PERCEPTION OF FOREIGN ACCENT IN HERITAGE SPEAKERS OF SPANISH

by

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DEDICATION

This dissertation is dedicated to:

my parents (Victor Monárrez Perez and D. Patricia Martínez Cebreros),

brother (Victor Monárrez Martínez),

husband (Denton Wayne Rhone),

daughter (Ashley Sendy Patricia Rhone),

and soon-to-be-born son (Dylan Denton Wayne Rhone),

who have been and continue to be my sustenance and support in this journey.

EPIGRAPH

"Mi familia siempre dice que tengo como un acento más como del inglés, y normalmente cuando me escucho hablar siento que no hablo diferente.

Ellos siempre me recuerdan que mi primer idioma es español y que necesito ser experta en español porque es mi raíz. Pero así no es la cosa, porque en Estados Unidos tengo conexión con el inglés. Yo quiero que ellos sepan que no voy a ser experta en español, y que soy un poco diferente por la manera en que yo crecí."

– M. R. (student in the Spanish as a Heritage Language Program)

To Dr. Alejandra Balestra, who has been my cheerleader. For all those collegiate conversations over ice cream and tea when the stress got intense, and for reminding me that this can be done.

To my professors from the Department of Hispanic Studies at UH, who allowed me to pursue my research in every class possible.

To my students, past, present, and future, for being the reason behind my passion for languages, teaching, and this research.

A mis padres y mi hermano, por siempre creer y apoyar mis locuras académicas.

To my adopted parents, Liz and Jerry, who received me in their home at the beginning of this journey. Thank you for everything.

ABSTRACT

Even though a vast amount of research has been conducted on second-language accent perception, little has been studied in terms of accent perception of heritage speakers. Furthermore, there is a lack of a phonetic standard capable of accurately measuring the accent of Spanish heritage speakers in a context of contact with English, due to the dichotomous system of classification and description of accent perception, which provides a limited and rigid alternative for accent perception: native speaker or second language speakers. This is perhaps because heritage speakers are generally perceived as having native-like pronunciation. This study focused on the perception of foreign accent of heritage speakers of Spanish. Specifically, it investigated if heritage speakers acquire a foreign accent in their heritage language as compared with monolingual native speakers or late bilingual native speakers of Spanish, and whether degree of bilingualism (as measured by the Bilingual Language Profile) is relevant. The results of this study contributed, in a scientific and methodological way, to the main discussion of the definition and description of a possible *heritage accent*.

Keywords: heritage speakers, Spanish heritage speakers, foreign accent, accent perception, bilingual language profile

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CHAPTER 1

INTRODUCTION

1.1.Background and Justification

The study and comparison of foreign accent (FA) and native-like accent in a

second language is a common topic of research in second-language acquisition (SLA)

studies (for an overview, see DeKeyser & Larson-Hall, 2005). There are two different

views for native-like accent acquisition in a second language: some researchers claim that

it is possible for learners to attain native-like levels of proficiency (Montrul, 2013b; Rao,

2014), while others claim it impossible to happen outside of the critical period for

language acquisition (Abrahamsson & Hyltenstam, 2009; Amengual, 2012), since

pronunciation in the target language is one of the most difficult skills to acquire for late

learners (Gowhary et al., 2016; Hopp & Schmid, 2013; Muñoz & Llanes, 2014).

Even though vast research has been conducted on second language accent

perception, few studies have addressed accent perception of heritage speakers (HSs).

Furthermore, there is no precise description of the accent of Spanish heritage speakers in

terms of phonetic and prosodic characteristics in a context of contact with English, due to

the dichotomous system of classification and description of accent perception that

provides a limited and rigid alternative for accent production and perception: native

speaker or second language student. There is a strong current tendency to evaluate

accents as native-like or foreign, without considering the complexities of situations such as language contact, where cases like heritage speakers do not fall neatly into either categorization, but rather are exposed to and use a mix of two or more languages, and consequently their accent is affected by their language dominance, use, exposure, input, etc. Therefore, in this study we focused not on native-like or foreign accent, but rather consider the accent perception from a continuum: non-accented speech on one side and accented speech on the other side. This continuum allows us to place all speakers into degrees of accentedness, regardless of their status as native speakers or not, rather than a rigid binary categorization of native and nonnative.

The dichotomous system of classification and description of accent perception is perhaps due to the general idea that heritage speakers are native speakers and thus *sound* like native speakers (Ronquest & Rao, 2018).[1] Many heritage speakers acquire their heritage language first (as first language) at home during childhood, but it is done under reduced input conditions and already from a language contact situation from their parents or caregivers, as perceived from Valdés' (2005) definition of heritage speakers: "[an individual] who is raised in a home where a non-English language is spoken" (p. 412). Thus, as HSs grow and begin their social interactions in the majority language, they continue speaking their heritage language (HL) in limited contexts such as the home, with family members, and the community (Kupisch, Barton, et al., 2014; Montrul, 2013b; Pascual y Cabo, 2016; Valdés, 2005). See section *3.2 Heritage Speakers* for more.

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[1] There are two classifications of bilinguals for heritage speakers: sequential and simultaneous bilinguals. Generally, heritage speakers of Spanish in the United States are sequential bilinguals with Spanish as their L1, though some grow up as simultaneous bilinguals.

Only during the last two decades have studies regarding HSs pronunciation and phonology been conducted more systematically. In terms of accent perception in HSs, Boomershine and Ronquest (2019) claim that HSs' pronunciation is often perceived as that of native speakers. However, other studies indicate that HSs either consider their own pronunciation as not native-like (Bajorek, 2017; Helmer, 2010; Lanier, 2014) or are perceived as not having native-like pronunciation (Polinsky & Kagan, 2007).

In addition, these studies have been conducted under the premise that heritage speakers are compared with monolingual, native speakers living in a monolingual context. However, most heritage speakers do not live in this kind of context. They are heritage speakers because they live in situations where language contact takes place.

According to the 2020 United States Census (Jones et al., 2021), the Hispanic or Latino population in the country grew by 23%, from 50.5 million (16.3% of the U.S. population) in 2010 to 62.1 million (18.7%) in 2020, which comprises almost one fifth of the total U.S. population of 331.4 million (see Table 1 and Figure 1).

Table 1

Demographics of Hispanic Population in the United States

	2000		2010		2020	
	N	**%**	**N**	**%**	**N**	**%**
Total population	281.4 million	100	308.8 million	100	331.4 million	100
Hispanic population	35.3 million	12.5	50.5 million	16.3	62.1 million	18.7

Texas is the third state with the largest number of Hispanics or Latinos. According to the 2020 United States Census Bureau (2020), the Hispanic or Latino

population in Texas is the second largest racial or ethnic group in the state, with 11.4

million (39.3% of the state population) in 2020. There was a 20% growth in the Hispanic

or Latino population in Texas, from 9.5 million (37.6%) in 2010 to 11.4 million (39.3) in

2020. Of the total 2.3 million Hispanics or Latinos (43.9% of the population in the metro

area) in Houston, the fourth largest metropolitan area in terms of Hispanic population,

75.7% is of Mexican origin (Lopez et al., 2022). See Table 2 for a comparative

demographics of Hispanic population in Texas from 2000 to 2020 (United States Census

Bureau, 2020).

Figure 1

United States Hispanic Population Growth.

U.S. Hispanic population reached more than 62 million in 2020

In millions
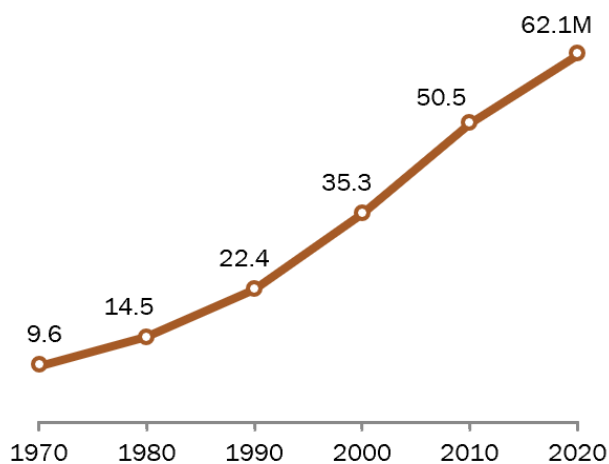
Note: Population totals are as of April 1 for each year. Hispanics are of any race.
Source: Pew Research Center analysis of 1970-1980 estimates based on decennial censuses (see 2008 report "U.S. Population Projections: 2005-2050"), 1990-2020 PL94-171 census data.

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Table 2

Demographics of Hispanic Population in Texas

	2000		2010		2020	
	N	**%**	**N**	**%**	**N**	**%**
Total population in TX	281.4 million	100	308.8 million	100	331.4 million	100
Hispanic population in TX	6.7 million	32%	9.5 million	37.6%	11.4 million	39.3%

Pertaining to use of Spanish among the Hispanic or Latino population 5 years and over, an estimate of 13.5% of the total US population speaks Spanish at home, whereas in Texas, 29.2% (7.9 million people) reported to speak Spanish at home. The majority of those (5.4 million) are between the ages of 18 and 64. In the Houston-Sugar Land-Baytown metropolitan area, 29% of the total population speaks Spanish (Lopez et al., 2022).

Since it is the largest minority group in the United States as well as in Texas, the so-called *Spanish of the United States* is influenced by three main factors: (1) the country of origin of the speakers, (2) the generation the speakers belong to, and (3) the predominant dialect spoken in each region. Thus, if we consider these factors, we should talk about more than one dialect of United States Spanish, and therefore more than one variety of Spanish of the heritage speakers.

Based on the origin of the speakers in each region, we can see that historically, New York has predominantly Puerto Rican Spanish (known as *Nuyorican*), Miami has Cuban Spanish, whereas Houston and Los Angeles have a dominance of Mexican Spanish. However, this does not mean that the Spanish spoken in those cities is the same as that of the countries of origin. When in contact with English, and in particular by

increasing the number of Hispanics of second and third generation (Schwegler & Kempff, 2019), the dialects of Spanish in the United States have their own characteristics, unique to variants in contact (more of this is discussed in Chapter 2).

Regarding the generation of speakers, the greatest influence that marks dialectal differences is not geographical but rather access to and use of Spanish. Unlike direct immigrants (first generation), who almost always keep Spanish as the majority language with the phonetic characteristics of their place of origin, the children and grandchildren of immigrants (second and third generation) already have some variations in their speech, which is a result of the influence of contact with English, as well as not having gone to school in Spanish.

Considering these factors, we can see that a two-category classification of heritage speakers might not be the most appropriate. Although most studies dealing with global accent, whether investigating second-language learners (L2s) or heritage speakers, present a dichotomy between native-like vs. foreign accent, it is necessary to develop a specific system that includes *heritage accent* because the speech of heritage speakers presents its own phonetic characteristics. The main problem with this native-like accent/foreign-like accent dichotomy is that first, heritage speakers are hard to place or do not fit at all into it. In addition, it creates a judgement where some speakers and/or language learners belong and others do not belong, no matter how much they may try or develop their proficiency. For instance, in the case of L2s, using this binary classification, highly proficient learners could still not be classified as native-like speakers because of their status as foreign language learners.

Perhaps a third norm, though it would probably not be so rigid and could take into consideration the language contact context of heritage speakers, could not be the best fit either, as it would still require all heritage speakers to be classified into one category– which, by the definition of heritage speakers itself, is not possible. Rather, this research suggests considering accent perception as part of a continuum of accented and non-accented speech (like Valdés' continuum of bilingualism, see section *3.2 Heritage Speakers*), where all speakers–native monolingual and bilingual, heritage, and L2s–would fit regardless of their status or category.

This dissertation considers previously mentioned factors such as origin, generation of speakers, age of onset of dominant language, among others, in an analysis of how heritage speakers' accents are perceived by other Spanish speakers. The focus is on the perception of foreign accent of monolingual native Spanish speakers (1LNSs),[2] native speakers of Spanish who are late learners of English (2LNSs), heritage speakers of Spanish who are linguistically dominant in English (HSs)[3], and native English speakers who are late second-language learners of Spanish (L2s). Both monolingual and bilingual native speakers of Spanish are included to avoid the problem of comparing the HSs with monolinguals (Grosjean, 1995). The input that HSs have in their HL comes mainly from their parents and sometimes some family members, all of whom are to a certain degree bilingual and live in constant contact with the majority language. Therefore, Spanish may

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[2] This study used two groups of native speakers of Spanish: monolinguals living in a Spanish-speaking country and English-Spanish late bilinguals living in the United States. Additionally, though HSs are considered native speakers of their HL, in this dissertation we use the term *native speaker* to align with language experience and linguistic dominance rather than order of acquisition. See Methodology section *4.1.2 Speakers* for a more detailed explanation of the type of native speakers used for this study.

[3] English-dominant is the typical case for HSs. In this dissertation we will be referring to HSs as linguistically English-dominant, which does not mean that they could not have been Spanish dominant from the results of the BLP. See Methodology section *4.1.2 Speakers* for a more detailed explanation of HSs.

be passed down to HSs in this form that is different than in monolingual contexts, not due to influence of English or incomplete acquisition but because the input itself is different. Heritage Spanish, though considered by some to be their first language, may already be experiencing the changes that come with the language contact context in which they live (Flores & Rato, 2016; Hualde et al., 2021; Silva-Corvalán, 1994).

The goals of the current study are to contribute, in a scientific and methodological way, to the main discussion of the definition and description of a possible *heritage accent* and, at the same time, to determine whether monolingual NSs or bilingual NSs are a more appropriate control group to which to compare HSs, at least for studies on phonological acquisition.

1.2. Purpose of the Study and Research Questions

The objective of the proposed study is to investigate how accent is affected if a language is acquired as a minority (heritage) language in a language contact situation as compared to a majority (dominant) language given that accents are usually evaluated based on the native-like norms, without regards to complexity of language contact situations such as bilingualism, multilingualism, and heritage speakers. Thus, there is a need to think of classifying and/or describing accents differently.

The research questions posed in this study can be divided into two categories: accent perception and factors that influence accent perception. The five research questions are as follows:

RQ1: Are Heritage Speakers of Spanish (HSSs) perceived foreign-accent free in their heritage language? (See section *3.4 Foreign Accent in Heritage Speakers* for a definition of foreign accent.)

RQ2: Are late bilingual native speakers (2LNSs) perceived foreign-accent free in their native language?

RQ3: Is there a difference in the perceived foreign accent of HSSs when comparing them with 2LNSs and 1LNSs?

RQ4: Does the HSSs' level of proficiency correspond with the perception of a foreign accent?

RQ5: Is there a correlation between the score of the HSSs on the BLP and the perception of a foreign accent?

To address these Research Questions, an accent perception quasi-experiment was be conducted. Recordings of five groups (1LNSs, 2LNSs, A-HSs, E-HSs, and L2s) were taken and presented to Spanish monolingual judges in order to determine where the heritage speakers of Spanish fall within the foreign accent continuum and if any of the two factors taken into consideration in this study affect that perception.

This manuscript is divided in six chapters. After this first chapter of introduction, the second chapter focuses on the phenomenon of language contact and its resulting in language transference and change. From here, the third chapter transitions into examining heritage language phonology, first by defining the heritage speaker, and then the process of phonological acquisition in heritage speakers of Spanish as well as the study of foreign accent in heritage speakers. The fourth chapter introduces the methodology used in this study: the research design, the instruments, the participants, and the procedure to collect

and analyze the data; followed by the fifth chapter, which is a detailed analysis and a

discussion of the results. Finally, the sixth chapter presents the conclusions, including

pedagogical implications, limitations, and future directions of the research.

CHAPTER 2

LANGUAGE CONTACT, LANGUAGE TRANSFERENCE, AND CONTACT-INDUCED LANGUAGE CHANGE

2.1 Introduction

Bilingualism, multilingualism, and languages in contact are very common phenomena around the world, as it is estimated that more than half the world's population is bilingual, and that almost every country has bilingual people, regardless of their sociodemographic or economic status (Grosjean, 2010). Bilingualism happens at different levels, stages, and ages of onset, but it is known that many children around the world grow up as simultaneous bilinguals, learning two languages at the same time (Gampe et al., 2021).

Let us imagine a hypothetical but common example. Lara, 6 years old, was born in Thailand to a Filipino mother and an Indonesian father. At home, her mother speaks to her in Tagalog and her father in Bahasa Indonesia (also known as simply *Indonesian*). Her parents speak to each other in English and her environment outside of the home is mainly English. Her neighbors and playmates are Thai kids, so they speak Thai, and Lara has picked up a lot of it by interacting with her friends every day. At her young age, Lara is already multilingual. As much as this example may sound extreme and unique, it is a more common case than we might think, especially for those of us not used to bi- or multilingualism due to living in an officially monolingual environment or a de facto one like the United States. But even here in the United States, language contact is more common than it is accepted or imagined to be.

This second example is one that is very common in the United States. Luca, 4 years old, was born in Newark, NJ, to Brazilian parents. At home and in their community, they speak Portuguese. They attend a Luso-Brazilian church, and their play dates are with other Portuguese-speaking kids and moms. Once a week Luca's mom takes him to the library for children's story time in English, so he is beginning to be exposed to English and to say a few words in English. Luca, at his very young age, is growing up bilingual.

When people use or speak two or more languages on a constant basis, like in our two examples above, and particularly when living within a community of speakers, it is called *language contact* (Silva-Corvalán, 2001). Regardless of the level of competency in either of the languages, the constant communication or use of more than one language by a group of people constitutes contact between languages (Thomason, 2001).

As we can see from our two examples, in this study we focused on language contact in the context of languages spoken at home (heritage language) other than the national language (dominant language), and we did not consider language contact much from the perspective of learning an L2, be it in school or any other context.

2.1.1 General Characteristics of Language Contact

Language contact is a social phenomenon that results from speakers being either enabled, encouraged, or even forced to speak more than one language to communicate with different groups in a determined area. Thus, the communication between the natives of a given area, the colonist that came at a certain moment in history, and later the immigrants to that area, results in extensive language contact, which in turn leads to

enduring bilingualism and other phenomena such as language transference and language change (Grosjean, 1982; Winford, 2003).

There are different factors that determine language contact, from the country or region itself, to movement of people, to education, culture, social, and other aspects. Auer (2021) lists different social factors such as culture, politics, economics, power, and ideologies, among others, and the extent and strength of all those factors will determine or condition the amount of bilingualism, multilingualism, or linguistic contact (Grosjean, 2010).

2.1.2 Differences Depending on the Context

Language contact and the outcomes of this linguistic phenomenon emerge differently depending on the context in which they are present. Some countries have more than one official language (e.g., Canada, Singapore, Switzerland), others have official or de facto languages and co-official languages or regional languages (e.g., Spain, Nigeria), others yet have official or de facto languages and working languages (e.g., Mexico, where it is technically monolingual, but the workplace and education are more and more impregnated with English), while others still have their official or de facto language and unofficial minority languages (e.g., United States).

Another factor that determines the extent of language contact, especially in officially bilingual or multilingual countries, is the geographical distribution of the languages (Grosjean, 2010). If the languages are distributed by geographical areas, like the case of Canada or Switzerland, where each language is mainly spoken in a particular region, then the actual contact is less. On the contrary, if the languages all merge in the

same geographical area, such as in Singapore, then there may be more contact between language groups. Let us look at some examples of some countries around the world where language contact is present in different contexts.

Singapore is a good example of a society where languages are constantly in contact with each other, and where that contact has led to language transference and language change. Singapore, with a population of 5.4 million people (The World Bank, 2021), is a multiethnic and multilingual society. The ethnolinguistic diversity of Singapore is reflected in the four official and widely spoken languages in the island nation: English, Mandarin Chinese, Malay, and Tamil (Wee, 2014). However, the four languages are not equally spoken by all citizens. According to the Census of Population 2020 (Department of Statistics Singapore, 2022), in the section on Literacy and Home Language, 74.3% of the population is bilingual, but not necessarily multilingual. English is the language of administration, trade, industry, and tourism, and it is also the main language of education, as it is considered "a cornerstone of [their] education system" (Lee Kuan Yew Fund for Bilingualism, 2022). Mandarin is also strongly promoted in schools, as Chinese is the largest ethnic group on the island, comprising 74.3% of its population (Department of Statistics Singapore, 2022; Windstedt, 2022).

English is the home language of 48.3% of the population: 13.2% of those are monolingual; 56.1% report Mandarin as their second most frequently spoken language, and only a smaller number report speaking Malay (13.5%) and Tamil (5.1%) as their second language (Department of Statistics Singapore, 2022). Mandarin is the second most widely spoken language in Singapore, both as a first (L1) and second language (L2), and hence it is strongly promoted (Windstedt, 2022). 29.9% of the population reported

speaking Mandarin as their home language: 22.3% of them are monolingual and 49.2% speak English as their second most frequent language (Department of Statistics Singapore, 2022). As per Malay and Tamil, they could be considered minority languages if solely counting the number of speakers. Only 9.2% of the population reported speaking Malay at home, though Malay is the country's national language, and 2.5% speak Tamil as their home language. Both groups are either monolinguals or English bilinguals.

As we can see, none of the people who reported their home language as being other than English speak any of the other three official languages in the country. Thus, we can see that though officially a multilingual nation, its population is not multilingual; rather, multilingualism is a societal and political decision for inclusion and policy making purposes. English as the main lingua franca between the citizens became the working and education language, while the government encourages people to remain bilingual in their ethnic language as well as in English (Wee, 2014).

Because of this contact between the four languages on the island, Singlish emerged as a hybrid language that simplifies English and mixes pieces of Chinese and the other official languages. The beginnings of this hybrid dialect date back to 1965, when Singapore became independent from Malaysia, and made the four languages official (History SG, 2019); however, English became the inter-ethnic lingua franca (Wee, 2014; Wong, 2015). Therefore, language transference began to happen on both directions – from English into the other three languages, and especially into English. As much as English was the official language, "Singlish became the language of the street" (Wong, 2015).

In Canada, the situation of bilingualism and language contact is similar in that the country is also officially bilingual–English and French–at the federal level. In 1867, the *Constitution Act* recognized the use of English and French in Parliament and the federal courts, but the status of official bilingualism was only adopted a century later, in 1969, with the *Official Languages Act*, which declared English and French to be the two official languages of Canada (Government of Canada, 2022).

Bilingualism in Canada, however, happens more at a regional level. Each province has the option to institute either language and to apply their own language policies, as the *Official Languages Act* does not regulate outside of the federal government (Office of the Commissioner of Official Languages, 2021). Therefore, throughout history, some provinces and territories have officially established one of the two languages as the language of government and education. For instance, Quebec enacted Bill 101, the *Charte de la langue française* (*Charter of the French Language*) in 1977, which stipulated that French is the official language and must be used in legislation, administration, work, businesses, and education (Busque, 2022). Of the 10 provinces and three territories, only New Brunswick is officially bilingual (Canadian Museum of History, n.d.).

According to the *2021 Census of Population* report by Statistics Canada (2022), of the 36.9 million people in Canada, 54.9% reported English as their mother tongue, 19.6% French (of which only 3.8% are outside of Quebec). 18% of the population are FR/EN bilinguals, but that status of bilingualism in the country's official languages is not distributed equally among the provinces. Quebec is 46.4% bilingual, whereas Ontario is 10.8% and British Columbia is only 6.6% bilingual.

In addition, due to a large flow of immigration, there are also a variety of languages other than English and French commonly and widely spoken in Canada; 21% of the population reported 'other' as their mother tongue. Of the 215 languages represented in this category, the largest is Punjabi, spoken by 2.2% of the population, followed by Mandarin, spoken by 2.1% of the population (Statistics Canada, 2022). The Canadian government calls the speakers whose mother tongue is other than English or French *allophones* (Statistics Canada, 2022). The nation, thus, can be considered to have a strong multilingual aspect to its social, cultural, and linguistic characteristics (Harrison, 2000; Thomas, 2009).

Seeing this clear distinction and geographical distribution of languages in Canada, one could understand how one language would suffer from being the subordinate and the majority language the one of prestige, which is the case in many contact situations (Pattillo, 2021). Outside of the Canadian Bilingual Belt (Ottawa, Montreal, and Quebec City) and New Brunswick, in regions where francophones are already a minority–the western provinces (e.g., British Columbia is 1.2% French-speaking) and the Atlantic Region (e.g., Newfoundland and Labrador is 0.5% French-speaking)–, there is still not much support for minority languages. French in Anglophone Canada for Francophone minorities gets support under the government bilingualism law, but other minority languages (heritage languages) do not enjoy the same official protections. Therefore, it is not uncommon to see community schools, religious communities, cultural educational centers, and after-school and other personal social groups that encourage and provide for the ethnolinguistic needs of many immigrant communities (Duff & Becker-Zayas, 2017).

When studying languages in contact, one must not overlook the case of the United States, where diversity and vitality of minority languages is very much present (Grosjean, 1982). According to the United States 2020 Census (United States Census Bureau, 2020), of the 332.9 million people living in the United States, 21.5% reported speaking a language other than English at home, and 13.2% speak Spanish at home, the largest minority language in the country. Outside of Latin America and Spain, the United States has the largest Spanish-speaking population, being the nation with the fifth-largest population of Spanish speakers after Mexico, Colombia, Argentina, and Spain (Carreira, 2021).

Whenever there is considerable contact between languages, bilingualism will arise (Grosjean, 2010), though the direction in which the languages are learned depends on which one is the language of power. In the United States, despite the presence of many non-English speaking groups, they are considered minority languages, and suffer from being the subordinate language/culture to English, or the dominant language and language of power (Pattillo, 2021). However, when the sociolinguistic minority becomes a large enough group, other linguistic groups are encouraged or motivated to learn the language for socioeconomic and professional purposes, as is the case of Spanish in Texas, where Spanish speakers are a majority-minority (United States Census Bureau, 2020).

2.1.3 Importance of Language Contact

In language contact situations, the higher the intensity of the contact and the more asymmetry in power and prestige from the majority language, the greater the tendency for

the minority language to suffer language transfer (Aktürk-Drake, 2015; Winford, 2003).

Many times, the majority language group exerts linguistic power over the minority

language group, creating unidirectional contact. For example, in the case of bilingualism

in Ottawa, it is common that French (the minority language) takes borrowed words from

English (the majority language) and not the other way around (Poplack et al., 1988). This

is also the case for Spanish in the United States, where it is the recipient of loan words,

structures, and phonology from the prestige language (English) more than in the opposite

direction, conversely, English, as much as it takes gastronomic terminology from

Spanish, has not been overly affected by contact-induced change (Pattillo, 2021;

Winford, 2003). An extreme result of this kind of situation is the construction of a totally

new and different language, as in Haitian creole and Papiamento, a creole language of

Spanish-base mixed with Portuguese and Dutch, spoken on the Dutch Caribbean–Aruba,

Bonaire, and Curacao.

These cases of language contact, though exemplifying bilingualism (and/or

multilingualism) by definition, show a difference when one of the languages in question

does not enjoy the status of official or de facto language, as in the case of the United

States. Heritage speakers of any given language, for instance, Spanish, are bilinguals, but

their language combinations are in contact within the greater society where one (Spanish)

is a minority language and has the sociocultural status of a "subordinate position of

prestige and distribution to the dominant societal language (English)" (Judy et al., 2018).

Thus, it is important to consider language contact when studying heritage

speakers, and in particular, heritage speakers' pronunciation because of the bilingual

setting in which their two languages are constantly in contact with each other, and their

heritage language is constantly being affected by the majority societal language, which incidentally is also most of the time their stronger and most used language.

This chapter first presents a description and explanation of the phenomenon of language contact, its resultant in language transfer and contact-induced language change, and how it can influence the perception of a foreign accent, particularly in heritage speakers.

2.2 Language Contact

The situation of language contact happens when two or more languages "coexist in the same geographical space" and people who speak them use both languages (Silva-Corvalán, 2001, p. 269). Even though language contact does not necessarily require the individuals to be proficient bilinguals or multilinguals, they do tend to have a certain degree of fluency or communicative abilities in both/all languages (Thomason, 2001).

Language contact is very common across the globe in many different settings, be it in academics when learning a second language (L2), learning an L2 outside of the classroom, or when speaking a language other than the national language at home.

In European countries, we can observe a constant and common language contact, with interactions in and outside the classroom between the official or de facto language of each country and at least one (and sometimes two) foreign language, and sometimes also heritage languages. For example, in the German-speaking Community of Belgium, students start learning a foreign language at 3 years of age, and the compulsory age for starting a second foreign language is 13 years old. In addition, Belgium is officially trilingual—Dutch, French, and Belgium—with English as a lingua franca (Devlin, 2015).

Another example of language contact with different language combinations is Germany. Even though the country is officially monolingual, it is mandatory for students to learn one foreign language starting at 8 years old (Devlin, 2015). As for which language the students may choose as a foreign language, especially when it comes to a third foreign language, it is left to the students' choice (and of course, within the options provided and languages available at the institution). However, the teaching and learning of a heritage language is voluntary (Pfaff et al., 2017). Additionally, in non-academic contexts, there are several different immigrant communities that have kept their heritage languages alive and passed it on to subsequent generations. Such is the case of Turkish and Russian, and to a lesser extent Catalan, Portuguese, and French. However, heritage languages tend to be relegated to nonacademic settings, as learning an immigrant minority language is not appreciated by majority language speakers, culture, and policy makers because it is seen to hinder integration and to threaten national identity (Extra, 2017).

Germany is the leading destination in Europe for asylum seekers, and this translates into diverse linguistic environments reflected in immigration patterns. 90% of the German population speaks German at home, which means that there is a small but significant number of people that use their heritage language at home. Of all the languages spoken as heritage languages in Germany, Turkish and Russian are the most frequently spoken, comprising 2% of the adult population each (Czapka et al., 2021). 1% of German adults speak Arabic, and the rest speak another language at home, such as Catalan, Portuguese, or French (Devlin, 2020; Gil & Jiménez-Gaspar, 2022).

With this context and given that in larger German cities, such as Berlin, the immigrant population is larger in proportion to the national average (32% of people with migration background vs. 24% nationwide), heritage languages such as Turkish and Russian are largely researched in school-aged children (Czapka et al., 2021).

In the 1960s, Germany created a migrant workers policy to fill the demand for cheap labor coming from Turkey (Devlin, 2020). This influx of workers became a trend that prevails until now and created the largest ethnic minority in German demographics— about 4 to 7 million residents, or 13% of the population, have a Turkish background, most of which live in urban industrial cities (Czapka et al., 2021; McFadden, 2019; Pfaff et al., 2017), which in turn has resulted in a significant prevalence of non-German languages.

Another group of immigrants that were benefitted by Germany's economic boom that opened its doors to guest (migrant) workers were Portuguese people, though much smaller in proportion compared to the Turkish population, with only 0.2% of migrants in Germany being from Portugal (Rinke & Flores, 2021). Though insignificant in number, this population of Portuguese speakers is interesting to study due to their sociolinguistic characteristics that favor the prevalence of the heritage language: (1) often-times Portuguese-speaking families have both parents as native speakers; (2) living with a return-oriented lifestyle, these families keep a strong tie with their home country, culture, and language; and (3) subsequent generations also keep their heritage language and encourage their children to take heritage language classes (Rinke & Flores, 2021).

With Germany as only one example of many countries exposed to language contact, we can see that this linguistic phenomenon is very common and stable because

of constant migration, connection with the home culture, strong communities of ethnic minorities in the country of destination, and the passing on of the heritage language and culture to subsequent generations.

Bilingualism and, in turn, language contact are also very common and growing phenomena in the United States. 22% of the American population 5 years old and over are bilingual (U.S. Census Bureau, 2020), of which approximately 89% acquired these skills in their childhood at home (Devlin, 2015).

The most commonly spoken language other than English in the United States is Spanish, with an estimated 41.7 million speakers, or 13.5% of the U.S. population, which represents a growth of 6.3 million speakers since the 2010 census (United States Census Bureau, 2020). Of all those speakers, the largest group is of Mexican origin and most of them live in the Southwest (Jenkins, 2018).

The contact between Spanish and English in the southwestern United States, mainly of Mexican origin, has a history that can be traced to the nineteenth century, when the English-speaking settlers started to expand onto the newly-acquired territories by the United States after the Mexican American war (1846–1848) and the concession of such territories in the Treaty of Guadalupe Hidalgo. Other major contact situations have historically occurred with other dialects of Spanish, such as Puerto Rican Spanish and Cubans in New York and Florida, which are a result of political and economic migrations (Jenkins, 2018; Waltermire, 2014).

Though it is not uncommon to see communities where Spanish is predominantly spoken and individuals have little command of English, a general characteristic of the Spanish in the United States is its constant contact with and influence from English

(Thompson, & Lamboy, 2012). This contact situation has influenced the Spanish spoken in the U.S., particularly of bilingual speakers, but to some extent, also of the first-generation of native speakers of Spanish, who may not even have a strong command of English (Waltermire, 2014). But how intense is that contact, how much input are those speakers receiving from the minority language, and what type of input is it?

Particularly in the southwestern United States, and due to its proximity with Mexico and the constant immigration of Spanish speakers, Spanish has been preserved and continues to be maintained as a community language among Spanish-speaking enclaves, even though the Spanish language (HLs in general) is not commonly passed on to the third generation (Thomason, 2001; Waltermire, 2014). However, another factor that facilitates language maintenance within the language contact situation of Spanish in the southwestern United States is the generally extensive sense of belonging to the minority culture through family, religion, language, travel, and core values. Also, maintaining Spanish within the context of language contact aids to preserve the cultural heritage and ethnic identity (feeling of group membership) that is very strong in the values of many Spanish-speaking countries and communities (Alvanoudi, 2018).

However, significant language contact also comes with its pitfalls or disadvantages. In the United States, linguistic diversity many times is perceived as a problem or threat to maintaining the linguistic unity of English due to the sociolinguistic situation of intense contact between two languages with unequal social and functional status. On the other hand, learning a language as a foreign language, especially by monolingual English speakers, is considered advantageous (Silva-Corvalán, 1994; Wiley & Bhalla, 2017).

It is important to study the phenomenon of languages in contact because all contact, be it with a foreign language, with a second language learned at school, or a heritage language spoken at home and in the community, has an effect on the language systems that are exposed to the contact (Grosjean & Py, 1991).

This constant bi- or multilingualism can result in language transference, represented in different phenomena such as borrowed words, calques, and code-switching (Thompson & Lamboy, 2012), as well as in linguistic strategies such as simplification, overgeneralization, and mixing (Waltermire, 2014), and in even more subtle representations such as a perceived foreign accent (by both native and heritage speakers).

2.3 Language Transference

There is a significant difference in the approach to language learning and particularly to language transfer in the literature of bilingual first-language acquisition and that of second-language acquisition (SLA). The research traditions of these two fields are different in that the former relates to contact linguistics and monolingual first-language acquisition, whereas the latter is viewed and studied from the point of view of applied linguistics and the focus is second language (L2) teaching and learning (Thomason, 2001). When SLA studies language contact, it does so with the understanding of a negative transfer from the L1 into the learning process of the L2 (Thomason, 2001).

The research approach one can take to studying language contact and contact-induced language change can vary widely. However, to fully understand these phenomena, one must combine different perspectives (Thomason, 2001). This section

will consider the perspective of sociolinguistics to understand how bilingual first-language acquisition happens (especially that of a heritage language) from the context of language contact and contact-induced language change.

It is also important to note that there is a difference in terminology and use between the fields of language contact and applied linguistics. Language contact studies use the terms *interference* and *transfer* interchangeably, whereas applied linguistics prefers the use of the term *transference* (Chatterjee, 2015; Silva-Corvalán, 2001; Thomason, 2001; Thomason & Kaufman, 1988; Van Coetsem, 2000). Hence, in this study the term *transference* will be used, and it has been taken from literature where both terms are used.

Many times, when studying language transference, and particularly in SLA, the focus is on what happens and how the L1 influences the L2 learning process and outcome, and what elements get affected in that transference. However, there is also another focus, at the macro level, where language transference is studied as a community phenomenon (de Bot & Bülow, 2021) without necessarily emphasizing the problems in L2 acquisition or how L2 learning is affected.

In a community where more than one language is spoken, there are different linguistic behaviors that can be present. In the case where the speakers are not proficient in one of the languages, the natural practice may be to try to communicate regardless of the language barriers they may have by compromising the norms of language (Winford, 2003). When speakers are more proficient bilinguals, they may switch from one language to another, many times on a constant basis. This switch brings about transfer of features from the speakers' first language to their target language, and in the case of heritage

speakers, many times the transfer is unidirectional; that is, it occurs into the heritage language due to pressure from and proficiency in their dominant language (Chatterjee, 2015; Hickey, 2020; Keshavarz & Ingram, 2002). This is consistent with the hypothesis of Silva-Corvalán (1994), Thomason and Kaufman (1988), and Weinreich (1979), that language transference is influenced more by the social context, such as the speech behavior of the bilingual speakers and their social relations in language communities, and not language structures.

In a bilingual society or community, two languages are constantly in contact with each other in all social domains, and hence, this situation produces language transference. Waltermire (2014) indicates that language transfer is natural for bilingual speakers; even when they can separate the languages and are fluent in both languages, transfer will occur. Therefore, he suggests that we should not judge language mixing and language transference in terms of being a negative or positive cognitive process but as a social marker.

Language transference happens when linguistic elements from one language get incorporated into another language; that is, when the bilingual speaker (in any range of the bilingual continuum) shows elements in his or her speech that deviate from the monolingual norm, which results from the similarities or differences between the languages or "as a result of their [the bilingual individual] familiarity with more than one language," or "due to pressures or influences from the foreign language" (Weinreich, 1979, p. 1).

Weinreich first introduced the term *interference* in 1953 in his work *Languages in Contact: Findings and Problems* and defined it as a "deviation from the norm of either

language" of bilingual individuals in the context of language contact (Weinreich, 1979, p. 1). Silva-Corvalán (2001) adds to this definition by introducing the element of "monolingual linguistic norm." Interference, or language transference, according to Weinreich (1979), suggests that language structures from one language will be adapted into another language as foreign elements, such as some sounds in the phonemic system, grammar structures, word formation, and vocabulary.

Language transfer begins to happen when the minority group, in the interest of preserving its native language, passes on the minority language to the subsequent generations with contact-induced changes such as borrowings, calques, code-switching and constructions or patterns from the dominant language (Alvanoudi, 2018) that have been introduced throughout time.

The degree to which the transfer occurs depends on many aspects such as linguistic, psycho-linguistic, socio-linguistic factors and frequency of input, among others, and it depends on the characteristics of each context and situation of language contact (Gutiérrez, 2020). For instance, there are several social factors that contribute to language change at a community level (Jenkins, 2018). One of them is the prolonged social interaction that happens among speakers of a minority language with the speech community of the majority language. The minority language speakers might or might not be bilingual or their degree of bilingualism may vary, but the more the two speech communities interact, the more it may result in mixture or change in their languages, particularly in the speakers of the minority group (Winford, 2003). Another sociolinguistic factor is the intensity of contact, which is how much cultural pressure a speech community has over another based on their level of bilingualism and the attitudes

of the speakers of the minority language and of the majority language towards the minority language (Aktürk-Drake, 2015; Thomason, 2001).

Linguistic transference can also happen at different levels of the language: phonological, morphological, syntactic, lexical, semantic, and pragmatic (Silva-Corvalán, 2001; Waltermire, 2014). However, there is a tendency to study language transference at the morphosyntactic and lexical level, and in phonetics focusing on the segmental level (see Boomershine & Ronquest, 2019; Rao & Kuder, 2016; Rao & Ronquest, 2015; and Ronquest & Rao, 2018, for a detailed summary of research on speech production of contact varieties of Spanish). Regarding the transferability of the different elements of language and at what level they transfer, in morphology Thomason (2001) notes that nouns are more transferable than verbs. In phonology though, transfer is less evident, as typically loan words adopt the phonology of the recipient language (Stewart & Meakins, 2021).

According to Weinreich (1979), in phonology, there are four types of transfer: underdifferentiation, overdifferentiation, reinterpretation, and substitution. Underdifferentiation of phonemes is when two sounds exist as separate phonemes in language A but are not distinctive in language B (they are mapped onto one phoneme), This type of transfer happens when the speaker does not make the distinction of the two sounds in language B as a transfer from language A, such as how /b/ and /v/ from English maps onto Spanish /b/ in borrowings (and with an accent). Overdifferentiation is when language A does not make the distinction between two sounds and the speaker distinguishes them because the sounds exist as separate in language B (e.g., English speakers might overdifferentiate *vez* and *ves* as ve[z] and ve[s], respectively).

Reinterpretation is a less common type of transfer that happens when a bilingual makes a distinction between phonemes from language B "by features which in that system are merely concomitant or redundant" but that are not in language A (Weinreich, 1979, p. 18). Substitution is when the phonemes do exist in both languages and are identically defined but pronounced different (i.e., the consonants /b/, /d/, /g/ in Spanish are fricatives in intervocalic position, but English-dominant bilinguals pronounce them as stops).

A number of studies have examined different elements in the phonological development and transfer of bilingual children in the context of language contact, arguing that bilingual children do have separate phonological systems, but that they interact with each other to a certain extent.

Paradis (2001) conducted a study to determine if sequential bilingual children separate their phonological systems and if there is crosslinguistic transference between them. She studied 17 French-English bilingual two-year-olds and compared them with 18 French-speaking monolingual children and 18 English-speaking monolingual children, all from the greater Montreal area in Quebec, Canada. Children were given a nonsense-word repetition task with which the researcher was able to measure the presence of language-specific patterns and to analyze lexical stress pattern production in each language. Paradis had hypothesized that crosslinguistic transference was going to be from French to English given that English has more flexible lexical stress patterns. She found that bilingual children appear to produce lexical stress patterns that match the phonological principles of each language respectively, thus confirming that "bilingual children have differentiated phonological systems, [but that] their separate systems do not appear to be

autonomous" (p. 34), and hence concluding that crosslinguistic interference, though it showed to be unidirectional into French, was infrequent.

Keshavarz and Ingram (2002) studied the bilingual (Farsi-English) phonological acquisition of a child from 10 to 20 months, focusing on vocabulary, prosody, segments, particular phonemes, transfer, acceleration, and delay. They found that, in terms of transference, it happened unidirectionally, first from Farsi (the heritage language) into English (the dominant language)—particularly a transference of word stress—, but eventually the transference shifted to an influence from the dominant language into the heritage language. As to what elements suffered transfer, they found seven cases of language transfer in both directions: stress patterns were transferred from Farsi to English (only at the early stage of acquisition when Farsi was the dominant language); the use of Farsi glottal stop [ʔ] into English; and instances of vowel transference in both directions (into English: [o] instead of a diphthong; and into Farsi, the use of non-existing sounds in Farsi phonology: a central schwa-like vowel, the lax high back rounded vowel [ʊ], the mid back rounded vowel [ɔ], and the lax high front vowel [ɪ]). They concluded that the two phonological systems do exert an influence on each other and that children in early stages of bilingual language acquisition may show patterns of phonological transference in one or both languages.

Fabiano-Smith and Goldstein (2010) compared the phonological acquisition of 8 bilingual children to 8 Spanish-monolingual and 8 English-monolingual children, ages 3 to 4 years old, to examine the interaction between the two languages. Language interaction was measured through transfer, deceleration, and acceleration. To measure phonological transfer, they did an analysis of frequency of instances where transfer

occurred, be it that an unshared sound appeared in another language (i.e., substituting the English /ɪ/ for the Spanish /r/ in an English utterance) or that there was a language-specific fine phonetic distinction found in the other language (i.e., aspiration of /p/ in a Spanish utterance). Additionally, they also analyzed the type of transfer in terms of what patterns the children were following (i.e., if there was a specific sound or set of sounds used or if it was random transfer of unshared sounds) and the direction of transfer (from what language to what language). They found that there was not a significant amount of phonological transfer in the children studied. There was a low frequency of bi-directional transfer in a few of the children studied (25%). As to what phonological elements were transferred, mainly it was a systematic modification of some phonetic characteristics; that is, stop consonants (/k/ and /t/) were sometimes produced without aspiration in some English productions. Thus, they concluded that the phonological systems of bilingual children are separated and that they rarely produce crosslinguistic transfer, though the languages interact in terms of rate of acquisition.

In a study to determine whether there was phonetic interference from the dominant language (English, L2) to the heritage language (Spanish, L1), following the theory that L1-L2 phonetic interference cannot be avoided in the phonetic space of bilinguals, Kim (2011) compared 7 English-Spanish bilinguals with Spanish as their heritage language (average age was 19 years old) with 5 late L2 English learners and 5 late L2 Spanish learners. She found that Spanish heritage speakers do not show transference in their English production of stop consonants but did show transference in their Spanish production. Her argument for this unidirectional phonetic transference is that language dominance determines the direction of transference; thus, her subjects

being English-dominant bilingual speakers would show transference in their heritage language and not in their dominant language.

2.4 Contact-induced Language Change

Language change is a phenomenon that happens in monolingual and bilingual contexts, as languages are constantly evolving over time (Gutiérrez, 2020; Hualde et al., 2021). Throughout history we have seen how different regions have developed dialects that are different from other regions. For instance, studies on historical sociolinguistic show us that Spanish in Latin America was not always so different from that of Peninsular Spanish. In Martínez (2001), we see how Texans used *-se* for the imperfect of subjunctive just as the Spaniards did, as opposed to other parts of Mexico, where speakers displaced the use of *-se* for *-ra*. Silva-Corvalán (1994) also shares two examples of language change. One is the "simplification and loss of tense—mood—aspect morphology in the Spanish spoken by adult Spanish-English bilinguals" (p. 20), in which, she highlights, the linguistic change is not due to language transference or any direct influence from the dominant language; rather, the change is influenced by the results of language contact in the quantity and quality of input (reduction of exposure and use of the subordinate language). The second example is the generalization of *estar* 'to be' in the context of predicate adjectives, which, though accelerated in language-contact situations, is a change that is slowly happening in monolingual Spanish-speaking countries. These examples show that language change happens in different regions and contexts and at different rates.

Language variation is what originates language change since language change, in essence, is the development and use of a new form in coexistence with an already present form. For example, English-speaking expatriate teachers in Bangkok, Thailand start transferring vocabulary and syntax from Thai English (e.g., *air conditioning* or *AC* becomes *'aircon'*) and start referring to themselves in the 3rd person when speaking to their students (*'tell teacher what you liked about your reading'*). However, when they are with their expatriate friends, they go back to speaking English without these transferred elements. When this new form becomes popular and spreads into a larger speech community, that is when language change happens to its full extension (Holmes & Wilson, 2022; Lucas, 2015), as one of the premises of language change is the "diffusion from individuals or smaller groups to the speech community as a whole" (Sankoff, 2013, p. 514).

There are two main forces that influence language change: language-internal pressures and contact-induced changes (Chatterjee, 2015). For language-internal pressure, language change can happen in the context of monolingualism, without the presence of language contact but rather as the process of natural evolution of a language and the way its speakers use it over time. Secondly, a language can also change through the influence of other languages with which it is in contact. This change strictly happens in bi-/multilingual contexts, where the change is influenced and accelerated by constant contact with (and use of) two or more languages, and where it "would have been less likely to occur outside a particular contact situation"; it therefore presents differently, with more influence towards the other (dominant) language (Thomason, 2001, p. 62; Silva-Corvalán, 1994).

Since this research focuses on the possible influence of a majority language on the minority (heritage) language pronunciation, rather than discussing time or other variational changes in monolingual contexts or internally motivated language changes, we will further discuss and focus on contact-induced language change.

2.4.1 Definition

In the context of more than one language spoken in one region, daily contact between the two languages generally favors or accelerates language change (which is the most common result of language contact) due to the great number of loanwords from the dominant language to the minority language or to phenomena such as language transfer (Gutiérrez & Silva-Corvalán, 1993; Silva-Corvalán, 1994, 2001). The interaction between people and the constant switching between languages and transferring elements from one to another helps in the evolution of a language in contact, beginning with vocabulary and then grammar, but also in structure, pronunciation, intonation, etc. (Chatterjee, 2015; Holmes & Wilson, 2022; Thomason, 2001).

The hypothesis of Silva-Corvalán (1994) is that bilingual speakers in contact situations tend to find ways to reduce the mental process of having to use two languages at the same time. Therefore, language transfer becomes one of those strategies used by bilingual speakers. As a result of this intensive language contact and constant language transference, language change tends to occur (Silva-Corvalán, 2001; Weinreich, 1979).

Bilingual individuals can present language transference in their speech because of their knowledge (or limited knowledge) of another language or simply to lighten the cognitive load. However, when the transference occurs as an overall element in the

grammar of a language in contact, then it becomes contact-induced language change (Chatterjee, 2015).

As previously mentioned, in a broader sense, contact-induced language change is "any linguistic change that would have been less likely to occur outside a particular situation" (Thomason, 2001, 62). This is a broad definition that doesn't differentiate between internal or external causes that induce change, such as direct transfer, shift from a dying language, and subsequent changes. More specifically, "[language] change is an innovation that takes place in an individual's lexicon or grammar but subsequently spreads to the speech of other adults" (Pires & Thomason 2008, cited by Chatterjee, 2015), and for it to happen there needs to be contact between the languages (Thomason, 2001).

Now that contact-induced language change has been introduced and defined, we can proceed to review what predicts change (and to what extent), how the change happens, and what the results of language contact in language change are.

2.4.2 Predictors of Change

What factors are the major influence of contact-induced language change? According to Winford (2003), how contact-induced change results originates from many possibilities that can be categorized in two groups of factors: socio-psychological (external) and linguistic (internal).

A disclaimer that I find important to state is that by describing and expanding on contact-induced language change and what factors influence or even predict change, we are not predicting what changes *will* take place nor how exactly they will take place, but

rather describing the phenomenon that takes place particularly with, but not restricted to, a subordinate language that is in a contact situation. Thus, we talk about "probabilities, not possibilities" of change (Thomason, 2001, p. 71). Some conditions, such as social settings, bilingualism in borrowing situations, a community of speakers that are shifting to the dominant language, and speakers' attitude towards language transfer and change, influence or are predictors of (and can even accelerate) contact-induced language change, but that does not necessarily mean that change will actually happen (Thomason, 2001).

Some sociodemographic factors, such as education, socioeconomic level, age, generation, gender, etc., play an important role in influencing and/or accelerating language change (Gutiérrez, 1994; Holmes & Wilson, 2022).

In terms of the generational factor of the speakers, the greatest influence for dialect differences is not geographical but rather access to and use of Spanish. Unlike direct immigrants (first generation), who almost always keep Spanish as the majority language with the phonetic characteristics of the place of origin, the children and grandchildren of immigrants (second and third generation) already show much transference in their speech, which arises from the influence of contact with English as well as a lack of schooling in and limited use of Spanish (Belpoliti & Bermejo, 2020; Schwegler & Kempff, 2019). Thomason (2001) calls it *the typical three-generation shift pattern*, which is the tendency for third-generation heritage speakers to show more changed elements into their speech (De Leeuw et al., 2010; Kupisch, Barton, et al., 2014; Lein et al., 2016) or become completely passive language users (Au et al., 2002, calls them overhearers).

The outcomes of contact-induced language change can also vary depending on socioeconomic level and social status of a linguistic community. A specific feature of language change can happen in any social group at any given time, but depending on the social status of the group, the types of changes may vary. For example, lower-class linguistic communities tend to be more susceptible to less conscious transference in contact situations than groups with more social status, which, in turn, produces language change that they consider to have more acceptance, status, and prestige (Holmes & Wilson, 2022; Thomason 2001).

Another important source of variation that results in language change is gender differences. Whereas both men and women can innovate and lead a linguistic change, often times men have the tendency to lead language change in vernacular forms while women lead in both prestige and vernacular changes (Holmes & Wilson, 2022). For example, Bernate (2016) studied the difference between men and women (with the same socioeconomic level) in the aspiration of /s/ to determine if men aspirate more than women, to in turn determine who leads this specific linguistic change of informal speech production. She found that men aspirate the /s/ more evidently than women, thus confirming that men lead this change in informal and colloquial speech.

With the appropriate social conditions (intensity of contact, motivation to use the languages, etc.) present in a determined speech community, there is a high possibility of change happening as a consequence of language contact, and any feature can be the affected element of change (Thomason, 2001; Winford, n.d.).

The first social factor to consider is the intensity of contact. Thomason (2001) provides a four-point scale of intensity of contact that goes from casual contact to intense

contact. She states that "as the intensity [of contact] increases, the kinds of borrowed features increase according to relative ease of borrowing from a linguistic perspective, until finally all aspects of a language's structure are susceptible to borrowing" (p. 69).

In the lowest level of intensity of contact, casual contact, the transference happens mainly at a lexical level, and it does not even require speakers to be fluent in the language that influences the change. For example, monolingual English speakers in the United States, particularly in the Southwest, would be able to say words or phrases like *poquito*, or *no español*. A more specific example, health care providers (practitioners, nurses, dentists, etc.) that have a lot of monolingual Spanish patients, would eventually be able say a few instruction phrases in Spanish to guide their patients in their daily basic routines (for instance, a dentist would say *abre la boca por favor*). On the other extreme of the intensity scale, there is intense contact with very extensive bilingualism among speakers and with social factors that promote language transference and accept change. When contact is very intense, the result is intense transference of lexical elements across sections of the lexicon as well as intense structural-grammatical transference. For instance, in syntax, word order may be changed; in phonology, loss of phonetic categories; and in morphology, a loss of agreement patterns.

To provide a concise example of Spanish in the United States, Silva-Corvalán (1994) indicates that there are two main factors that have a strong positive correlation with language change: duration of residence in the language contact community and the reduction of domains of use of the minority language. The change she studied was the simplification and loss of discourse pragmatic rules.

The second social factor we will consider that influences the probability of language change is the speaker's motivation to transfer and their attitude towards the change. Thomason (2001) argues that the speaker's attitude towards change is many times one of the strongest forces in contact-induced change. In addition, she states that the more intense language contact is, the more the speakers' attitude towards language change plays a role towards what is transferred and what is not, and what is accepted as change and what is not.

There are also cases where all sociocultural and social factors in a language contact situation are the same, and yet there can be variation in the outcomes of language change based on some sociocultural characteristics, such as community settings, patterns of social interaction, degrees of bilingualism in speakers, history of contact, continuous influx of first-generation speakers, and the power relationship between the groups (Poplack et al. 1988; Winford, 2003).

As was stated when discussing the social factors that predict the probability of language change, the results of language contact are influenced by both internal/ linguistic factors, and external/social factors (Winford, 2003). However, linguistic factors are less important than social, sociocultural, and sociopolitical factors, as many times "the linguistic factors can be overridden by social factors" (Thomason, 2001, p. 77).

As per the linguistic factors that predict language change, Thomason (2001) highlights three: universal markedness, degree of integration of features, and typological distance between languages. Markedness is the least probable predictor of change, as speakers can transfer marked and unmarked features. In terms of the degree of integration of features, some features, such as inflectional morphology, are less likely to be

transferred in a contact situation. As per the typological distance between languages, the closer the systems of the source language and the recipient language are, the higher the probability of change in the recipient language.

Historically, Gutiérrez (1996), Klein (1980), Limerick (2022), Ocampo (1990), and Shin et al. (2017), among others have focused on morphosyntactic and lexical changes, but in recent years, the body of experimental research on heritage language phonetics and phonology has grown (Amengual, 2012, 2016; Kim, 2015; Rao, 2014, 2015; among others), which directly informs contact-induced language change.

2.4.3 Mechanisms of Contact-induced Change

Now that we have defined language change and seen the predictors that are the major influence in contact-induced language change, we can transition into discussing how exactly contact-induced change takes place.

It is known that language contact will produce an effect on the individual, on the community of speakers, and on the linguistic systems of the languages involved (Grosjean & Py, 1991). Bilingual speakers in a contact situation often introduce features of one language into the other, be it lexical, phonological, or morphosyntactic, which subsequently becomes language change (Sankoff, 2013).

There are of course many specific processes to describe how these elements or features of one language get introduced into another language and how contact-induced language change is expressed. In this section, based on chapter 6 of Thomason (2001) and *The Routledge Handbook of Language Contact* (Adamou & Matras, 2021), we will

briefly discuss 3 mechanisms of contact-induced change that are relevant to this research: code-switching, passive familiarity, and bilingual first-language acquisition.

Language change, particularly contact-induced change, can be seen in different phenomena such as simplification, hypergeneralization, and code-switching (Chatterjee, 2015; Silva-Corvalán, 2001). Code-switching is the most studied mechanism of contact-induced language change, and Thomason (2001) argues that it could be because it is the one mechanism that is the easiest to study and easiest to identify in bilingual speech. Code-switching is "the use of material from two (or more) languages by a single speaker in the same conversation" (p. 132), which means that all interlocutors must speak, or to a certain extent understand, the languages in play. Even though some scholars believe that code-switching does not lead to language transference, which, in turn, will not lead to language change, there is another school of thought that argues in favor of code-switching as the one mechanism through which foreign elements get introduced in a language. Though it might not be a "universal factor in contact-induced change" (p. 133), code-switching plays a significant role in language transference when the transferred elements become nativized into the receiving elements. For that process to take place, the foreign element that is being code-switched, and later transferred, must appear in not only one speaker but in a community, and must appear not only once but with enough frequency that it becomes incorporated as a change.

A second mechanism of contact-induced language change that is relevant to our study of heritage speakers of Spanish in the United States is passive familiarity, which Thomason (2001) defines as "a speaker [that] acquires a feature from a language that s/he understands (at least to some extent) but has never spoken actively at all" (p. 139). This is

the case of many first-generation Spanish speakers in the United States with their knowledge of English; in the case of our study, these speakers are the main source of language input for our heritage speakers. Therefore, sometimes heritage speakers receive input in a contact-induced changed language that happened through passive familiarity with English from their parents.

Bilingual first-language acquisition as a mechanism of contact-induced change happens when a group of children grow up bilingual in a context of language contact, and therefore, their languages relate to each other, creating a transfer into one or both languages that is influenced by the fact that they grow up learning both languages simultaneously. Several studies have focused on phonological influences in one (or more) language in the context of children who grow up bilingual (Amengual, 2016; Bunta et al., 2016; Rao, 2014, 2015; to mention a few; see Chapter 3 for further discussion of this topic). These studies have focused on phonetic changes in bilingual speakers that do not happen in monolingual speakers, and therefore, can be counted as contact-induced language change. That said, bilingual first-language acquisition is a common mechanism of language change between many heritage speakers of Spanish in the United States. Queen (2012) studied phonological features of Turkish-German bilingual children and found that this bilingual group of children had created new intonational patterns particular to their group (not present in either the speech of either their Turkish-speaking parents nor in their German-speaking teachers) in each language that was influenced by the other language.

2.4.4 Contact-induced Change in Spanish in the United States

We saw throughout this section of Language Change that many features can be transferred at all levels of language structure; however, the most common and first feature to be transferred and to suffer change is the lexicon. Phonological changes are subtler, and therefore, harder to identify and are mainly studied in laboratory or experimental studies (Waltermire, 2014).

Outside of the Spanish-speaking countries in the world, the United States has the fifth-largest population of Spanish speakers (Carreira, 2021), and yet in the United States, Spanish is classified as a minority language. Thus, Spanish in the United States is a language in a contact situation, which, in turn, produces a particular contact-induced language variety different from the other varieties of Spanish in countries where Spanish is either the majority language or the official or de facto language.

Spanish in the United States, given that it is the minority language with the longest history of contact with English in this territory (Carreira, 2021), has accumulated many linguistic features transferred from English, which has changed the structure of the variety of Spanish spoken in the United States (Waltermire, 2014). Given the minority language status of Spanish in the United States, and the high degree of community bilingualism among Hispanic communities, there is a larger probability of language change in the minority language (Aktürk-Drake, 2015).

Spanish heritage speakers in the United States, as well as heritage speakers of other languages, use a large number of transferred elements from English to their heritage language as part of everyday life in their communities, and though those changes may not presuppose language shift, they are important enough to consider Spanish in the United

States a variety or a dialect of the language (Winford, 2003). However, Silva-Corvalán (1994) believes that, with time, and if the right socio-political conditions allow it, Spanish in the United States may develop as a totally fundamentally different language than those varieties in non-contact contexts.

Despite a high degree of individual bilingualism and despite the strong cultural and linguistic attachments to their community and their heritage, subsequent generations of Spanish speakers in the United States tend to lose their heritage language and shift to English (Winford, 2003). Particularly in the third generation is when language shift happens. The first generation of Spanish-speaking immigrants are dominant in the native language while usually learning English as their second language. This group is then the main source of Spanish input for the second generation of English-Spanish bilinguals, who then become linguistically English-dominant bilinguals. Then the third generation tends to be completely English dominant and have passive or limited competency in their parents' heritage language (Jenkins, 2018). Therefore, contact-induced language change is strongest and most evident in second-generation speakers.

2.5 Summary

First, this chapter introduced the concept of language contact, particularly in the context of Spanish as the largest minority language in the United States, while also providing other examples of language contact situations. In the first and second sections, the general characteristics of language contact were described, then some examples were given of differences in language contact depending on the context of each country or

region, and finally, we stated the importance of language contact when studying heritage speakers, and in particular, heritage speakers' pronunciation.

The third section explained language transference as a result of language contact. This section introduced and defined language transfer, and then explained the factors that influence transfer and the levels of language in which transfer happens. Lastly, it presented some examples of research that focused on phonological language transfer.

Finally, in this chapter, we pondered language change and the factors that lead to that linguistic phenomenon. Again, after introducing and defining the concept of language change, and differentiating between internal change and contact-induced language change, this section described the predictors and mechanisms of contact-induced language change before concluding with some exploration of how this phenomenon happens in the variety of Spanish in the United States.

As we have seen, (bilingual or multilingual) contact-induced language change can produce differences at the phonological level. The remainder of this manuscript will focus on phonological changes (or lack thereof) in Spanish spoken as a heritage language in the United States, specifically in the greater Houston area. Even though in this study we do not focus on individual sounds that get affected by language contact, those sound changes may result in a perceived accent of the speaker. The focus of this study is to analyze to what extent there is a perception of a foreign accent in individuals within the context of language contact, particularly heritage speakers of Spanish in the southwestern United States, and late bilingual native speakers of Spanish (see full description of this group in chapter 4). Therefore, the next chapter will focus on heritage language phonology, where we will first expand on the definition and characteristics of heritage

speakers, then on phonological acquisition in heritage speakers of Spanish, and finally,

we will define and describe foreign accent in heritage speakers.

CHAPTER 3

HERITAGE LANGUAGE PHONOLOGY

3.1 Introduction

Many scholars (including Abrahamsson & Hyltenstam, 2009; Flege, 1988; Munro & Mann, 2005; Schmid & Hopp, 2014) argue that one of the most difficult, if not unattainable, tasks when learning an L2 later in life is to achieve a native-like accent. Many of those L2 pronunciation and accent perception studies focus on the effect of age of onset (AoO) of the L2 and how this affects the accent of the second language (for an overview, see DeKeyser & Larson-Hall, 2005).

Even though vast research has been conducted on L2 accent perception (Abrahamsson & Hyltenstam, 2009; Flege, 1988; Flege et al., 1995b, 1995b; Kuronen & Tergujeff, 2017; Schmid & Hopp, 2014; among many others), few studies have addressed accent perception of heritage speakers (HSs). Furthermore, there is no precise description of the accent of Spanish heritage speakers in terms of phonetic and prosodic characteristics in a context of contact with English.

It is of utmost importance to take into consideration language contact when studying heritage language pronunciation, and in particular, HL accent perception, because of the particularity of the context and characteristics in which the learners acquire their HL: input, bilingualism, majority vs. minority language exposure, shifts of literacy, language attrition, etc. Even though heritage speakers are considered native speakers of their HL, many times they experience a shift in language dominance once starting school, and therefore, the increase of majority language input and use affects

their continuous development of pronunciation and accent in what has now become their HL.

This chapter focuses on heritage speaker and heritage language phonology. It begins with a broad description of the heritage speaker by providing the definitions used in the field as well as the different characteristics of this very heterogeneous group. Then, it transitions to phonological acquisition in heritage speakers of Spanish by revising the phonological system of Spanish as a HL, in particular, segmental and suprasegmental-prosodic features. It ends with a section on foreign accent in heritage speakers, and after discussing how terms vary and providing the definition of foreign accent, it presents previous studies conducted on foreign accent perception in HSs of different language pairs such as German-French/Italian /Portuguese, and English-Korean/Spanish/Polish, among other language combinations. Finally, it concludes with presenting the problematic nature of a binary rating of accent perception that only allows for native or non-native accent.

3.2 Heritage Speaker

The terms *heritage language* and *heritage speaker* were first used in Canada in 1977 to refer to a *home-background language* other than English (or French) of immigrants. In the United States, in the context of language policy, the term began to be used in the late 1990s, after the Center of Applied Linguistics convened the first heritage language conference, "Heritage Languages in America," in California (Cummins, 2005; Kagan & Dillon, 2012). In the general use, the term *heritage language* gained more

traction when it appeared in the National Standards in Foreign Language Education

Project in 2006 (Valdés, 2001).

In the United States and Australia, the term *heritage language* refers to non-

English languages of immigrants and refugees (Cummins, 2005). Similarly, in Europe, a

heritage language is a language other than the official, de facto, or majority language

(e.g., a non-German language in Germany) spoken by immigrants and refugees.

However, the term used varies depending on the location. In the United States, such

languages are widely and commonly referred to as *heritage languages*, while in Canada

they are called *immigrant languages* (Statistics Canada, 2022). In Australia the term

community language is used, and in Europe, several terms are used such as *immigrant*

language, *home language*, *regional language*, and *minority language* (Kagan & Dillon,

2012). Other terms such as *ethnic language* and *home background language* have also

been used to refer to the language spoken by those whose home language is not the

majority language (Thompson & Lamboy, 2012).

Similar to how there is no consensus in the terminology for *heritage language*,

there is also a discrepancy in the terminology of *heritage speakers*. The field of

acquisition and retention of the heritage (minority) language refers to such speakers

mainly as *heritage speakers/learners*, and even sometimes as *native speakers* (Judy et al,

2018; Knightly et al., 2003; Wiese et al., 2022), or *childhood speakers* (Au et al., 2002;

Au et al., 2008; Oh et al., 2002). And while the studies on the acquisition of the majority

language as an L2 tend to call them *bilinguals* or *early bilinguals* (Kagan & Dillon,

2012), many studies on heritage language also use this term (Kupisch, Barton, et al.,

2014; Kupisch et al., 2021; Lein et al., 2016; Lloyd-Smith et al., 2020; Marecka et al., 2015, to name a few).

Language education research, and particularly heritage language education research, has been debating a definition for heritage speakers for some time. HSs do not represent a homogeneous group (Boomershine & Ronquest, 2019; Pascual y Cabo, 2016). It is generally understood, though, that a heritage speaker is someone "who lives in a home where a language other than English is spoken" (Kagan & Dillon, 2012). The heterogeneity of HSs is due mainly to the extent to which speakers can use the language and their proficiency level, which are mainly caused by the different types of HL input received during childhood, age of onset of the dominant language, family background and family type, and the continued use of the HL and dominant language throughout adulthood, among other variables. Additionally, the very fact that there is a difference in the use of the terms *heritage language learners* or *heritage language speakers* makes the task of defining them an even more complex one. Some researchers and educators use the term *heritage speaker* (Boomershine & Ronquest, 2019; Polinsky & Kagan, 2007; Valdés, 2001), while others reject this, as it implies a certain level of proficiency in the language, and rather call them *heritage language learners* (Abdi, 2011). However, the problematic nature of using the term *heritage language learner* is that it implies that the person is a student (so it restricts the term to mainly the context of language pedagogy and assessment), while the term *heritage speaker* encompasses all persons, regardless of their status as students or not. For this research, we opt for the term *heritage speaker* because while the results may have pedagogical implications, the main research questions here are related to broader questions of acquisition.

There are two approaches to defining *heritage speaker*: *broad* and *narrow*

(Polinsky & Kagan, 2007; Valdés, 2001). On the one hand, the broad definition does not

consider any linguistic competence in the non-English language(s), and the emphasis is

merely on having had a connection between the cultural and linguistic heritage through

family interaction. As the term itself implies, it is too broad to be able to define and

categorize language students, and it leaves us with a lot more variability since linguistic

competence is not essential for this categorization (Cummins, 2005; Pascual y Cabo,

2016; The Alliance for the Advancement of Heritage Languages, n.d.).

On the other hand, the narrow definition implies a certain degree of language

proficiency in the non-English language(s), with "at least a minimal communicative

capacity in the heritage language" (Pascual y Cabo, 2016, p. 4), though command of the

HL could vary widely, ranging from having a passive knowledge of the HL—merely

understanding it—to having a productive command of the HL—speaking it with different

degrees of fluency and accuracy (Benmamoun et al., 2013; Montrul, 2013b; NHLRC

Survey, 2023; Pascual y Cabo, 2016; Valdés, 2005). Studies have found that HSs often

have stronger command of the HL than the L2, but they typically do not converge on an

entirely native-like grammar, at least compared to monolingual NSs (Au et al., 2008;

Boomershine & Ronquest, 2019; Kim, 2015; Montrul, 2013b).

A general narrow definition of *heritage speakers* would be "[individuals] who

were raised in homes where a language other than the dominant community language was

spoken, resulting in some degree of bilingualism in the heritage language and the

dominant language" (Valdés, 2001), though this definition would place HSs anywhere in

the L1/L2 continuum of linguistic dominance/proficiency (see Figure 2 below), ranging

from hardly being able to communicate in the HL to being fluent speakers of the HL (Pascual y Cabo & DeLaRosa-Prada, 2015).

Another aspect that will determine what definition of *heritage speaker* is used is the objective of the study in question. Pascual y Cabo and DeLaRosa-Prada (2015) and Pascual y Cabo (2016) indicate that the use of either definition is based on the research goals: they recommend using the broad definition for studies that focus on language and culture identity and the narrow definition for studies that focus on any aspect of linguistic competence. Since this study focuses on HSs pronunciation and foreign-accent perception, a narrow definition is adopted.

Valdés' (2005) continuum of L1/L2 users (Figure 2) describes the proficiency level of bilinguals removing the native vs. non-native speaker dichotomy. It rather places the emphasis on a range of possible proficiencies, from monolingual in one language (A), to a growing level of bilingualism (A_b, Ab), to the middle of the bilingual continuum (Ab, AB, aB), to then monolingual in the other language (B). However, language dominance and bilingualism are not unidimensional but rather relative, continuous, and fluid because bilinguals are classified not just dichotomously (binarily), as A_b or B_a dominant, but with respect to the other language and with respect to other bilinguals. Given that language dominance varies, bilingualism levels can change over time (Gertken et al., 2014; Grosjean, 2001; Kagan & Dillon, 2012; Solís-Barroso & Stefanich, 2019), but "balanced bilingualism may be the ideal but hardly exists" (Gampe et al., 2021, p. 483).

Figure 2

A Continuum of L1/L2 Users
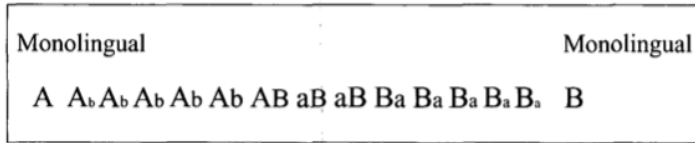
In addition to variability in language proficiency, there are other characteristics that need to be taken into consideration when defining and describing HSs, such as generation (either first, second, or subsequent generations), sibling order, years lived in a country/region where the HL is the dominant language, years of formal education in the HL, context of acquisition of HL, type of input, age of onset of L2, etc. (Boomershine & Ronquest, 2019; Montrul, 2010; Pascual y Cabo, 2016; Pascual y Cabo & DeLaRosa-Prada, 2015).

However, the main distinctive characteristic of heritage speakers is that they learn their HL (in this case, Spanish) at home during childhood under reduced input conditions and continue speaking it in limited contexts such as the home, with family members, and in the community (Kupisch, Barton, et al., 2014; Montrul, 2013b; Pascual y Cabo, 2016; Valdés, 2005). Despite the noticeable similarities in the process of acquiring any native language in monolingual contexts, having acquired the HL at home only and in reduced input conditions implies that it was in a naturalistic manner focusing on oral proficiency, which was never complemented with formal literacy in a classroom setting (Boomershine & Ronquest, 2019; Montrul, 2010; Pascual y Cabo, 2016); therefore, acquisition is, in most contexts, limited and unequal in terms of language skills and proficiency as compared to the dominant language (Boomershine & Ronquest, 2019; Kupisch, Barton, et al., 2014). Heritage speakers, although a heterogeneous group, tend to be very good at

speaking and listening in their HL, and therefore, socializing in the HL, especially in common, familiar, everyday contexts, is usually not a problem for them; however, most HSs agree that they struggle with writing and using their HL in more formal contexts (Montrul, 2010).

The "normal" progression of monolingual language acquisition is that children learn to speak first, progress through language development of pronunciation and grammar formation, and then, when they go to school, learn to read and write and acquire the more complex syntactic structures of language (Montrul, 2010). Heritage speakers begin the process the same way, learning their L1 at home, and in most cases, they are not exposed to the L2 (in this case, English) during this period, but when it is time to go to school, they gain literacy in the L2, which then becomes their linguistically dominant language and their L1 becomes their HL.

A common denominator among HSs is that they usually have no formal literacy in the HL. This, in turn, creates other limitations such as little metalinguistic awareness with respect to the HL (Judy et al., 2018). Since literacy is a strong factor for differentiating HSs and NSs of a minority language, this limits the age to consider an immigrant child as a HS to six years old (Ronquest & Rao, 2018), which is when they enter the educational system, and thus, the society of the dominant language. During this key period of beginning literacy in the dominant language, HL input is significantly reduced in time, type, and domain (Rao & Kuder, 2016). Input in both languages is then naturally divided (giving less than 100% of each language, as opposed to monolingual language acquisition, where input is only in one language), and given the amount of time spent at school, more input is received in the dominant language than in the HL (Gampe

et al., 2021; Unsworth, 2015). Additionally, given that the socioeconomic status of most immigrant families (and that the Mexican immigrant population includes a high number of individuals from rural areas), some children are not given much access to printed language and written and formal registers; thus, their oral skills are stronger than their written and reading skills, and their knowledge of familiar domains is stronger than that of formal academic domains (Hualde et al., 2021; Montrul & Ionin, 2012).

Heritage speakers feel more comfortable using their HL in oral and informal contexts rather than in academic and professional settings (de Bot and Bülow, 2021). This preference agrees with Grosjean's (1997) complimentary principle of bilinguals, in which he indicates that "bilinguals usually acquire and use their languages for difference purposes, in different domains of life, with different people. Different aspects of life require different languages" (p. 165). This principle suggests that individuals who live in language contact situations, regardless of the status of their languages (be it L1 and typically late L2, early bilinguals, heritage language speakers, etc.), do not use the same or all language domains for all languages; language A might be for work and language B might be for the home and friends. On the other hand, some researchers, particularly in the field of heritage language studies (de Bot and Bülow, 2021; Montrul & Ionin, 2012), believe that a limitation of domain is due to the way HSs learned their L1/HL. Normally, the context in which HSs use their HL is with parents and relatives and, to a lesser extent, siblings and friends in the community context, thus limiting the domain of HL use to the purpose of family, the home, socializing, and religion. This limitation in language use produces a limitation in register use, which, in turn, reduces vocabulary and grammar use

as well as the register that comes with using language in more formal and academic settings.

Another important characteristic of HSs is that, regardless of their level of proficiency in the HL, they have strong cultural, personal, and family connections to the heritage language and culture (Judy et al., 2018). Therefore, even though English becomes their dominant language, they continue to have strong ties to their language and culture from having spent considerable time with their community of speakers and culture during childhood and continuing to do so as they grow towards their early adulthood.

Another key factor in literacy development is how it affects phonological awareness. Heritage speakers at the secondary and university level have strong difficulties with spelling in their HL, and much of it is argued to be not because of interference with English orthography, but rather due to difficulties in phonological segmentation and discrimination of speech units in the HL itself (Llombart-Huesca, 2019).

Given the definition and characteristics of HSs, for this study, to be considered a heritage speaker, an individual must have been born in or arrived at the United States at 6 years of age or younger.

3.3 Phonological Acquisition in Heritage Speakers of Spanish

It is widely believed that there is a *critical period* for language learning in general regardless of the linguistic domain, and the upper threshold has historically been placed at 12 years of age (Flege, 1988; Lenneberg, 1967). This theory is based on the idea that

there is an ideal period during childhood when the brain is still in development, and as it matures with age, it loses its plasticity, and therefore, its ability to distinguish sounds other than those of the native language (De Bot & Bülow, 2021; Vanhove, 2013). More recent studies have shown that the brain continues to be plastic through adulthood (Bates, 1999). The reasons, though, for the continued non-native-like phonology of late L2 learners are likely due to the distribution and weight that listeners assign to acoustic cues; that is, when learning an L2, listeners must learn to stop using their L1 as a filter for perceiving L2 sounds and start attending to the relevant cues that signal contrasts in the L2, which may be different than the cues they attend to in the L1.

It is believed that "there are different windows of opportunity for different language domains" (de Bot & Bülow, 2021). As per phonological acquisition, some authors indicate that the critical age for phonological acquisition is from birth to three years (Fabiano-Smith & Goldstein, 2010; Stangen et al., 2015; among others), while others claim that it can be extended up to the age of 6 years (Abrahamsson & Hyltenstam, 2009; Kupisch, Barton, et al., 2014; Muñoz & Llanes, 2014; Ronquest & Rao, 2018). Regardless of which model of acquisition one espouses, it is clear that it comes natural for children to acquire their first language and to learn additional languages, and that it is harder to learn and differentiate the sounds of a different language as one gets older (Birner, 1999; Kupisch, Lein, et al., 2014).

Within the field of linguistics, a lot of research has been conducted on first- and second-language acquisition of phonology (see chapter 2 of Goodin-Mayeda, 2016, for a summary of infant and adult phonological acquisition and speech perception). For first-language acquisition, studies have shown that the first year of life is crucial in the

language development of the child and that they acquire detailed information about their native language during this period of life (Kuhl et al., 2003). Infants are better than adults at perceiving sounds in a second language (Kuhl et al., 2003), as adult L2 learners have more difficulty perceiving L2 sounds that are not part of their L1 phonemic repertoire (Goodin-Mayeda, 2016).

The rapid, early development of speech perception has implications when it comes to L2 acquisition, L2 speech perception, and L2 production. By the age of 12 months, infants' ability to discriminate non-native phonological contrasts is significantly reduced as their perception of native language speech contrasts strengthens (Goodin-Mayeda, 2016; Kuhl et al., 2003; Werker & Tees, 1984). The perceptual system seems to become specialized earlier than the critical period theory of native language accent attainment. The language abilities for L2 production and particularly the ability to acquire a native-like accent in an L2 are extended, following the critical period hypothesis more through childhood. Thus, early L2 learners are believed to be able to acquire native-like perception and production after the critical period of speech perception passes.

Regarding heritage speakers, HL phonology acquisition is unique because in the case of sequential bilinguals, HSs start with their HL as L1, and by the time they are exposed to the majority language (usually as a language of instruction at school) their HL becomes the minority language and they become more and more dominant in the majority language (see section *3.2 Heritage Speaker* for a full explanation of the characteristics of a heritage speaker). In other words, they spend the first year of life specializing their perceptual abilities in their HL. Thus, HSs may have a greater

advantage compared to L2s in that their earlier exposure to their HL makes them fundamentally different from L2 speakers, at least regarding phonological acquisition.

Considering that HSs fall within the critical period of phonological acquisition, they might be expected to acquire the full span of sounds in their HL. However, some studies indicate that heritage speakers do show attrition in their phonological production as they grow toward majority language dominance (see section *3.4.1 Previous Studies on Accent Perception* for examples). As adults, HSSs in the United States tend to become more English dominant, yet their path of acquisition is different than that of late L2 speakers, because while the former is a case of L1 acquisition that later suffers attrition, the latter involves L1 language transfer. This could be an important distinction when considering pedagogical implications and the possibility of HS phonology changing with more use of the HL or upon returning to a country where the HL is the dominant language.

While late bilinguals will likely retain a foreign accent in their L2 regardless of their length of residence in a target language environment, this is possibly not true for HSs due to their early exposure to the HL (Au et al., 2002; Au et al., 2008; Knightly et al., 2003; Oh et al., 2002).

Another factor to consider regarding a critical period of phonological acquisition for heritage speakers and the attrition of phonological abilities is the amount of HL input received during childhood. While some believe that being exposed to the HL from birth does not automatically guarantee full phonological acquisition to the point of being perceived accent-free as adults (Lloyd-Smith et al., 2020), other studies show a positive

correlation between exposure to the HL and more native-like pronunciation (Aktürk-Drake, 2015; Wrembel et al., 2019).

3.3.1 Phonological System of Spanish as a HL

In order to understand the phonological acquisition of HSs and see how similar or different it is to that of NSs or L2s, we need to review the studies that have been done on the phonological system of Spanish as a HL, focusing on segmental (i.e., consonant and vowel sounds) and suprasegmental (i.e., intonation, rhythm, and stress) features. Once similarities and differences have been established, then we can analyze how they contribute to HSs being perceived as native or foreign (Ronquest & Rao, 2018).

As summarized by Boomershine and Ronquest (2019), Rao and Amengual (2021), and Ronquest and Rao (2018), much of the research conducted on Spanish pronunciation focuses on consonants (see Table 3 for the main consonant sounds of Spanish). The studies have particularly focused on voiced and voiceless stops consonants, /bdg/ and /ptk/, respectively, since these sounds are phonetically and phonologically different in English and Spanish. For instance, HSs pronounce /b/ and /d/ in Spanish as approximants more often than L2s but not as often as NSs (Au et al., 2008). As per the elision of /d/, Tovar (2013) confirms that third-generation HSs of Spanish elide /d/ in initial (e.g., *dónde* 'where') and intervocalic position (e.g., *pescado* 'fish') more often than first-generation native speakers of Spanish. Also, HSs are found to differentiate orthographic <b> and <v> in Spanish, producing <b> as a bilabial stop or approximant and <v> as a labiodental fricative, especially in words that have lexical correspondence in English, such as *visitar* 'visit' and *evaluar* 'evaluate' (Hualde et al., 2021; Montrul,

2013a; Rao, 2014). Another pair of consonant sounds that have been the target of studies in HSs is the rhotics, given that the simple /ɾ/ and multiple /r/ are contrastive in intervocalic position in Spanish (Rao & Amengual, 2021). HSs are more likely to produce a tap instead of a trill (Henriksen, 2015; O'Rourke & Potowski, 2016). As per less studied consonants such as /ɲ/, /tʃ/, /j/, HSs of Spanish show more variation when pronouncing the /ɲ/ (as in *moño* 'bow' or *señora* 'Mrs.'), particularly third-generation speakers (Carrillo, 2018).

Table 3

Main Spanish Consonant Sounds

	Bilabial	Labiodental	Interdental	Dental	Alveolar	Prepalatal	Palatal	Velar	Glotal
Oclusivas	p b			t d			ɟ	k g	
Fricativas		f v	θ		s z	ʃ ʒ	j	x	h ɦ
Aprox.	β			ð				ɣ	
Africadas						tʃ dʒ			
Nasales	m	ɱ		n̪	n	nʲ	ɲ	ŋ	
Laterales				l̪	l	lʲ	ʎ		
Vibr. simple					ɾ				
Vibr. múltiple					r̄				

Note. Voiceless consonants to the left, voiced consonants to the right (Hualde, 2014).

The Spanish vowel system has six contrastive vowels, /a e i o u/, and they are symmetrically organized in the acoustic space, as shown in Figure 3 (Ronquest & Rao, 2018). However, differences in the vowel system of HSSs have been found when compared to the traditional monolingual pattern in that they are asymmetrical and not as triangular as that of NSs (Rao & Ronquest, 2015). Research on vowel production in HSSs also shows that HSs have considerable reduction of unstressed vowel duration in their HL

relative to stressed vowel duration (Boomershine & Ronquest, 2019; Hualde et al., 2021; Ronquest, 2012, 2013). This phenomenon is presumed to happen for two main reasons. On the one hand, the appearance of unstressed vowel reduction may be due to English dominance and contact (Byers & Yavas, 2017; Rallo Fabra, 2015), as it is a phenomenon that happens in English (Braun et al., 2011; Gowhary et al., 2016). On the other hand, it may be due to the fact that these differentiated linguistic characteristics are from rural varieties of Spanish (and as we saw in the previous section, the Mexican population in the United States includes a large number of first-generation individuals from rural areas). Therefore, in some of the phonological characteristics of rural Spanish varieties, we find reduction of unstressed vowels (e.g., unstressed vowel reduction in contact with /s/, as in *pues* becoming *ps*, or *peces* pronounced as [ˈpesə̥s]), as well as a variation between mid and high vowels (e.g., raising of final mid vowel /e/ to [i], as in *noche* becoming *nochi* and *leche*, *lechi*) (Hualde et al., 2021; Lipski, 2008).

Figure 3

The Spanish Vowel System
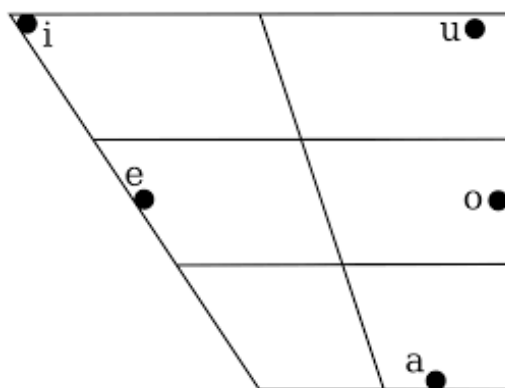
As most of the research on HSSs pronunciation has focused on segmental features (vowels and consonants), suprasegmental (prosodic) features are less explored for the

phonetic and phonological systems of HSSs, particularly regarding intonation, stress, and rhythm (Rao & Amengual, 2021; Ronquest & Rao, 2018). These characteristics are considered key elements in distinguishing a *heritage accent* (Boomershine & Ronquest, 2019; Chang, 2021; Rao, 2015). In general, HSs tend to have tonal patterns and rhythmic strategies closer to those of the dominant language when speaking the HL, as studied by Carter and Wolford (2016) in a three-generations language contact community in South Texas, United States. Also, HSs of subsequent generations have shown no rhythmical distinction between their HL and dominant language (Boomershine & Ronquest, 2019). Kim (2015), in her study of lexical stress found that even though HSs perceive lexical stress the same way NSs do, they produce most of unstressed vowels longer than stressed vowels, which more closely resembles L2 production.

For a fully detailed description of similarities and differences in HSs pronunciation, see Boomershine and Ronquest (2019), Rao (2019), Rao and Amengual (2021), Rao and Ronquest (2015), and Ronquest and Rao (2018).

3.4 Foreign Accent in Heritage Speakers

Before getting into a deeper review of foreign accent in heritage speakers, it is important to consider variation in terminology and to define terms. Studies on accent perception often use the terms *foreign accent* and *global accent* interchangeably. For instance, recent studies on the accent perception of heritage speakers' minority language and foreign language studies (English and other languages) vary in the terminology used. Most authors use the term *foreign accent* (e.g., Abrahamsson & Hyltenstam, 2009; Au et al. 2002; Au et al., 2008; Knightly et al., 2003; Kupisch, Barton, et al., 2014; Kupisch et

al., 2021; Marecka et al., 2015; Oh et al. 2002; Uzal et al., 2015, 2017; Wrembel et al., 2019), while some use *global accent* (e.g., De Leeuw et al., 2010; Flores & Rato, 2016; Kupisch et al., 2020; Lein et al., 2016; Lloyd-Smith et al., 2017, 2020; Rato et al., 2015; Schmid & Hopp, 2014; Stangen et al., 2015), claiming that they use *global* because speakers could be perceived with a either a foreign or a native accent (Kupisch et al., 2020; Lein et al. 2016; Lloyd-Smith et al., 2017). However, others such as Kupisch et al. (2020) refer to *global* accent as the analysis of accent perception through a combination of features, giving it a global perspective rather than basing the analysis on specific aspects of pronunciation such as VOT or consonant or vowel production.

The Linguistic Society of America (Birner, 1999) defines *accent* as "the way you sound when you speak," and Moyer (2013) expands on this by saying that an accent includes "sounds, rhythms, and melodies of speech" (p. 9). Therefore, it can be said that we all have an accent without it necessarily being a foreign accent—it can be a regional accent (Birner, 1999; Moyer, 2013; Torstensson, 2010). *Foreign accent* is defined as the perception of a divergent pronunciation from a local standard (as rated by the general group of people—native speakers) that results from the influence of speaking another language (Birner, 1999; Derwing & Munro, 2009; Flege et al., 1995; Flores & Rato, 2016; Lloyd-Smith et al., 2017). This divergence may be present at the morphosyntactic level but may also occur phonologically, affecting segmental or suprasegmental features (Birner, 1999; Kupisch et al., 2020; Lloyd-Smith et al., 2017). However, this definition had not always been nonjudgmental, as Munro (2008) historically recounts that scholars from the 1920s up to even the 1980s considered a foreign accent to be "imperfect or defective speech."

An example of a foreign accent is a person who speaks one language and learns another language but some of the consonant or vowel sounds are pronounced different in the L2 because of the influence of the L1; some of the sounds from the L2 are not in the phonological repertoire of the L1, and therefore, there is incomplete acquisition of sounds in the L2 (Birner, 1999).

Some definitions of foreign accent refer to the local or standard pronunciation that is the norm for a native accent, as produced by monolingual speakers (Boula de Mareüil & Vieru-Dimulescu, 2006; Flores & Rato, 2016; Lein et al., 2016; Torstensson, 2010), or that has the phonological repertoire of the language learned as children (Birner, 1999). The main problem with associating a foreign accent with second-language speakers is that it limits the accent produced by an L1 speaker learning an L2. In the case of heritage languages, the foreign accent is in the speakers' L1.

3.4.1 Previous Studies on Accent Perception

Within the field of second language acquisition (SLA), a lot of research has been conducted on L2 phonology, especially from the perspective of how the first language (L1) influences or affects the acquisition of the second language (e.g., Abrahamsson & Hyltenstam, 2009; Alves & Brisolara, 2020; Amino & Osanai, 2014; De Leeuw et al., 2010; Flege, 1999; Flege et al., 1995a, 1995b, 1999; Munro & Mann, 2005; among many others). SLA studies of foreign accent speech have historically focused on a dichotomous system of accent classification—native-like or foreign-like.

Many studies have researched foreign accent in speakers of English as a Second or Foreign Language (e.g., Braun et al., 2011; Byers & Yavas, 2017; Flege et al., 1995a,

1995b, 1999; Gowhary et al. 2016; Kuhl et al., 2003; McCarthy et al., 2014; Muñoz & Llanes, 2014; among many others), and to a lesser extent, other foreign languages (e.g., Abrahamsson & Hyltenstam, 2009; Alves & Brisolara, 2020; Amino & Osanai, 2014; De Leeuw et al., 2010; Kuronen & Tergujeff, 2017; Schmid & Hopp, 2014; Vieru-Dimulescu et al., 2007; among others), and almost unanimously state that the pronunciation patterns of L2 speakers are influenced by their L1. Additionally, many studies have been conducted with bilingual speakers to see what features of their L2 (majority language) may indicate or influence a foreign accent, with most agreeing that early bilinguals have more native-like pronunciation in their L2 than that of late L2 learners (e.g., Byers & Yavas, 2017; Konopka & Pierrehumbert, 2010; Llama & Lopez-Morelos, 2016).

This dichotomous limitation in accent perception is not only present in SLA studies. Within the field of heritage language studies, even more recent research on accent perception with heritage speakers has used a binary rating system: foreign accent or native accent (e.g., Kupisch, Lein, et al., 2014; Kupisch et al., 2021; Rato et al., 2015; Stangen et al., 2015). However, as we have mentioned in previous sections, heritage speakers require their own classification, as this perspective does not fit the characteristics of heritage speakers and should not be used as a limiting classification of their accent because it ignores complex phonological and sociolinguistic elements that are present due to prolonged language contact. Additionally, it does not allow for degrees of accentedness on a bilingual continuum, but rather places HSs on the extreme ends of either a native speaker or a foreign speaker. Therefore, when studying foreign accent in

HSs, it is important to consider the unique contexts and outcomes of acquisition regarding HSs.

Recent studies have been conducted for global foreign accent, also known simply as *foreign accent*, in HSs of different languages, including Spanish. These studies have focused on global accent ratings, acoustic measures, and perceptual measures, and have shown high variability in their results; while some report that HSs are perceived as sounding native-like (e.g., Au et al., 2002; Au et al., 2008; Benmamoun et al., 2013; Knightly et al., 2003; Moreira Flores, 2014; Pascual y Cabo & DeLaRosa-Prada, 2015), others report that HSs sound foreign or accented when judged by native speakers (e.g., Kissling, 2018; Kupisch, 2013; Polinsky & Kagan, 2007).

Stangen et al. (2015) studied German-Turkish bilinguals in both their languages (dominant and heritage). Their participants (speakers) for the Turkish as a HL experiment consisted of 21 HSs of Turkish (11 simultaneous and 10 sequential bilinguals) and a control group of 5 Turkish monolingual speakers (L1ers) and 5 Turkish late second language learners (L2ers). Using a binary (foreign accent or native accent) judgement scheme, they found that the HSs were considered to be native more often in their HL (Turkish) than in their dominant language (German).

Another study on adult bilinguals is that of Rato et al. (2015), which compared the perceived accent of European Portuguese heritage speakers. Also using a binary (foreign accent or native accent) judgement scheme, 12 Portuguese HSs (German dominant), 6 monolingual NS,[4] and 6 highly proficient late L2 learners (level B2/C1 of the Common European Framework of Reference for Languages) were evaluated. Their results showed

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[4] Even though these speakers are not technically monolingual, as they had studied English, French or Spanish as an L2, but none reported having knowledge of German.

that the HSs of Portuguese were considered NSs of their HL with a high rate of

confidence (as compared to the L2s, whose evaluations were very low and very distant

from the other two groups).

Flores and Rato (2016) focused on returnee HSs (German-Portuguese bilinguals),

studying 20 European Portuguese HSs (17 returnees), 5 Portuguese monolingual NSs,

and 5 highly proficient Portuguese as L2 speakers (German L1). The European

Portuguese HSs were either born in Germany or had an age of onset of German

(dominant language) before 8 years old. They found that the Portuguese HSs were

considered more native-like, while the NSs and the L2s were rated with a strong native

accent and a clear foreign accent, respectively.

In regard to studies concerning speakers who had contact with the HL during

childhood but either stopped speaking it after entering school (around age 5 or 6) or who

only heard it but did not speak it during childhood, Oh et al. (2003) studied Korean

overhearers (English dominant). Their study compared the accent perception of

productions by 15 Korean HSs, 6 childhood overhearers, 12 NSs (Korean-English

bilinguals), and 10 novice L2 learners (English L1). Their accent rating results showed

that childhood speakers (HSs) outperformed overhearers and L2 learners.

Another set of studies of childhood (Spanish) overhearers, is that of Au et al.

(2002); Au et al. (2008); and Knightly et al. (2003). The first study (Au et al., 2002) was

a preliminary report based on a subset of data (about half of the participants from the full

study), which consisted of 10 childhood overhearers (passive HSs) and two control

groups of 7 Spanish NSs and 12 late L2 learners. Their findings reported that English-

dominant childhood overhearers (passive HSs) have more native-like pronunciation when relearning their HL during adulthood.

Knightly et al. (2003) analyzed the accent of 15 Spanish-English bilinguals (native speakers),[5] 15 Spanish childhood overhearers (passive HSs), and 15 typical late L2 learners. Their results confirmed that passive HSs do have a pronunciation advantage over the typical late L2 learner.

Au et al. (2008) presents the complete, full-sample report that compared 20 childhood overhearers (passive HSs) with 10 adult (active) HSs of Spanish, 25 Spanish NSs, and 39 typical late L2s. Their findings are consistent with their preliminary reports (Au et al., 2002; Knightly et al., 2003) in that passive HSs' pronunciation is closer to that of monolingual NSs, and thus, HSs are generally perceived as sounding more native-like as compared to L2s.

Contrary to these findings, Kupisch, Barton, et al. (2014) conducted research comparing German-French and German-Italian simultaneous bilinguals (French and Italian as HL) to L2s and monolingual speakers of both language combinations, and found that bilingual speakers (HSs) tend to have a foreign accent in their HL, as perceived by monolingual speakers.

A follow up study comparing German-French bilinguals was conducted by Kupisch, Lein, et al. (2014) in which they compared two groups: 10 speakers of French as a stronger language (people who grew up bilingual in France and moved to Germany during adulthood, *2L1 strong*) and 11 speakers of French as a weaker (heritage) language

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[5] Based on our definition and age classification of HSs, these participants are really considered sequential bilinguals, and thus HSs of Spanish, as they were reported to have learned English as an L2 before the age of 10 and were born in the United States.

(people who grew up bilingual in Germany, *2L1 weak*). The experiment also had two control groups: 5 native speakers of French and 5 second language learners. This study only analyzed accent perception in French, and findings showed that the bilingual speakers (2L1 strong) were perceived more native-like in French, while the HSs (2L1 weak) were judged as having a less of native-like accent.

Lein et al. (2016) also found that German-French bilinguals are perceived as more foreign-like in their HL. They analyzed two groups of heritage speakers: 7 French HSs (who grew up in Germany) and 7 German HSs (who grew up in France), and compared them with control groups of their respective languages: 5 NSs of French and 5 NSs of German. Their results showed that both HSs groups were perceived as more foreign-like in their HL.

A second follow up study to Kupisch, Barton, et al. (2014), with only Italian-German bilinguals (Italian as HL), was conducted by Lloyd-Smith et al. (2020). Their group of Italian HSs consisted of 21 adults born in Germany to Italian-speaking parents, which was compared to two control groups: Italian monolinguals and L2 learners of Italian living in Germany. Their results on the Italian experiment showed that HSs were rated more foreign-like than NSs but more native-like than L2 speakers.

A study was conducted with bilingual children by Wrembel et al. (2019), who analyzed the perceived accent of 32 Polish HSs living in the UK and compared them with 10 monolingual native speakers of Polish. Their results agree with the previous studies on adult HSs in that Polish HSs children were perceived as more foreign accented in their HL.

A third study by Kupisch et al. (2021), now with German-Russian bilingual children in both of their languages, divided the group of Russian HS children in two: 12 pre-primary school HSs (aged 4-6 years) and 12 primary school HSs (aged 7-9 years). These groups were also compared to two control groups: 12 Russian L1 and 12 German L1 children (six per age group per language). Their results were divided not only by age group but also by type of family: heritage mixed (family with one German and one Russian parent, speaking both languages at home) and heritage Russian (family with both Russian parents, speaking only Russian at home). Their results for Russian as a HL showed that all HSs, regardless of their age and family type, were perceived to be more accented than L1 speakers, with slight variability when considering age and family type.

Though it is still a controversial issue in SLA research[6] (for further discussion see Moyer, 2013; Muñoz & Llanes, 2014; Uzal et al., 2015), researchers agree on one thing: L2 speech is compared to that of native speakers to determine phonological errors and overall levels of accentedness (Abrahamsson & Hyltenstam, 2009).

However, a binary rating—native or non-native accent—is problematic for assessing HSs because, while SLA research focuses on comparing these two groups, HL education adds a third group of speakers, thus eliminating the binary comparison and making the issue more complex: are HSs perceived as NSs in their HL? Regarding studies on foreign accent perception in HSs, it is not as straightforward as in the case of an L2.

HSs are truly unique in their pronunciation patterns, as was presented in the previous section, and there are many factors that influence their language learning,

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[6] The controversy relies mainly on whether there is a critical period for SLA, particular for phonetical acquisition.

development, and maintenance (Boomershine & Ronquest, 2019). To mention some factors, Flores and Rato (2016) suggest that age of onset of language acquisition (AoO), quality of exposure, quantity of exposure, and length of residence are crucial predictors of acquisition but that these factors ought to be addressed differently in HL research. For instance, considering AoO, the HL is acquired at birth, so in many cases, children grow up bilingual or at least being exposed, to a certain extent, to English, so "the HL is no longer the only language in a speaker's mind, but has to compete with another one" (Flores & Rato, 2016, p. 162). On the other hand, L2 learners have a specific age at which they begin to learn the L2. This factor should also consider linguistic contact, which mainly influences speakers of second and subsequent generations of a language (Escobar, 2021).

Another factor that influences HSs' language learning, development, and maintenance is the kind of input they receive in their HL. The main language input, at least in early childhood, comes from their parents, and secondarily, from their community, but if their parents speak to them in both English and Spanish and speak to each other in both English and Spanish, studies have suggested that the children become English-dominant or monolingual English speakers (Hualde et al., 2021). In addition to the input received at home, once HSs begin school, their HL input becomes significantly reduced in quantity, quality, and types of contexts and situations (Flores & Rato, 2016). As per the quality and type of input, in addition to not being formally schooled in the HL (the situation which already provides formal and academic registers of a language), HSs are mainly exposed to informal registers of their HL at home, which, by coming from an adult immigrant community, might already come to them with changes and as a contact

variety that differs from the homeland variety of the HL (Flores & Rato, 2016; Hualde et al., 2021; Silva-Corvalán, 1994).

Especially in the case of the second and subsequent generation speakers of a HL, even if they were exposed to their heritage language at birth, some research suggests that it does not guarantee native-like pronunciation (De Leeuw et al., 2010; Kupisch, Barton, et al., 2014; Lein et al., 2016). Given that they usually transition into the majority language being their dominant language as they begin schooling, the influence of the dominant society language in their HL is evident in their HL sound system and leads to an accented HL pronunciation (Flores & Rato, 2016; Kupisch, Barton, et al., 2014; Lein et al., 2016). Thus, it is understood that studying HL pronunciation involves questions beyond language acquisition, but it also requires us to take into consideration concepts such as language contact, language maintenance, and literacy, among others.

3.5 Summary

In this chapter on heritage language phonology, we first presented a brief introduction to the study of L1 and L2 phonology and reviewed how language contact affects phonological acquisition and ultimately leads to a foreign accent. The second section expanded on the heritage speaker in order to better contextualize studying heritage language phonology. This section first defined what a heritage speaker is and the unique characteristics that distinguish them from other L1 or L2 learners.

The third section discussed the phonological acquisition of heritage speakers of Spanish. This section started with a brief review of L1 phonological acquistion in children and L2 acquisition in adults, and then contrasted them with the phonological

acquisition of heritage languages. It then transitioned to the main focus of this section, which was to present the principal characteristics of the phonological system of Spanish as heritage language, where we showed some examples of variation in pronunciation of this variant of Spanish.

The last section in this chapter dealt with foreign accent in heritage speakers. Foreign accent was first defined, and then we proceeded to review a series of recent research on the perception of foreign accent of different heritage languages and presented how there are two views in the field, with one side arguing that HSs are perceived as foreign-accent free in their HL and the other proposing that HSs are perceived as foreign accented in their HL.

After reviewing the research on HSs accent perception, there is an important disconnect to point out: in most studies (e.g., Kupisch, Barton, et al., 2014; Kupisch, Lein, et al., 2014; Lein et al., 2016; Rato et al., 2015; Schmid & Hopp, 2014; Stangen et al., 2015, among others), judges were asked to classify speakers as native or non-native. However, as we saw in section *3.2 Heritage Speakers*, bilingualism is not a duality, it is more a continuum. Particularly, HSs do not and cannot be expected to fit neatly into categorical classifications. Even classifying them as a third group is problematic due to the inherent heterogeneity of their backgrounds and linguistic outcomes. Therefore, accentedness should not be analyzed categorically but rather as a scale. From a methodological standpoint, it should not be presented to judges using a binary judgement scheme.

Additionally, in previous research on HS accent perception, very few studies have compared the accent of HSs with 2LNSs–that is, to properly exemplify the L1 input that

HSs have while living in a language contact situation. Au et al. (2002) and Oh et al. (2002) compared HSs to late bilingual NSs groups but did not consider their bilingual status as a variable, simply calling them *native speakers*. We only realize they are late bilinguals (NSs studying in the United States) when reading about the group description in their methodology.

The purpose of the present research is to study how accent is affected when learning a language that a minority (heritage) language, given that this is the environment in which heritage speakers acquire their heritage language. The main reason for this is that in the field of language acquisition, and even of heritage langauge education, there is a tendency to compare HSs with NSs only and classify them through a binary scheme of either NSs or L2s. On the contrary, with this research, we are trying to shed more light on how HSs should be classified as a group of their own and should be considered bilinguals in the context of language contact, with input (from their parents and community) in their L1/HL from a dialect that is already affected by language contact. Thus, there is a need to think of classifying and/or describing accents differently.

To carry out that task, five research questions were posed in Chapter 1 of this dissertation, which are here presented again:

RQ1: Are Heritage Speakers of Spanish (HSSs) perceived foreign-accent free in their heritage language?

RQ2: Are late bilingual native speakers (2LNSs) perceived foreign-accent free in their native language?

RQ3: Is there a difference in the perceived foreign accent of HSSs when comparing them with 2LNSs and 1LNSs?

RQ4: Does the HSSs' level of proficiency correspond with the perception of a foreign accent?

RQ5: Is there a correlation between the score of the HSSs on the BLP and the perception of a foreign accent?

The next chapter will present the full and detailed methodology used in this research. It will first introduce the instruments used—an accent perception quasi-experiment (using Praat) and a sociodemographic and linguistic questionnaire—then, it will describe the participants who judged the audio stimuli, and finally, it will conclude by discussing the procedure used with the judges.

CHAPTER 4

METHODOLOGY

This chapter describes the methodology implemented in the study. It begins with a detailed explanation of how the accent-perception quasi-experiment was constructed (4.1), which includes the sociodemographic and linguistic questionnaire used to determine the speakers' language profile and to classify them in their corresponding groups (4.1.2), the speakers interviewed with their full sociodemographic and linguistic characteristics (4.1.1), and the audio stimuli taken from the interviews (4.1.3). Subsequently, the judges that were asked to carry out the accent-perception exercise (4.2), the procedure (4.3), and a description of how the analysis was conducted (4.6) are explained. At the end, there is a short summary of the chapter and a brief description of the upcoming chapter (4.7).

4.1 Instrument

The instrument used to measure the perceived foreign accent of heritage speakers of Spanish in this research consisted of two parts: a sociodemographic profile of the judges and the foreign-accent perception quasi-experiment. This section will expand on how the foreign-accent perception quasi-experiment was constructed. First, it describes in detail the questionnaire on language profile applied to the speakers, then the speakers interviewed to create the stimuli, and then how the audio stimuli were collected.

4.1.1 Sociodemographic and Language Profile Questionnaire

Before the interview, all speakers interviewed were asked to fill out an online

questionnaire on language profile adapted from the Bilingual Language Profile (BLP)

questionnaire English-Spanish version (Birdsong et al., 2012; in cooperation with the

Center for Open Educational Resources and Language Learning, COERLL). The BLP is

an open-source language profile self-assessment tool developed for language dominance

that is very efficient and practical to administer and interpret (Gertken et al., 2014). The

BLP has an online platform (https://sites.la.utexas.edu/bilingual/using-the-blp/access-

testing-materials) where the authors have shared and Online Google Form version of the

questionnaire in different languages, including Spanish. The self-scoring Google Forms

file can be copied into one's Google Drive to be administered.

The BLP was chosen for this investigation for its frequent appearance in language

assessment throughout the literature of bilingual studies and because it allows categorical

and continuous evaluation of participants, rather than providing a dichotomous

classification of speakers (Sim, 2019). Additionally, given the sociolinguistic nature of

this research, participants' level of bilingualism was not assessed in terms of their

proficiency levels based on a particular language task, but rather on their self-perception

of language dominance, to provide a general description of their bilingual profile in

academic environments as well as in regular social contexts (Gertken et al., 2014). As a

self-reporting linguistic questionnaire, the BLP is a great tool for this research because it

also allows one to assess a non-linguistic factor that makes the language profile of a

bilingual speaker more complete: language attitude (Sim, 2019). A printed document of

the online questionnaire can be found in Appendix D. The full online version was administered using Office 365 Forms.

The Bilingual Language Profile is a self-report instrument of 20 questions that assesses language dominance, language use, and attitude towards language and culture. The original BLP, as well as the adapted version that was be used in this research, assesses participants on a continuum of bilingualism that can, in turn, be used to classify them into three groups of bilinguals: Spanish-dominant, balanced, and English-dominant bilinguals (Solís-Barroso & Stefanich, 2019). Three questions were added on the biographical information section about family background and one question was added on the language attitude section about anxiety when using each language. All added questions were not counted in the assessment of language dominance, as they were used for sociodemographic purposes.

The questionnaire is separated into four equally weighed sections plus a biographical introductory section that helps produce a general, non-dichotomous language profile of each speaker in the following dimensions of language: (1) language history, (2) language use, (3) language proficiency, and (4) language attitudes. The three questions added to the biographical section were: place of birth of parents, place of birth of grandparents, your place of birth. In Module 1, some of the questions concern the years spent in a country or region where Spanish/English is spoken (question 4), and years spent in a family where Spanish/English is spoken (question 5). Regarding language use, some of the questions are the percentage of use of Spanish/English in an average week with friends, family, and at school/work (questions 7-9), and how often they use Spanish/English when counting (question 11). The language competence module

contains four questions about proficiency levels in the four language skills (speaking, writing, reading, listening). In the last section, on attitude towards language, some of the questions concern how important it is for them to speak Spanish/English as a native speaker (question 18) and to be perceived as a native speaker of Spanish/English (question 19). One question was added to the last module, which was not originally in the BLP and which did not count towards the overall score of the questionnaire, but rather was used as an additional piece of information for this research: (a) *Me siento ansioso cuando hablo en ESPAÑOL* [I feel anxious when I speak SPANISH], (b) *Me siento ansioso cuando hablo en INGLÉS* [I feel anxious when I speak ENGLISH].

The following is a full explanation of how the BLP was used to assess the speakers' level of bilingualism. When using the online version of the questionnaire, the results are automatically calculated and provided by the online form. The questionnaire can also be scored manually, in which case each question is associated with a number on a scale based on each module, where higher numbers mean greater dominance in one of the languages. Each of the five modules has a different set of questions with different values for the answers; however, in the end, each module receives equal weighting.

The scores are first tabulated by modules, with each language being calculated separately. In Module 1 (Language History), each of the six questions for each language is worth between 0 and 20, with question 1 being scored in reverse (a 20 response is worth 0 points, a 19 response is worth 1 point, etc.). Phrasal responses, such as "since birth" and "For as long as I can remember," are worth 20 points, and "not yet" is worth 0 points. In Module 2 (Language Use), each of the five questions for each language is worth between 0 and 10 points based on the numerical value given in each response. In

Module 3 (Language Proficiency), each of the four questions for each language is worth between 0 and 6 points and also based on the numerical value given in each response. In Module 4 (Language Attitude), each of the original four questions for each language is worth between 0 and 6 points based on the numerical value given in each response.

Then, to obtain the global language score and to ensure that each module receives equal weighting, the score for each module for each language is multiplied by a factor. The global score for each language is then calculated by adding the new totals of all modules. The total points possible is 218 for each language. To obtain the language dominance index, one language total is subtracted from the other to render a dominance score that ranges from -218 (English dominant) to +218 (Spanish dominant). A score near zero indicates balanced bilingualism.

4.1.2 Speakers

The stimuli used in the data collection for perceived foreign accent were taken from five groups of adult speakers: (1) monolingual native Spanish speakers (1LNSs, i.e., one language native speakers); (2) native speakers of Spanish who acquired English as an L2 as adults (2LNSs, i.e., two language native speakers); (3) elementary heritage speakers of Spanish (E-HSs); (4) advanced heritage speakers of Spanish (A-HSs); and (5) native speakers of English who are late second-language learners of Spanish (L2s).

All participants selected were interviewed only in Spanish, and the NSs and HSs were controlled for identification with a Mexican Spanish dialect so as to keep the dialects as similar as possible to the main dialect of Spanish spoken in the southwestern United States, (Waltermire, 2014). Hualde et al. (2021) show that 66% of the Hispanic

population in the United States is of Mexican origin, and that most of Mexican immigrants live in the southwest and west. Texas has a high population of speakers of a Mexican Spanish dialect, and particularly in Houston, where 75.7% of the Hispanic or Latino population is of Mexican origin (Lopez et al., 2022), particularly of eastern border states (e.g., Tamaulipas and Nuevo Leon), and historical central states (e.g., Jalisco and Michoacán). For equal representation, each of the five groups consisted of five male and 5 female participants, for a total of 50 speakers. The method used to select the sample was convenience sampling due to the availability of the participants and willingness to participate in both sections of the construction of the instrument (survey and interview). 1LNSs and 2LNSs were selected from a network of people the researcher knew with the desired characteristics; A-HSs, E-HSs, and L2s were selected from groups of Spanish students at the University of Houston.

The 10 1LNSs (mean age = 43.7, SD = 11.81) were speakers living in Nuevo Leon, a state considered border region (highlands Spanish, non-rural standard variety; Parodi, 2014), who grew up speaking only Spanish at home during childhood, had Spanish as the only language of instruction during their early years in school, and have lived their entire life in a Spanish-speaking country with Spanish as the majority language (criterion for *native speaker* taken from Abrahamsson & Hyltenstam, 2009; and phonological acquisition criteria proposed by Kupisch, Barton, et al., 2014). The reason for choosing participants from a border region state is that though historically Mexican migrants were mainly coming from the historical region (e.g., Jalisco, Michoacán) from the 1920s up to the late 1970s, beginning on 1980s migrants started to also come from other regions such as the border states, including Nuevo Leon and Tamaulipas.

Additionally, when analyzing region-to-region flow of migrants, western border states migrants (e.g., Sonora and Sinaloa) tend to get established in California and Arizona, while eastern border states migrants (e.g., Nuevo Leon and Tamaulipas) tend to settle in Texas (Massey et al., 2010).

The 10 2LNSs (mean age = 47.4, SD = 11.71) were English-Spanish unbalanced sequential late bilinguals (A_b bilinguals, see Figure 2) who grew up with Spanish as the majority language of their area. All bilingual NS participants were from Mexico but lived in a language contact context in the United States at the time of stimuli collection. These first-generation speakers of Spanish moved to the United States in their early 20s, on average, and have lived in the United States for an average of 25 years. When asked about their language use and proficiency, all 2LNS expressed that they kept Spanish as their dominant language throughout adulthood and indicated Spanish as their more proficient language. Based on their responses to the language profile questionnaire, the group answered that 63% of the time in an average week they spoke Spanish with their friends, 82% of the time they spoke Spanish with their family, 57% of the time they spoke Spanish at work, and 71% of the time they used Spanish as the language of their thinking processes.

The 20 HSs from both groups (E-HS, mean age = 21.1, SD = 2.57 and A-HS, mean age = 19.9, SD = 1.85) were second-generation speakers of Spanish born in Texas, United States, and were residents of the Greater Houston area at the time of stimuli collection. Background information was gathered using the *Bilingual Language Profile* with a few sociodemographic questions added for full details on their family origin. All HSs selected were from families with Mexican heritage and background but they

themselves were all born in the United States. They were sequential (n = 15, subgroup average of AoO in English, 6.1) or simultaneous (n = 5) bilinguals who spoke Spanish at home with family and relatives but went to school in the United States with English as the language of instruction (see Table 4 for sociodemographic and linguistic overview of all HSs participants). At the time of the stimuli collection, in addition to using Spanish as the language of the home, all HSs reported using their HL with other Spanish speakers in their community, with their friends, at school, and in other contexts. Hence, their acquisition of Spanish has mainly been from informal, non-classroom settings (main criterion used in this research for *heritage speaker* taken from Boomershine & Ronquest, 2019) until they started college courses in the Spanish as a Heritage Language program at the University of Houston. Therefore, all heritage speakers are considered linguistically English dominant, second-generation speakers of Spanish.

The Spanish Heritage Language program at the University of Houston offers courses specifically designed for people who grew up in Spanish-speaking communities are bilingual to a certain extent, though the abilities and proficiency of the students enrolled in the program vary widely. Thus, the program offers courses that cover all levels: Elementary, Intermediate, and Advanced, that is designed to help students develop their language skills with activities particularly targeting oral and written activities to master formal and informal speech.[7]

The participants in this category were college students of various majors at the time of stimuli collection and had an average age of 20.55 years (range 18-26 years). Elementary Heritage Speakers (E-HSs) were taken mainly from the elementary course of

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[7] For more details on the Spanish Heritage Language Program at the University of Houston: https://www.uh.edu/class/spanish/language-programs/heritage-language/

the Spanish as a Heritage Language Program (SPAN 1507 – Intensive Elementary Spanish for Heritage Learners), and one student in this group (E-HS_1F) was from the L2 track (SPAN 1502 – Elementary Spanish II). In this case, the BLP sociodemographic and language background and history questions were used to classify her as a HS. Advanced Heritage Speakers (A-HSs) were taken mainly from the advanced courses of the Spanish as a Heritage Language Program (SPAN 3307 – Public Speaking in Spanish, and SPAN 3308 - Written Communication for Hispanic Heritage Learners) as well as from some upper-level courses of the Spanish major or minor (BLP was also used to classify them).

When asked about which language they considered their dominant language, four E-HSs and one A-HSs identified themselves as balanced bilinguals, one A-HS considered himself Spanish dominant, whereas the other 14 speakers (six E-HSs and eight A-HSs) identified themselves as English dominant (see Figure 4 for the results of the Bilingual Language Profile for both HSs groups). It is interesting to note that Speaker A-HS-1M is a very strong Spanish dominant bilingual influenced by the fact that he grew up in a border town in Texas, with a lot of exposure to Spanish and a strong Spanish-speaking community and family ties. All but one speaker (E-HS-2M) affirmed a positive attitude towards Spanish in terms of identifying with their HL culture, feeling "themselves" when speaking their HL, the importance of using their HL as native speakers, and being considered native speakers of their HL. Speaker E-HS-2M is a simultaneous bilingual that grew up in a home where both English and Spanish were spoken but indicated that he has always felt comfortable speaking English and still (at the time of stimuli collection) does not feel comfortable speaking Spanish.

Table 4

Overview of HS Participants

Speakers	Type of Bilingualism	AoO in Spanish	AoO in English	Age at stimuli collection
A-HS_1F	Sequential	Birth	6	20
A-HS_1M	Sequential	Birth	12	20
A-HS_2F	Simultaneous	Birth	Birth	20
A-HS_2M	Sequential	Birth	5	19
A-HS_3F	Sequential	Birth	5	19
A-HS_3M	Sequential	Birth	4	18
A-HS_4F	Sequential	Birth	4	22
A-HS_4M	Sequential	Birth	6	24
A-HS_5F	Simultaneous	Birth	Birth	19
A-HS_5M	Sequential	Birth	6	18
Mean (SD)				**19.9 (1.9)**
Speakers	**Type of Bilingualism**	**AoO in Spanish**	**AoO in English**	**Age at stimuli collection**
E-HS_1F	Sequential	Birth	5	25
E-HS_1M	Simultaneous	Birth	1	19
E-HS_2F	Sequential	Birth	7	20
E-HS_2M	Simultaneous	Birth	Birth	18
E-HS_3F	Sequential	Birth	9	22
E-HS_3M	Sequential	Birth	5	21
E-HS_4F	Sequential	Birth	10	26
E-HS_4M	Sequential	Birth	6	21
E-HS_5F	Sequential	Birth	6	19
E-HS_5M	Simultaneous	Birth	Birth	21
Mean (SD)				**21.2 (2.6)**

Figure 4

Bilingual Language Profile Results for both HSs groups
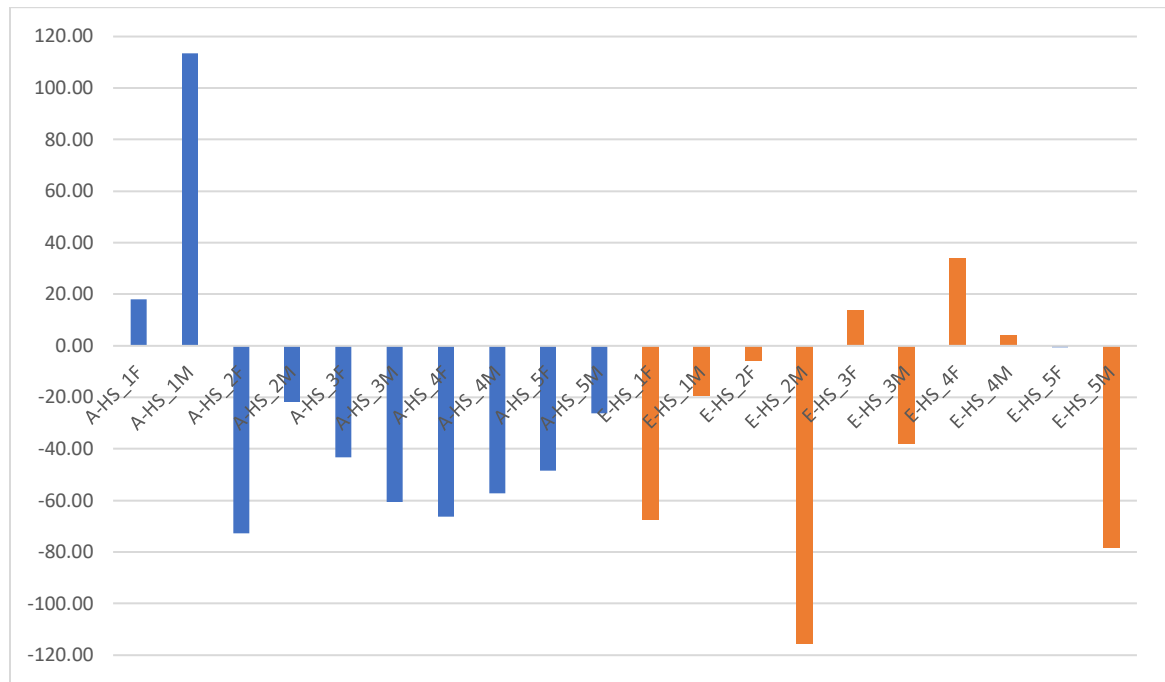
Note. A negative result is English dominant, and a positive result is Spanish dominant. The scores range from -218 to 218.

The 10 L2s (mean age = 22.6, SD = 7.32) were participants born in the United States who grew up speaking only English at home, at school, and in the community. In addition, their experience with Spanish was from a formal setting, in the L2 classroom, and not from a home setting, as is the case for HSs. Their first contact with Spanish started mainly during their adolescent years (average AoO = 13.2, SD = 5.07). All L2 speakers were studying or had recently studied Spanish as a second language at the university level, having reached a high-intermediate conversational level of Spanish. L2 participants in this study were in the same level of proficiency as the A-HSs, as they were in upper-level courses of the Spanish major or minor at university. Regarding their

language use, all L2 speakers reported not using Spanish in their home nor with family members, but mainly at school (group mean of 55% of the time in an average week) and rarely with friends (group mean of 28% of the time in an average week).

The only group living outside the U.S. at the time of testing was the 1LNSs. They were included as a group who should have no foreign accent. Participants in the other groups were living in the United States. In particular, the HSs and the 2LNSs lived in a language contact situation. Finally, L2 speakers were included to show a clear example of foreign accented speech.

4.1.3 Audio Stimuli

Some experiments on accent perception of HSs have used very controlled laboratory-type speech productions, such as Au et al. (2002) and Oh et al. (2002), where they elicited the experiment words from the participants with phrases such as "Diga _____ por favor" or "this is a _____," or with sentence repetition tasks such as that of Marecka et al. (2015). Freer speech sample production tasks used in research have consisted of picture description tasks (Lloyd-Smith et al., 2020) and narratives (Knightly et al., 2003 and Kupisch et al., 2021). However, there is a tendency in recent studies of accent perception of HSs to elicit speech samples from sociolinguistic conversations in a more naturalistic manner (e.g., Hopp & Schmid, 2013; Kupisch, Barton, et al., 2014; Kupisch, Lein, et al., 2014; Kupisch et al., 2020; Lein et al., 2016; Rato et al., 2015). For this study, speakers were interviewed and recorded in a naturalistic sociolinguistic conversation so as to exemplify as close as possible real speech patterns that can be subjected to perceptual evaluation.

Interviews were conducted face-to-face in the Language Commons Laboratory at the University of Houston to ensure a quiet setting suitable for recordings, and later, analyses of speech production. Also, some speakers were interviewed online via the Zoom videoconference platform and were asked to use headphones with an integrated microphone and to be in a quiet setting with a stable internet connection that prevented interference during the interview. Face-to-face interviews were recorded with the researcher's personal smartphone, and online interviews were recorded with the recording feature in Zoom. The duration of the interviews was between 10 to 15 minutes.

The interview consisted of two sections with three questions in total: a warm-up introduction question and two questions in the free conversation section (one about narratives and memories, and one about giving instructions; see Appendix A). The three interview questions were chosen upon considering that adult HSs have "a stronger command of the majority language" and that the topics in which they use the HL tend to be limited to family and personal issues (Montrul, 2013b).

One speech sample per speaker was selected from one of the questions in the free conversation section, for a total of 50 speech samples. The warm-up introduction question was not considered for the speech samples, as it was used only to allow the interviewees to become comfortable in the interview and with the interviewer.

The method for this selection was inspired by and modified from Kupisch, Barton, et al. (2014). The speech samples were extracted from continuous speech, generally consisted of complete sentences/utterances, and had an average duration of 20 seconds (SD = 0.03), with a range of 13-26 seconds, depending on the sentence, to avoid the midsentence cutoffs. These passages did not contain any morphosyntactic or lexical

errors or cues that could reveal the personal or cultural background of the speaker, including code-switching, hesitations, or long pauses, nor any sociocultural references that could identify the speaker as a migrant, to ensure that the judgements were based only (or as much as possible) on phonological cues. In some cases, pauses or slips of the tongue were cut from the sample. All cuts were made at zero crossings to avoid introducing blips or other extraneous sounds into the signal.

4.2 Participants (Judges)

The selected speech samples were rated by monolingual native speakers of Spanish (judges). The criterion for selecting the group of judges was the same as what we saw for the 1LNSs (see *4.1.1. Speakers*). Participants grew up speaking only Spanish at home, had Spanish as the only language of instruction at school, and have lived their entire life in a Spanish-speaking country with Spanish as the majority language. All judges were phonetically naive individuals, and all reported having no hearing impairments.

The reason for using only monolingual native speakers of Spanish as judges was based on previous studies that have used the monolingual group as the norm for detecting foreign accents in HSs (Flores & Rato, 2016; Kupisch, Barton, et al., 2014; Uzal et al., 2015; Stangen et al., 2015).

Previous studies on foreign accent perception of heritage speakers vary significantly in the number of raters used. While some studies used very few raters (e.g., Knightly et al., 2003 used 2 raters for their narrative data collection; Marecka et al., 2015 used 6 raters; and Oh et al., 2002 used 8 judges), the largest number of raters found in an

accent perception experiment evaluating HSs was 55 (Wrembel et al., 2019). Other studies have utilized hundreds of judges (e.g., Hopp & Schmid, 2013), but their population evaluated was not HSS but rather L2 learners. Most studies evaluating HSs have employed, on average, between 14 and 30 raters (e.g., Au et al., 2008; Flores & Rato, 2016; Kupisch, Barton, et al., 2014; Kupisch, Lein, et al., 2014; Stangen et al., 2015; among others), with a few more utilizing in the range of 40 (e.g., Rato et al., 2015 used 45 judges and Lloyd-Smith et al., 2020 used 47 judges).

For this research, two groups of judges were collected: 42 from Nuevo Leon and 46 from Sinaloa; both border states (highlands Mexican Spanish). The reason for choosing an additional group from Sinaloa was due to the researcher's accessibility to an additional set of participants from that state. A t-test statistical analysis was conducted to find if there was any difference in the judges' evaluation of accent perception based on their place of residence, and we found no significant difference (see Table 6). Of the total of 88 judges (52 females and 36 males; mean age = 39.06, SD = 15.62) that completed the accent perception exercise, we excluded data from 26 judges from Sinaloa because the Praat files were not properly saved at the time of data collection. The data for the remaining 62 judges was used for analysis (25 males and 37 females; mean age = 42.44 years, SD = 15.15).

Judges were given a short sociodemographic questionnaire to complete before proceeding with the foreign-accent perception exercise (see Appendix E for the full questionnaire, and Table 5 for an overview of the judges). The questionnaire began with an informed-consent form, which discussed the purpose of the study.

Table 5

Overview of Judges

Judge	Age	Place of residence	Do you speak English?	Academic level
J-Maz-F-01	32	Mazatlán, Sinaloa	6	University
J-Maz-F-02	47	Mazatlán, Sinaloa	6	University
J-Maz-F-03	65	Mazatlán, Sinaloa	6	University
J-Maz-F-04	40	Mazatlán, Sinaloa	3	Graduate
J-Maz-F-05	61	Mazatlán, Sinaloa	3	Graduate
J-Maz-F-06	51	Mazatlán, Sinaloa	5	University
J-Maz-F-07	35	Mazatlán, Sinaloa	2	Graduate
J-Maz-F-08	43	Mazatlán, Sinaloa	5	University
J-Maz-F-09	64	Mazatlán, Sinaloa	6	Elementary
J-Maz-M-01	28	Mazatlán, Sinaloa	3	High school
J-Maz-M-02	68	Mazatlán, Sinaloa	6	University
J-Maz-M-03	19	Mazatlán, Sinaloa	4	University
J-Maz-M-04	39	Mazatlán, Sinaloa	2	Graduate
J-Maz-M-05	66	Mazatlán, Sinaloa	4	Graduate
J-Maz-M-06	36	Mazatlán, Sinaloa	3	University
J-Maz-M-07	45	Mazatlán, Sinaloa	3	Graduate
J-Maz-M-08	45	Mazatlán, Sinaloa	3	University
J-Maz-M-09	39	Mazatlán, Sinaloa	2	Graduate
J-Maz-M-10	20	Mazatlán, Sinaloa	5	University
J-Maz-M-11	21	Mazatlán, Sinaloa	3	University
J-MM-F-01	33	Montemorelos, Nuevo León	3	Graduate
J-MM-F-02	62	Montemorelos, Nuevo León	3	University
J-MM-F-03	62	Montemorelos, Nuevo León	2	University
J-MM-F-04	26	Montemorelos, Nuevo León	3	High school
J-MM-F-05	56	Montemorelos, Nuevo León	4	University
J-MM-F-06	51	Montemorelos, Nuevo León	4	Graduate
J-MM-F-07	58	Montemorelos, Nuevo León	5	University
J-MM-F-08	31	Montemorelos, Nuevo León	3	Graduate
J-MM-F-09	58	Montemorelos, Nuevo León	2	Graduate
J-MM-F-10	52	Montemorelos, Nuevo León	2	University
J-MM-F-11	18	Montemorelos, Nuevo León	3	University
J-MM-F-12	27	Montemorelos, Nuevo León	5	Graduate
J-MM-F-13	48	Montemorelos, Nuevo León	6	Graduate
J-MM-F-14	50	Montemorelos, Nuevo León	2	Graduate
J-MM-F-15	56	Montemorelos, Nuevo León	6	University

Judge	Age	Place of residence	Do you speak English?	Academic level
J-MM-F-16	50	Montemorelos, Nuevo León	4	Graduate
J-MM-F-17	35	Montemorelos, Nuevo León	4	University
J-MM-F-18	59	Montemorelos, Nuevo León	4	Graduate
J-MM-F-19	55	Montemorelos, Nuevo León	4	University
J-MM-F-20	36	Montemorelos, Nuevo León	3	Graduate
J-MM-F-21	51	Montemorelos, Nuevo León	4	Graduate
J-MM-F-22	61	Montemorelos, Nuevo León	4	Graduate
J-MM-F-23	20	Montemorelos, Nuevo León	4	High school
J-MM-F-24	20	Montemorelos, Nuevo León	2	University
J-MM-F-25	63	Montemorelos, Nuevo León	6	Graduate
J-MM-F-26	50	Montemorelos, Nuevo León	4	University
J-MM-F-27	18	Montemorelos, Nuevo León	4	University
J-MM-F-28	24	Montemorelos, Nuevo León	5	Elementary
J-MM-M-01	35	Montemorelos, Nuevo León	4	University
J-MM-M-02	24	Montemorelos, Nuevo León	2	Graduate
J-MM-M-03	60	Montemorelos, Nuevo León	3	Graduate
J-MM-M-04	34	Montemorelos, Nuevo León	5	University
J-MM-M-05	27	Montemorelos, Nuevo León	3	University
J-MM-M-06	64	Montemorelos, Nuevo León	5	University
J-MM-M-07	24	Montemorelos, Nuevo León	3	University
J-MM-M-08	34	Montemorelos, Nuevo León	3	High school
J-MM-M-09	36	Montemorelos, Nuevo León	3	University
J-MM-M-10	51	Montemorelos, Nuevo León	2	Graduate
J-MM-M-11	59	Montemorelos, Nuevo León	4	Graduate
J-MM-M-12	26	Montemorelos, Nuevo León	4	University
J-MM-M-13	31	Montemorelos, Nuevo León	3	Graduate
J-MM-M-14	32	Montemorelos, Nuevo León	5	University

Note. For the question, "Do you speak English?", the numbers are as follows: 1) Yes, like a native speaker of English; 2), Yes, professionally; 3) Somewhat; 4) Very little; 5) Almost nothing; 6) No, nothing.

The presence of the sociodemographic variables (gender, place of residence, English level, and academic level) over the judges' evaluation of their accent perception was not a significant factor of difference. As we can see in Table 6, a *t*-test for each

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variable showed no significant difference between participants' evaluation of perceived

foreign accent and place of residence, gender, and academic level. Additionally, an

ANOVA confirmed no difference when comparing their English level.

Table 6

Statistical Tests of Difference Considering the Sociodemographic Variables of the Judges

	Group 1	Group 2	Statistical test
Place of residence	Sinaloa (m = 2.88, SD = .521)	Nuevo Leon (m = 2.78, SD = .432)	t = .760, p = .450
Gender	Female (m = 2.73, SD = .46)	Male (m = 2.94, SD = .427)	t = -1.84, p = .071
Academic level	Undergraduate (m = 2.90, SD = .483)	Graduate (m = 2.73, SD = .430)	t = 1.359, p = .180
English level	ANOVA: F = .827, p = .513		

4.3 Procedure

The foreign-accent perception exercise was conducted face-to-face. The method

used for the data collection was adapted and expanded from Kupisch, Barton, et al.

(2014) and Flores and Rato (2016), and it was designed and administered using Praat,

v.6.3.09 (Boersma & Weenink, 2023), software for speech analysis and speech

perception experiments. The audio stimuli were presented to the judges through

headphones from the researcher's personal computer. The researcher met with each judge

separately.

When judges entered the testing area, they were greeted in Spanish. First, they were given the short sociodemographic questionnaire (see Appendix E) and then oral instructions about the accent perception exercise. Both parts of the data collection were self-paced.

The foreign-accent perception exercise consisted of two parts, a short training period of six speech samples and the actual quasi-experiment with the 50 speech samples to be evaluated. Audio stimuli in both sections were automatically randomized by Praat, and the judges could hear each speech sample only once.

Regarding the oral instructions given to the judges about the procedure of the accent perception exercise, it was explained that they were going to listen to a series of speech samples in Spanish and that, after each recording, they were going to make two decisions on that person's accent along two scales: the first was regarding if the speaker's accent sounded foreign or native-like, and the second one was regarding how sure they felt about making that decision. Judges did not receive any further sociodemographic or linguistic information (such as place of origin or language(s) spoken) about any of the speakers they were going to listen to. It was also emphasized that they should not base their judgment on vocabulary or content, but rather only on pronunciation, and that regional accents or dialects of Spanish should not count as foreign accent.

A short training period was used to allow the judges to get familiarized with the exercise and the procedure of listening and making their selection. The speech samples for the training period were: three monolingual NS of Mexican highland Spanish (one female and two males), one female elementary HS, and two L2 learner (one female and one male) with clearly identifiable foreign accents. These samples were selected

separately and were not part of the data collection. The judges received no feedback during the training period. (See Appendix B for the actual screenshots of the training period using Praat.)

For both sections, judges would first see the instruction page displayed on the screen (see Appendix C for the actual screenshots of the quasi-experiment using Praat) and then were prompted to click anywhere on the screen to proceed with listening to the speech samples. Then, the first speech sample would appear, during which a blank screen was displayed so that judges could only hear the speaker but could not click on anything or advance the screen until the recording finished. Once the speech sample finished, the software automatically proceeded to show the screen with the questions for the judges to make their two judgements. Accents were judged using a 6-point Likert scale, with 1 being *SIN acento extranjero* (NO foreign accent), and 6 being *MUCHÍSIMO acento extranjero* (STRONG foreign accent). Then, they were asked to indicate how sure they were about their rating using a 5-point Likert scale going from *Nada seguro* (Not sure at all) to *Totalmente seguro* (Totally sure). This procedure was repeated for every speaker until the judges had listened to all the audio stimuli from all the speakers. After judges were finished, they were thanked for their participation. The data collection took between 20 and 30 minutes per judge.

The following example shows a speech sample from a heritage speaker:

> *El mejor cumpleaños que he tenido fue el último, donde cumplí 25 años. Mi novio, mis dos amigos, mi tío y mi mamá saltaron de avión conmigo ese día. Lo único malo fue que cuando salió el avión, no pude respirar por un rato.*
> [E-HS-1F]

'The best birthday I've had was the last one, where I turned 25. My boyfriend, my two friends, my uncle and my mom jumped from a plane with me. The only bad thing is that when the plane took off, I couldn't breathe for a while.'

To allow for a more detailed understanding of how the accent of the two groups of HSs was perceived, and to allow for an understanding of accent perception as a continuum rather than a binary classification, this study employed a larger Likert scale (following Au et al., 2002; Flores & Rato, 2016; Knightly et al., 2003; Oh et al., 2002; among others), instead of using the binary rating of 'native' or 'non-native' (used by Kupisch, Barton, et al., 2014; Kupisch, Lein, et al., 2014; Lein et al., 2016; Rato et al., 2015; Schmid & Hopp, 2014; Stangen et al., 2015; among others). In addition, following Kupisch, Barton, et al. (2014), a confidence rating was used as a second judgement question, since it is conceivable that that judges may be less confident when rating HSs as compared to NSs and L2s, as well as less confident when rating 2L1NSs as compared to 1LNSs. Previous research (De Leeuw et al., 2010; Hopp & Schmid, 2013; Rato et al., 2015; Schmid & Hopp, 2014; Stangen et al., 2015) has used a confidence scale not to evaluate judges' sureness of their evaluation, but rather to convert a binary accent-perception judgement into a Likert scale. To our knowledge, only Kupisch, Barton, et al. (2014) and Lloyd-Smith et al. (2020) have used confidence ratings to "explore whether raters show differences in their ability to judge the accent of [HSs] as compared to L1 and L2 speakers" (Kupisch, Barton, et al., 2014, p. 130).

4.4 Summary

This chapter presented the methodology of the study in detail, explaining how the instrument was constructed and what elements were included in it. It began with a detailed description of the *Bilingual Language Profile* questionnaire used to determine the level of bilingualism of each speaker, a full explanation of the speakers who participated in the construction of the quasi-experiment, and how the audio stimuli were collected. Following that was an explanation of the judges who participated in the data collection, which included detailed sociodemographic information about them. Then, it explained the procedure used to collect data related to perceptual judgements.

The following chapter presents how the results were statistically analyzed, as well as an in-depth explanation of the results collected through the accent-perception experiment, and a discussion of the results.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter focuses on the results of the current study and a discussion of the findings. It briefly introduces the statistical analyses conducted in this research (5.1) and then presents in detail the results (5.2) in four sections: perception of foreign accent, confidence ratings, correlation between perceived foreign accent and level of bilingualism, and correlation with other factors. Finally, it discusses the results in relation to the five research questions as well as other aspects.

5.1 Analysis

Data collected for accent-perception judgements and confidence ratings were done in Praat, v.6.3.09 (Boersma & Weenink, 2023) and downloaded into Excel spreadsheets. Perceived foreign accent rating scores were computed for each speaker by calculating the average across judges. Statistical analyses were performed in SPSS 24. Results were analyzed and discussed in accordance with the research questions. ANOVA was performed with the dependent variable (accentedness score) and the categorical independent variables: language group (RQs1-3), and HSs' proficiency, as measured by course level in which HSs were registered at the time of the interview (RQ4). A Tukey post-hoc test was then done when ANOVA indicated group differences to determine which groups were different from each other. A Pearson Correlation Coefficient test was performed to investigate the possible association between students' level of bilingualism

and perceived foreign accent (RQ5), as well as possible associations with other linguistic and sociodemographic variables.

5.2 Results

This section presents the results of the research. The first part includes the results of the perception of foreign accent part of the quasi-experiment. The second part presents the confidence ratings. Then the third and fourth part include the statistical results for the correlational analysis between perception of foreign accent and some linguistic, sociodemographic, and affective factors.

5.2.1 Perception of Foreign Accent

The first question for the judges was if the speakers sounded foreign accented. Figure 5 indicates the average rate of perceived foreign accent by group of speakers (Group 1 is 1LNSs, group 2 is 2LNSs, group 3 is A-HSs, group 4 is E-HSs, and group 5 is L2s) from a total of 62 raters and a total of 50 speakers.

For the two experimental groups (A-HSs and E-HSs), the advanced heritage speakers were perceived to have a *Acento extranjero MUY LEVE* (VERY SLIGHT foreign accent), with a mean of 2.57 (SD = 0.68), ranging from 1.90 to 4.37. Similarly, elementary heritage speakers were perceived to have *Acento extranjero LEVE* (SLIGHT foreign accent), with a mean of 3.26 (SD = 0.92), ranging from 2.35 to 5.03. Even though many elementary HSs have rating averages close to those of bilingual native speakers, no elementary HS actually falls within the bilingual NSs' rating span (1.26 to 2.32).

Figure 5

Perceived Foreign Accent by Group of Speakers
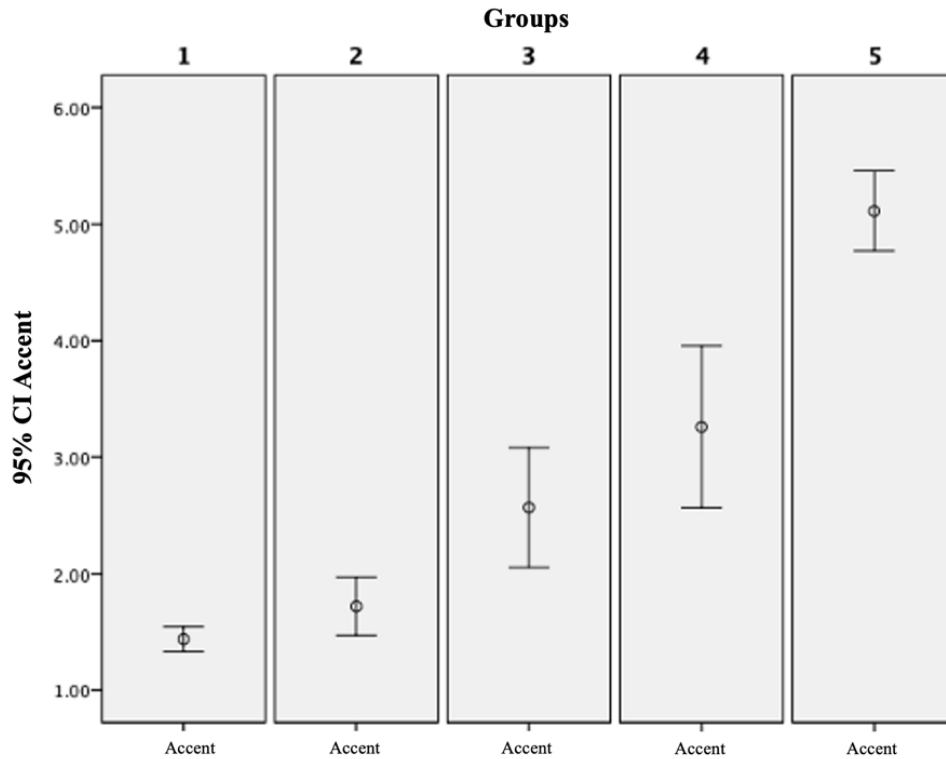
Note. Group 1 is 1LNSs, group 2 is 2LNSs, group 3 is A-HSs, group 4 is E-HSs, and group 5 is L2s.

An ANOVA statistical analysis was done to compare the average ratings of foreign-accent perception between all groups, and the results revealed that *group* was a significant factor ($F = 58.93$, $p = .000$). A Tukey's post hoc revealed that 1LNSs and 2LNSs are not significantly different from each other ($p = .836$), and that A-HSs and E-HSs are not significantly different from each other either ($p = .096$). However, we found a significant difference when comparing HSs with all control groups: A-HSs are different from both the monolingual and bilingual NS groups ($p = .001$, $p = .024$ respectively), E-

HSs are different from both NS groups (*p* = .000 for both), and both HSs are different

from L2s (*p* = .000 for both HS groups).

Based on these results for the HS groups, it is useful to look at individual results

of all groups because, as we saw in section *3.2 Heritage Speaker*, HSs tend to be a very

heterogeneous group. Therefore, now we show the average rate of accent perception for

each speaker in each group (1LNSs, 2LNSs, A-HSs, E-HSs, and L2s), from a total of 62

raters, and the average per group (see Figure 6).

Figure 6

Average Rate for Accent Perception for Each Speaker in Each Group
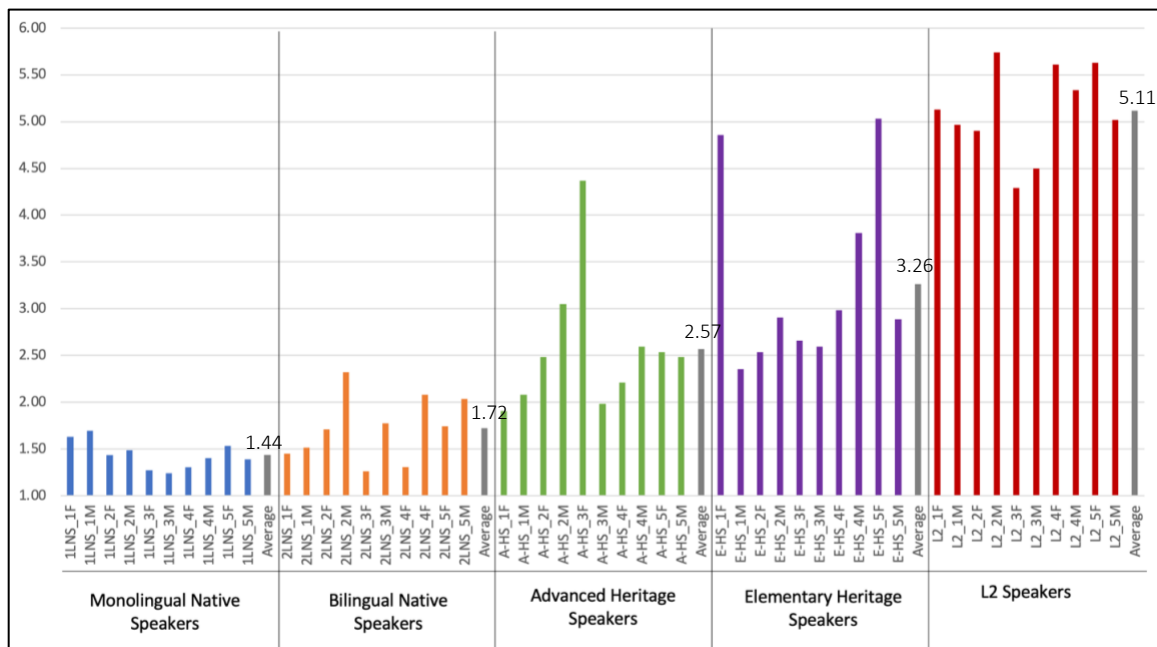
Using a 6-point Likert scale for accent perception (1 being *SIN acento extranjero*

[NO foreign accent] and 6 being *MUCHÍSIMO acento extranjero* [STRONG foreign

accent]), in both NS groups, participants were consistently rated low on the scale,

indicating that judges heard no foreign accent. The monolingual native speakers had a

mean rating of 1.44 (SD = 0.14), ranging from 1.24 to 1.69, and the bilingual native

speakers had a mean rating of 1.72 (SD = 0.33), ranging from 1.26 to 2.32. On the

contrary, L2 speakers were consistently rated high on the scale, as having *Acento*

extranjero MUY NOTABLE (VERY NOTICEABLE foreign accent), with a mean rating

of 5.11 (SD = 0.46), ranging from 4.29 to 5.74. Looking at the individual results, one can

appreciate that some HSs scored within NS ranges for accentedness, while others scored

within the L2 range.

5.2.2 Confidence Ratings

The second question for the judges intended to measure their level of confidence

when making their judgements of the perceived accent in each speaker they listened to.

The trend for accent perception research has been to use a binary rating for accent

perception and then use a confidence rating question to convert the binary accent-

perception judgment into a Likert scale (see section *4.3 Procedure*). However, no

research until Kupisch, Barton, et al. (2014) had used confidence ratings to analyze the

judges' certainty of their evaluation of foreign accent. Since then, others such as Lloyd-

Smith et al. (2020) and now this study, have found it useful to implement confidence

ratings in addition to accent-perception judgements. Therefore, following Kupisch,

Barton, et al. (2014), we expected that judges would be less confident (regardless of

judging foreign or native accent) when judging both groups of HSs.

A 5-point Likert scale was used (1 being *Nada seguro* [Not sure at all] and 5

being *Totalmente seguro* [Totally sure]) for the confident ratings. Generally, across all

five groups, confidence ratings were high, with an average of 4.39 for 1LNSs, 4.42 for

2LNSs, 4.39 for A-HSs, 4.46 for E-HSs, and 4.70 for L2s. As we can see in these average ratings, L2s had the highest confidence ratings, which means that judges were the most certain that L2s have foreign-accented speech, whereas there is more variability in the other groups.

The results of the *confidence ratings* (as show in Figure 7) indicate that there is no significant difference between the HS groups ($p = .535$), and that neither HS group is significantly different from either NS group (see Appendix F). The only significant difference was found between HSs and L2s ($p = .000$ for both HS groups).

Figure 7

Confidence Ratings
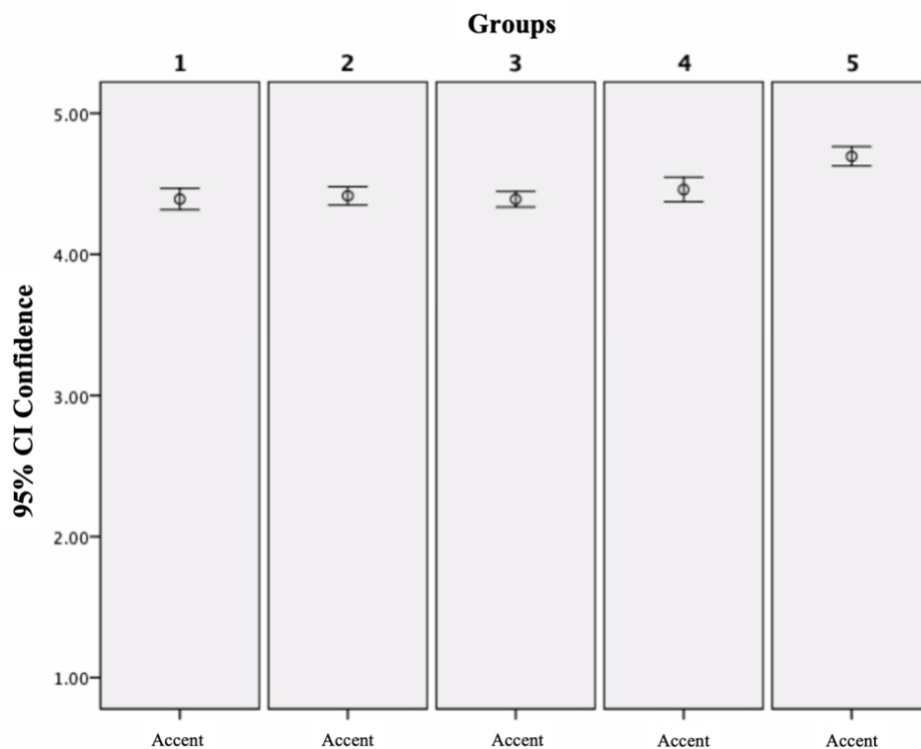
Note. Group 1 is 1LNSs, group 2 is 2LNSs, group 3 is A-HSs, group 4 is E-HSs, and group 5 is L2s.

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Additionally, a Spearman's rank correlation was computed to assess the relationship between perceived foreign accent and confidence ratings. There was a moderate positive correlation between the two variables, $r(50) = .555$, $p = .000$ (see Figure 8). These results mean that the more foreign accent the speakers have, the more the judges are confident about their judgement of foreign accent. In other words, the judges are more confident in their rating of a strong perceived foreign accent for the L2s.

Perceived Foreign Accent and Confidence Ratings
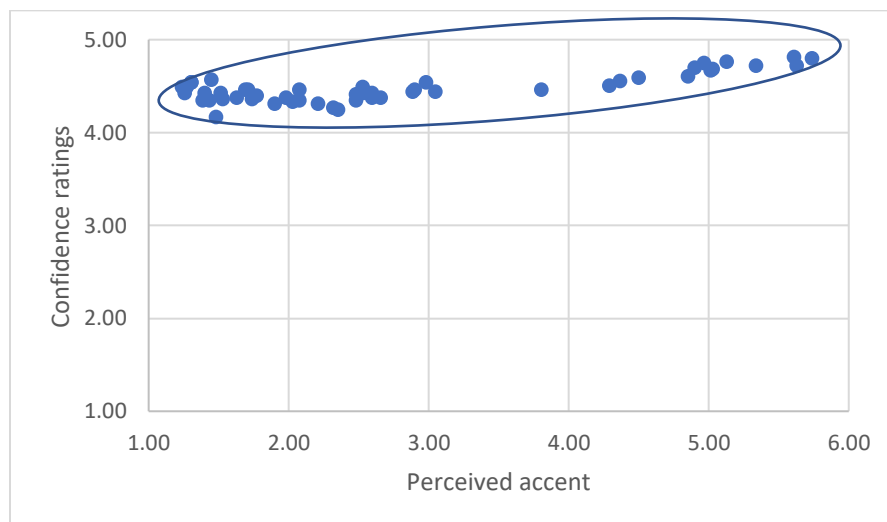
Note. Perceived foreign accent and confidence ratings for all participants from all five groups.

5.2.3 Correlation Between Perceived Accent and Level of Bilingualism

A correlation test was done to assess the relationship between perceived foreign accent of all speakers and their level of bilingualism, as taken from their score in the Bilingual Language Profile (BLP). Results showed a strong inversely proportional

correlation between the two variables ($r = -.791$), as shown in Figure 9a. However, when

analyzing particularly the HSs (both groups), we found that there is a weak negative

correlation between the two variables ($r = -0.112$), as shown in Figure 9b.

When looking at accented scores correlated to each section of the BLP (History,

Use, Proficiency, and Attitude), there is a moderate to strong correlation between them

across the overall results (see Table 7). However, again, when analyzing only both HS

groups, we found that there is a weak correlation between the accented scores and each of

the subcategories of the BLP (see Table 7).

Figure 9

Correlation Between Accent-perception Results and BLP Results
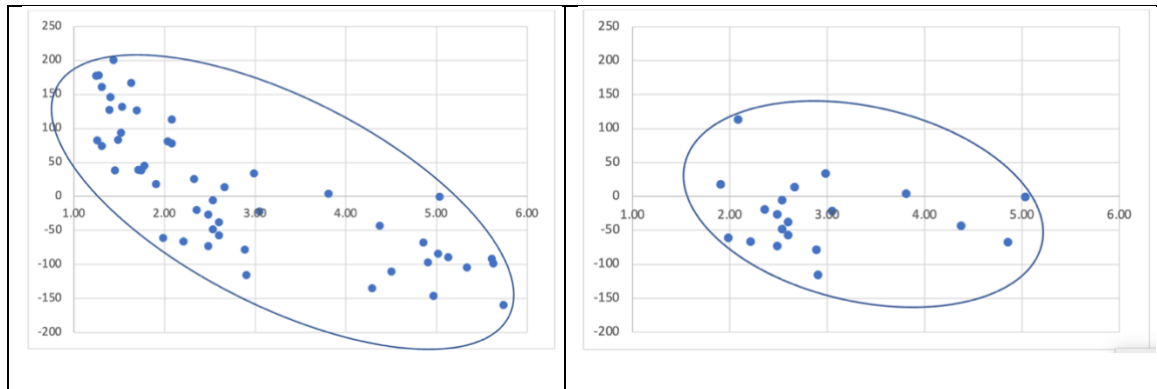
Note. Left graph (9a) is all speakers, right graph (9b) is for HSs of both groups.

Table 7

Correlation Between Accent-perception Results and Subcategories of the BLP Results

Overall (*p* value)		Only HS groups (*p* value)	
II. History	-0.81	II. History	-0.17
III. Use	-0.68	III. Use	0.03
IV. Proficiency	-0.72	IV. Proficiency	-0.05
V. Attitudes	-0.74	V. Attitudes	-0.19

5.2.4 Correlation Between Perceived Accent and Other Factors

Regarding language use, HSs in this research tend to use the majority language (English) more frequently than their HL in general (see Figure 10), as shown in the results from the Bilingual Language Profile Section 3 (see <mark>Appendix D</mark>). Regarding the correlation between perceived foreign accent and *language use* at the time of testing, the Pearson correlation test ($r = -.676$) showed a strong significant correlation between the variables, which means that the more the speaker uses English, the more foreign accented their speech in Spanish is perceived.

Figure 10

Language Use for All Groups of Speakers
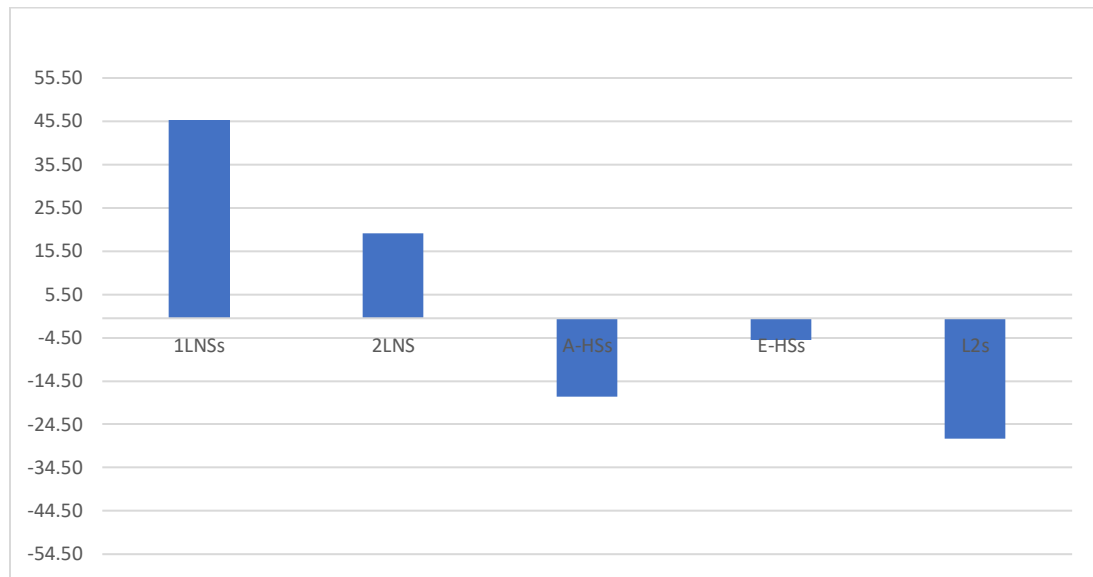
Note. A negative result is English dominant, and a positive result is Spanish dominant. The scores for language use range from -54.5 to 54.5.

As per the domain of HL use, the results of the Sociodemographic and Language Profile Questionnaire indicate that HSs use their HL more among family members and significantly less among their friends. HSs tend to do a lot more of their thinking and counting in the majority language (see Figure 11).

Concerning the gender of the speakers, a *t*-test comparing accent perception and gender of speakers by groups showed that there are no gender differences for 1LNSs, A-HSs, E-HSs, and L2s. However, there was a difference found for the 2LNSs, for which men were found to have more of a foreign accent than women (see Table 8).

Figure 11

Language Use Among Heritage Speakers by Domain
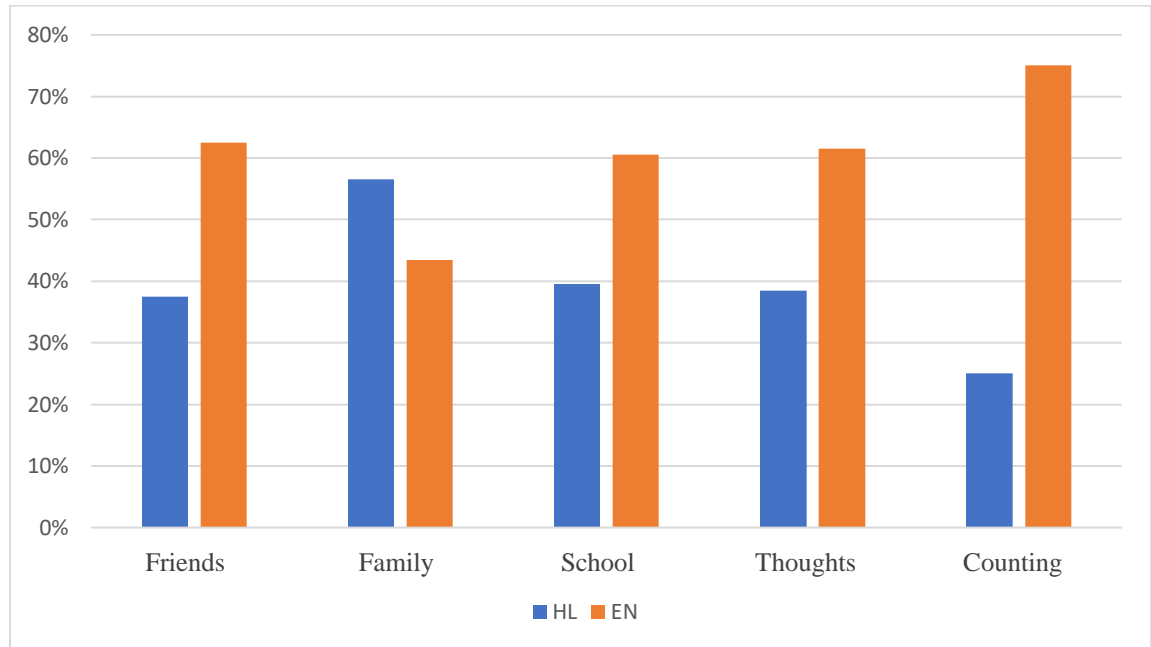
Table 8

Gender Differences Among Speakers' Perceived Accent

Groups	*t*-test value	Significance (*p* value)
1LNSs	.040	.969
2LNSs	2.654	.029*
A-HSs	-.549	.598
E-HSs	-1.163	.292
L2s	.006	.995

Note: * indicates that the difference is significant ($p < .050$).

Regarding the type of bilingualism, as measured by HSs being simultaneous or sequential bilinguals, there is no significant difference between perceived foreign accent and the speakers being sequential or simultaneous bilingual, $t(20) = 1.32$, $p = .205$, which means that age of onset (AoO) of the majority language is not a predicting variable for accent perception of HSs.

5.3 Discussion

5.3.1 Perception of Foreign Accent

Consistent with the results from Flores and Rato (2016), Kupisch, Barton, et al. (2014), Lloyd-Smith et al. (2020), and Rato et al. (2015), among others, there is an evident difference in accent perception ratings between the control groups (both 1LNSs and 2LNSs as well as L2s), which confirms that these groups are at both extremes of the continuum of bilingualism. These results serve not so much to compare the HSs with either of these groups or to try to place HSs in either of the groups, but rather to confirm the validity of the stimuli and the reliability of the judges' ability to accurately determine the presence and absence of foreign accent. Lastly, it also answers positively RQ2, which

asked if the typical late bilingual native speakers (L2NSs) are perceived foreign-accent free, with the answer being yes, they are.

Regarding the reason for using two NS groups, monolinguals (1LNSs) and late bilinguals (2LNSs), we found no difference between their perceived accent, as both groups were judged as non-foreign accented. The original expectation was that 2LNSs may be judged, at least to a certain extent, as more foreign accented than 1LNSs, as the former group is in a language contact situation even though Spanish is still their dominant language; and the main reason for using 2LNSs as an additional control group was because we thought that since they represent the actual source of HL input of the HSs, passing on a variety of Spanish that is influenced by that context of language contact, there may be similarities between the 2LNS and the HS groups. While these results did not confirm any difference between the NS groups, one could still argue that the 2LNS group is a more appropriate comparison for HSs, since they are also bilingual, and many researchers note that bilinguals are not two monolinguals in one brain (see Grosjean, 1985 and 1989, for a full description of this perspective on bilingualism). At any rate, more research should be done using 2LNSs, since, to our knowledge, only Kupisch, Lein, et al. (2014) used monolingual and bilingual NSs, though their 2LNSs were part of the experimental group (and did not sociodemographically represent the population of the parents of HSs, which was our case, see section *4.1.2. Speakers* for a full description of the 2LNSs), so their purpose for using the two groups is not the same as ours. Others (Au et al., 2002; Au et al., 2008; and Oh et al., 2002) used bilingual NSs as a control group but not use monolingual speakers, and labeled their control group as simply NSs, so they were not used as an additional comparison group.

Concerning the experimental groups, on average, A-HSs were perceived to have a very slight foreign accent and E-HSs a slight foreign accent. This answers RQ1 (if HSs perceived foreign-accent free in their HL); that is, they were not perceived as foreign-accent free, as they were rated low to mid on the scale of perceived foreign accent. So, while they did rate slightly higher than either of the NS groups, they rated substantially below the L2s. Au et al. (2002), Au et al. (2008), and Knightly et al. (2003) also conducted research with Spanish HSs and found that this group of speakers was perceived as more native-like in their speech. Additionally, Flores and Rato (2016), Oh et al. (2002), Rato et al. (2015), and Stangen et al. (2015) conducted research on HSs of other languages and also found them to be perceived as more native-like.

Furthermore, both HS groups (advanced and elementary) were not different from each other in terms of their perceived foreign accent. I believe this is due to one of the main characteristics of HSs: the high heterogeneity of this group. We will discuss this more in depth later in this section.

Au et al. (2008) found that both HS groups were overall perceived equally more native-like than L2s, with no significant intergroup difference, which agrees with our results that both HS groups are not different from each other. However, they conducted two experiments for accent perception—sentence accent rating (of the type *'Diga _____ por favor'*) and narrative accent rating—and found a group difference in the sentence accent rating experiment, with active HSs being perceived less foreign accented than the overhearers. In our research, even though by average rating A-HSs (mean group rating = 2.57) outperformed E-HSs (mean group rating = 3.26), there was no statistical difference between the two groups.

On the contrary, Knightly et al. (2003), Kupisch et al. (2021), and Oh et al. (2002) found intergroup differences when comparing two HS groups. Kupisch et al. (2021) found group differences in their two HS groups, with preschoolers being perceived less accented than school children. Oh et al. (2002) found that overhearers were different from HSs but not different from L2s, while Knightly et al. (2003) found HSs, overhearers, and L2s to be all different from each other. It is important to note, though, that in their experiment, they labeled active HSs as NSs, but when reading in detail the description of this group, one finds out that they are actually HSs ("Native speakers were Spanish–English bilinguals who learned English as their L2 before age 10, and most of them were born in the U.S.", p. 466).

Analyzing these previous investigations, we can conclude that the fact that they found group differences can be attributed to their two experimental groups having included passive HSs (overhearers), while in our research, the elementary HS group was active speakers (what previous studies would call *childhood speakers*) and were at least able to have a simple conversation in their HL.

The fact that both HS groups are not different from each other in perceived foreign accent also makes it impossible to attribute language proficiency (as determined by the course level in which the HSs were placed—advanced or elementary) as a predicting factor for accent perception. Another scale that helps us determine language proficiency is Section 4 of the BLP, which through a self-rated evaluation, provides a very reliable measure of language proficiency (see section *4.1.1. Sociodemographic and Language Profile Questionnaire* for a detailed explanation and Appendix D for the full questionnaire). The results also confirm that language proficiency is not a predictor for

accent perception for HSs, since it is the weakest correlation of all the five categories of the BLP (see Table 7). Therefore, both results help us answer RQ4 negatively, which asked if HSs' level of proficiency corresponded with their perceived foreign accent.

Regarding language proficiency differences, some studies determined proficiency by the type of speakers—active HSs and passive HSs, or what they called *overhearers*—(Au et al., 2008; Knightly et al., 2003; and Oh et al., 2002) and others by the course level and age (Kupisch et al., 2021). Regardless of how proficiency is determined, it measures vocabulary and grammar skills, which does not necessarily mean that it will determine the presence or absence of foreign accent. In addition, in this study, L2s were in the same level of proficiency as the A-HSs (as all L2s were studying upper-level courses of the Spanish major or minor and all A-HSs were studying either advanced courses of the Spanish as a Heritage Language Program or upper-level courses of the Spanish major or minor), and yet L2s were still rated less than 1 point from the most extreme point on the scale (6 = *strong foreign accent*). This shows that there is no evidence or connection between high proficiency of the L2 and accent perception.

One aspect in which previous studies and this investigation coincide is that HSs are different from both control groups, NSs and L2s, regardless of how their accent was perceived (Kupisch, Barton, et al., 2014; Kupisch et al., 2020; Lloyd-Smith et al., 2020; Rato et al., 2015; Stangen et al., 2015; among others). This also answers positively our RQ3, which asked if there was a difference in the perceived foreign accent of HSs when comparing them with the two groups of NSs. It should be noted, however, that even though HSs were different from both NS groups, they still greatly outperformed the L2s.

Regarding within-group variability, HSs had the highest amount of variability in accent perception ratings overall, as well as intergroup differences and in determining influencing factors for perceived foreign accent. This variability confirms the problem of limiting HSs into a binary classification of native or non-native speaker. Looking into individual data within the two HS groups will shed more light into on this highly heterogeneous group and their highly varied results.

First, the range of perceived accent by individual is higher in both HS groups than in the control groups. Using a 6-point Likert scale, with 1 being *SIN acento extranjero* (NO foreign accent), and 6 being *MUCHÍSIMO acento extranjero* (STRONG foreign accent), 1LNSs had a within-group range of 0.45 points, 2LNSs of 1.06 points, A-HSs of 2.47 points, E-HSs of 2.68 points, and L2s of 1.45 points. That makes E-HSs the group with the highest variability, followed by A-HSs by only 0.21 points, whereas the control groups are significantly lower in within-group variability range. Additionally, there are 4 out of 10 A-HSs that fall within NSs range on accent rating, and 2 out of 10 E-HSs and 1 out of 10 A-HS fall within L2 range on accent rating, even though the group mean for both HS groups (A-HSs mean = 2.57, E-HSs mean = 3.26) is significantly below the L2 group mean of 5.11 (see Figure 6).

For instance, speakers A-HS-3F, E-HS-1F, and E-HS-5F in our study were judged to have the most foreign sounding accent among all participants in the two experimental groups, with individual mean values of 4.37, 4.85, and 5.03, respectively. Though their values fall within the rage of some L2 speakers, they still fall below the group average of L2s (5.11), while also falling very far from the group average of both NS groups (1LNSs mean = 1.44, 2LNSs mean = 1.72). However, when looking at their level of bilingualism

(from the BLP, as shown in Figure 4, section *4.1.2 Speakers*), they are not outliers within that category. Therefore, there is nothing in their sociodemographic or linguistic characteristics that can be traced to determine their higher accentedness ratings, at least based on the extensive biographical data available.

Rato et al. (2015) also found significant variation in the accent rating of their experimental group. Using a 6-point Likert scale, their NSs had a group mean of 1.06 (SD = 0.07) and their L2s a group mean of 5.82 (SD = 0.13), whereas their HS group had a mean of 1.66 (SD = 0.85), much lower than that of the L2s. Nine of their 12 HSs were judged with similar scores to those of the monolingual speakers, whereas two HSs had accent ratings that were significantly more foreign sounding than their group average (*m* = 3.29 and 3.51 respectively); however, these two values were still far from the L2 ratings, and therefore were not considered foreign accented. Also, Kupisch, Barton, et al. (2014) found higher variability in the consistency of accent ratings. They did an additional analysis of perceived accent to explore the consistency of the binary accent rating and made it into a 3-point consistency scale, where judgements were placed as: *native* (when speakers were judged with a native accent by 80% of the raters), *unclear* (judged with a native accent by 20% to 79% of the raters), and *non-native* (judged with a native accent by less than 20% of the raters). HSs were given *unclear* accent judgements 34% of the time, while NSs were given *unclear* accent judgements only 15% of the time and L2s 20%.

Kupisch et al. (2021) studied children from two age groups (preschool and school) and from two types of families (monolingual and mixed) and found a lot of individual variation. Therefore, they suggested that research ought to look beyond these

two variables to see what accounts for these differences. Flores and Rato (2016) also found high variation in their HS group, though even the highest rated HSs were still very distant from the L2s rating span, and the lowest rated HSs were still not within the NSs rating span. They concluded that this high variation in the perceived accent of HSs indicates that there are traces of non-native speech in the HSs, and thus, suggest further analysis of acoustic measures as well as other suprasegmental features that could help determine the reason for such high variation.

Our results showed a strong inverse correlation between perceived foreign accent and level of bilingualism (taken from the BLP score) of all speakers, so one can easily be prone to make level of bilingualism a strong determining factor of foreign accent. Additionally, we would think that by being more majority-language dominant, HSs would be more foreign accented in their HL. This is the case found in Kupisch, Barton, et al. (2014), where heritage language preference was a predictor for a perceived nativeness in the HL. However, we obtained some puzzling results: when selecting only the HSs, the correlation was much weaker (see Figure 9b, section *5.2.3 Correlation Between Perceived Accent and Level of Bilingualism*). In the case of the control groups (NSs and L2s), the more Spanish dominant they are, the less foreign accented they are perceived. However, for HSs, a more majority-language dominant HS still has a large amount of early exposure to and input from their HL, which may account for them being perceived as less foreign accented than L2s, who, in turn, are consistently far more English dominant and do not have the benefit of early childhood exposure to their second language. This weak correlation among HSs is another interesting data point to highlight, given that no significant difference was found between the two HS groups in terms of

accent perception, and that these two groups are the ones that present the most within-group variation for accent perception as well as for level of bilingualism.

In this study, HSs were grouped according to their proficiency level as determined by placement in university Spanish courses (see section *4.1.2. Speakers*), and since proficiency does not seem to correlate with accentedness nor does level of bilingualism, perhaps grouping them according to another variable might result in more homogenous groups, although what that variable may be is an unanswered question. Thus, we can conclude that level of bilingualism is not a strong predicting factor for a perceived foreign accent, which answers our RQ5, which inquired about a possible correlation between the HSs' level of bilingualism (taken from the BLP) and the perception of foreign accent, with the answer being no, they are not.

Our results may seem to be in contrast with Kupisch, Barton, et al. (2014), who found a correlation between language preference and perceived native accent in the HL; however, it should be noted that in their study, they only used a 3-point Likert scale for speakers to self-determine their language preference, as opposed to our research, which used a more comprehensive self-evaluation (see section *4.1.1 Sociodemographic and Language Profile Questionnaire*) to determine language preference, among other sociolinguistic factors linked to level of bilingualism. This difference in evaluation for determining language preference could account for the discrepancy in results, as more factors, rather than only language preference, could be involved in this difference of results.

If proficiency is not a definitive predictor of foreign accent in HSs, nor is their level of bilingualism, then one could conclude that early exposure to the heritage

language would be, regardless of the AoO of the majority language (simultaneous or sequential bilinguals). This conclusion is also supported by Au et al. (2008), Knightly et al. (2003), and Oh et al. (2002), who found that adult HSs, regardless of their proficiency level (either overhearers or active HSs), were perceived as less foreign-like than L2s by virtue of their early exposure (even with limited input). In addition, this also confirms the general conclusion in applied linguistic studies that later language learning is associated with a stronger accent (Munro, 2008), so we can conclude the opposite: if HSs' L1 is their HL, then that early exposure from birth will help them not to have a (strong) foreign accent.

AoO of the majority language also does not seem to affect perceived accent in the HL (since all HSs have early exposure to the HL, regardless of their proficiency level at the time of testing), as concluded by Lloyd-Smith et al. (2020) and Stangen et al. (2015). HSs start with their HL as their L1, and therefore, phonology acquisition of their HL/L1 is strongly developed from childhood, which makes HSs fundamentally different and at an advantage from L2 speakers in phonological acquisition. By the time they are exposed to the majority language (usually around the age of 6, when they start going to school), HSs have specialized their perceptual abilities in their HL/L1, and therefore, are at an advantage in producing foreign-accent free speech. Additional accent perception studies (e.g., Flores & Rato, 2016; Rato et al., 2015) as well as acoustic measures studies (e.g., Kim, 2015; Rao, 2015) agree with the advantage of early exposure to a language for developing foreign-accent free speech.

Even though early exposure to the HL is an important factor, one should also consider the type and quantity of input HSs were exposed to during childhood (as

determined by the type of family: both parents NSs of the minority language or mixed families) as an important predictor. Most of the studies that found HSs to be more foreign accented included HSs from mixed families that used the one-parent-one-language method daily (Kupisch, Barton, et al., 2014; Kupisch et al., 2021; Kupisch, Lein, et al., 2014; Lein et al., 2016), and most of the studies that found HSs to be more native accented had HSs with parents who were both monolingual first-generation migrants (Flores & Rato, 2016; Knightly et al., 2003; Rato et al., 2015; Stangen et al., 2015). Therefore, while we did not ask specifically about the type of families from which our HSs came (mixed or monolingual), this may be another determining variable to HSs being perceived as more foreign accented in their HL.

5.3.2 Confidence Ratings

As we saw in the results section *5.2.2 Confidence Ratings*, to our knowledge, only two similar studies (Kupisch, Barton, et al., 2014; and Lloyd-Smith et al., 2020) used confidence ratings to measure judges' certainty of their accent-perception evaluation. The expectation of the current study, that judges would be less confident when judging both groups of HSs (regardless of their judgement being foreign or native accent), was not fulfilled. This is contrary to Kupisch, Barton, et al. (2014) and Lloyd-Smith et al. (2020), who found a slight but significant difference in levels of certainty for HSs, compared to those of NSs and L2s, in their HL, meaning judges were more uncertain when judging HSs in their HLs. Additionally, Kupisch, Barton, et al. (2014) had a third element in their experiment: the option for the raters to revise their judgement. They found that raters

revised their judgement more often for HSs, thus confirming their results that it is more difficult to determine the accent of HSs in their HL.

Though my results showed an overall high confidence rating, judges were particularly and only significantly stronger in their confidence for L2s. Even though no significant difference was found in confidence ratings within the two HSs and the two NS groups, the confidence ratings for HSs were still significantly different and lower than for those of L2s.

While the results for the current study do not confirm that raters have less confidence about their ratings when judging HSs, we are able to confirm that raters do make a more decisive judgement about a stronger foreign accent than when the perceived accent is on the middle and lower range of the scale. We can conclude that what makes the judges very confident about their ratings is when the speakers have a clear and distinctive foreign accent, as in the case of the L2s.

5.3.3 Other Factors

Given that the different studies presented here counted different sociolinguistic factors that determined or influenced the perception of their HSs' accent, it remains unclear what accounts for the high variability in their perceived foreign accent, and ultimately, what accounts for an apparent *heritage accent*. However, this also confirms the main characteristic of HSs as being highly variable and bolsters the need to consider accentedness as a continuum, just as we do with bilingualism, rather than a binary classification of native and non-native. In addition, it is important to look beyond linguistic features and into sociodemographic and affective characteristics (such as those

described in the BLP), and to look for a combination of factors rather than only using accent-perception experiments or solely acoustic measures.

Regarding language use (taken from the results of the BLP section 4, see Appendix D) as a possible predicting factor for a perceived foreign-accent free speech in HSs, this research concluded that, overall, the more the language was used, the less foreign accented the speaker is perceived in that language. This is similar to Lloyd-Smith et al. (2020), who found that Italian HSs' language use was strongly correlated to their perceived naiveness in their HL, to Kupisch, Barton, et al. (2014), who revealed similar results for a French-German and Italian-German combination, and to Kupisch et al. (2020) who found similar results for Turkish HSs. However, when conducting a separate correlational analysis in our research with only the HS groups, we found that it is not the case for only the HSs; that is, accent perception has a weak correlation with language use for both HSs only (the weakest of all the subcategories of the BLP, see Table 7). Additionally, we could deepen the analysis and study the influence of HL use with family on perceived foreign accent, as taken from question 8a of the BLP (see Appendix D). However, this factor showed to have a weak correlation as well.

The last module of the BLP, attitude, gives more insight into what a determining or influencing factor could be for a perceived foreign accent in HSs. When analyzing a possible correlation between the five questions of section 5 of the BLP, *Attitude*, we find a moderate negative correlation between accent perception and the importance of using Spanish as a native speaker (question 18a, $p = -.50$), as well as with wanting others to think of oneself as a native speaker of Spanish (question 19a, $p = -.46$). Therefore, even though attitude as a general factor is not strongly correlated to accent perception of HSs,

individual questions shed more light on possible correlations. The more HSs consider it important to use their HL as a native speaker, the less foreign accent they might be perceived to have, and the more they want others to think that they are a native speaker of Spanish, the less foreign accent they might be perceived to have.

In terms of gender differences as a possible predicting factor for accent perception, we found interesting results. No difference in accent rating was found in 1LNSs, A-HSs, E-HSs, and L2s. The only group that showed a statistical difference between male and female participants was the 2LNSs. Even though Knightly et al. (2003), Oh et al. (2003), and Rato et al. (2015) reported the amount of male and female speakers for their speech samples, they did not report any results that concerned gender as a variable. When checking for BLP results as possible reasons in our research for this difference in average ratings or for statistical outliers, we did not find anything particular or outstanding. Therefore, and given that gender was not a specific research question in our study, more research would be needed to draw any conclusions about gender differences in perceived accent.

5.4 Summary

Now we pose the question of the importance of all these findings and their similarities and differences with previous research. We had asked at the beginning of this research if HSs were perceived as foreign-accent free in their HL, as well as if 2LNs, as a proposed new control group, were perceived as foreign-accent free in their L1, which is believed to be influenced by a language contact situation due to their extended length of residence in a country where the majority language is not their L1. Additionally, we had

asked if language proficiency and level of bilingualism were predicting factors of a perceived foreign accent. We found that, even though HSs were rated low to mid on the scale of perceived foreign accent in their HL, the factors that we proposed were not predictors of a foreign accent in HSs, though they were for the control groups.

Besides language proficiency and level of bilingualism, as posed in the RQs, other sociolinguistic and affective factors were discussed here, such as AoO of the majority language, language use, the importance of being perceived as NSs of Spanish, and only the affective factors seemed to have a significant influence on accent perception for HSs. Thus, we conclude that more background information (such as additional sociolinguistic, sociodemographic, affective, or phonological predicting factors) is needed for HSs to be able to have more defining answers. It seems that the sociolinguistic and sociodemographic factors that lead to a perceived foreign accent in general are more complex in HSs; therefore, a larger number of HSs might be required to tease these out.

Even though no significant difference was found between 1LNSs and 2LNSs in their perceived accent, we still suggest conducting further research with these two groups of NSs as control groups, given that only a few previous studies have included the two groups, and given that 2LNSs are the source of input for HSs and do speak a contact variety of Spanish, which is different from monolingual speakers. Additionally, including the two groups of NSs strengthens one of the main purposes of conducting this research as well as the trend in HL education of not classifying HSs as native vs. non-native but rather on a continuum of bilingualism. Ultimately, these results can help us in research, in HL teaching, and in SLA, among other disciplines within linguistics, to shed more light on accentedness in the L1, L2, and HL.

The next and last chapter presents the conclusions drawn from this research, which include pedagogical implications of our findings, as well as other considerations regarding HL studies and future directions of research.

CHAPTER 6

CONCLUSION

This last chapter presents the conclusions of this study. It first provides a summary and general conclusion of the study. Then it poses some pedagogical implications based on the results, and other considerations for heritage language studies in general. Finally, it discusses future directions and recommended studies that can follow up this research.

6.1 General Conclusions

The present study focused on the perception of foreign accent in the speech of heritage speakers of Spanish who are more linguistically dominant in English. Previous studies regarding accent perception in the speech of HSs of different languages, including Spanish, showed that they are perceived to have a more native-like accent in their heritage language when compared to L2 speakers, while others posit that HSs' accent in their HL is more foreign-like than that of their majority language. In order to fully understand how the accent of HSs of Spanish is perceived, and to a lesser extent, what sociolinguistic aspects are predicting factors for the detection of a foreign accent in the HL, the present study conducted an accent-perception quasi-experiment with native listeners evaluating the speech of five groups of Spanish speakers: monolingual native speakers (1LNSs), bilingual native speakers (2LNSs), advanced heritage speakers (A-HSs), elementary heritage speakers (E-HSs), and typical late second-language learners (L2s).

The current study can be summarized as answering two questions: Do HSs of Spanish have a perceived foreign accent in their HL? What are the predicting factors for such an evaluation? In response to the first general question, the results revealed that HSs are perceived to have a relatively low to mid foreign accent on the foreign-accent scale (closer to NSs than to L2s). This helps us conclude that HSs' accent ought not to be classified binarily (native vs. foreign) but rather using a continuum. Heritage speakers do not have completely accent-free speech, but at the same time, they are far more native-like than the L2s, who, in turn, are perceived with a relatively strong foreign accent. This continuum should also be used in other aspects of language, and even for the description of this particular group of speakers, and not only for accent perception. In turn, this will allow for a better understanding of the heterogeneity of heritage speakers and their linguistic characteristics.

In the sociocultural context of Houston, where the HSs sampled for this study were taken, with a high population of Spanish speakers, the results can also mean that region of residence can be an influencing factor for the perceived accent of the speech of HSs. In other words, it is possible that the speech of HSs in this study has been influenced by living in a city or region where speakers have constant access to their HL in the widespread community (beyond the circle of family) and have language input from a variety of NSs.

Regarding the possible sociolinguistic predicting factors that determine a perceived foreign accent in HSs, we posed that proficiency and level of bilingualism could be strong predictors. Based on the results, we conclude that they did not play a determining role, as initially hypothesized; however, we suggest further studies,

especially involving a larger population of HSs, that might allow stronger conclusions to be made. Thus, for the field of heritage language education, and particularly for research concerning heritage speakers and their accent, we suggest taking into account, in addition to more speakers, more linguistic, sociodemographic, and affective factors, such as family type (monolingual or mixed) and anxiety level when speaking their HL.

Additionally, this study proposed an advance in the methodology of foreign accent perception in the speech of heritage speakers in two particular aspects: (1) the inclusion of late bilingual native speakers (2LNSs) as an additional control group; and (2) the use of a continuum rather than a binary scale for the assessment of foreign accent perception. Rothman et al. (2022) discuss the problem of using monolingual comparative normativity in studies on bilingualism, including those of HSs. They argue that using monolinguals as the main and only control group "has historically contributed to inequalities in many facets of bilingualism research and continues to impede progress on multiple levels" (p. 1). Thus, their recommendation is to compare HSs with other types of bilinguals, as this research has done it by using 2LNSs.

This, in turn, will allow us to confirm what some scholars have been discussing: the possibility of a *heritage accent*. This concept was originally proposed by Benmamoun et al. (2010) as an accent different than a native or foreign accent, not only in subjective global accent perceptions but also in phonetic and phonological production and perception measurements. This proposal has, since then, continued to be supported by scholars in the field of heritage language phonetics and phonology (Boomershine & Ronquest, 2019; Flores & Rato, 2016; Kupisch et al., 2021; Rao, 2015, 2018; Ronquest & Rao, 2018; among others). Therefore, this study contributes, in a scientific and

methodological way, to the legitimacy of a *heritage accent*. The full acceptance and adoption of terminology in heritage language education and in linguistics in general is very important and much needed, as we have been able to reach more and more of a consensus (in the field of heritage language studies) that heritage speakers are a group of their own and have their own variety of Spanish.

6.2 Pedagogical Implications

There are many pedagogical implications of this study, particularly focusing on direct phonetic and pronunciation instruction in the heritage language classroom, that we could explore. However, the focus of this section is on philosophical and psychological/socio-affective areas of language learning, more specifically, the affective domain, which deals with emotions and feelings, which, in turn, are linked to cognitive (linguistic) development.

One factor of the affective domain that the results of this study can be linked with is self-esteem. Because heritage speakers tend to be majority-language dominant, there is a tendency for them to disapprove of themselves for not being able to communicate as effectively in their HL as compared to their parents or monolingual native-speaker relatives. A preliminary study was conducted by Rhone (2021), where she surveyed 41 HSs students with the BLP to find out their attitude towards their own Spanish accent and the results showed that HSs do indeed want to be perceived as foreign-accent free and want to attain a native-like pronunciation in their HL. This is also confirmed by the results of the current study, where HSs indicated in their BLP answers that they do want others to think that they are native speakers of Spanish, and that they even value their

own use of Spanish as a native speaker. However, regardless of their own attitude, SLA studies have long confirmed that foreign accent speech engenders diminished acceptability and negative evaluations from native speakers (Flege, 1988), which in turn is confirmed when anecdotally speaking with them as a HL teacher: we find out that they feel put down by native speakers because of their errors, mispronunciations, code-switching, and other characteristics of speech that are more present in a language contact situation. To help improve their self-esteem and their confidence when speaking their HL, one can also take advantage of their low anxiety levels when speaking their HL (Rhone, 2021).

By confirming that HSs are perceived with a slight foreign accent, still far from that of L2 speakers, as HL teachers, we could incorporate dialogues and classroom activities that help HSs address their feelings. For example, the first day of classes one could ask the students what made them select Spanish, which their answer as HSs tends to be that it is because they want to improve their Spanish, and when asking deeper into this question, one finds out that many times it is because they feel judged or criticized that their Spanish is not so good or that they do not feel confident in their abilities to express themselves in Spanish. By listening to their feelings towards their heritage language, as teachers we can then maximize this openness and reassure them that the classroom is a judgement-free zone to strengthen the uniqueness of being a heritage speaker. Additionally, as teachers we should make sure we do not constantly compare their speech, vocabulary, language choices, etc., to that of native speakers. From the definition of *foreign accent* (see section 3.4 *Foreign Accent in Heritage Speakers*), we see that it is a global perception and not any feature of language that makes a person have

an accent. Thus, as teachers we could focus on improving intelligibility and comprehensibility more than on the accent itself.

Additionally, important pedagogical implications that results from the findings of this study deal with identity. From the results of the BLP, we also see that HSs identify themselves with Spanish-speaking culture but feel more like themselves when speaking English than when speaking Spanish. Therefore, this difference also strengthens the social consequence for Hispanics in the United States to feel *ni de aquí ni de allá* (from neither here nor there). To help them in their quest for linguistic identity, avoiding comparing them with native speakers or with 'correct Spanish' is a very important practice for the HL classroom. Instead, it is recommended that teachers address the differences in each student's variety of Spanish and allow them to embrace that variety, or *heritage Spanish*, by teaching strategies for negotiating diversity (Carreira, 2021).

Regarding HL instructors themselves, we emphasize the need for approaching Spanish in the United States as a contact language, which has also been suggested by Carreira (2021). This implies that instruction in the HL classroom should also include language learning strategies for negotiation and communication in a language contact situation. Thus, we do not recommend teachers to try to reach a less foreign (or more native) accent in their students by teaching pronunciation directly or by preventing their students from code-switching or code-mixing, but rather to empower their reality of Spanish as a language contact, with its possible strengths and weaknesses.

6.3 Other Considerations in Heritage Language Studies

The main consideration and recommendation that we bring from this study into the field of heritage language studies is the need for a more widespread understanding of and philosophy shift away from the idea that the only native speaker is a monolingual person. It is becoming more and more normal, though maybe not normalized in the United States, to grow up bilingual. Sadly, the concept of language dominance still remains binary, where a person may only be either a native speaker—which entails monolingualism and becomes the linguistic norm—or a second language learner/speaker—which implies, among many other things, a foreign accent (Grosjean, 2008; Montrul, 2013b). Instead, this study contributes to strengthening the field of heritage language studies in the understanding that a person can be a bilingual native speaker (as proposed by Montrul, 2013b) and have a native-like accent in one of his/her L1s and near-native-like accent in the other L1. Therefore, concepts like native speaker, bilingual user, and second-language learner/speaker need to be reconsidered in order to make space for non-binary classification that includes heritage speakers.

Additionally, terminology for heritage speakers needs to be unified, where studies and scholars of the heritage language field as well as of the SLA field stop calling heritage speakers *unbalanced bilinguals* or claiming that their heritage language is the weak language (Kagan & Dillon, 2012), but rather accept and normalize the term *heritage speaker*, with its implications, including a *heritage accent*. Similar to how the term *bilingual* has been proposed to not be limited to speakers who have mastered two or more languages to the native level (Grosjean, 1997), a heritage speaker should also be considered as a bilingual individual who acquired their HL from birth in the context of

their family and community speaking a minority language (as seen in section *3.2 Heritage Speaker*), who therefore might have multiple linguistic competences and different levels in both languages (de Bot & Bülow, 2021).

A lot of the research on bilingualism is from the field of SLA, with a strong perspective of English L2, which focuses on the shortcomings and difficulties, in all linguistic areas, of learning English (ESL or TESOL). To a lesser extent, bilingualism is approached from the perspective of L1 English speakers learning a foreign language, which focuses on praising or emphasizing the L2 skills acquired by these late bilinguals. However, when it comes to heritage speakers, the trend has been to focus on their attrition, on their incomplete acquisition, and what aspects of their HL differ from the native norm, based on their HL being a minority language, and on the disadvantages of the way their HL was acquired. However, much of the same characteristics of incomplete acquisition or not reaching the native norm is overlooked when typical late L2 learners (L1 English speakers) are learning an L2.

Another characteristic of heritage speakers that has been wrongly attributed to this group only is that since they have limited access to printed language and written and formal registers, by being children of immigrant families, their written skills are weaker than their oral skills, and their formal academic domain is weaker than their familiar domain (Montrul & Ionin, 2012). However, this also happens with children in monolingual countries from lower socioeconomic statuses that also do not have much access to written and formal registers. Their reading comprehension and formal register, for instance, though monolingual and being schooled in the native language, is not at the

optimal level. Therefore, a narrow dominion of registers and skills is not strictly limited to heritage speakers.

6.4 Limitations and Future Directions

As the focus of this study was to investigate the level of perceived foreign accent in the speech of heritage speakers of Spanish, we first emphasize the importance of evaluating accent with a continuum scale of accent rather than as a binary form of native vs. non-native. Thus, based on the results of this study on accent perception in the speech of HSs, and with this understanding of continuum, we propose the following recommendations for future directions.

Concerning aspects to improve our current study, we recommend adding more HSs to the instrument, as we have seen that this group of speakers is highly varied in characteristics, and therefore, in results. Having more HSs in the study would allow for stronger conclusions and more defining influencing factors that lead to a perceived accent. However, the proportion of native controls needs to be carefully analyzed and decided based on previous research. Flege and Fletcher (1992) and Schmid and Hopp (2014) found that the proportion of native controls and the bilingual/heritage speakers to monolingual ratio does influence relative foreign accent ratings. Additionally, they found that including or excluding strong accented speakers (L2s) affects the ratings as well; specifically, reducing the size of NSs resulted in more native-like ratings for L2s. Therefore, we suggest using more HSs, but performing a deeper analysis of what the ratio of HSs and control groups would be.

Regarding methodological variation, we suggest conducting further studies that have variation in the instrument, the languages tested, the speakers, and the judges. These changes are proposed with the expectation that more varied analysis will help defining more precisely the predicting factors that lead to the perceived accent of the speech of heritage speakers. As per the instrument used, possible alternatives would be to include an additional question: "Where do you think this person is from?" This way, it could give us more insight into whether accent variation is connected to the person being a heritage speaker by not living in a monolingual country. Another variation to the instrument we could include is adding pictures of the speakers to the speech samples of HSs and L2s to see if such images would alter perceived accents, given that, anecdotally, we can all agree that if we were to take one of the L2s (which, in this study, were highly proficient, and thus, comprehensibility was already confirmed) and ask a random monolingual NS by looking at the person how their Spanish is, they would most probably say something like "their Spanish is very good," based on the fact that it is their L2 and that they have made an effort to learn it, regardless of having a strong foreign accent. On the other hand, if we were to ask the same NS how the Spanish of one of the HSs in this study is by looking at them, we would most probably have a completely different answer; it would not be that their Spanish is very good but rather something like "they speak like a *pocho[8]*," because by ethnicity and race they are expected to speak like native speakers.

Another aspect of the instrument that could be revised is the wording of the question that elicits the judgement from the raters. Schmid and Hopp (2014) show that by asking the judges in two different ways ('*Does this person have ___[language]___ as*

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[8] *Pocho* is a pejorative slang in Spanish to refer to Mexican Americans or Mexican emigrants, especially when they speak broken Spanish or Spanglish.

his/her native language?' vs. '*Does this person have a foreign accent?*'), the absolute

results of foreign accent ratings varied; that is, if asked with the native standard, the

ratings are a certain way, and if asked with the foreign accent standard, the results are

more native-like.

Considering the languages tested, the current study focused on the heritage

language exclusively, which gives us insight into the degree of accentedness in one

language only (following the line of Flores & Rato, 2016; Kupisch, Lein, et al., 2014;

Rato et al., 2015; among others). Other studies, however, tested both languages of the

heritage speaker and obtained insight into the degree of accentedness of the heritage

language as compared to the majority language (Hopp & Schmid, 2013; Kupisch, Barton,

et al., 2014; Kupisch et al., 2021; Kupisch et al., 2020; Lein et al., 2016; Lloyd-Smith et

al., 2020; Stangen et al., 2015). Interestingly, their results mainly reported that HSs

sounded more foreign-like in their HL as compared to the majority language. Thus, their

results indicated not fully a foreign accent for HSs but rather *more* foreign in one

language than in the other. Therefore, we suggest conducting more research that studies

both languages of the bilingual/heritage speaker, given that one of the main

characteristics of their heritage language is that it is in a language contact situation, and

thus, is not isolated, as in the case of the language of monolingual speakers.

We also suggest additional research focusing on bilingual native speakers of

Spanish (2LNSs). Even though both monolingual and bilingual native speakers of

Spanish were equally perceived as foreign-accent free in this study, several other studies

of 2LNSs concluded that native speakers are sometimes perceived with some degree of

foreign accent after a prolonged post-emigration period (De Leeuw et al., 2010; Hopp &

Schmid, 2013, among others). Therefore, we propose additional research comparing the

L1 of 2LNSs using a larger population to be able to confirm the proposition of using a

more appropriate native norm to compare heritage speakers to late bilinguals–their

parents–and not to monolingual native speakers.

Another controversy in accent perception studies is the type of raters used: naïve

vs. expert. This can also be another variable to consider in further research, inspired by

Kupisch, Barton, et al. (2014), who used both naïve and expert judges, De Leeuw et al.

(2010), Flores and Rato (2016), or Marecka et al. (2015), and who all used expert judges

with linguistics training. Additionally, further research can be conducted using 2LNSs

judges. Variations can include asking them where they think the speaker is from, with the

question of confidence rating, to see if they are able to identify HSs, given that 2LNSs are

more exposed to HL and language contact speech daily. Kang et al. (2016), Munro and

Mann (2005), and Toivola and Ullakonoja (2017), among others, concluded that there is a

difference in foreign accent ratings depending on the type of judges used (monolingual or

bilingual).

In addition to these methodological suggestions for further studies, we propose

conducting additional analyses to strengthen the results of perceived accent judgments.

There are two ways to analyze accent: global perception and acoustic analysis. The global

accent rating provides an overall judgement of whether a speaker has a perceived foreign

accent; however, since this evaluation is based on perception, it is more subjective, as

raters use their overall judgement to report their answers and not a particular phonetic or

phonological feature (Stangen et al., 2015). On the other hand, acoustic analysis studies

(of production and perception) allow for a more objective measurement of particular

sounds or sound features that could potentially contribute to a *heritage accent* (Ronquest & Rao, 2018). Previous studies on accent perception of the speech of heritage speakers paired their overall accent ratings with production and perception acoustic analyses. Abrahamsson and Hyltenstam (2009) performed a second experiment in addition to one on perceived foreign accent, with 10 tasks to measure linguistic knowledge and processing abilities such as speech production, speech perception, morphosyntax, and formulaic language. Of the 10 tasks, HSs received the highest scores of participants within the NS range in VOT production and VOT categorical perception. These two tasks also had the highest statistical difference between HSs (AoO 1-11) and L2s (AoO 13-19). Au et al. (2002) also conducted additional analyses to pair with their accent perception findings and concluded in their phonological assessment that passive HSs (overhearers) were virtually native-like in acoustic analyses. Thus, an additional study could be conducted with an objective measurement, such as acoustic analysis, using the same stimuli collected to see if a correlation can be made with any particular acoustic measurements and perceived foreign accent.

One last recommendation as a follow up on this study is to compare the perceived accent of HSs with returnees (HSs that have decided to move to a country where the HL is the dominant language), be it for study or professional purposes. In this regard, comparisons can be done using length of stay in the country to which one returned as an independent variable, which was done in the study conducted by Flores and Rato (2016).

Overall, these suggestions for further research are presented to continue strengthening the premise of heritage speakers as part of a continuum of bilingualism and the existence of a *heritage accent*, as suggested by Ronquest and Rao (2018). In

conclusion, as has been previously described, even though research on the perception of foreign accent in the speech of heritage speakers has been more prone to considering heritage speech as a variety or dialect in and of itself, there are still many who use a binary classification, particularly in the field of phonetics and phonology, and even more specifically, in accent perception. It is our hope that this study motivates more researchers to accept, use, and promote the premise that heritage speakers are not weak in their HL, unbalanced bilinguals, or attriters, but rather belong somewhere on the continuum of bilingual speakers and have a classification of their own.

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APPENDIX A

INTERVIEW SCRIPT TO SPEAKERS

Duration: 10-15 minutes

Hola, ¿cómo estás? ¿qué tal la semana?

Bueno, vamos a comenzar.

Estoy haciendo un <u>estudio</u> sobre las <u>costumbres actuales y pasadas de los habitantes de</u> <u>Houston</u>, y queremos que hables normalmente, como hablas en la casa.

(Free conversation)

- *Cuéntame un poquito sobre ti: tu nombre, qué estudias (o a qué te dedicas), de dónde eres, dónde creciste y sobre tu familia. ¿De dónde son tus papás (y tus abuelos)?*

<u>Narratives</u>

- *Cuéntame sobre el susto más grande que hayas tenido / el viaje más interesante que hayas hecho.*

<u>Memories and celebrations</u>

- *¿Celebras tu cumpleaños? ¿Te lo celebraban cuando eras niño(a)? Cuéntame sobre una fiesta de cumpleaños que recuerdas.*

<u>Telling instructions</u>

- *¿Cuál es tu postre/bebida favorita? Comparte la receta.*

INSTRUCTIONS FOR THE ACCENT-PERCEPTION QUASI-EXPERIMENT

USING PRAAT

Esta es una práctica.

Escuche a cada persona y conteste si suena con acento extranjero.

1 = SIN acento extranjero.
2 = Acento extranjero MUY LEVE.
3 = Acento extranjero LEVE.
4 = Acento extranjero NOTABLE.
5 = Acento extranjero MUY NOTABLE.
6 = MUCHÍSIMO acento extranjero.

Primero va a escuchar el audio y luego van a aparecer las preguntas.

Haga clic para comenzar.

1 / 6

¿Suena con acento extranjero?

1 = SIN acento extranjero.   2 = MUY LEVE.   3 = LEVE.
4 = NOTABLE.   5 = MUY NOTABLE.   6 = MUCHÍSIMO acento extranjero.

| 1 | 2 | 3 | 4 | 5 | 6 |

¿Qué tan seguro está de su respuesta?

| Nada seguro | No tan seguro | Más o menos seguro | Bastante seguro | Totalmente seguro |

QUESTIONS FOR THE ACCENT-PERCEPTION QUASI-EXPERIMENT USING

PRAAT

EXPERIMENTO 1

Escuche a cada persona y conteste si suena con acento extranjero.

1 = SIN acento extranjero.
2 = Acento extranjero MUY LEVE.
3 = Acento extranjero LEVE.
4 = Acento extranjero NOTABLE.
5 = Acento extranjero MUY NOTABLE.
6 = MUCHÍSIMO acento extranjero.

Primero va a escuchar el audio y luego van a aparecer las preguntas.

Haga clic para comenzar.

---

2 / 50

¿Suena con acento extranjero?

1 = SIN acento extranjero.   2 = MUY LEVE.   3 = LEVE.
4 = NOTABLE.   5 = MUY NOTABLE.   6 = MUCHÍSIMO acento extranjero.

| 1 | 2 | 3 | 4 | 5 | 6 |

¿Qué tan seguro está de su respuesta?

| Nada seguro | No tan seguro | Más o menos seguro | Bastante seguro | Totalmente seguro |

SOCIODEMOGRAPHIC AND LANGUAGE PROFILE QUESTIONNAIRE

El presente cuestionario es un instrumento básico para recopilar información sobre el perfil, la historia, los usos, las actitudes y la competencia del español, para fines de una investigación de clase. A partir de esta información y gracias a su colaboración anónima se podrán delimitar las variables del estudio. Este cuestionario fue adaptado del Bilingual Language Profile[9] del COERLL de la Universidad de Texas en Austin. El cuestionario consta de 20 preguntas y toma no más de 10 minutos completarlo. No es un examen, por lo que no hay respuestas correctas e incorrectas.

Le agradezco que conteste a cada pregunta con sinceridad. El valor, interés y utilidad del estudio quedan condicionados por la veracidad de la información recogida en este cuestionario. Por ello, le agradezco su opinión y su tiempo. El investigador se compromete a enviarle, si es de su interés y así lo solicita, un resumen de los resultados del estudio.

La información proporcionada es confidencial. Los datos serán codificados de manera que no se pueda reconocer la identidad de los participantes.

Muchas gracias por su colaboración,

Sendy Monárrez | Spanish Instructor
Graduate Teaching Assistant
University of Houston
Department of Hispanic Studies
College of Liberal Arts and Social Sciences

sendymonarrez@gmail.com

Correo electrónico: _____

I. Información biográfica
Iniciales (de su nombre y apellido): _____   Edad: _____
Sexo: __ Masculino   __ Femenino   __ Otro o no binario

Lugar de nacimiento: (ciudad, estado, país): _____
Lugar de residencia actual: (ciudad, estado, país): _____
Años viviendo en Estados Unidos (NA si no aplica): _____
Lugar de nacimiento de los padres: (ciudad, país): _____
Lugar de nacimiento de los abuelos: (ciudad, país): _____
Profesión de los padres: _____
Educación de los padres: _____

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[9] Birdsong, D., Gertken, L.M., & Amengual, M. (2012). *Bilingual Language Profile: An Easy-to-Use Instrument to Assess Bilingualism.* COERLL, University of Texas at Austin. Web. 20 Jan. 2012

II. Historial de la lengua
Esta sección incluye algunas preguntas sobre su historial lingüístico. Favor de responder seleccionando la respuesta más apropiada para cada pregunta.
1. ¿A qué edad **empezó** a aprender:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

2. ¿A qué edad **empezó a sentirse cómodo** usando:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

3. ¿Cuántos años de **clases (gramática, historia, matemáticas, etc.)** ha tenido (desde la escuela primara hasta la universidad) en:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

4. ¿Cuántos años ha pasado en **un país/una región** donde se habla:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

5. ¿Cuántos años ha pasado en **familia** hablando:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

6. ¿Cuántos años ha pasado en un ambiente de **trabajo** donde se habla:
español?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

inglés?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

III. Uso de la lengua
Esta sección incluye algunas preguntas sobre su uso de la lengua. Favor de responder seleccionando la respuesta más apropiada para cada pregunta. El total de los dos idiomas debe resultar en 100% para cada pregunta.
7. En una semana normal, ¿qué porcentaje de tiempo usa los siguientes idiomas **con sus**

amigos? (El total de los dos idiomas debe resultar en 100%)

español	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA
inglés	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA

8. En una semana normal, ¿qué porcentaje de tiempo usa los siguientes idiomas **con su familia**? (El total de los dos idiomas debe resultar en 100%)

español	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA
inglés	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA

9. En una semana normal, ¿qué porcentaje de tiempo usa los siguientes idiomas **en su trabajo/escuela**? (El total de los dos idiomas debe resultar en 100%)

español	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA
inglés	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA

10. Cuando se habla a usted mismo, ¿con qué frecuencia **se habla a sí mismo** en los siguientes idiomas? (El total de los dos idiomas debe resultar en 100%)

español	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA
inglés	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA

11. Cuando hace cálculos contando, ¿con qué frecuencia **cuenta** en los siguientes idiomas? (El total de los dos idiomas debe resultar en 100%)

español	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA
inglés	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	NA

IV. Competencia de la lengua
Esta sección incluye algunas preguntas sobre su competencia lingüística. Favor de responder seleccionando la respuesta más apropiada para cada pregunta.

	0 = nada bien						6 = muy bien
12. ¿Cómo habla en **español**?	0	1	2	3	4	5	6
¿Cómo habla en **inglés**?	0	1	2	3	4	5	6
13. ¿Cómo entiende en **español**?	0	1	2	3	4	5	6
¿Cómo entiende en **inglés**?	0	1	2	3	4	5	6
14. ¿Cómo lee en **español**?	0	1	2	3	4	5	6
¿Cómo lee en **inglés**?	0	1	2	3	4	5	6
15. ¿Cómo escribe en **español**?	0	1	2	3	4	5	6
¿Cómo escribe en **inglés**?	0	1	2	3	4	5	6

V. Actitudes
Esta sección incluye algunas preguntas sobre tus actitudes lingüísticas. Favor de responder seleccionando la respuesta más apropiada para cada pregunta.

	0 = desacuerdo						6 = acuerdo
16. Me siento "yo mismo" cuando hablo en **español**.	0	1	2	3	4	5	6
Me siento "yo mismo" cuando hablo en **inglés**.	0	1	2	3	4	5	6
17. Me identifico con la **cultura hispanohablante**.	0	1	2	3	4	5	6

Me identifico con la **cultura anglohablante**.	0	1	2	3	4	5	6
18. Es importante para mí **usar (o llegar a usar) español** como un hablante nativo.	0	1	2	3	4	5	6
Es importante para mí **usar (o llegar a usar) inglés** como un hablante nativo.	0	1	2	3	4	5	6
19. Quiero **que los demás piensen** que soy un hablante nativo de **español**.	0	1	2	3	4	5	6
Quiero **que los demás piensen** que soy un hablante nativo de **inglés**.	0	1	2	3	4	5	6
20. Me siento ansioso cuando hablo en **español**.	0	1	2	3	4	5	6
Me siento ansioso cuando hablo en **inglés**.	0	1	2	3	4	5	6

APPENDIX E

SOCIODEMOGRAPHIC QUESTIONNAIRE TO THE JUDGES

Título de la investigación: Percepción del acento extranjero en hablantes de español de herencia

Investigador: Sendy Monárrez. Este Proyecto forma parte de una tesis doctoral que se realiza bajo la supervisión de la Dra. Elizabeth Goodin-Mayeda.

La participación en este estudio no implica ningún riesgo significativo. No habrá ninguna compensación por su participación, pero se le agradece de antemano su apoyo en esta investigación.

La información proporcionada es confidencial. Los datos serán codificados de manera que no se pueda reconocer la identidad de los participantes.

Muchas gracias por su colaboración,

Sendy Monárrez | Spanish Instructor
Graduate Teaching Assistant
University of Houston
Department of Hispanic Studies
College of Liberal Arts and Social Sciences

spmonarr@cougarnet.uh.edu
Acepto participar en esta investigación: £ Sí £ No

Iniciales del nombre completo: ⎽⎽⎽⎽⎽⎽⎽⎽ Edad: ⎽⎽⎽⎽⎽⎽⎽
Sexo: ⎽⎽ Masculino ⎽⎽ Femenino

Lugar de nacimiento: (ciudad y estado): ⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽
Lugar de residencia actual: (ciudad y estado): ⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽
¿Cuántos años lleva viviendo ahí? ⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽

<u>¿Habla inglés?</u>
⎽⎽ Sí, como hablante nativo de inglés ⎽⎽ Sí, nivel profesional ⎽⎽ Más o menos
⎽⎽ Muy poco   ⎽⎽ Casi nada   ⎽⎽ No, para nada

<u>Nivel académico</u>
⎽⎽ Primaria   ⎽⎽ Secundaria   ⎽⎽ Preparatoria   ⎽⎽ Universidad   ⎽⎽ Postgrado

Profesión: ⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽⎽

APPENDIX F

MULTIPLE COMPARISONS

Dependent variable: Confidence rating

HSD Tukey

(I) Groups	(J) Groups	Difference in means (I-J)	Standard error	Sig.	95% Confidence interval Lower limit	Upper limit
1	2	-.02300	.04444	.985	-.1493	.1033
	3	.00100	.04444	1.000	-.1253	.1273
	4	-.06800	.04444	.549	-.1943	.0583
	5	-.30300*	.04444	.000	-.4293	-.1767
2	1	.02300	.04444	.985	-.1033	.1493
	3	.02400	.04444	.983	-.1023	.1503
	4	-.04500	.04444	.848	-.1713	.0813
	5	-.28000*	.04444	.000	-.4063	-.1537
3	1	-.00100	.04444	1.000	-.1273	.1253
	2	-.02400	.04444	.983	-.1503	.1023
	4	-.06900	.04444	.535	-.1953	.0573
	5	-.30400*	.04444	.000	-.4303	-.1777
4	1	.06800	.04444	.549	-.0583	.1943
	2	.04500	.04444	.848	-.0813	.1713
	3	.06900	.04444	.535	-.0573	.1953
	5	-.23500*	.04444	.000	-.3613	-.1087
5	1	.30300*	.04444	.000	.1767	.4293
	2	.28000*	.04444	.000	.1537	.4063
	3	.30400*	.04444	.000	.1777	.4303
	4	.23500*	.04444	.000	.1087	.3613