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A Voiced Labiodental Fricative [V] In El Paso Spanish

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A VOICED LABIODENTAL FRICATIVE [V]
IN EL PASO SPANISH

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A VOICED LABIODENTAL FRICATIVE [V]
IN EL PASO SPANISH

by

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CHAPTER ONE

INTRODUCTION

1.1 Purpose and Overview

Language contact happens around the world when speakers of different languages and countries interact with each other either sporadically or on a daily basis (Coronel-Molina & Samuelson, 2017). Sankoff (2001) points out that language contact is an intrinsically social event that has linguistic and cultural repercussions on speakers. These consequences have been documented, for instance, in the literature of linguistics about how the native language (L1) of speakers influences their second language (L2) at the syntactic and phonological levels (Bruhn de Garavito, 2003; Muñoz-Balsos & Salazar, 2016; Torres, 2003; Vásquez-Carranza, 2009). On the other hand, studies have argued that the L2 can also influence the L1 depending on a number of factors such as age of arrival, level of exposure, and length of residence in the L2 community (Amengual, 2011; Limerick, 2015; Marian & Kaushanskaya, 2007; Petersen, Thompsen, Guiberson, & Spencer, 2016). Also, research has revealed that speakers who show foreign linguistic characteristics in their L1 obtain a type of social prestige and positive linguistic evaluations from members of their society (Sima-Lozano & Hernández-Mendez, 2015; Valiente-Catter & Villari, 2016)

The findings of research on language contact yield interesting questions: Why does language contact influence both the native and the second language of speakers? Is language contact a dynamic process? How does this play out in El Paso, Texas, where English and Spanish coexist? All these questions are the pillars of this investigation.

In order to understand and describe the linguistic situation of El Paso, Texas, in terms of language contact, the present study will analyze the voiced labiodental fricative [v] as a variant of the Spanish phoneme /b/.

The following three types of factors will be analyzed: 1) linguistic factors: stress, position in word, and previous and following segments. 2) social factors: gender and participants' group. 3) the acoustic parameters of duration and relative intensity. I will explain each of these factors in chapter 3. The data will be acoustically and statistically analyzed to provide a detailed description of the variant of interest.

In standard Spanish, the labiodental fricative [v] is not present. However, Hualde (2014) reported [v] in Spanish as a result of a coarticulatory process called assimilation, causing a word such as *Afgano* (Afghan) to be pronounced as [avgano]. English, on the other hand, has a voiced labiodental fricative /v/ phoneme in its repertoire (Jogman, Wayland, and Wong, 1998). Both English and Spanish orthography have the graphemes and <v> but Spanish pronounces both as [b] or [β] depending on the phonetic context and regional variation, while English <v> is realized as [v] and as [b] (Hualde, 2014). This difference will be crucial for the current investigation and will be discussed in more detail in the Literature Review chapter.

The presence of the phoneme /v/ in English has been hypothesized to influence the Spanish sound system, causing [v] to appear as a variant of the phoneme /b/ (Takawaki, 2012; Trovato, 2012). Previous studies have explored the variant of interest and have attempted to explain it under the scope of language contact between English and Spanish. Most of them analyzed the presence of [v] in New Mexico and California Spanish. For instance, Takawaki (2012) and Torres Cacoullos and Ferreria (2000) studied the realization of [v] by New Mexico Spanish speakers of different proficiency levels in both English and Spanish. In general, the

authors found that speakers with higher proficiency in English produced more instances of [v]. This suggested an influence of English on Spanish. In California Spanish, Tim (1976) reported a higher rate of labiodental fricatives [v] among Chicano Spanish speakers in Los Angeles who have lived most of their adolescence in English speaking communities, while Stevens (2000) found [v] in the speech of Spanish as second language instructors who were influenced by English orthography. Trovato (2017) is the only study to date that has documented [v] in El Paso Spanish. In his study, Trovato (2017) concluded that El Paso speakers who have higher reading and writing skills in English produced more instances of [v] in Spanish.

Hypercorrection has been proposed by different authors as an alternative explanation for the presence of [v] in Spanish. For instance, Lope Blanch (1988) claimed that the labiodental fricative is present among the elite society of Mexico City in reading and emphatic situations. Also, Isbasescu (1968) suggested that Spanish [v] is the result of an artificial distinction between the graphemes and <v>. The results of the present study can help determine if [v] in El Paso Spanish is due to hypercorrection or influence from English.

The studies above will be discussed in detail in chapter 2 but, as noted earlier, literature about the labiodental fricative in the El Paso-Ciudad Juarez border region is limited. Also, practically all studies, except for Trovato (2017), lacked an acoustic analysis of the variant of interest. This is because most previous studies have relied on auditory and impressionistic judgments of [v] in careful speech (Stevens, 2000; Tim, 1976). Furthermore, the elicitation techniques of all previous studies have consisted on reading tasks that encourage the influence of orthography (Takawaki, 2012; Torres Cacoulllos & Ferreria, 2000). Only Trovato (2017) included an acoustic analysis and a picture-naming task, besides the reading task. However, the picture-naming activity elicited single and isolated words, while the elicitation technique of the

present study will include a story-telling task, eliciting a continuous and more casual speech style without the immediate influence of orthography. Therefore, such data will consist of more natural speech of El Paso Spanish speakers. With these changes, the acoustic analysis and the presence of [v] may exhibit a different behavior that has been previously reported, particularly in Trovato (2017). As a result, this present study will provide a more accurate characterization of El Paso speech.

My research will analyze the following three factors: 1) the linguistic factors of stress, position in word, and previous and following segments. 2) The social factors gender and participants' group. 3) The acoustic parameters of duration and relative intensity. The data will be acoustically and statistically analyzed to provide a detailed description of the variant of interest.

In the next section I will provide some demographic and linguistic information about El Paso. Also, I will discuss El Paso and Ciudad Juarez Spanish speakers' attitudes towards the standard and non-standard use of the graphemes and <v> in writing settings through social media such as Facebook. An analysis of their perceptions and evaluations will be useful to determine Spanish speakers' awareness of the alternation between and <v> in writing and may indicate whether there is a conscious awareness of the variation in speech.

1.2 Spanish in Texas

Spanish, after English, is the most common language spoken in the United States, and the interaction between those languages creates phenomena that need exploration (Lipski, 2008). Texas is the second largest state, after California, with a population 29% Hispanics in Texas and 69% Hispanics in El Paso (US Census Bureau, 2017). Several of those Hispanics use Spanish in

different environments. Figure 1.1 illustrates the percentage of Spanish use at home in El Paso, Texas

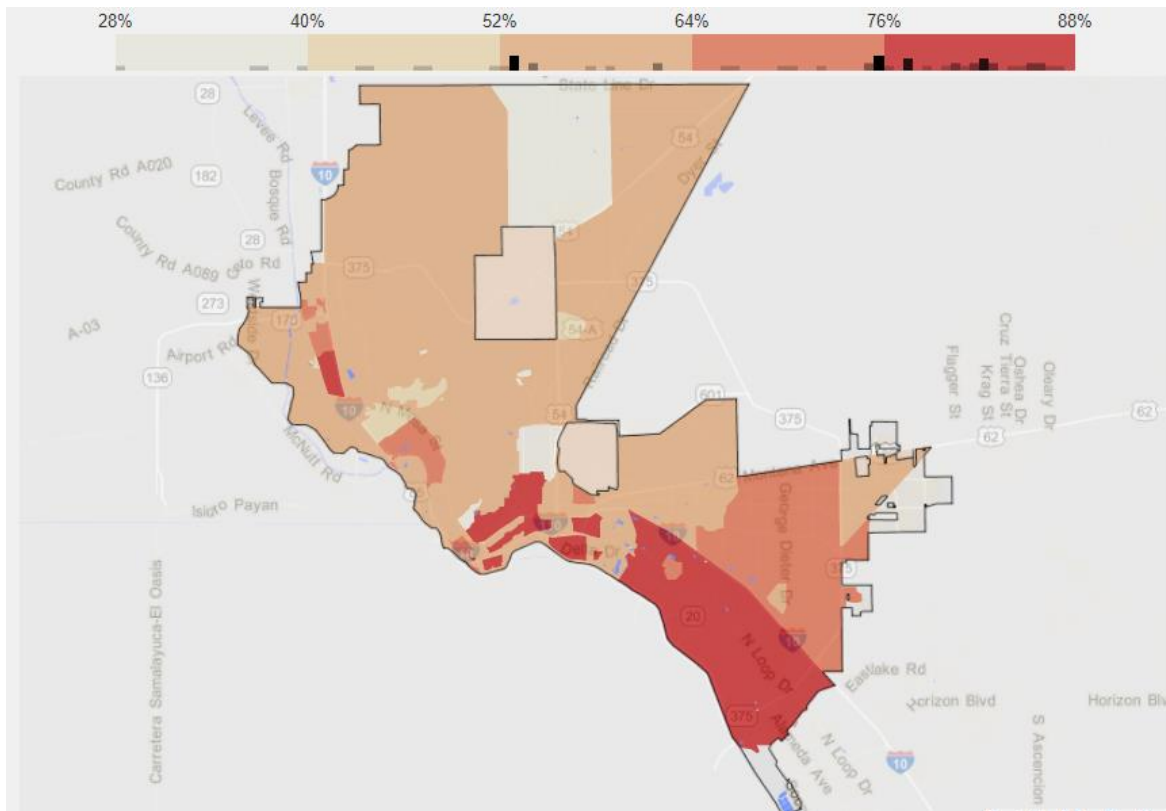


Figure 1.1 Percentage of respondents who use Spanish at home in El Paso, Texas (US Census Bureau, 2017).

The figure above shows a higher concentration of Spanish use near the border with Mexico. This helps us visualize the intense contact between English and Spanish in El Paso and the possible linguistic consequences on speakers.

1.3 Spanish Speakers's Awareness: vs. <v> in Social Media

As mentioned before, standard Spanish has only one phoneme that corresponds to both graphemes and <v>. In other words, there is no phonetic, much less a phonemic difference between the two graphemes mentioned above. However, misspellings on Facebook often provoke corrective comments. This suggests some awareness of the variation between and <v> at the orthographic level. Images in Figure 1.2 serve to document the perspective and opinions of Spanish speakers when they find orthographic discrepancies between and <v>. In almost all instances, Facebook users that misspell a word receive negative comments.





Figure 1.2 Social judgments against the non-standard orthography related to and <v> on Facebook.

The images above indicate that users consider orthographic confusion of and <v> as something negative. When the grapheme is used instead of <v>, Spanish speakers immediately correct the misspelling. This orthographic confusion is due to the fact that in Spanish the two graphemes and <v> represent the phoneme /b/ and since there is no difference in pronunciation people do not know which grapheme to use.

In the following chapter, I will introduce studies that have documented the influence of L2 on the L1 of speakers due to language contact. In addition, I will present an overview of the English and Spanish phonological systems which will be fundamental for the proper understanding of the labiodental fricative [v] as a variant of the Spanish phoneme /b/. I will present previous studies on [v] in Spanish. I will examine the two arguments that are often proposed to account for [v]; language contact and hypercorrection and will hopefully shed some light on the current discussion

CHAPTER TWO

LITERATURE REVIEW

This study argues that the voiced labiodental fricative [v] is present in El Paso Spanish as a result of the contact with English in the U.S.-Mexico border. Transfer of linguistic features from one language to another occurs as a result of linguistic and social interactions (Thomason, 2001). Much research has examined the influence of the native language (L1) on the second language (L2) (Muñoz-Balsols & Salazar, 2016; Vásquez-Carranza, 2009). However, recent studies suggest that the L2 can influence the L1 depending on a number of factors such as age of arrival, level of exposure, and length of residence (Amengual, 2011; Marian & Kaushanskaya, 2007; Petersen, Thompsen, Guiberson, Spencer, 2016). The following section will present studies that have documented the influence of the L2 on the L1. Next, I will present investigations around the labiodental fricative [v] in Spanish. Finally, I will discuss particularities of English and Spanish phonetics.

2.1 Influence of the L2 on the L1

Gildersleeve, Peña, Davis, and Kester (2009) analyzed the influence of English on six children with a mean age 3.5 years. All children were native Spanish speakers and were analyzed after eight months of attending the Head Start classroom. This program offered children 20 hours a week of English-medium classes. All children spoke only Spanish at home, until the Head Start program began. Gildersleeve et al. (2009) tested the production of consonants in Spanish words by children before and after the program using a picture naming task that elicited 270 isolated tokens. Data were transcribed and analyzed using the acoustic analysis software Logical International Phonetics Program, version 2.02. During the first test, children produced all

Spanish vowels and four produced most of the consonant allophones. After 8 months, all six children produced the English consonants [ɹ ɳ ʃ dʒ ʒ] and the vowels [ɪ ɛ ʊ ʌ] in otherwise Spanish discourse. Figure 2.1 shows children's performance accuracy in the production of Spanish consonants and vowels before English contact and after eight months of English contact in Gildersleeve et al. (2009). Individual children were labeled; GH MV GV KS SR and CV

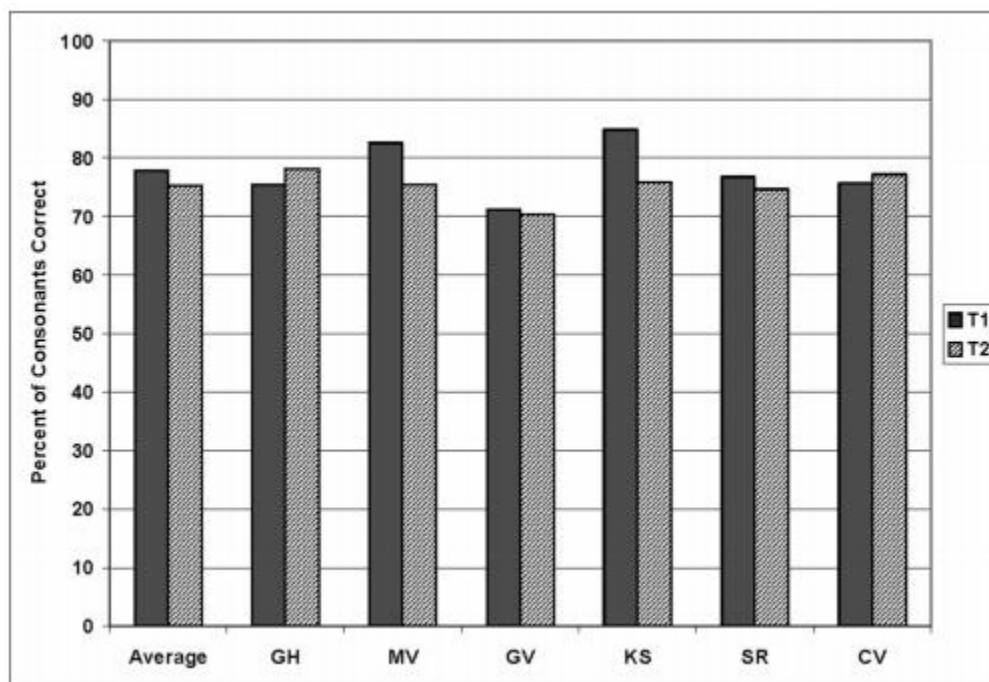


Figure 2.1 Results of consonant and vowel accuracy production in Spanish before (T1) and after (T2) contact with English began (Gildersleeve et al., 2009)

Gildersleeve et al. (2009) concluded that the presence of English consonants and allophones not found in the phonetic repertoire of Spanish indicated a cross-linguistic transfer from English to Spanish.

Amengual (2012) is another study that has documented the effects of the L2 on the L1. The author (Amengual, 2012) analyzed a temporal acoustic measurement called VOT on words with overlap form and meaning (cognates) in Spanish-English cognates. VOT is defined as the

duration between the release of the air of the stop consonant and the beginning of the vibrations caused by the following vowels (Lisker & Abramson, 1964, 1970). VOT values are different across languages. For instance, English VOT for voiceless stops /p t k/ are longer (Kent & Read, 1992) than Spanish /p t k/ (Lisker & Abramson, 1964; Maddieson, 1984). Due to this difference, Amengual (2012) compared the VOT of /t/ in initial position in word by different Spanish-English bilinguals and Spanish monolinguals and predicted that speakers with an extensive exposure and contact with English would exhibit English-like VOT values. Forty-nine participants were grouped based on their linguistic and social characteristics. Groups consisted of the following speakers: Spanish Heritage speakers who had acquired Spanish at home and were learning English at school. This group reported a better linguistic competence in English and more use of English compared to Spanish. English Heritage speakers had learned English as their native language at home and Spanish at school. They reported more use and better competency in Spanish than English. English bilingual speakers acquired English at home and completed their higher studies in Spanish speaking universities. Spanish bilinguals had acquired Spanish as their native language and completed their university studies in the U.S. having extensive contact with English. The last group analyzed in Amengual (2012) was Spanish monolinguals who had very limited contact with English and reported the lowest level of English competency and use. The experiment consisted of reading 40 phrases in Spanish, with 10 containing cognates and 10 non-cognates. The author analyzed the VOT of interdental /t/ in initial position using the acoustic analysis software PRAAT (Boersma & Weenink, 2011). Figure 2.2 presents Amengual's (2012) findings.

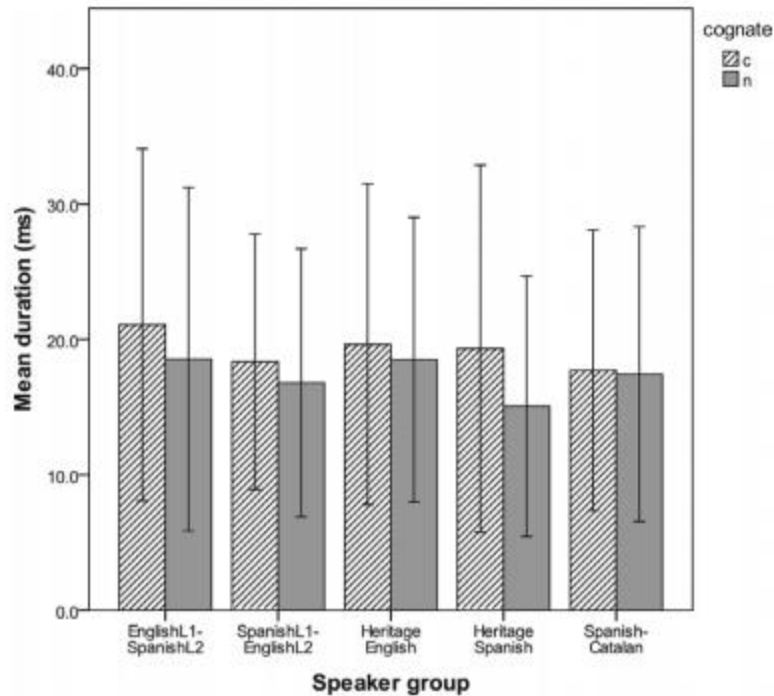


Figure 2.2 VOT results of /t/ in initial position by all groups (Amengual, 2012)

Results indicated longer VOT for /t/ by speakers heavily exposed to English. Amengual (2012) argued that long VOT is characteristic of English and concluded that speakers who reported higher levels of competence and usage of English exhibited cross linguistic phonetic transfer.

Both of these studies, Gildersleeve et al. (2009) and Amengual (2012), analyzed speakers with early L2 exposure (since 3 years old for Gildersleeve et al. (2009) and since pre-school or kindergarten for Amengual (2012)). As a result, Gildersleeve et al. (2009) and Amengual (2012) pointed out that cross-linguistic transfer occurs with more frequency in speakers who were exposed to L2 during their childhood. However, Chao, Yao, Hynes, and Rhodes (2011) and Kang and Guion (2006) found a cross-linguistic contrast in speakers exposed to an L2 during their childhood. These studies have found that early bilinguals are capable of distinguishing and maintaining both languages without transferring linguistic features of one language to the other.

Chao, Yao, Hynes, and Rhodes (2011) compared the production of English and Mandarin voiceless stops and back vowels by heritage speakers of Mandarin and native speakers of Mandarin and English. Chao et al. (2011) hypothesized that heritage speakers would maintain a separate phonological inventory for each of the languages. Results of the study confirmed their predictions. Also, Kang and Guion (2006) drew similar conclusions from their study of Korean and English voiceless stops. The authors performed an acoustic analysis using VOT, amplitude difference, and fundamental frequency to measure Korean and English voiceless stops produced by early and late Korean-English bilinguals. Kang and Guion (2006) predicted that early bilinguals would produce more near native-like voiceless stops corresponding to the target language than late bilinguals. Results found that early bilinguals were capable of producing near native-like voiceless stops in both languages, suggesting an independent phonological system for each language, as opposed to late bilinguals who did not produced native-like voiceless stops in English, their second language. Kang and Guion (2006) argued that the performance of late bilinguals in English voiceless stops was due to their late exposure to the L2 (English).

The results of the studies presented so far seem to contradict one another. In Gildersleeve et al. (2009) and Amengual (2012), the effects of language contact was seen in terms of cross-linguistic transfer, while Chao et al. (2011) and Kang and Guion (2006), results showed that speakers' L1 was not influenced by their L2, at least in terms of phonetic features transfer. These opposite findings deserve exploration, and due to that reason, the present study will try to contribute to the understanding of language contact and its linguistic consequences on speakers.

2.2 Overview of the Phonetics and Phonology of English and Spanish

Since this study explores the variation affecting /b/ in El Paso Spanish, a basic description of the phonetics and phonology of English and Spanish is necessary. Phonetics refers to the physical characteristics of sounds such as the auditory, acoustic, and articulatory mechanisms necessary to produce and describe a sound (Cruttenden, 2014). On the other hand, “The discipline of phonology is primarily concerned with the contrastive units of speech (phonemes) and the patterns in which they are arranged and distributed in different languages” (Hualde, 2005, p.12). The most basic concept of phonology is the phoneme, which is the mental representation of a contrastive sound (Cruttenden, 2014). In phonology, an acoustic feature is called “contrastive” when a change in that feature produces a change in meaning.

Sounds can be defined in terms of voicing, place, and manner of articulation. Collins and Mees (2003) described a voiced sound as one produced with the vocal cords vibrating and a voiceless sound as one with no vibration. Place of articulation refers to the position of the articulators (i.e. the lips and tongue) during the realization of the sound (Collins & Mees, 2003). Manner of articulation is how the airstream is modified as it flows from the lungs to either the mouth or the nose (Mihaliček & Wilson, 2011). With regard to /b/ and /v/, English has a voiced bilabial stop [b] and a voiced labiodental fricative sound [v] respectively. English [b] is produced with the two lips (the articulators) touching each other, creating a complete closure in the oral cavity that impedes the escape of the air while the vocal folds are vibrating. The air is suddenly released, causing an explosive sound. The articulation of [v] involves a light contact between the lower lip and the upper teeth. This light contact creates a narrow constriction in the oral cavity where turbulence is produced by the flow of the airstream (Shadle, 1990).

Both sounds, the voiced bilabial stop and voiced labiodental fricative, are English phonemes and they appear in initial, medial, and final position (Thomas, 1947). Phonemes are represented between two slashes, for example /b/ and /v/. These minimal pairs exemplify the contrast in meaning produced by these phonemes (Roach, 2009).

Position	Written Form		Phonetic Form
Initial position	Best	Vest	[best vɛst]
Medial position	Gibbon	Given	[gɪbən ɡɪvən]
Final position	Dub	Dove	[dʌb dʌv]

In Spanish, as in English, a voiced bilabial stop is a sound produced with the lips closed blocking the air flow. The main acoustic difference between English and Spanish [b] is that in English [b] in initial position, the vocal folds start vibrating as soon as the air is released (Brown, 2014), while in Spanish, the vocal folds start vibrating much earlier, from the beginning of the closure (Bosque, 2009). Another Spanish sound of interest for the purpose of this study is the bilabial approximant. Instead of having a complete stricture like a stop, or a close stricture like fricatives, approximants have an open stricture. The shape of the oral cavity is more open, therefore the air can flow but is not narrow enough to produce turbulence (Bosque, 2009; Rogers, 2000). The Spanish voiced bilabial approximant is represented by the following symbol: [β], as in *lobo* [loβo] or *había* [aβia].

Like English, Spanish only has two bilabial phonemes, one voiced and the other voiceless (meaning the vocal folds are not vibrating). These are /b/ and /p/. Although the bilabial approximant is produced in many Spanish varieties, its distribution is complementary with the voiced bilabial stop, making it an allophone of the bilabial phoneme /b/ (Diaz-Campos, Geeslin & Gurzynski-Wess, 2018). In phonology, a sound that is in complementary distribution does not

occur in overlapping environment. In other words, [b] and [β] do not occur in the same phonetic environment. The bilabial approximant does not occur after a pause or a nasal consonant, but it does occur in all other possible environments, mainly in intervocalic position (Bosque, 2009; Hualde, 2014). Diaz-Campos et al. (2018) explained that [b] is permissible in initial and medial position, but not in final position. Also, the authors stated that Spanish has only one labiodental fricative phoneme: the voiceless /f/.

There are several other phonetic and phonological differences between English and Spanish labial obstruents, but for the purpose of this study I will focus only on the differences that pertain to the sounds under study. As stated earlier, /v/ does not occur as a separate phoneme in Spanish, but rather as an allophone of the phoneme /b/. Therefore, the contrast between the voiced bilabial stop and the voiced labiodental does not produce any difference in meaning. Words pairs like *bota* ('boot'), *vota* ('to vote'), *baya* ('berry'), and *vaya* ('go') are in fact homophones; the difference is only orthographic. Most authors do not include [v] as a variant, least of all as an allophone of /b/ (Diaz-Campos et al. 2018; Lipski, 2008; Lipski, 2011). The voiced bilabial stop phoneme /b/ in intervocalic position is realized as [β] in varieties of Spanish such as Mexican Spanish, while in English it is realized as a voiced stop (Brown, 2014; Diaz-Campos et al. 2018). English does not have a voiced bilabial approximant in its phonological repertoire (Collins & Mees, 2003). In English, the graphemes that correspond to /b/ and /v/ are and <v> respectively (Thomas, 1947). Whereas in Spanish there is no direct relationship between graphemes and <v>, since both refer to the same phoneme.

2.3 The Presence of the Voiced Labiodental Fricative [v] in Spanish

The voiced labiodental fricative [v] as a variant of the phoneme /b/ has been previously reported and analyzed in Spanish (Alonso, 1967; Lope Blanch, 1988; Martinez-Gil, 1998; Penny, 2000; Romero, Guerreiro, & Alviárez, 2010; Sadowsky, 2010; Stevens, 2000; Takawaki, 2012; Tim, 1976; Torres Cacoullos & Ferreria, 2000; Trovato, 2017; Vergara, 2013; Wheeler, 2005; Zamora, 1970). Here, I will discuss the most relevant investigations that relate to my study and present the hypotheses that were elaborated based on the review of previous literature.

Previous authors (Alonso, 1967; Martinez-Gil, 1998; Penny, 2000; Wheeler, 2005; Zamora, 1970) have defined the labiodental fricative [v] as an archaic feature of Spanish. According to Alonso (1967) Old Spanish had two contrastive phonemes, /b/ and /v/ from Latin, which explains the distinct graphemes and <v> in current Spanish. Penny (2000), following Alonso added that the phonemes /b/ and /v/ were present in Old Spanish until the 15th century. As a result, Wheeler (2005) identified [v] in Catalan as an archaic feature. Judeo-Spanish varieties such as Ladino also contain the labiodental [v], which Zamora (1970) considered also as an archaic feature. Another perspective on the labiodental [v] suggests that its presence in Spanish is due to hypercorrection (Lope Blanch, 1988; Isbasescu, 1968). According to Isbasescu (1968), hypercorrection suggests a distinction between /b/ and /v/ based on orthography. The author reported that some Spanish speakers try to be loyal to orthography and produce [v] when <v> is written (Isbasescu, 1968). Lope Blanch (1988) documented that the variant [v] is present among the highly educated and elite groups of Mexico City only in reading situations where <v> was present, and in emphatic contexts. According to Lope Blanch both of these situations are related to hypercorrection.

Other studies have analyzed the presence of the labiodental fricative as a variant of /b/ in different Spanish dialects. For instance, Sadowsky (2010) found that Chilean Spanish has a labiodental [v], which occurs without the influence of orthography. Vergara (2013) confirmed such findings, and added that [v] is present in highly educated speakers as well as in illiterate speakers. Romero et al. (2010) mapped the distribution of [v] in Venezuelan Spanish. The authors found frequent instances of [v] in initial position regardless of orthography. Hoyos Piñas (2013) reported similar results in Cáceres, Spain. Yet the presence of a labiodental fricative [v] in varieties of Spanish in the United States has been explained in terms of language contact influence (Stevens, 2000; Takawaki, 2012; Tim, 1976; Torres Cacoullos & Ferreria, 2000; Trovato, 2017). Therefore, the variant [v] of my study will not be treated as instances of hypercorrection because El Paso is a language contact community and the orthographic <v> in English corresponds to [v] (Thomas, 1947) and suggests a cross linguistic influence of English on Spanish. Philips (1982) and Tim (1976) reported a high rate of labiodentals [v] in California, when the grapheme <v> was present. Takawaki (2012) found orthography to be a statistically significant factor for the realization of [v] in New Mexican Spanish.

In the following section I will discuss previous studies that consider language contact, particularly with English, as a possible explanation for the presence of [v] in Spanish.

Torres Cacoullos and Ferreira (2000) analyzed voiced labiodental and voiced bilabial variation in Spanish and considered two hypotheses. The first hypothesis proposed that [v] was present in New Mexican Spanish as a result of an ongoing loss of an archaic feature. The second hypothesis suggested that [v] was a result of language contact between English and Spanish. This was tested by analyzing word frequency.

Bybee (2001) suggests that word frequency has an impact on phonology. When change is motivated by coarticulatory processes, high frequency words change before than low frequency words. On the other hand, when change is motivated by analysis, either syntactic, morphological, or phonological, low frequency words undergo change before high frequency words (Bybee, 2001). Therefore, following Bybee, Torres Cacoullos and Ferreira (2000) hypothesized that sound change induced by language contact could be a form of change motivated by analysis. Torres Cacoullos and Ferreira (2000) claimed that coarticulatory processes did not motivate labiodental or bilabial variation because they both appeared in intervocalic position. As a result, if higher rates of [v] occurred in low frequency words, the authors would adopt a contact induced view for the occurrence of [v]. If [v] occurs more often in high frequency words, then the labiodental would be a loss of an archaic feature (Torres Cacoullos & Ferreira, 2000). The authors analyzed age, Spanish proficiency and use, and formal education in Spanish to measure an influence of English on Spanish. Also, cognate status was considered. Cognates are for instance, Spanish words with an English translation similar in orthographic representation and phonetic shape. Cognates with <v> in both English and Spanish would suggest a transfer from English to Spanish.

Torres and Ferreira (2000) collected their data by asking participants to translate English words or phrases from a list. The /b/ variants were classified by watching the speakers' mouths. The authors elicited 599 tokens from 18 speakers that were analyzed using a statistical analysis called VARBRUL. Speakers with a high degree of Spanish proficiency and usage exhibited lower rates of [v]. Labiodentals occurred more in high frequency words, without constraints on cognate status or orthography. However, Torres Cacoullos and Ferreira (2000) also found that labiodentals were favored in low frequency words with <v> in English and Spanish. Based on

these results, the authors concluded that New Mexican Spanish [v] is a result of both language contact and the persistence of an archaic feature.

Takawaki (2012) analyzed the labiodental [v] in New Mexican Spanish and concluded that such variant could be an instance of hypercorrection. However, important insights and interpretations can be generated from Takawaki's study. The author investigated internal and external factors that might motivate the presence of the variant [v]. Under internal factors, Takawaki analyzed syllable onset, onset cluster and coda, preceding and following sound, and position in word. This last factor was analyzed by comparing three different tasks: a one hour interview, reading of a word list, and reading of a paragraph. External factors analyzed were education level, gender, and style. Four participants took part in Takawaki's study; two males and two females. Two participants were graduate students, and two had incomplete secondary studies. The author classified /b/ variants based on spectrographic characteristics. Takawaki elicited 2,326 tokens, and 29% were realized as labiodentals (N=429). The most influential factor was orthography, followed by previous sound, education and elicitation task. Participants pronounced a labiodental fricative 58% of the time where the grapheme <v> was present during the reading task. The previous segments that favored the realization of [v] were the mid [e] and low [a] vowel and /s/. Participants with a higher degree of education produced the labiodental [v] with a rate of 37%.

Stevens (2000) analyzed the labiodental fricative [v] among instructors of Spanish as a second language in California. His motivation originated from seeing a constant labiodental variation of the labial phoneme /b/ in a series of videos called *Puntos* dedicated to instructors at a language program. Stevens hypothesized that [v] occurred in Spanish as a result of the contact with English. To test his prediction, the researcher analyzed linguistic (orthography, phonetic

context) and social factors (speech formality, Spanish proficiency, amount of contact with English). A total of 15 speakers participated in the study, 10 native speakers and 5 near native speakers. Stevens used length of residence in the U.S. as an indication of amount of English contact. The author employed three tasks to elicit the data: reading a word list, reading a sentences list, and an informal interview. The data were analyzed using VARBRUL.

Stevens' (2000) results showed that the overall distribution of the labiodental fricative among California instructors was 20% after a pause, 21 % after nasals, and 53% when the grapheme <v> was present in the reading tasks. Interestingly, the labiodental [v] was never produced when the grapheme appeared. The author concluded that orthography was a major influence on the realization of the variant in question. However, [v] occurred with more frequency in the informal interview than in the reading tasks. The low occurrence of [v] in the reading task was interpreted by the author as a loyalty to the standard pronunciation of /b/ in Spanish. Stevens suggested that instructors were extremely careful in their realization of the phoneme /b/ during the reading task while participants exhibited their English influence during the informal interview.

Trovato (2017) studied the variation of /b/ in El Paso, Texas. His study focused on the realization of the labiodental fricative [v]. The author hypothesized that such variant was present as a result of the contact with English. Thirty Spanish-English bilinguals took part in the study, equally distributed by gender and age. Trovato analyzed linguistic and social factors, and acoustic parameters. The linguistic factors considered were orthography, stress, position in the word, previous and following segments, cognate status, and word frequency. The social factors considered were education, gender, age, writing and reading proficiency in both English and Spanish. The acoustic parameters used to analyze the perceived labial variation were duration,

center of gravity, and relative intensity (see chapter 3 for a detailed description). The data elicitation technique consisted of reading a word list and a picture-naming task. Trovato elicited 1,566 tokens, with 33% (N=760) realized as labiodentals. All data were analyzed using a binomial regression analysis. Orthography was the most significant factor favoring the occurrence of [v], followed by writing proficiency in Spanish and English. As for the acoustic parameters, only duration and relative intensity were statistically significant. The author concluded that [v] was present in El Paso Spanish as a result of the contact with English. Trovato suggested that the grapheme <v> promoted the occurrence of the variant [v] and claimed that such process is a phonetic transfer from English to Spanish.

In the next chapter I will present the methodology followed in this study. I will describe the participants, data collection, and data analysis. I will also discuss the differences between Trovato's (2017) study and mine.

CHAPTER THREE

METHODOLOGY

3.1 Data Collection

The data used in this research come from a corpus developed in a broader investigation, in which multiple activities elicited data that served to explore the perception of consonantal and vocalic contrast between Spanish-English bilingual speakers (Mazzaro, Cuza, & Colantoni, 2016). By definition, a linguistic corpus is a compilation of naturally occurring language, which is intended to be representative of the linguistic variety produced by a speech community (McEnery, Xiao, & Tono, 2006). For the purpose of the present study, only data from a storytelling activity were used since it elicited informal speech, which is the register of interest.

Participants were asked to describe images as they appeared on the computer screen, one by one, as if they were narrating the story to children. The entire activity consisted of nineteen PowerPoint slides portraying the story of Little Red Riding Hood. The following images in Figure 3.1 are examples of the pictures that participants were asked to narrate.



Figure 3.1 Examples of images used in the storytelling activity

Stories lasted from one up to four minutes long, with a mean of 2.57 minutes. Participants were recorded using the software Audacity 2.1.1(Audacity Team, 2018) with a sampling rate of 44.1 KHz, and a Snowball USB microphone condenser with cardioid pick up pattern. There were multiple locations for the recordings, however, in all of them, external noises were avoided by conducting the sessions in quiet places.

Thirty-one stories were transcribed by UTEP (The University of Texas at El Paso) undergraduate linguistics students. Words containing the graphemes and <v> were coded using PRAAT (Boersma & Weenink, 2017). When possible, thirty words per narrative were analyzed containing the relevant sounds. When it was not possible to obtain thirty words, I analyzed as many words containing and <v> as I encountered in the narrative. Not all participants produced at least thirty words for two main reasons: First, some stories were shorter than others, generating smaller samples. Second, out of words that were frequently repeated by the same participant, I only selected the first 3. Words that had both and <v> for instance; *llevaba* (carry), *observaba* (watched), *sobrevivir*, (survive) etc. counted twice as a word of interest. The total number of tokens was 745; 262 by men and 483 by women. Table 1.1 shows the number of relevant words obtained per participant

Table 1.1 Total number of words with , <v> produced by all participants

Words with and/or <v>	Number of Participants
30	9
29-24	7
23-18	6
17-12	9

3.2 Participants

A total of thirty-one Spanish-English bilingual took part in the study. All of them were El Paso residents. Twenty participants were female and eleven were male. All were enrolled in different programs at The University of Texas at El Paso (UTEP).

Participants completed an adult language background questionnaire (Mazzaro, Cuza, & Colantoni, 2016) to obtain patterns of language usage, place of birth, and primary language used in their formal education. In addition, the questionnaire provided information regarding the participants' self-proficiency judgment in English as well as in Spanish in four different linguistic skills: Reading, writing, speaking, and listening skills. A Likert scale with odd number of options was used to measure responses. The scale ranged from basic, adequate, proficient, excellent, and native. Furthermore, participants completed an independent proficiency test, adapted from the *DELE* (Diploma de Español como Lengua Segunda) tests. Following Mazzaro, Cuza, and Colantoni (2016) participants are classified in three different groups: Heritage speakers, long-term immigrants, and recent arrivals. These categories are explained below.

Heritage speakers (henceforth HS) are born and raised in the United States, second-generation immigrants, or permanent immigrants who arrived in the U.S. before the age of twelve (Silva-Corvalán, 2003). HS acquire their native language (Spanish), typically the society's minority language, during the first years of their childhood at home or at another natural context (Montrul & Foote, 2014). They receive their formal education in the society's majority language (English), developing a better competency in the majority language than in their native language (Shi, 2017). Following Mazzaro, Cuza, and Colantoni (2016) this group was further subdivided as advanced and intermediate heritage speakers based on their age of arrival to the United States, their self-reported proficiency in English and Spanish, and their *DELE* scores. See Table 1.2 for details.

Unlike heritage speakers, long-term immigrants (henceforth LTI) arrived at the U.S. at the age of thirteen or later (Mazzaro, Cuza & Colantoni, 2016). Previous studies (Foster-Cohen, 1993; Snow & Hoefnagel, 1978) suggest that the long-term immigrants' L1 is already formed when they start acquiring the L2 at the age of thirteen or later.

Recent arrivals served as a control group since all were born in Mexico and have lived in the United States for less than a year. Table 1.2 provides demographic and linguistic information of all three groups.

Table 1.2 Participant's demographic and linguistic skills information

	Advanced Heritage			Intermediate Heritage			LTI			Control		
Place of birth	US/México			US/México			US/México			México		
Mean Age	23			24			39			20		
Mean AOA	4			1			26			20		
Mean LOR	19			22			15			0,69		
Mean Self Prof. ENG	3.67			3.8			3			1.67		
Mean Self Prof. SPAN	3.8			2,2			3.9			4		
Mean DELE score	45			37			45			45		
Language use	BOTH	ENG	SPAN	BOTH	ENG	SPAN	BOTH	ENG	SPAN	BOTH	ENG	SPAN
School	33%	50%	17%	0%	100%	0%	33%	22%	44%	11%	0%	89%
Home	0%	0%	100%	29%	43%	29%	22%	11%	67%	0%	0%	100%
Work	50%	17%	33%	0%	100%	0%	33%	5%	17%	0%	0%	100%
Social situation	50%	50%	0%	14%	86%	0%	50%	0%	50%	0%	0%	100%
	BOTH	ENG	SPAN	BOTH	ENG	SPAN	BOTH	ENG	SPAN	BOTH	ENG	SPAN
Most Comf Lang	83%	0%	17%	14%	86%	0%	33%	0%	67%	0%	0%	100%

3.3 Linguistic Factors

The analysis of linguistic factors, as stated by Tagliamonte (2012), is important because it helps the researcher understand the linguistic forces that affect the variable in question. In the present study, linguistic factors are necessary to understand the internal mechanisms that promote the voiced labiodental fricative in El Paso Spanish. The linguistic factors considered in this study are stress, previous and following segments, and position in word.

3.3.1 Stress

The effect of stress has been studied in previous research about Spanish stop consonants and vowels. For instance, Gonzalez (2002) finds that devoicing and frication of /b d g/ in North-Central Peninsular Spanish are more likely to occur in stressed syllables. In Henriksen and Harper (2016) stress influenced the noise variation of /s/ in /sp, st, sk/ clusters of South-Central Peninsular Spanish. According to Eddington (2011) [β] is less lenited in stressed syllables. Also, stress could suggest that a labiodental fricative in initial position is an articulatory strengthening process caused by an emphatic discourse

3.3.2 Previous and following segments

Previous and following phonetic context affects the realization of consonants. For instance stops are more likely to be voiced when they occur in between vowels (VCV) (Westbury & Keating, 1986). In most Spanish dialects, Hualde (2014) notes that intervocalic /b/ is commonly realized as [β], while [b] occurs after nasals.

In the literature about previous segments of the labiodental fricative, Sadowsky (2010) finds that Chilean Spanish /b/ is commonly realized as [v] after vowels, liquid consonants and /s/, /d/, and /b/. Vergara's (2013) similar results finds a higher rate of [v] after the vowels /i, e, a,

o/. In New Mexican Spanish, Takawaki (2012) reports that [v] occurs more frequently after vowels and the fricative /s/.

Regarding following segments, Vergara (2013) and Takawaki (2012) suggest that [v] is more common before /j/, nasals, liquids, and vowels. Similar results are found in Romero et al. (2008) where [v] occurs with a high rate before vowels /a e i/.

3.3.3 Position in Word

The phonotactic constraints, or the permissible ways of combining speech sounds, vary from language to language (Freeman et.al. 2016). For instance, the Spanish phoneme /b/ is only permissible in initial or medial position after /l/ and /r/ (Helman, 2004; Hualde, 2014). Therefore, consonant position might prompt allophonic variation. Venezuelan Spanish exhibits high frequencies of [v] in initial position (Romero et. al. 2008). Such pattern is also found by Hoyos Piñas (2013) in Spain where [v] occurs almost categorically in initial position. However, Sadowsky (2010), Vergara (2013), and Takawaki (2012) agree that [v] occurs more frequently in medial position.

3.4 Social Factors

Labov (1966) established the importance of social and speaker tied factors in the understanding of linguistic variation in his New York's Lower East Side study. Since then, many linguists have followed his methodology. As Hymes (1984) suggests, sociolinguistics brings useful insights about individuals or social groups and their relation with linguistic variables. For the present study, social factors can improve the understanding of the labiodental fricative in El Paso Spanish, and they might bring to scope insights that linguistic factors could omit. Social factors analyzed in this investigation are gender, language proficiency, and bilingualism

3.4.1 Gender

Investigations about labiodental [v] in Spanish have provided limited information about the influence of gender. However, Stevens (2000) reports that women produced more [v] than men, and suggests that [v] in Spanish could possess a prestigious feature. Romero et al. (2008) get similar results, where women's realization of [v] was higher than men's production of [v]. Trovato (2017) confirms such findings in the production of [v] in El Paso Spanish.

3.4.2 Language proficiency

Language proficiency has been reported to influence the native-like pronunciation of Spanish approximants [β ð ɣ] by English native speakers (Kissling, 2013). In Stevens (2000), low proficient Spanish speakers produced more labiodental fricatives than high proficient Spanish speakers. According to the author, this could be an influence of the English phonological system on the pronunciation of Spanish L2. This finding is corroborated by Trovato (2017) where [v] is favored by higher English proficient speakers. Both, Stevens and Trovato suggest that [v] in Spanish is a consequence of English phonological system.

Social factors (except gender) were measured based on what participants reported in the adult language background questionnaire. Language proficiency for English and Spanish is explicitly stated in Table 2 and described in section 3.2. Bilingualism of participants was inferred based on the self ratings of English and Spanish proficiency, patterns of language use, DELE scores, and participants' answer to the questions about their most comfortable language described in Table 2.

3.5 Acoustic parameters

The two acoustic parameters analyzed to document the voiced labiodental fricative [v] as a variation of the phoneme /b/ in El Paso Spanish are duration and relative intensity. Most studies that analyzed the labial fricative in Spanish have relied on auditory judgments (Cacoullos & Ferreira, 2000; Vergara, 2011; Romero et.al. 2008). However, more recent studies have used acoustic analysis software to inspect spectral characteristics of [v] (Vergara, 2013) and the acoustic parameters that identify [v] in Spanish (Trovato (2017).

3.5.1 Relative intensity

Stevens (1985) defines relative intensity as the difference in decibels between the target consonant and the following segment. In Jongman et al. (2000), relative intensity was a significant acoustic parameter that distinguished place of articulation among all English fricatives, including [v]. In Argentine Spanish, relative intensity was used to distinguished place of articulation among fricatives (Manrique & Massone, 1980; Mazzaro, 2011). Literature on relative intensity suggests that it can also measure degrees of constriction of labial consonants. For instance, Hualde et al. (2010) found that sounds with higher degrees of constriction exhibit higher levels of relative intensity. Trovato (2017) reported a significant correlation between perceived labial consonants, either [b]/[β] or [v], and relative intensity in El Paso Spanish.

3.5.2 Duration

Studies that analyzed duration of segments in English are abundant, and many of them focus on obstruent consonants, including stops and fricatives (Repp & Lin, 1988; Jongman et al. 1998). Based on similar literature, researchers have used difference in duration to describe place and manner of articulation of other languages' sounds (Holton, 2001; Lee et al. 2014). In Spanish, Gerfen (2002) analyzed duration to describe consonant lenition (or weakening) as well

as consonant retention in word final position. In El Paso Spanish, Trovato (2017) found that perceived labiodental [v] was significantly higher in duration than labial consonants [b] and [β].

3.6 Acoustic Analysis

To analyze these acoustic parameters, a TextGrid file (an annotation object) was created from every recording using PRAAT and PRAAT Align (Boersma & Weenink, 2017), an acoustic analysis software. Each TextGrid file was composed of five numbered tiers: ‘perception’, ‘syllable’, ‘word’, ‘phoneme’, and ‘participant’. These are illustrated in figure 3.2 below.

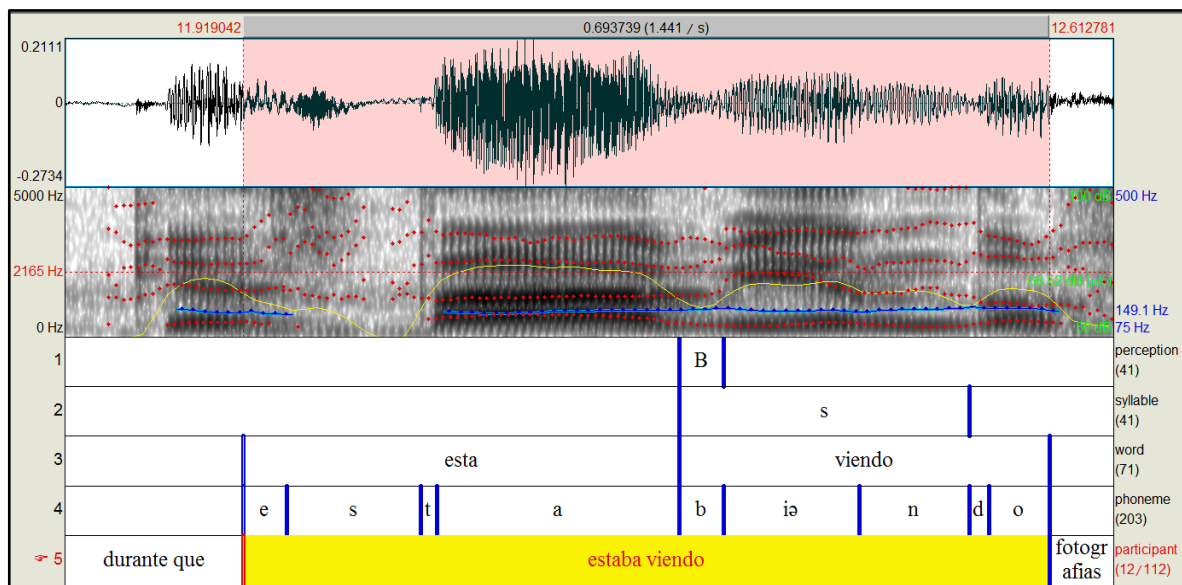


Figure 3.2 Example of all tiers' coding in the *estaba viendo* (she was watching) in PRAAT

Tier 5 named ‘participant’, consisted of the transcribed sentences produced by participants during the storytelling activity. Tier 4 called ‘phoneme’ was automatically generated by PRAAT Align (Boersma & Weenink, 2017). The software produced a phoneme-by-phoneme transcription. Tier 3 labeled ‘word’, selected words of interest, with graphemes and/or <v> or relevant surrounding words as figure 2 illustrates. Tier 2 named ‘syllable’, was used to mark whether the syllable containing the sound in question was stressed (s) or unstressed (u). Tier 1 called ‘perception’, recorded the phonetic realization of what I perceived. Sounds realized as an approximant were coded as [β]. If the sound was realized as a stop, it was coded as a [b]. If the sound was realized as a labiodental fricative, it was coded as a [v]. Values on tier 1 were assigned based on my auditory perception of the sounds. When it was difficult to distinguish between the three voiced labial consonants, sounds were visually inspected on PRAAT. According to Thomas (2011), the presence of a release (the visible burst in the spectrogram), the formants’ continuity, and the faint frication (the presence of noise in the upper region of the spectrogram) are effective acoustic spectrographic characteristics that distinguish labial consonants. As shown in Figure 3.3, sounds were coded as [b] if they contained both a release and murmur in initial position or after a nasal consonant.

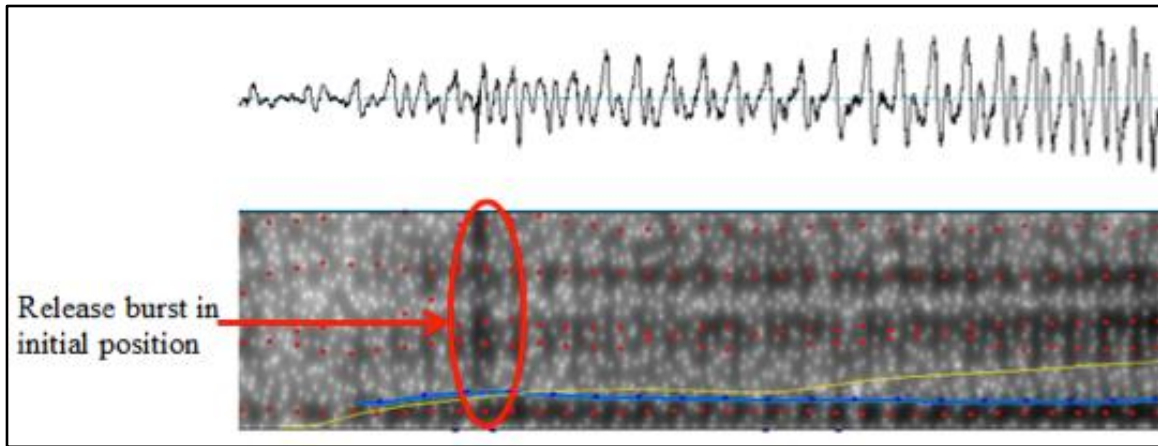


Figure 3.3 Sound coded as [b] due to the release burst in initial position

Sounds were coded as [β] if they showed a continuity of formants between vowels, as Figure 3.4 exemplifies.

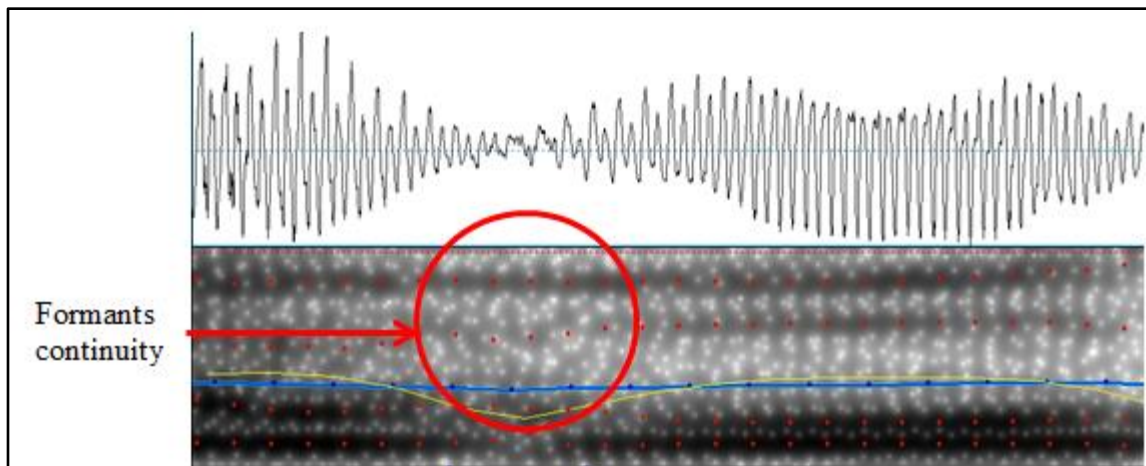


Figure 3.4 A sound coded as [β] based on the formants continuity displayed at the spectrogram

Sounds were coded as [v] if a) they lacked a release in initial position and b) if they exhibited a faint frication in either initial or intervocalic position. Figure 3.5 and 3.6 illustrate both instances respectively.

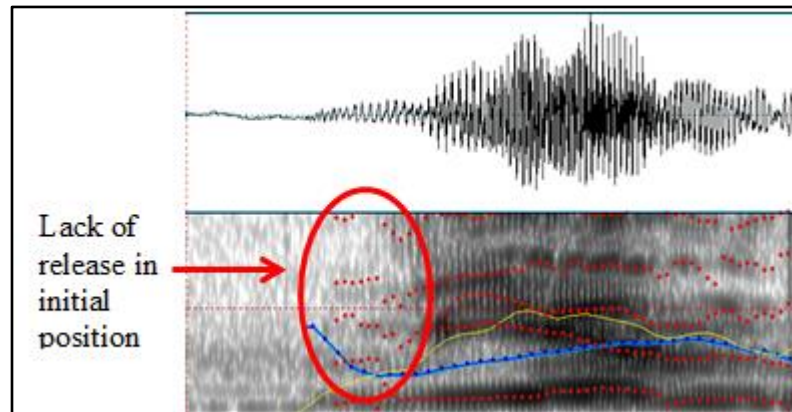


Figure 3.5 A sound coded as [v] due to the lack of release in initial position

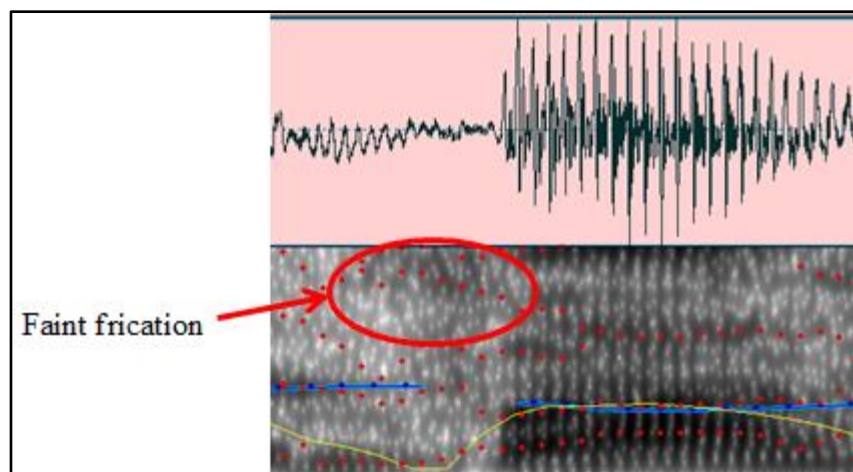


Figure 3.6 Faint frication of an intervocalic labial sound coded as [v]

Once the thirty-one narratives were coded as described above, all linguistic factors and acoustic parameters were measured in PRAAT using an automatic script. The outcome was

analyzed using Minitab[®] Statistical Software (2018). A logistic regression model was used since it helps the researcher to understand the dependent variable's relationship to numerous factors at once (Sankoff, 1988). Based on Trovato's analysis (2017), the variable in question was considered as a binomial variable coded as bilabial ([b]/[β]) or labiodental ([v]). Linguistic predictor factors included stress (s/u) previous segment (consonant/vowel) following segment (consonant/vowel) and position in word (absolute initial/initial/medial). Social predictor factors included group (advanced heritage/intermediate heritage/ long-term/control) and gender (male/female). Continuous variables were the acoustic parameters of relative intensity and duration.

3.7 Hypothesis

The findings of Trovato (2017) reveal that [v] is present in El Paso Spanish. Factors analyzed here, are also studied in Trovato's research. However, data from the present study comes from a story-telling activity, whereas part of Trovato's data comes from a reading task. Hence, Trovato's task involved the orthographic representation of the word, while the story-telling activity is more informal and do not includes the written word. Therefore, the following hypotheses are proposed

- 1) I hypothesize that this study will exhibit a lower rate of [v] compared with the findings of Trovato's findings where the task used included the orthographic representation of words.
- 2) [v] is present in El Paso Spanish as a result of the contact with English phonological system. This is suggested by Stevens (2000) and Trovato (2017) and will be verified by comparing the performance of the different groups.

- 3) Based on studies discussed in section 3.3.1, I expect to find more instances of a labiodental fricative in stressed syllables.
- 4) I predict high occurrences of [v] after liquid consonants and after vowels /i, e, a, o/ as suggested by Sadowsky (2010) and Vergara (2013). In addition, I expect more realizations of [v] before nasals, liquids, and vowels /a e i/ following Vergara (2013), Takawaki (2012), and Romero et al. (2008).
- 5) [v] production will be more frequent in medial position as previously reported by Sadowsky (2010), Vergara (2013), and Takawaki (2012).
- 6) Women will exhibit a higher rate of [v] than men based on previous studies (Romero et al. 2008; Stevens, 2000; Trovato 2017).
- 7) I expect realizations of [v] to be favored by highly proficient English speakers as reported by Trovato (2017).
- 8) I hypothesize that relative intensity and duration will be significant for the identification of [v] as stated in Trovato (2017).

In the next chapter, I will present and discuss the results of the linguistic and social factors and the acoustic parameters analyzed in the present study.

CHAPTER FOUR

RESULTS

4.1 Distributional Analysis

The overall distribution of /b/ variants in El Paso Spanish is presented in Table 2.1

Table 2.1 Overall distribution of /b/ variants in El Paso Spanish

[b]		[β]		[v]	
%	N	%	N	%	N
7.8	58	80.1	597	12.1	90
Total N		745			

As expected based on the findings of Trovato (2017), the voiced labiodental fricative [v] occurs as a variant of the phoneme /b/ in El Paso Spanish. Out of the 745 voiced labial tokens, 7.8% were realized as stops [b], 80.1% as approximants [β], and 12.1% as labiodentals [v]. Table 2.2 presents the distribution of all three labial consonant realizations with respect to the social and linguistic factors.

Table 2.2 Distribution of /b/ variants in El Paso Spanish by social (Group and Gender) and linguistic (Stress, Position in Word, Previous Segment, and Following Segment) factors

/b/ variants	Stop [b]		Approximant [β]		Fricative [v]	
FG1: Group	%	N	%	N	%	N
Advanced						
Heritage	5.6	7	82.3	102	12.1	15
Intermediate						
Heritage	8.3	14	66.3	112	25.4	43
Long term	8	20	85.3	214	6.7	14
Control	8.5	17	84	169	7.5	15
FG2: Gender						
Female	7.5	36	79.7	385	12.8	62
Male	8.4	22	80.9	212	10.7	25
FG3: Stress						
Stressed	9.9	39	74.9	296	15.1	60
Unstressed	5.4	19	86	301	8.6	30
FG4: Position in Word						
Absolute Initial	45.8	16	17.1	6	37.1	13
Initial	8.9	20	74.3	168	16.8	38
Medial	4.6	22	87.4	423	8	39
FG5: Previous Segment						
#_(Initial)	48.6	18	16.2	6	35.1	13
Consonants	26	30	55.7	64	18.3	21
Vowels	1.7	10	88.9	527	9.4	56
FG6: Following Segment						
Consonants	14.9	7	70.2	33	14.9	7
Vowels	7.3	51	80.8	564	11.9	83
Total N			745			

4.2 Results of Social Factors

4.2.1 Group

As predicted, and as previously reported by Stevens (2000) and Trovato (2017), speakers with an intensive contact with English produced more [v] than speakers with less contact with English. Results indicate that the Intermediate Heritage group has the highest frequency of [v] with 25.4%, followed by the Advanced Heritage group with 12.1% of [v]. Both, Long Term Immigrants and Control groups have lower percentages of [v] with 6.7% and 7.5%, respectively. All groups have higher rates of approximants [β] compared to [v]. Long Term Immigrants produced 85.3% of [β], Controls 84%, and Advanced Heritage 82.3%. The lowest rate of [β] is found in the Intermediate Heritage group with a 66.3%. Finally, the Control group has the highest rate of the stop [b] with 8.5%, followed by the Intermediate Heritage group with 8.3%, and Long Term Immigrants 8%. The lowest rate of [b] was produced by the Advanced Heritage group with 5.6%

4.2.2 Gender

More female speakers were analyzed in the present study, which resulted in more instances of [v] by women (N= 62) than by men (N= 28). However, on an average we can see that women produced a higher rate of [v] with 12.8% compared to men's rate of 10.7%. This performance was predicted based on previous studies about voiced bilabial variation in Spanish (Romero et al. 2010; Stevens, 2000; Trovato, 2017). Men show higher rates for both [β], with 80.9% , and [b], with 8.4%, than female who produced 79.7% of [β], and [b] 7.5% of the time.

4.3 Results of Linguistic Factors

4.3.1 Stress

Results from the linguistic factor groups, presented in Table 2.2, indicate higher rates of [v] in stressed syllables, with 15.1%, compared to unstressed syllables, with 8.6%. For the approximant [β], unstressed syllables show a relatively higher rate of 86% in contrast with 74.9% in stressed syllables. These results are similar to those reported in Eddington (2011), Gonzalez (2014), and Trovato (2017). The percentage of [b] in stressed syllables is higher (9.9%) than in unstressed syllables (5.4%). The statistical significance will be discussed in section 4.5.

4.3.2 Position in Word

Due to the nature of the narrative task, few absolute initial positions as in *Bueno, este es el cuento la caperucita roja* (Well, this is the story of the little red riding hood) were elicited. Surprisingly, out of the 35 tokens in absolute initial position, 37.1% were realized as labiodentals [v]. The stop [b] shows the highest rate of occurrence in absolute initial position (45.8%), and [β] shows the lowest rate (17.1%). Results of [b] and [β] were expected based on the allophonic distribution of the Spanish phoneme /b/ (Hualde, 2014). During the narrative, participants produced a high number (N= 226) of initial positions with the same phonetic context of medial position. For instance, in a phrase like *una banca* (a chair), the phoneme /b/ is in between vowels, which in many Spanish dialects, cause a pronunciation of [β] (Hualde, 2014). As a result, [β] was the most frequent variant in word initial position preceded by a vowel (74.3%), followed by [v] with 16.8%, and [b] with 8.9%. Medial position in the word yielded similar results, with [β] as the most frequent labial variant (87.4%), followed by [v] (8%) and [b] (4.6%). Previous studies report similar patterns (Sadowsky, 2010; Vergara, 2013; Takawaki, 2012).

4.3.3 Previous Segment

Distribution of /b/ variants in El Paso Spanish with respect to previous and following segments are presented in Table 2.3 below.

Table 2.3 Distribution of /b/ variants in El Paso Spanish by the last linguistic factors (Previous Segment and Following Segment)

/b/ variants	Stop [b]		Approximant [β]		Fricative [v]	
FG5: Previous Segment	%	N	%	N	%	N
Initial	48.6	18	16.2	6	35.1	13
Consonants	26	30	55.7	64	18.3	21
Vowels	1.7	10	88.9	527	9.4	56
FG6: Following Segment						
Consonants	14.9	7	70.2	33	14.9	7
Vowels	7.3	51	80.8	564	11.9	83
Total N			745			

In contrast with the findings of Sadowsky (2011) and Vergara (2013), the labiodental variant [v] in El Paso Spanish occurred more frequently with no preceding segments with a rate of 35.1%. When consonants are preceding /b/, labiodentals [v] occurred with a rate of 18.3%. The lowest percentage of [v] is found when vowels are preceding the sound of interest with a 9.4%. When vowels are preceding [β], the rate of its occurrence is a 88.9%, when consonants are preceding, results shows a percentage of 55.7%, and when no segment are preceding, rates go down at 16.2%. The stop [b] occurred more frequently when previous segments were not present with 48.6%, followed by preceding consonants with 26% and 1.7% when vowels

preceded [b]. Results of [β] and [b] correspond to the distribution of /b/ described by Hualde (2014) and Westbury and Keating (1986).

4.3.4 Following Segment

Results of the Following Segment group show a higher rate of [v] when consonants are following with 14.9% as in *libro* [livro] (book) or *hablara* [avlara] (to speak) compared to following vowels with 11.9% as in *bosque* [voske] (woods) *salvó* [salvo] (saved). Realizations of [β] are higher when vowels are following with 80.8% compared to following consonants with 70.2%. The highest rate for [b] is found when consonants are the following segment with a rate of 14.9% while following vowels creates the lowest rate of 7.3%.

4.4 Acoustic Analysis Results

As described in section 3.5, the acoustic parameters analyzed to document /b/ variants in El Paso Spanish are Duration and Relative Intensity. Table 2.4 presents the overall results of the acoustic analysis.

Table 2.4 Overall Duration and Relative Intensity for [b], [β], and [v]

/b/ variants	Stop [b]	Approximant [β]	Fricative [v]
Mean Duration	26 ms	30 ms	59 ms
Mean Relative Intensity	-4.4 db	-2.6 db	-6.9 db

Results in Table 2.4 show that [b] is the labial variant with the shorter duration with a mean of 26 ms., followed by [β] with a mean of 30 ms. and [v] with a mean of 59 ms. These

results are similar to previous findings that report an increase in duration from the bilabial stop to the labiodental fricative (Gerfen, 2002; Pindziak, 2012; Trovato, 2017)

Table 2.4 shows that [v] has the lowest relative intensity with a mean of -6.9 db., compared to [b] with -4.4 db. and [β] with -2.6 db. These relative intensity differences were expected because the labiodental fricative sound is less constricted than the bilabial approximant or the bilabial stop (Carrasco et al. 2012).

Since I hypothesize that [v] is present in El Paso Spanish as a result of the contact with English, I compared the duration and relative intensity of the utterances produced by the different groups since they represent different degrees of English contact. Results are presented in two separate figures, one for duration (Figure 4.1) and the other for relative intensity (Figure 4.2) to facilitate the identification of differences between the acoustic parameters.

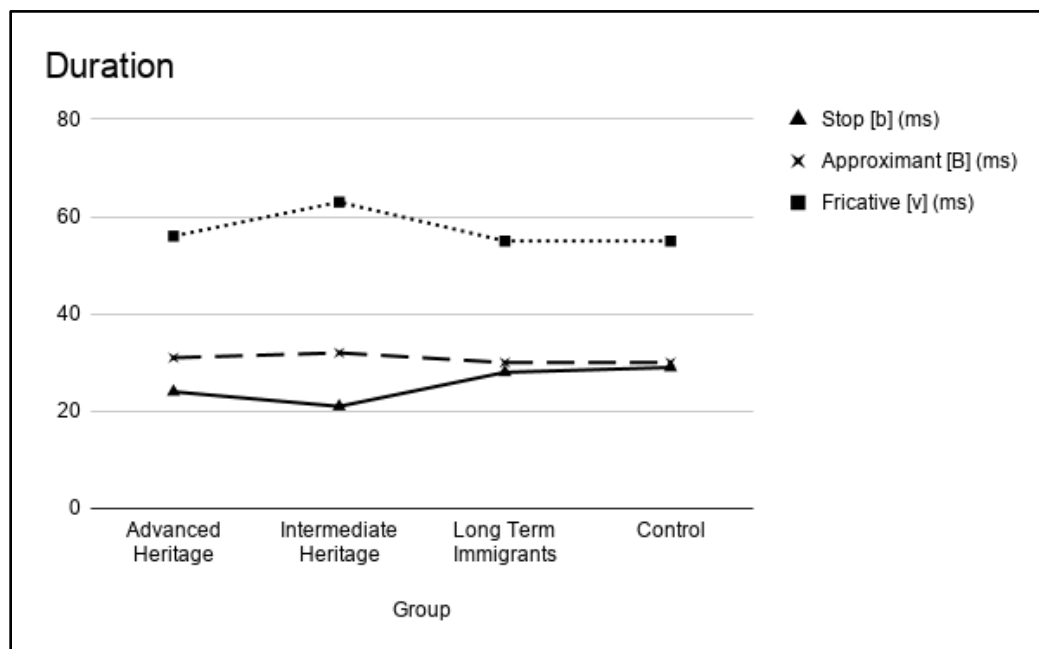


Figure 4.1 Duration of /b/ variants in El Paso Spanish across Groups (Advanced Heritage, Intermediate Heritage, Long Term Immigrants, and Control)

Results in Figure 4.1 show that the Intermediate Heritage group has the longest duration of [v] with a mean of 63 ms., followed by the Advanced Heritage group (56 ms.). Long Term Immigrants and the Control group have the same duration of [v] with 55 ms. respectively. Results of relative intensity across all groups are presented in Figure 4.2 below.

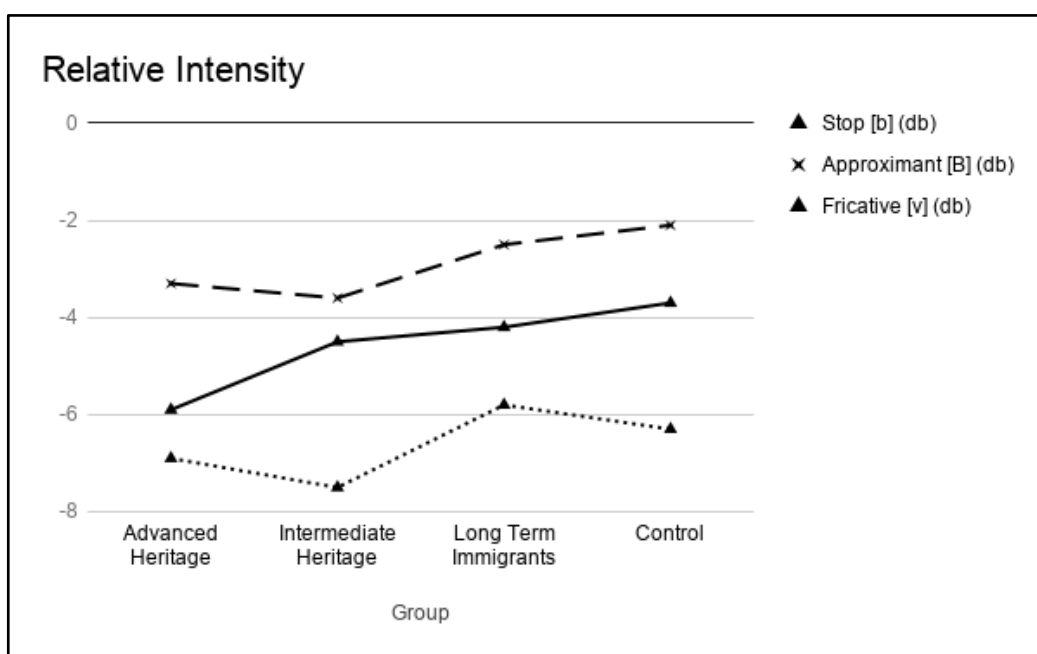


Figure 4.2 Relative intensity of /b/ variants in El Paso Spanish across Group (Advanced Heritage, Intermediate Heritage, Long Term Immigrants, Control)

Results in Figure 4.2 show that [v] has the lowest relative intensity with a mean of -7.5 db in the Intermediate Heritage group, followed by the Advanced Heritage group (-6.9 db), Control group (-6.3 db) and Long Term Immigrants (-5.8 db). Jongman et al. (2000) report similar relative intensity of English [v] with a mean of -7.9 db

4.5 Statistical Analysis

To find which factors are significantly correlated with the occurrence of [v] in El Paso Spanish, I conducted a binomial logistic regression using Minitab[®] Statistical Software (2018). The following tables present results only for the labiodental [v], since it is the focus of the present study. Table 2.5 shows the results of the acoustic parameters, linguistic, and social factor groups. Factors with a p-value less than 0.05 are considered statistically significant. Since Minitab could not analyze all social and linguistic factors at the same time, I performed a separate analysis for the factor groups Previous Segment and Following Segment, presented in Table 2.9.

Table 2.5 Regression analysis of acoustic parameters (Duration and Relative Intensity), linguistic (Position in Word and Stress), and social (Group and Gender) factor groups with their p-values

Deviance Table					
Source	DF	Adj Dev	Adj Mean	Chi-Square	P-Value
Regression	9	252.317	28.035	252.32	0.000
Duration	1	114.437	114.437	114.44	0.000
Relative Intensity	1	11.519	11.519	11.52	0.001
Group	3	17.869	5.956	17.87	0.000
Gender	1	1.215	1.215	1.21	0.270
Position in Word	2	6.569	3.284	6.57	0.037
Stress	1	5.809	5.809	5.81	0.016

The main factor groups showing statistical relevance are duration and participants' group ($p < 0.000$), followed by relative intensity ($p < 0.001$), and stress ($p < 0.016$). Position in word was the least relevant factor group with a p-value of 0.037. Surprisingly, gender did not show a significant difference. Stress and position in the word were not statistically significant in Trovato (2017), but gender was a significant factor.

As explained in section 3.5, I examined the correlation of duration and relative intensity with the presence of [v] in El Paso Spanish. Results from the binomial logistic regression indicate that these acoustic parameters are significantly correlated to the perceived place and manner of articulation of /b/ variants.

In addition to the significant relevance of the factor groups, the binomial regression analysis provides the coefficients of the factors analyzed (see Table 2.6). Coefficients can be understood as the behavior of the independent variables and their impact on the dependent variable. In other words, it allows the researcher to make predictions about the probability of occurrence of the variant of interest, in this case the labiodental [v], in relation to the factors analyzed. Table 2.6 presents such information and it will be discussed below.

Table 2.6 Binomial regression analysis of [v] against the independent variables considered in the study

Coefficients			
Term	Coef	SE Coef	VIF
Constant	-6.515	0.944	
Acoustic Parameters			
Duration	95.8	10.8	1.12
Relative Intensity	-0.1339	0.0412	1.24
Group			
Control	-0.283	0.497	1.77
Intermediate Heritage	0.981	0.443	1.92
Long term	-0.658	0.472	1.72
Gender			
Male	-0.382	0.350	1.10
Position in Word			
Initial	-0.038	0.629	4.14
Medial	-0.917	0.638	4.35
Stress			
stressed	0.881	0.371	1.44

Minitab assigns negative and positive numbers for the coefficients. As factors with negative coefficients increase, the probability for the response event to occur decreases. As factors with positive coefficient increases, the response event is more likely to occur. In this case, factors are the acoustic parameters, linguistic, and social factors. The response event is the labiodental [v] variant.

Table 2.6 indicates that perception of [v] is more likely to occur as the duration of the phoneme /b/ increases. On the other hand, the phoneme /b/ is less likely to be perceived as [v] if its relative intensity increases. In addition, realizations of [v] are more probable as the number of speakers in the Intermediate Heritage group increases, but if the Long Term Immigrants and Control group size increases, realizations of [v] are less likely to occur. Although Gender was not statistically significant, it is possible to make predictions about /b/ variant in relations to this factor group. The coefficients of male indicate that [v] is less likely to occur if the number of male speakers increases. Realizations of [v] are less likely to occur if instances of initial and medial positions in the word increase. Finally, coefficients of stress indicate that [v] is more likely to occur if instances of stressed syllables increase.

Another piece of information that a binomial logistic regression analysis in Minitab provides is the odds ratios. For continuous predictors like duration and relative intensity, the odds ratios indicate which factor more strongly favors the occurrence of the event; in this case, the perception of the variant [v]. For categorical predictors like group, gender, position in word, and stress, the odds ratios compare two levels of the same factor group and indicate in which one the event is more likely to occur. For instance, the odds ratios will compare male vs. female (both are factors of the same factor group, namely Gender) and will indicate in which gender the labiodental [v] is more likely to occur. A more detailed explanation and interpretation for the odds ratios will be presented latter in this section. Table 2.7 shows the odds ratios for the continuous predictors

Table 2.7 Odds ratios for the continuous predictors (Duration and Relative Intensity)

Odds Ratios for Continuous Predictors		
	Odds Ratio	95% CI
Duration	4.16560E+41	(2.53967E+32, 6.83245E+50)
Relative Intensity	0.8746	(0.8067, 0.9483)

In the odds ratios analysis, Minitab sets 1 as a baseline value for the continuous variables, which in this case are the acoustic parameters of duration and relative intensity. The variable with odds ratios greater than 1 will favor more the perception of [v] compared to the variable with odds ratios less than 1. As a result, Table 2.7 indicates that duration is the acoustic parameter that favors the most the perception of the labiodental [v] in El Paso Spanish. In addition, the exact value of odds ratios indicates that a change in duration of the sound of interest will favor the perception of [v] 4.16560E+41 times more than a change in relative intensity. Table 2.8 shows the odds ratios for the categorical predictors.

Table 2.8 Odds Ratios for the categorical predictors (Group, Gender, Position in Word, and Stress)

Odds Ratios for Categorical Predictors			
Level A	Level B	Odds Ratio	95% CI
Group			
Control	Advanced Heritage	0.7536	(0.2846, 1.9956)
Intermediate Heritage	Advanced Heritage	2.6682	(1.1189, 6.3628)
Long term	Advanced Heritage	0.5177	(0.2054, 1.3049)
Intermediate Heritage	Control	3.5406	(1.4842, 8.4464)
Long term	Control	0.6870	(0.2733, 1.7271)
Long term	Intermediate Heritage	0.1940	(0.0855, 0.4406)
Gender			
Male	Female	0.6824	(0.3437, 1.3547)
Position in Word			
Initial	Absolute Initial	0.9630	(0.2805, 3.3064)
Medial	Absolute Initial	0.3998	(0.1144, 1.3968)
Medial	Initial	0.4151	(0.2050, 0.8406)
Stress			
stressed	unstressed	2.4128	(1.1664, 4.9909)

Again, in the odds ratios analysis, Minitab sets 1 as a baseline value for the categorical variables (linguistic and social variables), and adds two levels; level A and level B. When odds ratio are greater than 1, the event is more likely to occur in factors under level A than in level B. When odds ratio are less than 1, the event is more likely to occur in level B than in level A. Also, odds ratio indicates how probable is the occurrence of the event in the factors under level A in

contrast to factors under level B (and vice versa, depending if odds of ratios are greater or less than 1).

Table 2.8 indicates that [v] is 3 times more likely to occur in the Intermediate Heritage group than in the Advanced Heritage and Control groups. And almost 4 times more likely to occur in the Intermediate Heritage group than in the Control group. Also, Table 2.8 indicates that realization of [v] is almost 3 times more likely to occur in stressed syllables than in unstressed ones.

Since the rest of the odds ratios are less than 1, it is understood that it is equally likely that the event occurs in factors under level B than in level A. As shown in Table 2.8, [v] is more likely to occur in the Advanced Heritage group than in the control and the Long Term Immigrants. The labiodental is more likely to occur in the Intermediate Heritage group than in the Long Term Immigrants. [v] is more likely to occur in female speakers than in male speakers. Finally, [v] is more likely to occur in absolute initial position than in word initial and medial positions, and it is more likely to occur in word Initial position than in medial position.

The binomial logistic regression results for the factors groups Previous Segment and Following Segment is presented below in Table 2.9

Table 2.9 Regression with p-value for the factor groups Previous Segment and Following Segment

Deviance Table					
Source	DF	Adj Dev	Adj Mean	Chi-Square	P-Value
Regression	3	22.169	7.3895	22.17	0.000
Previous Segment	2	21.349	10.6747	21.35	0.000
Following Segment	1	0.994	0.9938	0.99	0.319

Results in Table 2.9 show that Previous Segment is significantly correlated with the occurrence of [v] in El Paso Spanish with a p-value of 0.000, while Following Segment did not show a significant difference. These findings differ from those presented in Trovato (2017) where the adjacent phonemes were not found statistically significant. Table 3.1 shows the coefficients for Previous and Following Segment.

Table 3.1 Coefficients for previous vowels, #_(Initial), and following vowel

Coefficients			
Term	Coef	SE Coef	VIF
Constant	-1.091	0.451	
Previous Segment			
Vowel	-0.779	0.280	1.33
#_(Initial)	0.880	0.421	1.33
Following Segment			
Vowel	-0.427	0.412	1.00

As explained above (see coefficients discussion in this section) Minitab assigns positive and negative values to the coefficients of the independent variables. Table 3.1 indicates that [v] is less likely to occur with preceding vowels and more likely to occur in absolute initial position. Finally, [v] is less likely to occur with following vowels. Table 3.2 presents the odds ratios for the factor groups currently discussed.

Table 3.2 Odds ratios for the categorical predictors (Previous Segment and Following Segment)

Level A	Level B	Odds Ratio	95% CI
Previous Segment			
Vowel	Consonant	0.4591	(0.2653, 0.7943)
#_(Initial)	Consonant	2.4117	(1.0563, 5.5061)
#_(Initial)	Vowel	5.2536	(2.5313, 10.9035)
Following Segment			
Vowel	Consonant	0.6526	(0.2910, 1.4635)

As explained earlier Minitab sets 1 as a baseline value for the categorical predictors. Table 3.2 indicates that [v] is almost 3 times more likely to occur in absolute initial position than when preceding a consonant. Also, [v] is approximately 5 times more likely to occur in absolute initial position compared to preceding vowels. Table 3.2 shows that realizations of [v] are almost one time more likely to occur with following vowels compared to following consonants.

In the following chapter, I will summarize the main findings of the present study and interpret the results in connection to the hypotheses/research questions and the literature review. I will then discuss the implications of the research for the field of bilingualism.

CHAPTER FIVE

DISCUSSION

Previous studies have documented the influence of orthography on the pronunciation of [v] (Cartagena, 2002; Stevens, 2000; Takawaki, 2012; Torres Cacoullos & Ferreira 2000; Trovato 2017). Since data from this research come from a narrative task without the orthographic representation of the word, I predicted a lower rate of labiodentals compared to Trovato (2017) who used a reading task to elicit his data. The results from the present study indicate that the labiodental [v] occurred with a rate of 12.1% compared to the 33% reported by Trovato (2017). Therefore, this difference in results confirms that the different task used in this study elicited less instances of [v]. This could also be due to the more informal nature of the task used in this study.

On the other hand, Chilean [v] was not favored by orthography in previous studies. Sadowsky (2010) reported that Chilean [v] corresponds to both graphemes and <v>. Such results were further confirmed in Vergara and Perez (2013). In addition, Vergara (2011) argued that Chilean [v] is equally distributed among literate and illiterate speakers. Hence, these results show that orthography does not influence the occurrence of Chilean [v] as opposed to [v] described in Cartagena (2002), Stevens (2000) Takawaki (2012), Torres Cacoullos & Ferreira (2000), and Trovato (2017). This difference in results can be explained by considering the English phonetic repertoire, which includes a phoneme /v/ corresponding to the grapheme <v>. This will be explained in more depth below.

Results show that [v] was more frequent in the Intermediate and Advanced Heritage groups with 25.4% and 12.1%, respectively. This indicates that the labiodental variant is more frequent among speakers with a higher degree of English contact and English proficiency. As

explained in section 3.2, heritage speakers were exposed to English before the age of twelve and developed a better competency in their L2 phonology (Long, 1990; Scovel, 1988; Shi, 2017). Since English has this sound in its phonological system (Ladefoged, 1996), more [v] was expected among heritage speakers. The influence of contact with English is clear from the results, showing statistical significant differences between the groups. Also, the groups' results suggests that the phonemic contrast in English between /b/ and /v/ affects at different degrees the realization of the sounds in El Paso Spanish. The underlying representation of the phoneme /b/ in Spanish may be different even between the advanced and intermediate heritage group likely due to an incomplete acquisition of Spanish. Studies have documented that heritage speakers may be quite heterogeneous, with some speakers being highly proficient in the heritage language and almost indistinguishable from their monolingual peers, while others exhibiting only a receptive ability in the heritage language (Benmamoun, Montrul, & Polinsky, 2013; Montrul, 2015). Hence, These proficiency differences between the heritage speakers has been catalogued as an incomplete acquisition. Also, such results suggest that there is a cross-linguistic phonological influence of the L2 onto the L1 as suggested in Marian, and Kaushanskaya (2007) and Petersen et al. (2013). Such authors, explain that features of the L2, like phonemes, can be transferred to the L1 as L2 level of exposure increases.

Stress was significantly correlated with the occurrence of [v] in El Paso Spanish with a p-value of 0.016. The only study that has previously analyzed the influence of stress in the labiodental variation of /b/ is Trovato (2017). However, the author did not find stress as a statistical significant factor. This discrepancy could suggest an influence of the data elicitation technique. As mentioned before, Trovato (2017) used a picture naming and a reading task to elicit his data. Both tasks yield isolated tokens, whereas the data used in this study come from a

narrative (storytelling) task, which yield tokens in connected speech. Stressed syllables favored the occurrence of [v] in the present study, which suggests that realizations of [v] are the result of an articulatory strengthening process, as opposed to [β] which occurred more frequently in unstressed syllables.

Position in the word provided unexpected results. Previous studies have documented that [v] is favored in medial position (Sadowsky, 2010; Vergara, 2013 Takawaki, 2012; Trovato 2017). However, the present study found that absolute initial position favored [v] instead. Trovato (2017) argued that the lower incidence of [v] in absolute initial position suggests that labiodental variation is not part of a pragmatic strategy used by speakers to denote emphasis. As stated before, the data used in the present study come from a storytelling. Speakers were asked to narrate the story as if they were telling the story to children. Therefore, some participants did use a pragmatic strategy designed to entertain children, as opposed to previous studies which used data elicitation techniques such as picture naming, reading a word list, or a paragraph such as Takawaki (2012) and Trovato (2017). This suggests, again, that data elicitation technique influences the occurrence of the labiodental [v]. Also, stressed position and absolute initial position are phonetically more salient, which confirms the idea that [v] is used in more emphatic contexts.

Previous segment was found to be a statistically significant factor in the present study, but not in Trovato's (2017). As stated earlier, absolute initial position favors the realization of [v] almost three times more than a preceding consonant context and five times more than a preceding vowels context. Hence, results of preceding segment further confirm the influence of absolute initial position in the labiodental variant in El Paso Spanish. Preceding consonants to /b/ did not show a strong influence on the occurrence of [v] except for preceding /l/ which clearly

avored the occurrence of [v] (see Figure 5.1). The effect of preceding [l] was previously reported in Romero et al. (2010), Takawaki (2012), and Vergara (2013).

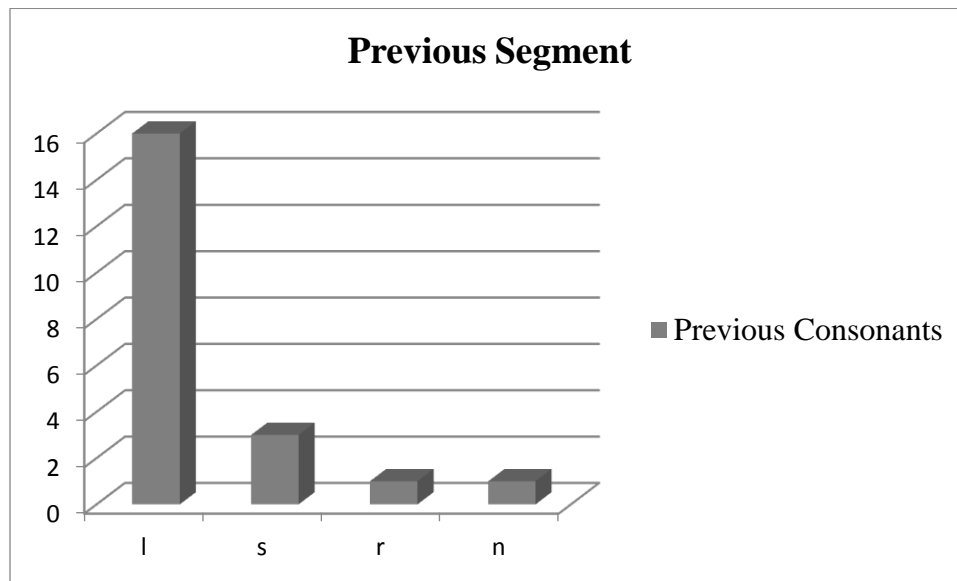


Figure 5.1 Number of labiodental realizations by preceding individual consonants

Following segments to [v] do not show such a clear pattern. However, instances of the labiodental [v] were not found when the following segment was /u/. This could be due to coarticulation between /u/ and the preceding sound. In this study, [β] was the most frequent variant before /u/, which makes sense because they are both bilabial.

Although gender did not yield statistical significance, female speakers did produce a higher percentage of [v] than male speakers (12.8% vs. 10.7%). These results follow the previous findings in Romero et al. (2008), Stevens (2000), and Trovato (2017). However, further research needs to explore the supposedly prestigious status of [v] suggested by previous research (Stevens, 2000) for [v]. Results of the approximant [β] are similar between female and male speakers with a percentage of 79.7% and 80.9% respectively. This confirms that [β] is the most

common variant in Spanish, as previously reported by Hualde (2014), and that it is not a sociolinguistic marker.

Results of the acoustic analysis suggest that duration and relative intensity are appropriate acoustic parameters to distinguish perceived labial variation of /b/ in El Paso Spanish. These parameters were found statistically correlated to the perception of [v] in Trovato (2017). Furthermore, the duration of [b] suggests an influence of English in the speech of the heritage group. This influence is seen with more strength in the Intermediate Heritage group since they exhibit the shortest duration of [b] compared to the rest of the groups.

VOT is useful to understand the relationship between duration of segments and language influence. As stated earlier (see Literature Review section), voice onset time (VOT) is the duration between the release of the stop and the beginning of the vocal fold vibrations (Kehoe, Lleo, & Rakow, 2004; Lousada, Jesus, & Hall, 2010). Deuchar and Clark (1996), reported a longer VOT in Spanish voiced stops compared to English. Considering such findings, the 21 ms. mean duration of [b] by the Intermediate Heritage group resembles the short duration of English [b] which is expected based on English VOT length. As influence of English decreases duration of [b] increases. The Advanced Heritage group reported a more balanced bilingualism and equal proficiency in both English and Spanish (see Table 1.2). As a result, the Advanced Heritage group reported a longer [b] (24 ms.) than the Intermediate Heritage [b] (21 ms.). Long Term Immigrants were exposed to English once their L1 grammar was fully developed at the age of 13 (Snow & Hoefnagel, 1978; Foster-Cohen, 1993). As expected, Long Term Immigrants' duration of [b] increases with respect to the heritage speakers by 4 ms. The Control group reported the lowest proficiency in English, but the highest proficiency and language use of Spanish as shown by their DELE or self proficiency scores. As a result, their [b] duration is the longest with a mean

of 29 ms. as expected for Spanish [b]. Again, the pattern of [b] duration suggests an increase in duration as speakers have less contact with English and are less influenced by it.

The approximant [β] is not present in the phonetic inventory of English (Ladefoged, 1996) but it is present in most of the phonetic contexts in Spanish as an allophone of /b/ (Hualde, 2014). On the other hand, the phoneme /v/ is absent in Standard Spanish, but present in English (Hualde, 2014; Ladefoged, 1996). Results of the groups analyzed in this study show that heritage speakers have longer labiodentals [v] and approximants [β] compared to Long Term Immigrants and Control groups. This could suggest that speakers may be producing more [v] as proficiency in English increases because [β] is absent in English. Conversely, speakers with lower proficiency in English realize the fricative [v] as an approximant [β] based on the results of duration. This bidirectional relation is illustrated in Figure 5.2.

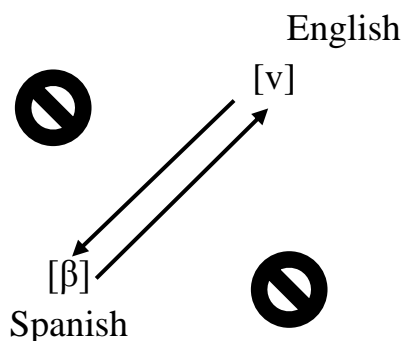


Figure 5.2 Bidirectional relation between the approximant [β] and the fricative [v]

Results of relative intensity confirm the findings of Carrasco et al. (2012) who argue that sounds with less articulation will exhibit a smaller relative intensity difference with the following vowel. It also suggests that the approximant [β] is the variant with less level of constriction.

Ladefoged (1975, p. 277) provides the following definition for approximants: “The approach of one articulator towards another but without the vocal tract being narrowed to such an extent that a turbulent airstream is not produced.” Since the articulators approach one another, the level of constriction is not strong as in the labiodental fricative or the bilabial stop where there is contact. Also, Martinez-Celdrán (2004) describes approximant consonants as sounds with no articulatory precision. These definitions along with the results of relative intensity suggest that [β] is a variant that occurs as a result of a weakening process and that appears in more colloquial style of speech (Hualde, 2005). As expected, heritage speakers had lower rates of [β], a variant absent in English, and higher rates of [v]. Results of the present study suggest that language contact not only affects the L2 sound system but also the native language system of sounds. In the case of the heritage groups, the intermediated heritage speakers show an underlying representation of /b/ more influenced by the phonemic contrast of /b/ and /v/ in English than the advanced heritage speakers, who are more proficient in the heritage language (Spanish). This could be due to limited input received of the heritage language during the intermediate heritage speakers’ childhood

Finally, it is important to consider the social aspect of the variant of interest. Both, English and Spanish interact at a social level in El Paso-Ciudad Juarez border. On one hand, English is the dominant language in the U.S. and speaking it provides its users a sense economic and labor security (Davila, &, Mora, 2000). Hence adopting English can symbolize a social and economic advancement in the border, whereas Spanish might represent struggles for the future of Hispanics in the U.S. However, Vance (2004) proposed to break certain social misconceptions about language. For instance, understanding that speaking Spanish in an English community could actually be beneficial. For Vance, today’s businesses demand that bilingual individuals and

students should be prepared in more bilingual schools. In this way both languages could be seen as equally important in society. This sociocultural conflict experienced by heritage speakers is rooted in discourses of society that in some way force bilingual speakers to perceive one language as beneficial and other as a deficit (Showstack, 2012). Adopting one language over another represents a cultural identity affiliation and heritage speakers seems to do so by adopting phonological characteristics of English over Spanish, in this case the use of [v], is an indication of an identity affiliation of heritage speakers.

CHAPTER SIX

CONCLUSION

6.1 Summary of Current Study

The purpose of this study was to investigate the occurrence of [v] in El Paso Spanish. As discussed earlier in Chapter 1 and 2, the voiced labiodental fricative is not present in standard Spanish, but it is part of the English phonological system. Therefore, this research was attempting to explain the presence of [v] in terms of language contact. More specifically, how speakers who were exposed to English at an early age show a phonological influence of the L2 in their L1 resulting in more instances of [v] in Spanish. In English, /v/ and /b/ are contrastive phonemes, whereas in Spanish there is no contrastive difference. Such phonological characteristic of English, among other linguistic and social factors, was hypothesized to influence the occurrence of the labiodental fricative [v] in El Paso Spanish. Results indicated that the variant of interest is present in all speakers, whether bilinguals or monolinguals with a different rate of frequency.

This study confirms the presence of [v] as a variant of /b/ El Paso Spanish. Other studies (Romero et. al. 2008; Sadowsky, 2010; Stevens, 2000; Takawaki, 2012; Tim, 1976; Torres Cacoulllos and Ferreria, 2000; Trovato, 2017; Vergara, 2013) have documented the occurrence of [v] in the Spanish spoken in the areas of the U.S. and different varieties of Latin American Spanish.

This study reported an overall occurrence of [v] of 12% (N=90) while Trovato (2017) reported a higher rate of [v] (33%). This may be due to the different task elicitation technique used in both studies: a reading task in Trovato (2017), and a narrative using pictures in the present study. The group that showed the highest percentage of [v] was the Intermediate Heritage

group with 25.4%. This group was composed of speakers with a high proficiency in English but low in Spanish, and with a more frequent reported use of English than Spanish. The characterization of the Intermediate Heritage group, along their high percentage of [v] provided evidence of the influence of English on the Spanish phonological system.

Duration and relative intensity proved to be successful parameters in the identification of different /b/ variants. The labiodental variant was the longest in duration with a mean of 59ms. The relative intensity of [v] was the lowest with a mean of -6.9 db. The pattern shown by the different groups indicated that duration of [v] was longer in groups highly influenced by English, and their relative intensity was lower too. Groups with less influence of English had a shorter duration of [v] and a larger relative intensity. This way, the acoustic analysis provided further evidence of L2 influence on the L1 and it matched well with the results of the perceptual analysis.

The results above confirmed in general the findings of Trovato (2017), who analyzed the same variant in the same speech community. However, the effects of factors such as stress, position in word, previous and following segments, and the overall occurrence of [v] were different in this present study compared to Trovato's (2017). Participants in the present study not only produced less labiodental fricatives explained by the absence of orthographic representation of the word, but also linguistic factors such as stress and position in word behaved differently. A possible explanation is that participants in this study were asked to narrate the story as if they were telling it to children. This instruction could have modified the participants' speech resulting in a different effect of stress and position in the word due to the emphasis added to their speech. For instance, stress was statistically significant in this study but not in Trovato's (2017) research.

Here, stressed syllables favored the occurrence of [v]. On the other hand, Trovato reported more instances of [v] in unstressed syllables.

Position of [v] in the word was significant in the present study and, surprisingly, the results indicated that absolute initial position was a determining factor in the realization of [v]. Another difference to Trovato's study is the lack of gender effect found in the present research.

The results of this study provided relevant information about how an early acquisition of an L2 can affect the phonological system of the L1. As discussed in Chapter 2, bilinguals' L2 is influenced by their L1, but it is also possible that their second language, as demonstrated in the present study, influences their native language. Interestingly, the long-term immigrants group showed limited L2 influence in their L1. Previous studies have found that second language adult learners can show L2 influence in their L1 at the lexical and syntactic level (Bice & Kroll, 2015; Dussias, 2003; Dussias & Sagarra, 2007; Link, Kroll & Sunderman, 2009). However, the results of this study seem to demonstrate that the cross-linguistic phonological influence works differently compared to the lexical and syntactic influence. In this study, heritage speakers exhibited a phonological feature that it is present in English, but not in standard Spanish. It is possible then, to argue that language contact is more dynamic, meaning that the L2 can influence the L1 of speakers as also reported by (Amengual, 2011; Limerick, 2015; Marian & Kaushanskaya, 2007; Petersen et al., 2016). In addition, this study confirmed that [v] can be acoustically identified using duration and relative intensity, which was reported in Trovato (2017).

These findings contributed to the acoustic study of sounds in linguistics using modern methods such as the PRAAT software. The benefits of using acoustic analysis software is that it

provides a more accurate picture of the variant of interest, rather than just relying on impressionistic judgments.

This study demonstrated that the data elicitation technique can impact on the occurrence of variant of interest, in this case [v]. Previous studies of [v] in Spanish have focused on a careful speech where the influence of orthography was present (Stevens, 2000; Takawaki, 2012; Torres Cacoullós and Ferreria, 2000; Trovato, 2017) however, this study adds to the literature results of a less careful speech where the influence of the printed word was absent. Finally, this study contributed to the linguistic description of El Paso which is a region that until Trovato (2017) study has not been studied using more advanced acoustic methods. El Paso is an interesting region because of its language contact situation and the mix of culture that provide unique environments for linguistic investigations like the present.

6.2 Limitations and Future Studies

There are limitations in this study that need to be further discussed. Since I used a corpus developed in a broader investigation (Mazzaro, Cuza, & Colantoni, 2016), I have no control on the participants. The most salient issue related to participants was that they were not equally distributed by age and gender, which made the statistical analysis of those social factors more challenging. In addition, the storytelling task itself represented a challenge because it was not possible to control the number of tokens per participants. Therefore, some participants ended up yielding more tokens than others causing an irregular distribution of /b/ variants including [v]. Also, because the story was narrated as if the audience were children, some participants exaggerated their speech in order to add suspense or emphasis to the story. The way participants narrated the stories may have altered the acoustic parameters of duration and relative intensity. In

addition, the rate of speech varied across participants which caused problems in the correct identification and analysis of /b/ variants. All these limitations should be considered in future studies that require elicitation of informal speech.

Further investigations could consider other aspects of Spanish [v] in El Paso such as language attitudes that can bring valuable information, as Chappell (2018) study did in San Antonio, TX. Following Torres Cacoullos and Ferreira (2000), future researchers can also investigate the behavior of [v] in English-Spanish cognate words to find similarities and differences between the New Mexican Spanish and El Paso Spanish. Lastly, it is important to examine other linguistic characteristics of heritage speech in order to increase our understanding of the effects of language contact, which was the main scope of the present study.

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APPENDIX

Appendix 1: IRB Approval Letter



THE UNIVERSITY OF TEXAS AT EL PASO
Office of the Vice President for Research and Sponsored Projects
Institutional Review Board
El Paso, Texas 79968-0587
phone: 915 747-8841 fax: 915 747-5931

FWA No: 00001224

DATE: September 8, 2017

TO: Roberto Ortega, BA

FROM: University of Texas at El Paso IRB

STUDY TITLE: [1123254-1] A labiodental fricative voiced [v] in the Spanish of El Paso Texas

IRB REFERENCE #: College of Liberal Arts

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: September 8, 2017

REVIEW CATEGORY: 45 CFR 46.101(b)(4)

Thank you for your submission of New Project materials for this research study. University of Texas at El Paso IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

Exempt protocols do not need to be renewed. Please note that it is the Principal Investigator's responsibility to resubmit the proposal for review if there are any modifications made to the originally submitted proposal. This review is required in order to determine if "Exemption" status remains.

We will put a copy of this correspondence on file in our office.

If you have any questions, please contact the IRB Office at (915) 747-8841 or irb.orsp@utep.edu. Please include your study title and reference number in all correspondence with this office.

cc:

VITA

Roberto Ortega is a linguistics graduate student from The University of Texas at El Paso. During his Bachelor's in Anthropology, Roberto took several classes related to linguistics, founding his academic passion the link between society and language. Roberto graduate from Anthropology with honors in Cum Laude, and a recognition as an Outstanding Student. During the development of his Master's of Arts in Linguistics with a concentration in Hispanic linguistics at The University of Texas at El Paso, Roberto was a teaching assistant of several linguistics classes such as Introduction to Linguistics, Syntax, Phonology, and Sociolinguistics, as well as a ESOL tutor working with students' essays and providing conversational classes to improve oral and written skills of students. In addition, Roberto was the research assistant of Dr. Carla Contemori where he conducted experiments, organize the data, and assist in the development of further research experiments.