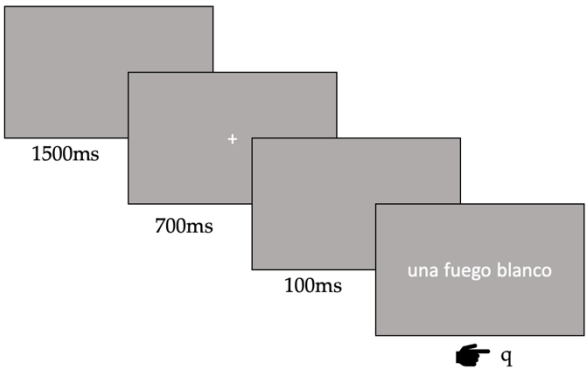

Figure 7: *Overview of the experimental layout for the second training session and actual experiment in the grammaticality judgement task. The example provided is an incorrect NP, with a correct marker in blanc-o 'white-M' but an incorrect marker on the indefinite article, un-a 'a-F.'*

Chapter 4

Results

This chapter presents the results of the present study, beginning by presenting the results which pertain to the first two research questions (regarding the overall patterns of L3 transfer) and then presenting the data pertaining to the third research question, which explores the necessary contexts for activation of gender. Six participants completed the translation task, and those same participants plus an additional three participants completed the grammaticality judgement task. The TrT consisted of 32 stimuli and the GJT consisted of 20 stimuli, leading to a total of 372 tokens being collected between both tasks, 192 from the TrT and 180 from the GJT. 133 of the TrT tokens (69.27%) and 158 of the GJT tokens (87.78%) were answered correctly, for a total of 291 tokens (78.23%) able to be analyzed.

4.1 The Gender Congruency Effect

4.1.1 Translation Task

Three participants (EFS03, EFS04, and CES03) were excluded from data analysis. Participant EFS03 did not correctly produce any of the incongruent nouns correctly, so there was no way to calculate a gender congruency effect for them. Participant EFS04 had a very large gender *incongruency* effect (that is, they had a significantly large decrease in response times for *incongruent* nouns) which classified as an outlier within the data. The experiment software failed for one participant (CES03) in the translation task, leading to data loss in this task only. With these two participants excluded, there was one control English-Spanish speaker, two English-French bilinguals learning Spanish, and three French-English bilinguals learning Spanish included in this task.

Paired Samples Student's T-Test (One-Tailed): Translation Task

Group	Mean RT (ms)		Mean Difference (Inc – Con)	statistic	df	p=0.05
	Congruent	Incongruent				
ES	2713	5282	2569			
EFS	2059	2904	844	2.6699	1	6.314
FES	2022	2983	962	3.6869*	2	2.920
Overall	2150	3334	1190	3.8253*	5	2.015

Note. $H_a\ \mu_{\text{Incongruent - Congruent}} > 0$

Table 5: *t-test summary table for the translation task. Test statistics of a significant value (p=0.05, one-tailed) are marked with an asterisk (*)*

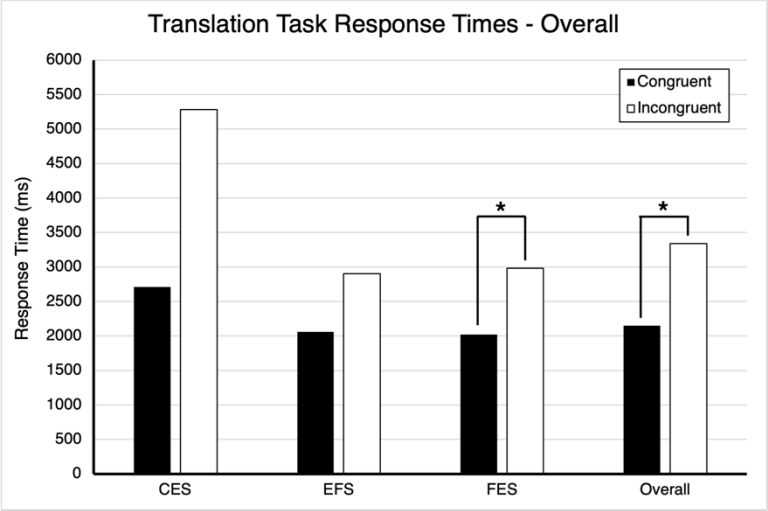

Figure 8: *Graph of the results of the translation task. Significant differences (p=0.05) are marked with an asterisk (*)*

Because two means were being compared, average response time in congruent conditions and average response time in incongruent conditions, and the pool of participants was the same for these two conditions, a paired samples t-test was used to evaluate the significance of the data in each of the tasks. The gender congruency effect predicts overall faster response times for congruent conditions–a specific directional prediction–so a one-tailed test was used instead of the more vague, two-tailed implementation. An overall significant gender congruency effect was observed (1,190 ms), with decreases in average response time in all groups and a significant advantage in processing for French-English bilinguals learning Spanish. A test statistic could not

be calculated for the ES group due to only one participant being eligible for inclusion in this group.

4.1.2 Grammaticality Judgement Task

Nine participants took part in the GJT: two ES, four EFS, and three FES. Unlike the translation task, no group showed evidence of a significant gender congruency effect, and in fact two of the three French-English bilinguals demonstrated a gender incongruency effect, leading to an (insignificant) gender incongruency effect for that group. Response times were an average of about 1300 ms shorter in the GJT as compared to the TrT, a significant decrease ($p=0.0019$) in response times, indicating a significantly less cognitively expensive process for the GJT.

Paired Samples Student's T-Test (One-Tailed): GJT

Group	Mean RT (ms)		Mean Difference (Inc – Con)	statistic	df	p=0.05
	Congruent	Incongruent				
ES	1673	1793	120	1.9577	1	6.314
EFS	1468	1537	69	0.7554	3	2.353
FES	1708	1593	-115	0.6423	2	2.920
Overall	1594	1613	19	0.2598	8	1.86

Note. $H_a\ \mu_{\text{Incongruent - Congruent}} > 0$

Table 6: *t-test summary table for the GJT. Note the lack of significant differences.*

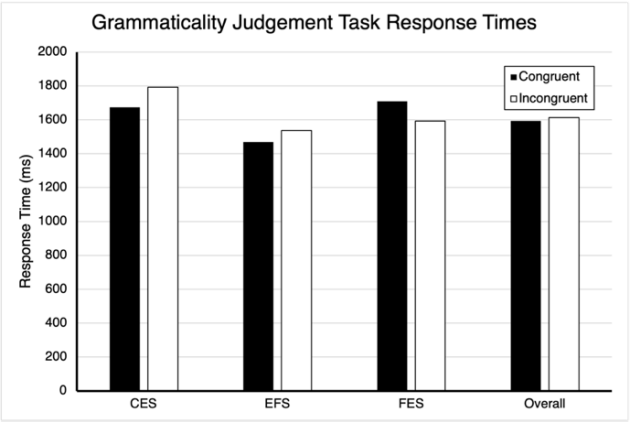

Figure 9: *Graph of the results of the grammaticality judgement task.*

4.2 Gender Activation and Selection

To explore patterns of gender activation and selection within the more general GCE of the previous two sections, the stimulus from the translation task were separated into bare noun stimuli and noun phrase stimuli. Because this task uses the data from the translation task, some statistical restrictions similar to those mentioned in Section 4.1.1 again apply. Where a test statistic is not given, there was insufficient data in that category. Only the overall average difference in congruent and incongruent conditions for bare nouns was significant. None of the groups demonstrated any significant differences in this condition, however they all demonstrated a *qualitative* processing advantage for bare nouns. In the noun phrase condition, only the FES group demonstrated a significant congruency effect. EFS participants demonstrated an (insignificant) gender *incongruency* effect.

Paired Samples Student's T-Test (One-Tailed): Bare Nouns

Group	Mean RT (ms)		Mean Difference (Inc – Con)	statistic	df	p=0.05
	Congruent	Incongruent				
ES	2777	5905	3127			
EFS	1235	5460	4225			
FES	1432	3384	1952	1.7442	1	6.314
Overall	1719	4533	2814	3.9535*	3	2.353

Note. $H_a\ \mu_{\text{Incongruent - Congruent}} > 0$

Table 7: *t-test summary table for the translation task. Test statistics of a significant value (p=0.05, one-tailed) are marked with an asterisk (*)*

Paired Samples Student's T-Test (One-Tailed): Noun Phrases

Group	Mean RT (ms)		Mean Difference (Inc – Con)	statistic	df	p=0.05
	Congruent	Incongruent				
ES	2688	5157	2469			
EFS	3654	2708	-946	0.8048	2	2.920
FES	2122	2896	774	3.3078*	2	2.920
Overall	2859	3138	279	0.4188	6	1.943

Note. $H_a\ \mu_{\text{Incongruent - Congruent}} > 0$

Table 8: *t-test summary table for the translation task. Test statistics of a significant value (p=0.05, one-tailed) are marked with an asterisk (*)*

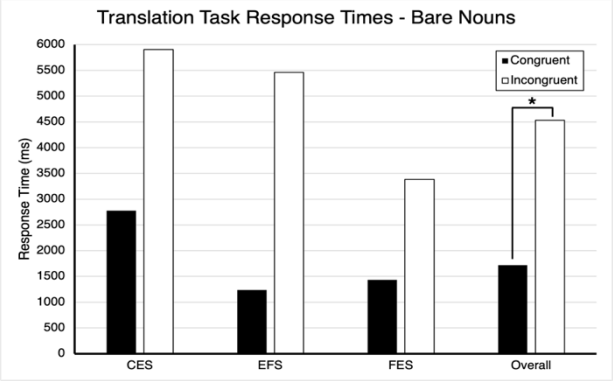

Figure 11: *Graph of the results of the translation task in the BN condition.*

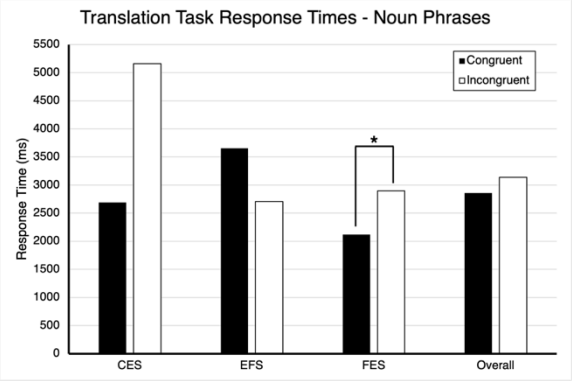

Figure 11: *Graph of the results of the translation task in the NP condition.*

In summary, participants completed two tasks, an English- and French-to-Spanish translation task, and a grammaticality judgement task in Spanish. Participants generally demonstrated a gender congruency effect in the translation task but not the grammaticality judgement task, with significant GCE observed in the FES group. Participants also demonstrated a significant GCE in both bare noun and noun phrase contexts. A discussion of these results is provided in Chapter 5.

Chapter 5

Discussion and Conclusion

This study asked whether: (1) a gender congruency effect is observed with English-French and French-English bilingual learners of Spanish, (2) whether transfer to the L3 is a chronological or typological process, and (3) whether the GCE can still be observed even in contexts when gender agreement is not necessary, for example in bare noun production. Research questions 1 and 2 jointly represent one component of this study, L3 transfer models, while research question 3 addresses gender activation, so these two topics are addressed separately from each other, in sections 5.1 and 5.2, respectively.

5.1 The Gender Congruency Effect

Whenever significant differences in response times between congruent and incongruent conditions were observed in the data, they indicated the presence of a gender congruency effect, in line with hypothesis one. Namely, these cases of a significant GCE were seen in the translation task for the collapsed noun conditions (BN and NP together) both for FES participants and for the all-participants collapsed group, for the all-participant group in BN conditions, and for FES participants in NP conditions. In the translation task, while not all the differences may have been significant, average group response times were consistently shorter for congruent nouns than they were for incongruent nouns, except for EFS participants in NP conditions. This non-significant gender congruency effect did include the sole ES participant, who had limited exposure to French and reported that they would not be able to hold a conversation or write in French or understand spoken French. This participant correctly translated eight of the 16 French stimuli, indicating that,

interestingly, lexical information and even its associated grammatical properties like gender may have been retained by this individual despite having low communicative and receptive proficiency. There were no significant results observed in the grammaticality judgement task, with between-condition response time differences varying by no more than 120 ms.

Overall, participants answered an average of 59.77% of questions correctly in the translation task and 87.88% of questions correctly in the GJT. Additionally, responses to the GJT were about three times faster than in the TrT. These data indicate a task effect. Theoretically, participants should be engaging–or at least could engage–lexical information in this task, though it may not be necessary given the use of canonically-gendered nouns in all stimuli. As such, the absolute minimum information that a participant needs to make a grammaticality judgement is the gender affix of the noun and the associated determiner and, when included, adjective; if the former matches both of the latter then it is grammatical, a rather quick decision-making process. Montrul et al. (2014) observe a similar effect. The researchers in that study had native speakers, heritage speakers, and L2 learners of Spanish complete three tasks which engage grammatical gender in varying ways: a gender monitoring task, a grammaticality judgement task, and a word repetition task. The first two tasks were predominantly explicit, asking participants to focus on the form of Det-Adj-N phrases to make binary decisions marked by a button push, while the third task was more implicit, having participants repeat the last word of Det-Adj-N phrases. L2 learners and heritage speakers performed about the same in the gender monitoring task and GJT, but heritage speakers had a significant advantage over L2 learners in the word repetition task. That is, L2 learners had longer response times in reception and production, indicating a greater processing cost, when the task directed participants' attention away from

explicit gender cues and towards spoken word recognition and production instead. These results suggest that L2 learners may be focusing heavily on morphophonemic cues. In future studies investigating the GCE in Romance languages, which are notoriously gender-transparent, it may be more appropriate to continue using the translation task, or opt for a picture-naming task or even a lexical decision task, all of which require a participant to activate semantic concepts alongside their lexical representations, to avoid participants simply defaulting to exclusively orthographic information to make grammaticality decisions. In studies involving, for example, Germanic languages, which do not typically mark gender morphophonemically, the GJT may be more effective since participants would have to access gender information at a more abstract level in order to determine if an agreement context is correct or not. Generally, tasks should be carefully designed based on the linguistic information that the task input provides and what linguistic information must be interacted with in order to produce a response.

Strictly speaking when it comes to theory, the data–which show a significant GCE only for FES participants–follow the predictions of the L1 Privilege Model, which claims that the only source of information is the L1. However, the limited data require this result to be interpreted with caution. From a statistical standpoint, the lack of a significant result in the EFS condition could easily be due to a simple lack of data in that condition. The equation for paired samples t-tests $\frac{\bar{d}}{s_d/\sqrt{n}}$ where $\bar{d}$ is the mean difference in response times, s_d is the standard deviation of the response times, and n is the number of data points. EFS and FES had relatively close mean differences in response times (845 and 961 ms, respectively) and nearly identical standard deviations therein (447 and 452 ms, respectively), but, with such low n, reducing the degrees of freedom

$(n-1)$ by just one participant more than doubles the necessary test statistic for an alpha level of 0.05 from 2.920 to 6.314. Obtaining such a high test statistic is impossible with just two participants, because, keeping the standard deviation the same for EFS participants, the mean difference would have to be at least 1995 ms, at which point participants have long exceeded automatic production of language. As such, the answer to research question 2 is inconclusive, perhaps preliminarily indicating an L1P model of L3 transfer, but with further data collection (as is the intent of the author) there could very well be transfer from the L2 as well, indicating a typological model of transfer.

5.2 Gender Activation and Selection

In determining if gender is still activated even without any agreement context, order of acquisition groups are less relevant than they are in the previous section, so they are largely ignored here. Significant GCEs were observed in the overall participant group for bare nouns and in the FES group for noun phrases; counterintuitively, the condition without a need for agreement demonstrated a significant GCE but the condition with necessary agreement did not show a significant GCE. The limited data restrict the broader validity of these conclusions, but preliminarily it seems that gender is activated even when agreement is not necessary, confirming hypothesis 3. This conclusion is in line with the claims of Sá-Leite et al. (2019), who distinguish gendered languages between those that carry gender lexically and those that carry gender syntactically. Languages with lexically-held gender, like many of the Romance languages, provide easier access to gender information since it is often readily apparent in the phonetic representation, orthography, and morphology of words, while such access of gender information in languages with syntactically-held gender, like many Germanic languages, is cognitively costlier and thus will be avoided unless necessary,

as it is in agreement contexts. Importantly, however, this research extends the typically-bilingual contexts of gender activation studies to L3 contexts, and do not indicate any change in behaviour from L2 to L3 contexts.

5.3 Translational Implications

While pedagogy is not a primary goal of this study, some of the conclusions of this study and related work may be useful for language teachers as they decide on teaching methods. Looking to the gender activation questions, students may benefit from teaching that draws attention to gender morphemes. Activities and practice that draw attention to the gender of non-canonical nouns (e.g., *nub-e* 'cloud-F', *lápiz* 'pencil.M') and irregularly-gendered nouns (e.g., *tema* 'theme.M', *foto* 'photograph.F') and help them establish patterns (e.g., "nouns ending in *-ción* are often feminine") may aid them in better performance in agreement contexts, while teachers of Germanic languages and other languages with syntactically-carried gender may see improvements when their students are given ample opportunity to practice the gender of nouns by using agreement contexts. Teachers may also use the L3 transfer conclusions to aid their students in applying and transferring existing linguistic knowledge into their target language. Even outside of L3 contexts, it is observed in the data presented here that at least some previous linguistic knowledge is available for transfer. Teachers may wish to survey their students to know which languages they are already familiar with and do research to familiarize themselves with what structures these PALs have (the World Atlas of Language Structures could be a useful resource; https://wals.info/) and integrate that previous linguistic knowledge into their teaching. This method generally falls within the field of *translanguaging* (Wei, 2018), wherein second/world language teachers intentionally engage and welcome previous linguistic knowledge, instead of the perhaps more mainstream method of treating the

target language structures as totally new information. The data indicate cross-linguistic interactions, so when these interactions are beneficial a teacher may wish to exploit that advantage.

5.4 Future Directions

This research has many opportunities for expansion. Most apparently, there is a need for additional data; ideally, recruiting for this study will continue to meet the initial target goals of 30 participants overall, as mentioned in Section 3.1. Beyond that, future research should examine additional grammatical structures. The presence of wholesale models of L3 transfer make it necessary to analyze more than just one grammatical structure, to analyze whether just one or several structures are transferred. In the case of EFS/FES learners, noun-adjective order may be a useful structure, especially since gender information would transfer exclusively from French while both NAdj and AdjN order are present in the previous linguistic repertoire from French and English, respectively. Also, in the context of Rothman's TPM, several considerations raise ideas for future research. The cognitive economy argument of the TPM considers that lexical similarity is highly-ranked by the parser when deciding which language to select for transfer. Future language combinations should be sufficiently distant in order to test how typological proximity choices are made without the strong genetic link that often comes with lexical similarity. The TPM also suggests that typological primacy is a choice that is made early in language learning, though this question of when selection occurs can be tested under any of the models. A future study may take on a longitudinal design, perhaps in a year-long language class, to evaluate if there are any changes in the source(s) of transfer over time. Finally, most studies on gender activation focus on these two language families. Focusing on Germanic and Romance languages is easily accessible to many linguists, but they only represent a relatively small share of

the world's languages and both come from the Indo-European language family. Arabic and Hebrew are just two examples of masculine-feminine gendered languages from the Hamito-Semitic family that may be accessible in future studies.

5.5 Conclusion

Overall, this study has preliminarily found that a gender congruency effect is possible in L3 contexts, particularly in French L1-English L2 learners of Spanish as an L3. At the very least, cross-linguistic transfer is available from a third language learner's first language, but future investigations with larger pools of participants may reveal other sources and patterns of transfer as well. Finally, third language learners do activate gender even outside of agreement contexts, especially speakers and learners of Romance languages, likely due to the highly-apparent nature of gender in Romance languages. This study expands upon a growing field of literature exploring which previous languages are available for transferring linguistic information in third language learners, and whether those previous languages are selected in their entirety or whether language properties are transferred individually to the third language from any of the learner's previous languages. In general, these data apply previous paradigms of psycholinguistic and L_n language acquisition inquiry and expand them into third language contexts. The evidence presented in this major research paper operate under and contribute to the longstanding idea that a multilingual's languages are interconnected and conform to a set of universal linguistic parameters.

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Appendix A

Linguistic History Questionnaire

Language history questionnaire (LHQ). Go to https://blclab.org/lhq3/ to use the online version and for reference

(1) Participant ID number				(2) Age	
(3) Gender	☐ Male	☐ Female	☐ Non-binary	☐ Non-relevant	
(4) Education	☐ Graduate school (Doctor)	☐ Graduate school (Master)	☐ College (Bachelor)		
	☐ High school	☐ Middle school	☐ Elementary school	☐ Other	
(5) Parents' Education — Father	☐ Graduate school (Doctor)	☐ Graduate school (Master)	☐ College (Bachelor)		
	☐ High school	☐ Middle school	☐ Elementary school	☐ Other	
(5) Parents' Education — Mother	☐ Graduate school (Doctor)	☐ Graduate school (Master)	☐ College (Bachelor)		
	☐ High school	☐ Middle school	☐ Elementary school	☐ Other	
(6) Handedness	☐ Right-handed	☐ Left-handed	☐ Ambidextrous		

(7) Indicate your native language(s) and any other languages you have studied or learned, the age at which you started using each language in terms of listening, speaking, reading, and writing, and the total number of years you have spent using each language.

*Notes For "Years of use", you may have learned a language, stopped using it, and then started using it again. Please give the total number of years.

Language	Listening	Speaking	Reading	Writing	Years of use*

(8) Country of origin	
(9) Country of residence	

(10) If you have lived or traveled in countries other than your country of residence for three months or more, then indicate the name of the country, your length of stay (in Months), the language you used, and the frequency of your use of the language for each country.

* You may have been to the country on multiple occasions, each for a different length of time. Add all the trips together

Never 1 Rarely 2 Sometimes 3 Regularly 4 Often 5 Usually 6 Always 7

Country	Length of stay (in Months)*	Language	Frequency of use
			☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
			☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
			☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
			☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.

(11) Indicate the way you learned or acquired your non-native language(s). Check one or more boxes that apply.

* e.g., Immigrating to another country where the dominant language is different from your native language so you learn this language through immersion in the language environment.

Non-native Language	Immersion*	Classroom instruction	Self-learning
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

(12) Indicate the age at which you started using each of the languages you have studied or learned in the following environments (Including native language).

Language	At home	With friends	At school	At work	Language software	Online games

(13) Indicate the language used by your teachers for instruction at each educational level. If the instructional language switched during any educational level, then also indicate the "Switched to" language. If you had a bilingual education at any educational level, then simply check the box under "Both Languages".

Environment	Language	(Switched to)	Both Language
Elementary school			☐
Middle school			☐
High school			☐
College (Bachelor)			☐
Graduate school (Master)			☐
Graduate school (Doctor)			☐

(14) Rate your language learning skill. In other words, how good do you feel you are at learning new languages, relative to your friends or other people you know?

Very poor	Poor	Limited	Average	Good	Very good	Excellent
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

(15) Rate your current ability in terms of listening, speaking, reading, and writing in each of the languages you have studied or learned (including the native language).

Very poor	Poor	Limited	Average	Good	Very good	Excellent
1	2	3	4	5	6	7

Language	Listening	Speaking	Reading	Writing

(16) Rate the strength of your foreign accent for each of the languages you have studied or learned.

None	Very weak	Weak	Moderate	Strong	Very strong	Extreme
1	2	3	4	5	6	7

Language	Accent
	☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
	☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
	☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.
	☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5, ☐ 6, ☐ 7.

(17) If you have taken any standardized language proficiency tests (e.g., TOEFL, IELTS, TOEIC, etc.), then indicate the name of the test, the language assessed, and the score you received for each. If you do not remember the exact score, then indicate an "Approximate score" instead.

Test	Year taken	Language	Score	Approximate score

(18) Estimate how many hours per day you spend engaged in the following activities in each of the languages you have studied or learned (including the native language).

Language	Watching television	Listening to radio	Reading for fun	Reading for school/work	Using social media and Internet	Writing for school/work

(19) Estimate how many hours per day you spend speaking with the following groups of people in each of the languages you have studied or learned (including the native language).

Note *Include significant others in this category if you did not include them as family members (e.g., married partners)
**Include anyone in the work environment in this category (e.g., if you are a teacher, include students as co-workers).

Language	Family members	Friends*	Classmates	Others (co-workers**, roommates, etc.)

(20) If you use mixed language in daily life, please indicate the languages that you mix and estimate the frequency of mixing in normal conversation with the following groups of people.

Note *Include significant others in this category if you did not include them as family members (e.g., married partners)
**Include anyone in the work environment in this category (e.g., if you are a teacher, include students as co-workers).

None	Very weak	Weak	Moderate	Strong	Very strong	Extreme
1	2	3	4	5	6	7

	Language 1	Language 2	Frequency of mixing
Family members			
Friends			
Classmates			
Others (co-workers, roommates, etc.)			

(21) In which language do you communicate best or feel most comfortable in terms of listening, speaking, reading, and writing in each of the following environments? You may be selecting the same language for all or some of the fields below.

	Listening	Speaking	Reading	Writing
At Home				
At school				
At work				
With friends				

(22) How often do you use each of the languages you have studied or learned for the following activities? (including the native language)

Note*This includes shouting, cursing, showing affection, etc.
**This includes counting, calculating tips, etc.
***This includes telephone numbers, ID numbers, etc.

	Never	Rarely	Sometimes	Regularly	Often	Usually	Always
	1	2	3	4	5	6	7

Language	Thinking	Talking to yourself	Expressing emotion*	Dreaming	Arithmetic**	Remembering numbers***	Praying

(23) What percentage of your friends speaks each of the languages you have studied or learned? (including the native language)

Language	Percentage
	%
	%
	%
	%

(24) Which cultures/languages do you identify with more strongly? Rate the strength of your connection in the following categories for each culture/language.

	Very poor	Poor	Limited	Average	Good	Very good	Excellent
	1	2	3	4	5	6	7

Culture/Language	Way of life	Food	Music	Art	Cities/Towns	Sports teams

(25) Use the comment box below to indicate any additional answers to any of the questions above that you feel better describe your language background or usage.

(26) Use the comment box below to provide any other information about your language background or usage.

(27) Do you also speak/use any dialects of the languages you know? Please indicate the name(s) of the dialect and the degree you use them.

End of LHQ3 (4 pages, 27 questions)

Appendix B

Lists of Stimuli

Translation Task:

English stimuli

Phrase	French Noun	Spanish Noun	Congruency	Phrase Type	Spanish Gender	French Gender	Determiner
a new week	semaine	semana	Con	DAN	F	F	Ind
the new world	monde	mundo	Con	DAN	M	M	Def
the American money	argent	dinero	Con	DAN	M	M	Def
an American boat	bateau	barco	Con	DAN	M	M	Ind
an egg	œuf	huevo	Con	DNA	M	M	Ind
door	porte	puerta	Con	N	F	F	NA
winter	hiver	invierno	Con	N	M	M	NA
the American pillow	oreiller	almohada	Inc	DAN	F	M	Def
the American butter	beurre	mantequilla	Inc	DAN	F	M	Def
a new smile	sourire	sonrisa	Inc	DAN	F	M	Ind
a new shoe	chaussure	zapato	Inc	DAN	M	F	Ind
the back	dos	espalda	Inc	DNA	F	M	Def
the lip	lèvre	labio	Inc	DNA	M	F	Def
the river	rivière	río	Inc	DNA	M	F	Def
pepper	poivre	pimienta	Inc	N	F	M	NA
shoulder	épaule	hombro	Inc	N	M	F	NA

Translation Task:

French stimuli

Phrase	English Translation	Spanish Noun	Congruency	Phrase Type	Spanish Gender	French Gender	Determiner
un œuf	an egg	huevo	Con	DNA	M	M	Ind
une semaine nouvelle	a new week	semana	Con	DNA	F	F	Ind
le monde nouveau	the new world	mundo	Con	DNA	M	M	Def
l'argent américain	the American money	dinero	Con	DNA	M	M	Def
un bateau américain	an American boat	barco	Con	DNA	M	M	Ind
porte	door	puerta	Con	N	F	F	NA
hiver	winter	invierno	Con	N	M	M	NA
le poivre	the pepper	pimienta	Inc	DNA	F	M	Def
l'épaule	the shoulder	hombro	Inc	DNA	M	F	Def
la rivière	the river	río	Inc	DNA	M	F	Def
le beurre américain	the American butter	mantequilla	Inc	DNA	F	M	Def
un oreiller américain	an American pillow	almohada	Inc	DNA	F	M	Ind
un sourire nouveau	a new smile	sonrisa	Inc	DNA	F	M	Ind
la chaussure nouvelle	the new shoe	zapato	Inc	DNA	M	F	Def
dos	back	espalda	Inc	N	F	M	NA
lèvre	lip	labio	Inc	N	M	F	NA

Grammaticality Judgement Task:

Phrase	English Translation	French Noun	Spanish Gender	Congruency	Correctness	Phrase Type	Determiner	Incorrect Part of Speech
el cuchillo caro	the expensive knife	couteau	M	Con	Cor	DNA	Def	NA
una estrella blanca	a white star	étoile	F	Con	Cor	DNA	Ind	NA
la rama	the branch	branche	F	Con	Cor	DN	Def	NA
un juego	a game	jeu	M	Con	Cor	DN	Ind	NA
un vino	a wine	vin	M	Con	Cor	DN	Ind	NA
la caja caro	the expensive box	boîte	F	Con	Inc	DNA	Def	Adj
una fuego blanco	the white fire	feu	M	Con	Inc	DNA	Ind	Det
la hilo	the thread	fil	M	Con	Inc	DN	Def	Det
el camisa	the shirt	chemise	F	Con	Inc	DN	Def	Det
un onda	a wave	onde	F	Con	Inc	DN	Ind	Det
el anillo caro	the expensive ring	bague	M	Inc	Cor	DNA	Def	NA
un zapato caro	an expensive shoe	chaussure	M	Inc	Cor	DNA	Ind	NA
el odio	the hatred	haine	M	Inc	Cor	DN	Def	NA
el método	the method	methode	M	Inc	Cor	DN	Def	NA
un segundo	a second	seconde	M	Inc	Cor	DN	Ind	NA
la sonrisa blanco	the white smile	sourire	F	Inc	Inc	DNA	Def	Adj
una vestido blanco	a white dress	robe	M	Inc	Inc	DNA	Ind	Det
la miedo	the fear	peur/horreur	M	Inc	Inc	DN	Def	Det
un primavera	a spring	printemps	F	Inc	Inc	DN	Ind	Det
un fruta	a fruit	fruit	F	Inc	Inc	DN	Ind	Det