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The production of Mexican rhotics by Haitian Creole speakers in Tijuana Mexico: a sociophonetic approach

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Abstract

This study investigates the production of the Spanish /ɾ-r/ (e.g., <pero> [ˈpɛ.ɾo] 'but' vs. <perro> [ˈpɛ.ro] 'dog') contrast by 30 multi-lingual Haitian Creole speakers learning Spanish, living in Tijuana, Mexico. Specifically, it (a) tests the Speech Learning Model (Flege, 1995) regarding the ease of acquisition of 'new sounds' (i.e. the Spanish rhotics), (b) examines the effect of orthography and (c) investigates the role of social factors, namely language attitude and education on the production of the Spanish rhotics. An acoustic analysis of 2396 tokens show that despite Flege's predictions, the [r] and the [ɾ] are difficult for the learners to produce, albeit the latter is easier than the former. Developmental patterns, transfer and target-like production of the /ɾ/ and the /r/ are reported. The results also indicate a novel effect of orthography, where the grapheme <r> and the digraph <rr> trigger an asymmetrical effect in the learners' productions. Moreover, the results presented a trend, where the more educated learners had less difficulty with the production of the /r/. Furthermore, all learners reported a positive attitude towards Spanish, which may explain why there was not a significant correlation between language attitude and the production of the /ɾ-r/ contrast. The findings make an important contribution to the field of L2 and speech learning because of the various factors that have been considered in the study.

Keywords

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Chapter 1

1 Introduction

1.1 Objectives of study

The overall aim of this study is to investigate the production of Spanish rhotics, specifically the tap /ɾ/ and the trill /r/ in intervocalic position (e.g., <pero> [ˈpɛ.ɾo] 'but' vs. <perro> [ˈpɛ.ro] 'dog') by Haitian Creole learners in Tijuana, Mexico. The Spanish rhotics (i.e. [ɾ and [r]) do not exist in Haitian Creole, which is the learners' first language (L1). The goals of this study are three-fold. The first goal of the study is to test Flege's (1995) Speech Learning hypothesis. This is accomplished by determining the degree of accurate production, the transfer from Haitian Creole, and the developmental patterns in their Spanish rhotic production. The second aim of the study is to determine whether exposure to orthography promotes or hinders the production of the [ɾ] and [r] in Spanish by Haitian Creole learners of Spanish. The third aim of the study is to investigate the effect of social factors, namely level of education and attitudes towards Spanish on Spanish rhotic production.

1.2 Research questions and overview of the methodology and findings

The research questions in this study are as follows:

1. Will Haitian Creole learners of Spanish have difficulty with the production of the Spanish [ɾ] and the [r] contrast?

2. Will orthography exert a positive or a negative influence on the production of the [ɾ] and the [r]?

3. Will there be an effect of social factors, namely level of education and language attitude?

To test the proposed research questions and hypotheses, 30 intermediate-advanced adult Haitian Creole-speaking learners of Spanish participated in this study. Part of the focus of this study was to examine the speech productions and the connections between social factors in a marginalized

community in a boarder and immigration context. The production of Spanish by Haitian Creole learners of Spanish living in Tijuana lends itself well to this kind of study because of their refugee status in Mexico. The participants have lived in Tijuana, Mexico for at least one year. Some had previous knowledge of Spanish and had lived in Spanish speaking countries. The participants were asked to perform a picture-naming task and a reading list in Spanish. The purpose of both tasks was to assess their productions of the Spanish rhotics. A second aim was to analyze whether there would be an effect of orthographic input or not. They were then asked to complete a reading task in Haitian Creole and French. In order to examine their production of the Spanish /ɾ-r/ contrast, stimuli were included where the phonological contrast occurs, in the intervocalic position and where orthography cues the difference too (e.g., <r>- [ɾ] vs. <rr>-[r]). The stimuli were the same for both tasks. Word stress, position, and number of syllables were controlled for. In addition to controlling for the effects of word position, stress and syllables, the effect of task repetition was controlled for by asking the participants to complete each task twice. Finally, to examine the social factors that have been previously mentioned, the participants were asked to complete a semi-directed interview, language attitude questionnaire, and a language background questionnaire. These additional tasks allowed measurement of the learners' language attitude responses and education background.

An acoustic analysis of Haitian Creole speakers' Spanish rhotics was conducted using PRAAT (Boersma & Weenink, 2017) in order to determine manner of articulation and to measure duration and voicing for the [ɾ] and the number of closures for the [r]. When examining accurate production of the Spanish /ɾ-r/ contrast, this study looks at the degree of accurate production, transfer from the Haitian Creole rhotics, developmental patterns, and other patterns that emerge in the production by Haitian Creole learners.

Both the Spanish [ɾ] and [r] were difficult for the Haitian Creole learners in this study, albeit the [r] was more difficult than the [ɾ]. Cross-linguistic influence was found in the production of the Haitian Creole learners' /ɾ-r/ contrast in Spanish. There was evidence of (a) the Haitian voiced velar fricative [ɣ] that occurs in coda and onset position before unrounded vowels (e.g., French /rêver/ [ʁeve] Haitian Creole /reve/ [ɣeve] 'to dream'), (b) the voiced labial-velar glide [w] which is realized when there is a rounded vowel in onset position (e.g., French /zéro/ [zeʁo] Haitian Creole /zewo/ [zewo] 'zero'), and (c) deletion, which occurs in coda position as well (e.g., French

<la mer> [lamɛʁ] occurs as Haitian Creole <la mè> [lamɛ] 'sea' (Storme 2017)). In addition, there was evidence of developmental patterns (e.g., [l] productions) as well as combination productions (e.g., [l+ɾ]). Combination segments have also been previously reported in the production of <ll> by naïve English-speaking learners of Spanish (Rafat & Stevenson, 2018) but not for rhotic productions. Moreover, the results showed that presence of orthography in the participants' productions promoted target-like realizations resulting in a higher rate of [r] and a slightly higher rate of [ɾ] production in the reading task. On the other hand, exposure to the digraph <rr> promoted combination productions when the target sound was a [r]. However, exposure to <r> reduced the rate of combination productions when the [ɾ] was the target sound. With respect to the effect of social factors, there was no significant relationship between the social factors and learner productions. The rest of this section describes the foundations and contributions this study provides.

Previous studies have found that Spanish rhotics are difficult for learners due to their articulatory difficulty (Olsen, 2012; Stockwell, Bowen & Martin, 1965). This study will contribute to the field of multilingual speech learning by comparing the findings to previous studies that have examined the production of the Spanish rhotics (Patience, 2018; Olsen, 2012). Additionally, it sets out to test and compare previous findings that have also tested Flege's Speech Learning Model (SLM; 1995). As per Flege's SLM (1995) it would suggest that both the [ɾ] and the [r] will be easy to acquire sounds because they are considered new sounds in the inventory of these learners.

To my knowledge, no previous studies have examined the production of Spanish by Haitian Creole learners of Spanish. The present study proposes significant contributions towards our understanding of the acquisition and production of the Spanish rhotics, specifically the /ɾ-r/ contrast in a multilingual context. Although this study does not examine the potential effect of the other languages (Portuguese and English) that some of the participants in this study may have spoken, it shows that based on the previous literature, the production of the multilingual Haitian Creole learners' of Spanish patterns are similar with those of second language (L2) learners. Moreover, this study will make a unique contribution to the field of multilingual speech learning because of the novel language pairing.

Secondly, the research presented in this thesis is significant because it contributes to our understanding of cross-linguistic influence. There are few studies considering the transfer of a first language (L1) in a multilingual context (Patience, 2018; Gabryś-Barker, 2012). This study examines the influence of Haitian Creole on this population's Spanish by completing an acoustic analysis and measuring the results to determine for transfer from their Haitian Creole rhotics into their Spanish. Thirdly, this research promises to make important contributions towards our comprehension of the influence of written language on oral production. Although there are a number of studies reflecting the role of orthographic input in the acquisition of L2 phonology (Steele, 2005; Showalter & Hayes-Harb, 2013; Rafat 2011, 2015), there is limited literature on the role of orthography in speech learning considering a multilingual population such as this.

Furthermore, few studies take a socio-phonetic approach like the current study has attempted. Many previous studies focused on the acquisition of Spanish rhotics either at a phonetic level only (Olsen, 2012, 2016; Balam, 2013), or have only focused on social factors that may influence foreign language learning and production, such as gender, identity, and class (Edwards, 1982; O'Rourke & Dunmore, 2016; Gao, 2014; Kobayashi, 2002). The current study attempts to combine these two focuses by examining the role of language attitudes and education level and their influence on the production of the Spanish rhotics.

In conclusion, this study will add to the empirical body of evidence on the acquisition of the Spanish rhotics by examining the production of the Spanish /ɾ-r/ contrast by Haitian Creole learners of Spanish living in Tijuana, Mexico. It will also test Flege's SLM and add to our understanding of the effect of transfer and developmental patterns. Moreover, it will shed light on the effect of orthography and highlight a new way in which orthography can modulate L2 production. Finally, in an attempt to gain a comprehensive understanding of what may determine speech learning in this population, it will adopt a socio-phonetic approach.

1.3   Structure of thesis

This thesis is comprised of 5 chapters. In the current chapter, I have commenced with a description of the objectives of the study, proposed the relevant research questions, and provided an overview of the methodology used and the findings. It also highlights the factors that

motivated this study and its contributions to the relevant fields. Chapter 2 is a review of previous studies. The first section of the Chapter 2 provides a phonetic description of the languages addressed in this study. It then provides an orthographic description of the three languages considered in this study (Haitian Creole, French and Spanish). Additionally, it examines the current theoretical models that are the most commonly used when studying L2 acquisition, specifically explaining how these current models are relevant to the current study. This is followed by a section on the role of orthographic input in L2 speech learning and focuses on studies that have considered the role of orthographic input in L1 and L2 acquisition. It then presents a review of previous studies that have examined the acquisition of the Spanish rhotics. Finally, Chapter 2 concludes with a section on the role of language attitudes in L2 speech learning. Chapter 3 presents the hypotheses and presents a summary of the methodological structure of the thesis including a description of the participants, the tasks, stimuli, and testing procedures. Chapter 4 describes the data analysis of the study. The results from all tasks are presented there, as well. I finish with Chapter 5 which involves the discussion of the study results as well as the conclusions section. The discussion compares the results from the present study with the findings from previous literature. The conclusions outline the contributions, implications, limitations and possible future studies of this work.

1.4   Chapter summary

This chapter provided an introduction to the themes this study addresses alongside a review of the methodology, a description of the objectives, and the presentation of the research questions. It also described the motivations behind this study as well as an explanation of how this thesis is structured. The following chapter will present a phonetic description of Spanish, Haitian Creole and French. Followed by an orthographic description of Haitian Creole, Spanish, and French, and a review of past studies that have considered the role of orthographic input. It will then review the most prominent L2 speech learning models and makes suggestions towards which theoretical model is the most applicable to the current study. It will then continue with a description of past studies that have examined the acquisition of the Spanish rhotics across various populations is provided. Finally, a review of past research that has considered the role of language attitude in foreign language production and learning is presented.

Chapter 2

2   Literature review

The current chapter will be a review of previous studies, which are relevant to the questions addressed in this study. The chapter begins with a phonetic description of Spanish, Haitian Creole and French. After, it provides descriptions of the orthographic systems of Spanish, Haitian Creole and French, followed by a description of the current L2 speech learning models. Next, a review of past orthographic studies that consider the role of orthographic input in L2 speech learning is presented. Additionally, it will examine past studies that have considered the acquisition of the Spanish rhotics and their findings. A section on past studies that have considered the role of language attitude in foreign language learning, acquisition and production concludes the chapter.

2.1   Phonetic characterization of Spanish, Haitian Creole and French rhotics

The current section will be a review of the phonetic characterizations of the rhotics sounds in three of the languages that the Haitian Creole learners of Spanish had knowledge of. The first will be a review of the target language Spanish and a description of the Spanish /ɾ-r/ contrast. This is followed by a description of the Haitian Creole rhotics and then a contrast of those to the French rhotics.

2.2   Spanish

In Spanish the voiced alveolar tap [ɾ] and the voiced alveolar trill [r] are contrastive intervocalically, (e.g., <pero> [ˈpɛ.ɾo] 'but' vs. <perro> [ˈpɛ.ro] 'dog' (Colantoni & Steele, 2008)) (e.g., <cerro> [ˈsɛ.ro] <cero> [ˈsɛ.ɾo] 'close' 'zero') (Hualde 2005). The main difference between the /ɾ-r/ contrast is that the [ɾ] "is produced with a single rapid contact of the tip of the tongue against the alveolar ridge (Hualde, 2005), whereas the [r] "is produced with several such rapid contacts, generally two or three [at a time]," (Hualde, 2005). The [r] also appears word initially (e.g., <reloj> [re.ˈlox] 'watch') and after a consonant as the onset in a different syllable

(e.g. <honra> [ˈõn.ra] 'honor') (Hualde, 2005, p.182), and as mentioned word medially. The Spanish [ɾ] occurs within an onset cluster (e.g. <grámo> [ˈgɾa.mo] 'gram'), word-finally after a vowel, and word medially (Hualde, 2005). It can also be produced as a [r] in this prevocalic position. However, there is variation in the production of the Spanish /ɾ-r/ contrast. It also is characterized by an assibilated/fricative [ř] (Colantonio, 2001; Rafat, 2015) and/or approximant [ɹ] (e.g., Blecua, 2001). The rhotics in Spanish can also vary widely across different varieties of Spanish. An example of this is the [ř] in Spanish which can be found across various Spanish speaking countries, includes but is not limited to the Spanish of the Andean highlands (Colantoni, 2001, 2006; Lipski, 1994; Quilis, 1999), Costa Rica (Vasquez Carranza, 2006) and Mexico, specifically Mexico City (Harris, 1969; Rissel, 1989). This sound is also influenced by sociolinguistic factors such as social class, which represents prestige and formality (Rissel, 1989; Navarro Tomas, 1971).

2.3   Haitian Creole

As will be discussed the French rhotic phoneme occurs as both a voiced and voiceless uvular fricative ([ʁ] or [χ]) as well as a voiced uvular trill [ʀ]. Whereas in Haitian Creole, a French-lexifier creole, the rhotic phoneme occurs as voiced uvular fricative [ɣ], [w] and deletion (Fattier, 2013; Storme, 2017). Although historically French and Haitian Creole are related, they are characterized differently. The Haitian [ɣ] occurs in onsets before unrounded vowels (e.g. French /rêver/ [ʁeve] vs. Haitian /reve/ [ɣeve] 'to dream'), whereas in onset position before rounded vowels the French [ʁ] sound is replaced with the Haitian [w] (Storme, 2017). The Haitian [w] is a voiced labial-velar glide that can be used as an allophone of the rhotic (e.g., French /zéro/ [zeʁo] vs. Haitian /zewo/ [zewo] 'zero' (Fattier, 2013; Storme, 2017). As well, in coda position the French [ʁ] is deleted in Haitian Creole (e.g., French <la mer> [lameʁ] vs. Haitian <la mè> [lamɛ] 'sea' (Storme, 2017, p.3). Above this all, as with any language, there is inter- and intra-speaker variation.

2.4   French

The French rhotics, in contrast, are phonetically distinct from that of the voiced alveolar rhotics found in Spanish and the Haitian Creole rhotics. The phonetic realization of the French /r/ can be found in most French varieties as a [ʁ] as in <purée> [pyʁe] 'purée', or [χ] as in <proche> [pʁɔʃ] 'nearby', or a [ʀ] as in <rendezvous> [ʀãdevu] 'appointment'. The [ʁ] is described as the contact of one or two beats between the uvula and the tongue dorsum (Van de Velde & van Hout 2001). The [ʁ] occurs between vowels, at the beginning of a word, or before voiced consonants (Colantoni and Steele, 2007). Another variation of the French /r/ as previously mentioned is the [χ]. This sound is produced by the lack of vibration in the vocal cords. It can occur either before a voiceless consonant in the coda, after a voiceless consonant in an onset, and in word-final position when the /r/ is pronounced (Van de Velde & van Hout 2001). It is also important to note that the [ʀ] is found in only four distinct languages, specifically: Batak, French, German, and Moghol (Wiese 2011, Van de Velde & van Hout 2001). Due to possible cross-language and/or cross-linguistic influence, the three mentioned French rhotic sounds could interfere with the production of the <r> sounds in Spanish and therefore may lead to a non-target-like production of the Spanish /ɾ-r/ sounds.

The above section was a description of the contrasting rhotic sounds found across three languages that are spoken by the Haitian Creole, Spanish-learners in the current study. The following section will provide an orthographic description of Spanish, Haitian Creole and French and will review other studies that have examined the role of orthographic input in L2 learning.

2.5   Orthographic description of Spanish, Haitian Creole, and French

This section will consider the role of orthography in L2 speech learning and will review previous studies that consider its influence. Orthography is a languages' conventional writing system (Varnhagen, Boechler & Steffler, 1999). Studying the role of orthographic influence is important because it allows us to explore, question, and examine the transparent qualities of an

orthographic system. Language writing systems have been positioned on a continuum that varies from very transparent to very opaque (Koda, 2007). It is important to note that a languages' writing system is never completely transparent or shallow; they differ in the degree of transparency from very transparent to very opaque or deep. For example, in Italian, Spanish and Turkish, a grapheme usually maps onto the same phoneme in different contexts (Katz & Feldman, 1983; Frost & Katz, 1992). On the other hand, in languages like English, French and Korean any given grapheme is often produced differently in different contexts such as the *a* in 'cat', 'was', 'saw', 'made' and 'car' (Ziegler, Bertrand, Tóth, Csépe, Reis, Faísca, & Blomert, 2010). In other words, the grapheme-phoneme correspondence is less regular, and speakers have to learn more complex, irregular rules in reading. Orthographic systems such as those found in English are referred to as opaque, deep or non-transparent. They are characterized by one-to-many or many-to-one grapheme-to-phoneme relationships and have been shown to contain both orthographic and phonological inconsistencies. An orthographic inconsistency consists of a single phoneme that can be mapped onto two or more graphemes.

This section provided definitions of orthographic systems that are placed on a continuum that is defined as either very transparent or very opaque. The languages examined in this study will be placed on the continuum and their transparent qualities (if any) will be discussed.

2.6   Spanish orthographic system

This section reviews the orthographic systems of three of the languages that the learners had knowledge of: Spanish, Haitian Creole, and French. Spanish is considered an example of a very transparent orthographic system even though it contains both orthographic and phonological non-transparencies (Erdener & Burnham, 2005). For example, although many one-to-one graphene-to-phoneme relationships are common in Spanish, both orthographic and phonological discrepancies exist. Rafat and Perry (in press) provide some examples for orthographic inconsistencies in Spanish and attribute one of the sources of orthographic inconsistencies to allophonic variation. For example, the grapheme <v> in <**v**ota> /**b**ota/ 'vote' and the <b> in <**b**ota> /**b**ota/ 'boat' are different graphemes that map onto the same phoneme /b/. Another

example they provide is with respect to the grapheme <c>; aside from <s> and <z> mapping onto the /s/ (e.g., <**z**apo> /**s**apo/ 'frog'), <ce> (e.g., <**ce**rdo> /**se**rdo/ 'pig') and <ci> (e.g., <**ci**rco> /**si**ɾco/ 'circus') are situations where <c> can also represent /s/ in dialects of Spanish in which the contrast between /θ/ and /s/ have become neutralized, such as in many South and Central American dialects. With respect to rhotics, they state that /r/ word-initially and post consonantally corresponds to the grapheme <r> and is typically produced as the [r]. However, word-medially the grapheme <rr> is realized as an [r] and <r> as [ɾ]. Moreover, word finally <r> may correspond to either a [ɾ] or a [r]. As it was described in the phonetic description section, the /r/ phoneme is additionally complicated as it can also be realized as an assibilated fricative rhotic (Rissel, 1981; Rafat, 2015; Colantonio, 2001) or an approximated rhotic (Blecua, 2001). Although Spanish is defined as a transparent orthographic system it is important to note that allophonic variation exists.

2.7   Haitian Creole orthographic system

Haitian Creole is defined as a transparent orthographic system, similarly to Spanish. Here it is important to note that the complex history of Haitian Creole and the roles of politics and identity have impacted the creation of the current orthographic system. The current orthographic system that is officially being used in Haiti is the Institut Pédagogique National (IPN) system. Throughout the history of Haiti, three separate models for an official orthographic system have been suggested. As stated above the current official system came into use after 1975 when the government became very motivated to introduce Haitian Creole as a medium for instruction in the schools. In 1975, the previous system was revised by the Institut Pedagoique National and a research group GREKA (Gwoup Rechech pou Etidye Kreyol Ayisyen). They suggested the new, revised system that was renamed the IPN version (Spears & Joseph, 2010). The IPN version contained parts of two previous orthographic models and was given official status in 1979 (Schieffelin & Doucet, 1994). The IPN would be defined as a transparent orthography because it is phonetic. Moreover, the IPN is an alphabetic system; as was previously mentioned, the phonetic realizations of the Haitian rhotic are as follows: (i) [ɣ] in coda and onset position before unrounded vowels, (ii) [w] which is realized when there is a rounded vowel in onset position, and (iii) deletion which occurs in coda position, as well (see Chapter 2.3 for examples). The

variation of Haitian rhotics may impact these learners' orthographic input as they may be cued to produce certain sounds when they see them in varying word positions.

French is also another orthographic system that needs to be considers as it is spoken and written by all of the participants in this study, thus it is important to note it has an opaque orthographic system (Joshi & Aaron, 2006, pp.81-104). It is mostly orthographically consistent however it remains phonologically inconsistent (Joshi & Aaron, 2006, pp.81-104). Additionally, the Haitian orthography does incorporate some features of French orthography (Spears & Joseph, 2010). French morphology is more opaque when compared to that of English (Joshi & Aaron, 2006) and Creole. In the Haitian Creole official orthographic system, the phone-grapheme relationship is not complex: most sounds always represent one and only one sound (see Table 1). Table 1 was created for a Speech Database at University of Pennsylvania. It is a representation of the phone inventory of Haitian Creole, which highlights it as an alphabetic orthographic system. It also shows that the grapheme-to-phoneme relationship is not irregular making it transparent. This contrasts with French because it has been defined as having an opaque orthographic system and is phonologically inconsistent unlike Haitian Creole.

 Haitian Creole can also be described as a transparent orthographic system due to its' similarity to other reportedly transparent systems, such as Tamil. Hengeveld and Leufkens (2018) created a chart) that ranks different languages based on their transparent properties from transparent languages in the lower rankings and opaque languages in the higher rankings. (Hengeveld & Leufkens, 2018, p. 32). In this chart, they rank Tamil as having more transparent qualities than Haitian Creole. Tamil, a Dravidian agglutinative language, has an orthography that is described as transparent because of the almost one-to-one phoneme-grapheme correspondence (Joshi & Aaron, 2006). Thus, it can be inferred that Haitian Creole has a demonstrably transparent or shallow orthography as it is ranked lower on Hengeveld and Leufken's (2018) table than Tamil. Despite the historical connection to a somewhat opaque French system, Haitian Creole has been found to have a relatively transparent system in similar ways to Spanish.

Table 1: *Haitian Creole Phone Chart*
From Language Data Consortium, University of Pennsylvania, https://catalog.ldc.upenn.edu/
(see Andrus at el. 2017)

TYPICAL LANGUAGE CORRESPONDENCE	IPA	X-SAMPA	Example
CONSONANTS			
p	p	p	**p**akèt
b	b	b	**b**agay
t	t	t	**t**onton
d	d	d	**d**ènye
k	k	k	**k**le
g	g	ɡ	**g**òch
m	m	m	**m**oun
n	n	n	**n**òt

TYPICAL LANGUAGE CORRESPONDENCE	IPA	X-SAMPA	Example
ng	ŋ	N	hi**ng**hang
f	f	f	**f**ig
v	v	v	**v**wazen
s	s	s	**s**is
z	z	z	**z**ero
ch	ʃ	S	**ch**eve
j	ʒ	Z	**j**edi
r	ɣ	G	**r**ezon
h	h	h	**h**inghang
l	l	l	**l**alin
w	w	w	**w**i
y	j	j	p**y**e

VOWELS			
a	a	a	**ab**ak**o**, pà**n**
an	ã	a~	**an**pil
e	e	e	kl**e**
è	ɛ	E	f**è**t
en	ẽ	e~	mw**en**
i	i	i	l**i**de
o	o	o	zwaz**o**
ò	ɔ	O	dey**ò**
on	�õ	O~	t**on**ton
ou	u	u	kaf**ou**
oun	ũ	u~	y**oun**
DIPHTHONG			
ui	ɥi	Hi	lan**nui**t

Speakers of Haitian Creole may have knowledge of the two prior models due to the history of the development of the orthographic system. On top of experience with multiple orthographies for one language, users can mix French lexicon and spelling into the current model. French historically was Haiti's only language used for nearly all written and official contexts, including education, government, and law (Robertshaw, 2018). The need for a Haitian Creole orthography system became apparent when Haitian poets and novelists started to produce works that were not in French. This allowed for a rising acknowledgement and a struggle that an orthographic system that would correctly represent the people's language (Robertshaw, 2018; Schieffelin & Doucet, 1994) was needed. The first Haitian Creole orthographic system was produced relatively recently and has changed over three times during the following years. The first orthographic system was created by Irish Methodist Minister, Ormande McConnell and Frank Laubach (1950). They based the writing system on the International Phonetic Alphabet; however, it was disliked by many people because they thought it was too "American" for the country. Feelings towards the orthographic system were associated with the unrest felt during the U.S. occupation from 1915 to 1934 (Schieffelin & Doucet, 1994). The second attempt to create an orthographic system was completed by Charles-Fernand Pressoir and Lelio Faublas. They were two Haitian citizens that modified the original orthographic system so it would resemble a more French lexicon and

writing system than the "American" one in place. This model was used until 1975 when the official use of the IPN system began (Schieffelin & Doucet, 1994). These 3 systems were built upon and borrowed from each other until they reached the final official IPN system.

Before 1987, Haitian Creole was not considered the official language, and it was not used in the school system as a medium for communication (Spears & Joseph, 2010). Therefore, within the current system there is some disagreement among the Haitian population itself toward the lexicon and grammatical spelling in the current IPN system regarding its accuracy. Most Haitians who attended school before the installment of IPN are not familiar with the model and continue to use either the Faublas-Pressoir or McConnell-Laubach Orthography models. Moreover, this portion of the population can also combine French spelling into their Haitian Creole (Spears & Joseph, 2010). The three systems were created within a small period of time; therefore, one person is capable of knowing many versions of the Haitian Creole orthography system as well as using a traditional French approach to the written language.

The use of Haitian orthography demonstrates a sense of pride and identity for the population in Haiti and abroad: "Creole is the true Haitian language for it constitutes a link to a valorized African heritage; French, in spite of the prestige that it enjoys, constitutes a vestige of colonialism, and White domination" (Zephir 1996, p.108). Although the agreement on the use of Haitian orthography varies, there is a sense of pride and identity and it is important to acknowledge the history of its development and use in Haiti. As stated above the current official orthographic system is the IPN model which is flanked by a complex political and social history. Although speakers of Haitian Creole may have knowledge of the previous two models and French, the current IPN orthography model would be defined as a transparent orthographic system.

The above section has described some of the orthographic characteristics of Spanish Haitian Creole and French by providing some historical context. Orthography is an important factor to consider in language learning as it can influence the production of Spanish rhotics in the learners. Spanish and Haitian Creole have been defined as having relatively transparent orthographic

systems whereas French is an opaque system. This study aims to examine if there will be an effect of orthography, specifically, whether orthography will exert either a positive or a negative influence.

2.8   L2 phonetic and phonological acquisition

This section will review current L2 acquisition models as proposed by Flege (1995), Best and Tyler (2007), and Brown (1998). The current models focus mainly on the influence of phonetic and phonological categories in L2 acquisition from a perception and production point of view. A gap in the literature that needs to be filled is to provide speech learning models for a multilingual study such as this one. Currently we are not aware of any multilingual speech learning model that could be applied to this study (see De Angelis, 2007; Patience 2018), nor any that consider the effect of orthography (but see Rafat & Stevenson, 2018) or the effect of social factors and attitudes. The following is a review of the second language speech models, and it will attempt to outline these different models to examine how L2 learners' experiences in their first language (L1) can influence L2 speech learning in many different environments (i.e., experienced vs. novice, similar vs. dissimilar, adult vs. child).

As per Flege's Speech Learning Model (SLM) (e.g.,1995), L1 and L2 phonetic categories are characterized cognitively in a shared phonological space. As a result, both systems will mutually influence one another, causing a bi-direction influence. Flege (1995) states that 'old sounds' which are sounds that are already present in a speaker's L1 do not need to be acquired and should not be difficult for learners of an L2. Alternatively, 'similar' sounds would be difficult, and 'new' sounds easy.

The Perceptual Assimilation Model (PAM) (Best & Taylor, 2007) looks at the perception of speech by L2 learners and attempts to answer the question of how non-native speech perception influences the phonological and phonetic aspects of L2 perceptual learning. The PAM suggests that if two distinct non-native phonemes are similar to any L1 phoneme, then acquisition of this contrast will be challenging, and these two phonemes will be assimilated to a single native sound. Perceptually learners would assimilate a non-native sound into a native sound in their L1.

This would cause them to produce the L2 sound incorrectly as they have mapped the L1 features onto their representation of the L2 sound thus creating an incorrect association that results in incorrect production. Suggesting that phonological memory, which is defined as the functional memory element that is responsible for holding verbal/acoustic information.

Brown (1998) suggests a phonological interference model that explains how the effect of L1 phonology filters the input and affects L2 acquisition. This model proposes that if an L1's grammar does not have the phonological features that differentiate a particular non-native contrast, then the learner will not be able to perceive the contrast and thus will not be able to obtain the novel segmental representation. Brown's findings highlight that a speaker's L1 grammar can impede the L2 learner from developing a non-native phonemic contrast.

Currently we do not know of any multilingual speech acquisition models (see De Angelis, 2007; Patience, 2018). The literature currently lacks discussions of multilingual phonetics and phonology as there are very few speech acquisition studies that consider more than two languages within a speaker. All studies done on multilingual acquisition of three or more languages has essentially extended or revised the currents models of L2 speech (Flege 1995; Best & Taylor, 2007: Brown, 1998). A review was provided of three different speech models to better understand how L2 learners may acquire and process their L2 language. It was important to understand these three models in terms of how the learners in this study may be influenced by their L1. For the purposes of this thesis, I will be testing Flege's Speech Learning Model, which is one of the most prominent models in the field. The models here are based on auditory input only and do not consider the role of orthography and how it is involved in formal language learning.

2.9   The role of orthographic input in L2 speech learning

The current section will be an examination of past studies that have considered the role of orthographic input in L2 speech learning. The various studies make different claims towards how orthographic input either promotes or hinders target L2 sounds. It examines studies that suggest a hindering effect of orthography contrasted by a study that suggests a positive influence of

orthography. It then provides a description of studies that suggests orthographic input plays a limited role in L2 speech.

The effect of orthography has been examined in various L2 speech perception and production investigations with varying results. Many studies have shown that orthographic input may affect or interact with the auditory input which can either promote (Steele, 2005; Showalter & Hayes-Harb, 2013; Bassetti, Escudero, & Hayes-Harb, 2015; Rafat, 2015) or hinder (Bassetti, 2007; Erdener & Burnham, 2005; Hayes-Harb, Nicol, & Baker, 2010) the target-like acquisition or perception of the target L2 or L3 sounds. In addition, in some cases, orthography may have no effect at all as suggested by Escudero (2015) and Showalter & Hayes-Harb (2015).

Erdener and Burnham (2005) examined the effect of audio-visual speech information, orthography on non-native speech production, and perception in Turkish and Australian English naive learners of Spanish and Irish. Whereas the Turkish and Spanish orthographic systems are transparent, English and Irish are opaque. Transparent orthographic systems tend to have consistent phoneme-to-grapheme correlations, whereas opaque orthographies such as, English, are described as diverging from moderately consistent phoneme-to-grapheme correlations. Their study looked at the production of non-native speech sounds in adults, where monolingual speakers of Turkish and Australian English were assessed in four different audio-visual and orthographic conditions. The study looked at the effect of visual speech information with and without the orthographic information present. Forty-eight Spanish and forty-eight Irish nonword stimuli were created using Spanish and Irish orthographic rules. Each participant was only shown the nonword sounds once. The stimuli were shown in four experimental conditions: audio only, audio visual, audio visual orthographic and audio orthographic. Results showed that providing orthographic information was effective in reducing the number of phone errors in their production. However, the results varied across the participant groups when orthography input was provided. Focusing on the Spanish stimuli, the Turkish participants were found to produce the phonemes more accurately than the Australian participants. However, when provided with the orthography for the Irish stimuli, the Turkish participants performed worse than the Australian participants. For the Turkish participants, the transparent orthography in Spanish aided them while the opaque orthography in Irish hindered their performance. For the Australian participants who had opaque orthography in their native language, there was little difference

between their performance on Spanish and Irish nonwords. What these findings suggest are that the Turkish participants were actually hindered when provided with the orthographic input in Irish. Suggesting that presenting the participants with orthographic input is helpful in regard to their pronunciation but only when the language had transparent orthography. When the target language had opaque orthography, it hindered their performance suggesting that researchers need to consider orthographic depth when looking at the effect of orthographic input. These results indicate that when a target language has transparent orthography such as Spanish, this this should help the learner's performance and not hinder it.

Rafat (2015) also examined the effect of exposure to orthographic input on L2 phonological acquisition. She examined the assibilated/fricative rhotic productions of twenty naive English-speaking learners of Spanish. The learners were assigned to two groups: auditory-only and auditory-orthographic. The auditory-only group participants were shown the auditory words accompanied by their images at training; participants in the auditory-orthographic group were shown both auditory and orthographic stimuli. Auditory stimuli and their accompanying pictures were presented with written words to the auditory-orthographic group. The results showed a higher rate of both [ř] rhotics and [ɹ] which showed that exposure to <r> resulted in both transfer ([ɹ] production) and a higher rate of target-like [ř] productions in the production of the auditory-orthographic group when compared to the auditory-only group. The positive effect of orthography was attributed to the effect of perceptual illusion which they suggested overrode the input. Rafat proposed that given the L1 and target language had shared acoustic figures (i.e., mainly rhoticity or language grapheme <r>) it was a possibility that a perceptual illusion effect may play a role. She suggested that the presence of the orthographic <r> and the shared rhoticity features by the L1 approximant rhotic and the assibilated/fricative rhotic in the L2 created a perceptual illusion of an approximant rhotic in the L2 for the participants. This illusion caused them to believe they had heard [ɹ] because they had seen the grapheme <r>. Results from previous studies (Rafat, 2015; Erdener and Burnham, 2005) make a case for a positive influence of orthographic input in the production, acquisition and perception of L2 learners. Orthographic input interacted with auditory input that resulted in target-like or near target-like productions. Thus it is possible that the presence of orthographic input may result in higher rates of transfer and target-like productions by the Haitian Creole learners of Spanish.

Rafat (2011) also examined the effect of orthography in the production of 40 novice English speakers learning Spanish. The experiment involved a Spanish picture-naming task and a Farsi non-word repetition phonological memory task. Participants were assigned to four conditions: three groups with varying degrees of exposure to orthography and one auditory condition. Two type of stimuli were included: (1) words with grapheme-to-phoneme correspondences that are identical in English and Spanish and (2) words with grapheme-to-phoneme correspondences that vary between English and Spanish. Although they share the same graphemes, they correspond to two different sounds in English and Spanish. The results showed that the effect of orthography had a negative effect on the production by the participants which thus hindered the target-like production in novice speakers. It was also suggested that individual grapheme-phoneme correspondences differed greatly enough that this disparity triggered phonological transfer. Rafat (2016) also suggests that the acoustic/phonetic difference between an L1 and L2 will determine the equivalence classification between grapheme-phoneme correspondences. She proposes that the smaller the phonetic/acoustic distance between the L2 and L1 sounds for a shared grapheme, the higher the likelihood there is for phonological transfer. As shown above orthographic input can either have no effect, a hindering effect or a positive effect in the production of L2 leaners highlighting that orthography is an important factor that needs to be considered. Subsequently considering that the role orthography for the current study is important to determine for positive, negative or no effect of orthographic input.

The previous studies reviewed have looked at the role of orthographic input. A study completed by Rafat and Stevenson (2018) examine the response with a McGurk-like effect (McGurk & MacDonald, 1976) in L2 speech learning in regard to the effects of orthographic input. They chose to look at how exposure to either auditory and/or orthographic input leads to a production of something like a McGurk effect in beginner Spanish learners whose L1 was English. They reported on the production of non-native-like tokens that were produced by the participants, finding that combination sounds were possible. They included word-initial and word-medial stimuli which consisted of the phonemes [b], [ð], [s] and [j]. Their findings show that there was in fact an indicator of a McGurk-like effect only for the Spanish digraph <ll> which showed the highest number of combination productions. For example, participants produced [lj] as in [poljo] instead of [pojo] <pollo>. This result suggests that the stimuli may have triggered a perceptual integration in which contrasting L2 and L1 sounds were perceived as a new percept thus

resulting in the production of combination segments. This study is relevant to the current one because it examines the results of orthographic input and report as a result the production of combination segments. This could be a possible outcome in the present study as there is a reading task that provides the aforementioned orthographic input, findings will be reviewed in the results section.

Moreover, an investigation completed by Escudero and Wanrooij (2010) examined the effect of L1 orthography on non-native sound perception. This study assessed the perception of Dutch vowel contrasts by native Spanish speakers of different Dutch proficiencies. They conducted two experiments. In experiment one, 204 Spanish learners of Dutch and 20 native speakers of Dutch were asked to judge and classify Dutch vowel tokens /a, i, u/ by choosing from auditorily presented options and then from an orthographic representation of Dutch. The results of the first study demonstrated that vowel categorization differed between the tasks. Specifically, the more challenging vowels in the auditory task were easier in the orthographic task. Moreover, it was found that vowels /a, i/ which showed a higher success rate in the auditory task were inadequately classified in the orthographic task. They then completed a second experiment with 22 monolingual Peruvian Spanish listeners who completed the same tasks as the first set of participants. The main results were consistent with the results of experiment one and corroborated the existence of an orthographic effect. Overall their findings displayed that for the more difficult contrast, orthography did help establish contrast, while for the vowel contrasts that were easier, orthography hindered the perception of contrasts. Although this study did find mixed results in terms of the role of orthographic input, their main findings suggest that orthography can hinder the perception of non-native (vowel) perceptions.

The studies above have shown how orthography can either hinder or help the acquisition, production, and perception in L2 speech. The following study exemplifies how orthographic input plays a limited role in L2 speech. Escudero (2015) completed a study where he examined the effect orthographic input in Spanish novel spoken-word learning in English speaking learners of Spanish. He created stimuli that used both non-minimal and minimal word pairs that were considered either easy or difficult to discriminate between for the learners. This study used 151 participants, including 78 with Australian English as their native or dominant language and 73 with Iberian or Latin American Spanish as their native language. The hypothesis was that

orthographic information would have a positive effect on word learning in general and that all of the listener groups in the auditory+ orthography group should outperform those in the auditory-only condition in all word pairs. The learners that were tested had native languages that had transparent orthographies, as well as learners with opaque orthographies. Successful L2 speech acquisition was measured through the use of the following tasks: half of the participants were provided with only an auditory word-learning condition and the other half with an auditory and orthography conditioned stimuli. What the findings indicated were that linguistic background and native orthographic systems did not have an influence on non-minimal pairs or perceptually easy minimal pairs. The only positive effect of providing orthographic input was found in the production of two minimal pairs which had the highest accuracy among the other perceptually difficult ones. Thus, it was found that orthography had relatively minimal influence except to help contrast pairs that were easier to differentiate. The study provides insight into how orthography affected these learners' L2 production. It found overall the orthography had relatively no influence in helping the L2 learners' speech which could be the case for the present study.

Beyond perception in L2 speech, orthography can also affect long-term maintenance of phonology. A study completed by Showalter and Hayes-Harb, (2015) examined the idea that the availability of written forms in L2 input will help a learner's retention for the phonological forms of recently acquired words. They designed their study to see whether or not new learners would benefit from the written forms of new, unfamiliar symbols. They did this by looking at native English speakers' acquisition of Arabic-like words that were marked by the voiceless velar-uvular stop contrast. They used Arabic because it uses an orthography completely different than the Roman alphabet used in English. The inventory of phonemes characterised by the writing system, the graphemes themselves, the representation of vowel phonemes, and the directionality of the script contrast with English's orthography. They tested 30 native English speakers who were randomly either assigned to the "Arabic script" or the "control" word-learning conditions. Experiment 1 entailed a word-learning phase, a criterion test phase, and a final test phase. The word-learning part of the experiment had participants hearing the auditory form of each word, seeing a picture and seeing the written form. In experiment two, the participants were provided with instructions about the Arabic writing system before they began the word-learning phase unlike in the first experiment. The results of the two experiments were then compared. However,

it was found across both experiments that there was no benefit of having the written form available for this novel contrast and script. They went on to complete two more experiments with the same participants. Despite inconclusive results, the researchers suggest that providing orthographic input for an entirely novel writing system, may be ineffective because novice learners cannot use the written input in a useful way. Once again, this study highlights that orthography can have affect L2 speech production, which is being examined in the current study. Although they suggest that orthography is ineffective for novice learners.

The previous studies have examined the role of orthography but found that overall it was generally ineffective in the production of the L2 learners. A study that considered both the negative and positive consequences of orthographic input in L2 Russian learners was completed by Simonchyk and Darcy (2018). They hypothesized that experienced learners who displayed advanced knowledge of the palatalized consonants would exhibit more accurate lexical encoding of the plain/palatized contrast when they were provided with orthographic input. This study looked at 40 American learners of Russian and 10 native Russian speakers as the control group. In the Russian language, palatalization exists in the form of 15 palatized consonants which can occur in either word-initial, word-medial or word final position. It is important to note that this palatizing is not opaque but overall Russian orthography is difficult because it can create an illusion for learners that are not familiar with the writing system. It can elude them into thinking that the initial consonants are the same, whereas the subsequent vowels are different (e.g., <luk> [лук] "onion (bow)" vs. <lʲuk> [люк] "manhole,"). The initial consonants are the matching, while the following vowels are different. However, it is in fact the other way around, the initial consonants are different, and the vowels are the same. The study was motivated by the question whether or not these learners that possessed the orthographic and metalinguistic knowledge would be able to distinguish the difference between the plain and palatalized consonants in Russian. Moreover, the authors intended to determine to what extent does having knowledge of the orthographic system have in enabling consequences on the lexical encoding of these contrasts. The tasks included 20 target words that were familiar to the participants, these target words contained coronal consonants in varying word positions. The participants were asked to complete three procedures, including a written picture naming, a metalinguistic task, and auditory word–picture matching. Results were mixed. The learners were not as familiar with grapheme-phoneme correspondences as had been predicted. They could spell most of the

familiar words accurately and they were able to identify the palatalized target consonants with 80% accuracy. The orthographic input was found to be reliant on the syllable position of the target consonants. In the intervocalic position the participants had the most trouble, where the representations appeared to lack phonological clarity and detail. They hypothesized this could be due to the lack of perceptual salience. For the purposes of this study it is important to note that the learners had trouble with the intervocalic position.

As presented in the studies above research has shown that orthotopic forms or "spellings" can affect the speech production in L2 learners. A study completed by Bassetti, Sokolović-Perović, Mairano, & Cerni (2018) tested if English orthography would lead to the production of English homophonic word pairs as phonological minimal pairs. The authors examined 30 Italian speakers of English and the focus was their production of English as to whether there would be phonological contrast in their L2 systems. This was completed through the use of Italian and English word reading tasks. The stimuli included 33 orthographic minimal or near-minimal pairs in English, and 18 minimal or near-minimal word pairs in Italian. The aim of the study was to predict whether their English homophonic word pairs that were presented as minimal pairs would be distinguished as short or long sounds when the same target word was spelled with either a single grapheme in one word or a digraph in the other. Results showed the prediction was correct: the participants did produce the English homophonic word pairs as minimal pairs. Moreover, due to orthographic input being provided, it led to the participants applying long-short phonological contrast to word pairs that are homophonic for native speakers. As has been discussed in detail above the presence of orthography can affect the speech production in L2 learners. Findings show there was an effect of orthography which may be the case for the current study.

The above studies provide a summary of the different ways in which orthographic input interacts with the auditory input to influence either target-like or non-target-like productions. They also show that the evidence on the effect of orthography is inconclusive: sometimes it may promote L2 speech learning, sometimes it may hinder it, and sometimes it may not have an effect. What has not been discussed is whether the strategies that of the speakers themselves employ when faced with difficult sounds have an effect. Colantoni, Steele & Escudero (2015) claim learners are influenced by their L1 orthography in the perception and production of complex sound

groups such as consonant clusters. They propose four types of coping strategies when learners are presented with these complex sounds. When faced with difficult sounds that are not present in their L1 orthography, learners may employ the following coping mechanisms: (1) epenthesis or insertion of a vowel or consonant, (2) deletion of one or more of the segments, (3) substitution of one or more of the segments, and (4) metathesis or re-ordering of the segments. Even though the target stimuli in this study are not consonant clusters, these coping strategies may be employed when Haitian Creole learners of Spanish are presented with the Spanish orthographic input. Summing up, orthography can either have a positive or a negative effect or no effect at all. The findings from the current study will be discussed further in section 5.

2.10   Acquisition of the Spanish rhotics in the L2+

The section above considered the role of orthography in the acquisition and production of L2 speech sounds. This current study aims to examine the speech productions of Haitian Creole learners, specifically the Spanish rhotics. It is important to provide a review of past results to be able to consider the current study in the context of previous work. Therefore Section 2.10 is an examination of past studies on the production and/or acquisition of Spanish rhotics. The implications towards bi/multilingual speech learning of a foreign sounds are described, as well. The first study presented was completed by Major (1986) who examines models of L2 speech learning in regard to the acquisition of the Spanish rhotics. The following study will be an L3 study of the acquisition of the Spanish rhotics by Kopečková (2016). Followed by a review of Amengual's (2016) who examines the acquisition of the Spanish rhotics in heritage speakers. Another study examines the acquisition of the Spanish rhotics in light of the current speech learning models and their predications (Colantoni and Steele (2007). Followed by a multilingual study that examines the acquisition of the Spanish rhotics in Mandarin learners of Spanish (Patience, 2018).

The production of Spanish alveolar voiced /ɾ-r/ contrast is difficult for L2 learners, as these sounds require a great amount of articulatory and aerodynamic accuracy (Johnson, 2008), especially when the rhotic sounds contrast with that of an L1. The following section aims to

review past acquisition studies considering the Spanish <r> sounds to better understand the type of patterns L2 learners have produced.

Major (1986) examined various models of L2 learning but his findings support the ontogeny model which states that during the early stages of acquisition, errors made by L2 learners become worse over time. Major suggests that transfer process errors (errors that appear to originate from L1 transfer or a structure in the L1) will decrease over time whereas developmental errors (errors that occur throughout the development of learning the L2 and do not originate from the L1) increase and then decrease overtime. This suggestion is contrary to the commonly held beliefs that L2 learners' errors should continually decrease never increase over time. Four native speakers of American English who were enrolled in an intensive Spanish course at the University of Washington State were examined. All four subjects were true beginners. The speech materials consisted of a word list, sentence list and a few short questions to examine the Spanish rhotics. The speech materials were chosen to review 5 phonological environments: (1) initial [r], (2) intervocalic [r], (3) intervocalic [ɾ], (4) post-consonantal [ɾ], (5) syllable final [r]. The learners were asked to complete the same tasks in various sessions over a number of weeks, listening to a recording of a native Spanish speaker producing the tasks and then were asked to do the same. In their analysis, the authors indicated the number of transfer errors versus developmental errors, as well as the number of correct productions. The findings from this study reflected the suggestions made by the ontogeny model the learner's errors tended to increase rather than decrease over time. The findings also indicated that the participants were clearly better at producing the intervocalic [ɾ] than any other target sound and position. This could be attributed to the fact that the [ɾ] also occurs in English. Overall, participants were unsuccessful in producing the [r] in all 3 environments. These results suggest that the rhotacized feature for an English speaker could be perceptually more discernible than the flapped feature. Participants also tended towards changing their rhotics from the alveolar to the uvular point of articulation, which has also been documented in French, German and Portuguese. Interestingly the rhotics were also produced with differing types of frication such as possessing a voiceless onset, or a complete voiceless substitution for the intervocalic [r], which is also to similar to what may occur in dialect of Brazilian Portuguese. This study highlights how L2 learners of Spanish have generally found the [r] more difficult to learn and had a higher success rate producing the [ɾ]. This could be due to the existence of a similar sound in English, as stated above. The Haitian

population in the study resided in Brazil for some time and has come into contact with Brazilian Portuguese. It is possible that they will produce similar patterns found in this study such as the use of voiceless substitution for the intervocalic [r] which has been found to occur in dialects of Brazilian Portuguese.

The examination of L3 phonological acquisition is still limited (e.g., Cabrelli, 2012), thus studies have only analyzed a limited range of phonetic abilities. However, a recent study on the acquisition of the Spanish rhotics was conducted by Kopečková (2016) looking at L3 learners. Kopečková (2016) examined the phonetic features of the Spanish <r> in L3 learners. It focused on L3 phonological development in 19 German learners of Spanish who had some knowledge of English. The author tested the production of the participants' ability to produce Spanish segments over 3 years in a formal language environment. The aim was to consider the long-term effects of bi/multilingualism in the acquisition and development in L3 learners. She suggested that extensive experience with perceiving and producing two or more sound systems improves the general cognitive flexibility of the speaker (i.e., general cognitive advantages exist for subsequent phonological learning). The participants were divided into two groups: active bilinguals (n = 5) and foreign language speakers (n=14) who had been exposed to 2 languages since birth and had learned at least 2 foreign languages at school. The participants were tested once within 3 months of beginning L3 language learning, again 7 months later, and the final test was at the end of 3 years of instruction. Spanish rhotics were characteristically different within the inventory of the L3 learners and their languages they occurred differently across each language that was spoken amongst the participants. During the first task they were asked to complete an interview with a native German speaker that questioned their language learning/history/experience and use in German. They then completed an oral interview with a native speaker of Spanish, a naming task and a picture naming task all in Spanish, and then interviewed in English. The results recorded the accuracy of the speaker's realization of the rhotics by classifying whether each token was a [ɾ], [r], or "other". The findings suggested, as in other studies, that the Spanish [r] appeared to be more challenging for all the bi/multilinguals to learn than the Spanish [ɾ]. The active bilingual group performed more accurately than the group of foreign language users when producing both Spanish sounds across all testing times. The results did not confirm however the prediction that all L3 learners who are active bilinguals

experience automatic advantages over foreign language users in the learning of new sounds. It is important to note that there was a large degree of intra-learner variability in the production of the rhotic sounds across the testing times. The general conclusions were that once having developed certain skills and learning strategies, experienced bi/multilinguals can be expected to realize their learning task with greater efficiency, specifically better than that of a monolingual speaker of the same language. The Haitians in this study are multilingual learners who may be expected to realize their learning task with greater efficiency than that of a monolingual learner of Spanish as had been previously reported in the literature. However, it is important to note once again that for the L3 learners in Kopečková's study the participants appeared to have a greater difficulty to learning the Spanish [r] than the [ɾ].

Various studies looking at the Spanish /ɾ-r/ contrast have reported that speakers of Spanish will/can produce a varying degree of non-canonical variations on the Spanish [r], including but not limited to a production of less than two apical closures, fricatives, approximants, and r-colored variants (Bradley & Willis, 2012; Colantoni, 2006; &Henriksen, 2014). As previously mentioned, the typical Spanish [r] is produced with two or more brief closures between the tongue apex and the alveolar ridge (Hualde, 2005). Based on previous research it has been shown that the rhotic productions are not constantly produced in the same way, and this could be largely due to the articulatory difficulty, leading to inter- and intra-speaker variation. It is thus expected that this variability would also be found within early bilingual speakers. A study carried out by Amengual (2016) examined the production of the Spanish rhotic sounds in 20 L2 learners of Spanish and 40 heritage speakers in a bilingual community in Northern California. The aim of the study was to focus on voiced alveolar /ɾ-r/ contrast in word-medial intervocalic position. This was accomplished through the use of read aloud tasks in Spanish. Two blocks were presented with 20 Spanish words, with each sentence containing one target word. The analysis revealed that there was a lot of variation within the speech tokens of the L2 learners and the heritage speakers. Results showed that the L2 learners and heritage speakers, that were English dominant were not able to produce the canonical two or more alveolar closures but were producing them as 1-closure or 0-closure [r]s instead. Contrastively, the Spanish dominant heritage speakers did produce the canonical [r] with two or more closures. These results demonstrate once again that the [r] is among one of the harder sounds for an L2 learner of Spanish to produce.

As illustrated by previous studies, the Spanish /ɾ-r/ contrast has been difficult for L2 learners of Spanish to acquire. Current literature on methodologies gives us insight into how/why L2 learners may or may not be acquiring these sounds in their L2 (Flege, 1995; Eckman, 1977; Brown, 1998). However, a study completed by Colantoni and Steele (2007) sought to challenge the current speech learning models that are dominant in the literature: Flege's SLM (1995), Eckman's markedness differential hypothesis (MDH) (1977) and Brown's feature-based theory of perception (FBT; 1998). This study claimed that these current speech learning models fall short as they do not consider interlinguistic difficulty. Moreover, apart from interlinguistic difficulty, they suggest that studies seldom examine the relative challenge that an L1 group has when acquiring one or more similar or new sounds in two different languages. This challenge includes issues of transfer versus general typological, and perceptual or articulatory constraints on the development of L2 sound systems. This study sought to test these models by analyzing the acquisition of the uvular French [ʁ] fricative, which can either be voiced or voiceless and the Spanish [ɾ] by native speakers of North American English. This study proposed that each of these rhotics created distinctive learning challenges for native English speakers. The authors provide descriptions of how the learners will learn these sounds based on the models named above. According to the MDH model, the French [ʁ] should be more difficult than the Spanish [ɾ] to acquire based on its absence from the learners' L1. The SLM model makes a contrasting prediction, that the French rhotic is a new sound with no perceptual equivalent in English and should thus pose no problem for L2 learners. The FBT models also predicts success, predicting that English speakers should be able to perceive and acquire the sound because there are already phonological representations of the rhotic sounds in English. For the Spanish [ɾ], the MDH predicts that there should be no difficulty acquiring the Spanish [ɾ] as it presents as an allophone in the learners' L1. The FTB model also predicts there should be no difficulties because there are representations of these sounds in English. Finally, the SLM model argues the [ɾ] should pose no challenges for learners in intervocalic position but should be difficult to acquire in other environments. These predictions were tested using sentence- and passage-reading tasks which contained 30 French tokens and 31 Spanish tokens all in differing word positions. The participants included 20 L2 learners of French (10 intermediate, 10 advanced), 19 learners of Spanish (9 intermediate, 10 advanced), as well as 10 native-speaker controls for each language. Three judges were selected for each language they were native speakers and were assembled to

evaluate the learners' speech on a scale from 1-5 (1 being non-native and 5 being native). It is important to note that mastering the French and Spanish rhotics involves the correct acquisition of their voicing, length and manner. Results showed that learners did not master the target segments in all positions equally. Within the Spanish learners, only the advanced speakers were able to master any of the properties of the [ɾ], specifically the length whereas the French learners were overall better than their Spanish learners. None of the three methodologies made accurate predictions in the acquisition of the French and Spanish rhotics. Moreover, the predictions were stated to be too general because they had not taken the different word positions or the complexity of mastering different phonetic features into account. This study highlights the limited qualities of the current L2 speech learning models, particularly in regard to French and Spanish rhotics. There is a current gap in the literature concerning methodologies of L2 speech learning, as they do not consider the difficulty of mastering different phonetic features such as one that the current study suggests, namely the /ɾ-r/ contrast.

Patience (2018) completed a multilingual study that examined the acquisition of the /ɾ-r/ contrast by L1 Mandarin speakers and L1 English speakers where Spanish was their L3. The goals of the study were to examine how target-like their acquisition of the Spanish rhotics was and to what extent their L1 and/or L2 influenced their production. The focus of the study was the Spanish language, testing 120 L1 Mandarin speakers, their L2 was English and their L3 was Spanish. The speakers were asked to complete a reading task where the participants were shown a word on the screen and they were asked to say it aloud. They were then asked to complete a reading task in English to evaluate whether the participants had acquired, and were thus able to transfer, the English flap and the English [ɹ] which were thought to be sources for L2 transfer into their L3. The third and final task was a reading task in Mandarin to be able to later analyze the intervocalic rhotic sounds produced in the L1 to measure for transfer and to determine whether the L1 was influencing the L3. Results showed that participants at the beginning stages of acquisition tended to produce the same non-target tokens for both sounds, which was typically the [l]. The findings are similar to the results of English-speaking learners of Spanish motivating the author to suggest a universal simplification strategy. Moreover, participants produced differing non-target segments as they became more fluent, showing that although they were motivated to alter their production, they were unable to produce the target. The author suggests

an initial single substitution strategy (i.e., use of non-target [l]) and as they become more fluent, the addition of additional articulations as they attempt to produce more target-like sounds. Moreover, this study contributes to the very understudied field of cross-linguistic influence as it highlights that cross-linguistic influence surfaces from both the L1 and L2 into their L3, but it varied by participant. Claiming that this cross-linguistic influence was determined on a segment-segment basis whenever the speakers perceived similarity of the target segments in their L1 or L2. These results are important for the current study as it highlights intra- and inter-speaker variation and cross-linguistic influence within these learners' speech productions.

These studies highlight a reoccurring pattern that the /ɾ-r/ contrast in Spanish is difficult for L2 learners to produce correctly, if at all, when compared to native-like production. These findings have implications for the current study as it highlights a trend that could also be found with this group of learners; that the /ɾ-r/ contrast will be difficult. Current models fall short of explaining the perceived difficulty of these sounds for L2 learners which is important to address in the current study, as was discussed in section 2.8. Another short coming of current literature in the study of the acquisition and production of Spanish rhotics is the lack of the examination of social factors such as language attitudes. In the following section, the current literature on language attitudes and its' role in L2 speech learning and production will be discussed.

2.11 Language attitudes

The current study questions the role of language attitudes in L2 speech learning specifically in regard to the production of the Spanish rhotics. Section 2.11 is a description of past studies that have considered the sociolinguistic factor of language attitudes and the role it may play in L2 acquisition, perception, and production. This section is structured as follows: the first part will be an examination of Gardner (1985), Mueller and Miller (1970), AlMansour (2016) who examine the role of language attitudes towards the L2 language and how this influence learners' acquisition of the language. A description is then provided of past sociolinguistic studies that have considered Haitian Creole, however, most of this work has been on language maintenance.

When looking to examine language attitude research, the focus has tended to be on language attitudes and their relationship with L2 learning. What is language attitude and why is it

important? Language attitude is "an organization of motivational, emotional and judgemental processes" (Kramarae, 1982, p.85) which has a direct influence on what an individual sees, hears, thinks, and may do (Kramarae, 1982). Studies have shown that a person's attitude is one of the greatest factors in learning an L2 (Shuy & Fasold, 1973, Gardner, 1985, 2010). Studies on language attitude can look at anything from motivation, social aspects including the meta- (Kramarae, 1982) and micro-attitudes (Gardner, 2010) toward a language. Research is limited to focusing on language attitudes and their relationship with L2 learning, and rarely on the effect of L2 acquisition and production on attitudes (e.g., Gardner, 1985).

Gardner (1985) reflects on how language attitudes directed towards an L2 community will decidedly influence the learners' acquisition of the language. He looked at numerous studies that examined how attitude can influence a learner's ability in a foreign language. He provided evidence that not just exposure to an L2 but cultural knowledge about the language can affect how students learn a language. He focused on the fact that in an L2 learning environment the role of language attitudes has a strong relationship with cultural knowledge and favorable attitudes towards the community. This is important to the current study as it examines the Haitian communities' attitudes towards Mexico and its population. Gardner (1985) speaks to how attitudes toward an L2 language community can highly influence a learners' acquisition of the language. He writes that more exposure to an L2 and having cultural information about the other groups can promote favorable attitudes towards that group. The same relationship also applies to students who dropped out of an L2 language course, they tended to have a less favorable attitudes towards the other language community. Although this study focused on students in an institutional L2 learning environment, it is relevant because it acknowledged the role of language attitudes towards the L2 community and how they highly influenced acquisition (or in this case learning) of a second language.

Mueller and Miller (1970) investigated the attitudes of English students studying French and how the emotions towards French people impacted and influenced the students' overall grade. For example, if a student felt a strong connection with French people, their grade showed a positive impact. These findings were corroborated in a study done by Jacobsen and Imhoof (1974), who demonstrated the importance of attitudes towards a language community. They examined 600 Protestant missionaries living in Japan and found that Japanophilia was among the

three best predictors of the speaking proficiency in both men and women. While these studies were driven by an educational motivation to better understand L2 learning, they are important to the current study as they recognize how language attitudes/perspectives can influence learning. This influence can be positive or negative in L2 acquisition.

AlMansour (2016) completed a study that was aimed at investigating how attitude influences foreign language acquisition. The study focused on the connection between language attitudes and the pronunciation proficiency in American students learning Arabic, specifically examining the students attitudes towards Arabic speakers. This study acknowledged that a method used to reduce students' negative attitudes towards Arabic is to further expose them to the Arabic language and environment in order to combat the negative impact on their pronunciation. Results revealed that students who tended to have good attitudes towards Arabic speakers, and who had visited or stayed in Arabic-speaking countries, would have the best pronunciation performance. Students who tended to not have good attitudes or who had not stayed a long time in an Arabic-speaking country exhibited the poorest performance. Although this study focused on students in a foreign language classroom, it emphasized the importance of investigating how attitude influences foreign language acquisition. This is essential to the current study as it highlights the importance of observing the influence of attitudes/perspectives of the target population (Haitians) and how this will impact their production of the Spanish rhotics.

Most sociolinguistic studies focusing on Haitian immigrants and Haitian Creole have only considered language maintenance and have been concentrated in the United States of America (e.g., Buchanan, 1979; Laforet, 2016; Woldemikael, 1989; Zéphir, 1996). Berrotte (1992) examined the relationships between different factors such as gender, age, place of birth, number of years in the United States of America, religion, socioeconomic status, marital status, self-reported language use and language attitudes among Haitians living in New York. There were various goals of the study, however the main goal was to see how self-reported linguistic attitudes and usage within the language community could be used to explore different language policy options by community agencies servicing this population and how schools could use this as a medium of instruction for children of a Haitian background. This study focused not only on language maintenance but also on linguistics attitudes, finding that Haitian Creole is preferred in the domains of solidarity, national identity and informal domains, whereas English is usually

preferred as the language of the school and the favored language of other formal domains. The author recognized a shift towards English being used more often while suggesting that the more proficient Haitians remain in Creole, the more positive their attitudes will become toward Haitian Creole. These findings complement the results of the studies above: attitudes towards a foreign language relate to the proficiency in that language, and the attitudes toward a native language relate to the maintenance of proficiency in that language. The inverted relationship between Haitian proficiency and attitude toward English implies that there may be cultural conflicts within speakers whereby Haitian represents adherence to one's native culture while English represents the language of assimilation to the host culture. Although this study is focusing on the use of Haitian Creole usage and attitudes in the United States of America it raises important points of how there is consistently a relationship between positive attitudes and language proficiency. The study emphasizes the complex relationship between learning the host community's language as it signifies integration and holding onto or becoming more proficient in one's native language or heritage language as it is associated with pride and identity. All of these are significant factors that are central to understanding the acquisition of a foreign language and how speakers' complex attitudes and experiences will influence their acquisition.

In sum, all of the studies above highlight various important extralinguistic social factors that are central to this study when considering how language attitude, learner's experiences, and individual variation will influence the target population's acquisition of the Spanish rhotics. The current section has been an examination of studies that have considered different sociolinguistic factors that are important to the current study, namely language attitude. This study questions how language attitudes will influence the of the production of the Spanish rhotics in the target group. Based from the previous studies mentioned above the current study proposes 5 hypotheses found in Chapter 3.

Chapter 3

3   Hypotheses and methodology

Chapter 3 includes an overview of the hypotheses and the methods. The hypotheses are followed by a description of the participants that were included and a detailed account of which tasks were completed by each participant group. Followed by a review of the tasks and stimuli that were used to complete this study. The last section provides an analysis of the completed tasks.

3.1   Hypotheses

The hypotheses in this study are as follows:

H1. Based on Flege (1995), the Haitian Creole learners will not have any difficulty acquiring the [ɾ] and the [r] because they are new sounds: distinct from the learners' L1 sounds.

H2. (a) As per previous studies (Olsen, 2012; Stockwell, Bowen and Martin, 1965) the Haitian Creole learners of Spanish will have difficulty acquiring the canonical Spanish /ɾ-r/ contrast but will produce a varying degree of non-canonical variations of these sounds (Bradley & Willis, 2012, Colantoni, 2006, and Henriksen 2014). It is predicted that they will produce the Spanish [ɾ] with less difficulty than the [r] in intervocalic position (Rose, 2012, Colantoni & Steele 2007).

(b) The Haitian Creole learners of Spanish will employ a simplification strategy that will be found across all tasks such as replacing the [r] with the [ɾ] (Weech 2009) or variations of [l] (Patience 2018).

H3. There will be an effect of orthography (Bassetti, Escudero, & Hayes-Harb, 2015). Specifically, exposure to <r> and <rr> will both result in some transfer because <r> corresponds to a [ɣ] in Haitian Creole, but there will be a higher rate of transfer for <r>. Moreover, exposure to the digraph <rr> will lead to more target-like productions in the reading task than the picture-

naming task because it will cue the learner that the [r] is a longer sound and has vibrations (Bassetti, Escudero, & Hayes-Harb, 2015; Rafat, 2015).

H4. The learners with a higher level of education will exhibit more target-like production of the /ɾ-r/ contrast. (Le Dorze & Bédard 1998).

H5. The language attitudes toward Spanish and Haitian Creole will influence their accurate production of the /ɾ-r/ contrast. Specifically, those with a more positive attitude towards Spanish will exhibit more target-like productions of the /ɾ-r/ contrast (Gardner, 2010).

3.2   Participants

This section describes the three groups of participants that were involved in the current study. The participants consisted of 39 individuals, including 30 Haitian Creole speakers, 4 monolinguals speakers of Mexican Spanish, and 5 Mexican Spanish speaking judges. The 30 Haitian Creole learners of Spanish had spent varying amounts of time in Tijuana Mexico and came from different linguistic backgrounds. To better understand the diverse linguistic backgrounds found across the participants the Haitian participants were asked to self-report on their proficiency in Haitian Creole, French and Spanish. Using a scale from 1 to 7 (1= beginner low, 2= beginner high, 3= intermediate low, 4= intermediate high, 5= advanced low, 6= advanced high, and 7= native-like). All participants rated themselves as 7 in all areas of Haitian Creole which was considered native-like. Examining the ranges of self-reported proficiency in French is important when considering the transfer input from their French into their Spanish. The mean level reported among the participants in French was 5.2 which would be considered advanced low, the lowest levels reported were 3.5 (intermediate low) and highest at 7 (native-like). The skills that were reported lowest proficiency in French were reading, writing and grammatical abilities. The skills that were reported with the highest level of proficiency in French were speaking, pronunciation and vocabulary. The mean level of self-rated proficiency in Spanish was 3.5 (Intermediate low), though one participant chose not to answer. The lowest rating was 2.5 (Beginner high) and the highest was 6 (Advanced high). Similar results were found across the judges' responses with the average level of judge-rated proficiency in Spanish as 3.5 (Intermediate low), the lowest rating was 2 (Beginner high) and the highest was once

again 6 (Advanced high). Moreover, participants were asked to report on language use in their homes, at work and socially.

The study intended to control for gender, but due to the availability of participants the final distribution was 6 females and 24 males. The age range was 24-45 years old and the average age of the participants was 33. The average time spent in Tijuana was roughly two years. The varying level of education across the participants was large: 3 participants had completed post-graduate studies, 1 had completed graduate school, 5 had completed university, 9 had completed high school, 9 had completed middle school and 3 had completed elementary school. The average amount of time for formal education between the 30 participants was 14 years with the range being 13-25 years (they were two participants who did not report their total years of formal schooling). The mean age reported for the age of acquisition for speaking Spanish was 19 (ranging between 10-35 years). When examining the age of fluency, many participants said they were not fluent in speaking Spanish and thus no average was reported as the findings would not be a correct picture of the participants background. When looking to the age of acquisition for reading Spanish the average age was 20, (ranging between 10-36 years). The same pattern was found regarding fluency in reading and thus no average is provided.

Other important factors when looking at the participant population was their acquisition of their spoken languages, current language dominance, as well as their current exposure to their known languages. An important note is that out of 30 participants, only 2 reported never living in Brazil. Most of this population spent a varied amount of time in Brazil ranging from a few months up to six years. Many of the participants had previously lived in Spanish speaking countries for different amounts of time for either work or education. Fifteen participants had lived in different Spanish speaking countries; Ecuador, Venezuela, Chile and the majority of those (i.e., 8 participants) lived in the Dominican Republic. The average amount of time spent in Spanish speaking countries was 3.5 years (4 months up to 10 years). Twenty-six of the participants had knowledge of Portuguese, and all reported knowledge of Haitian Creole and French. Most participants generally rated themselves around a 5 or 6 (advanced high or low) in French. Only one participant rated themselves 1 (beginner low) across all areas of French. The majority of

participants stated that Haitian Creole was their most dominant language with only one participant stating that had an equal dominance of both French and Haitian Creole. All participants stated that they first acquired Haitian Creole and then French except the one participant who said they had an equal dominance of French and Haitian Creole. Furthermore, some participants reported different levels of English.

There were two other participant groups involved in the current study. The second group was the control group that consisted of the 4 monolingual speakers of Mexican Spanish. They were born and raised in Tijuana and had never spent more than a year living or visiting outside their city. The two males and two female control participants were between the ages of 26-36. They were recruited through family and acquaintances in the region, coming from similar socioeconomic upper middleclass backgrounds (to each other). Each control participant had completed at least a university bachelor's degree. As stated above, the control participants were only asked to complete three tasks (language background questionnaire, picture-naming task and the reading task in Spanish) and were paid the equivalent of $15 Canadian dollars for their participation in the study.

The third participant group was the judge group. These were the ones who examined the semi-directed interviews of the Haitian Creole participants and were asked to rate learner proficiency levels on a scale from 1 to 7 according the rubric that was provided. These participants were between the ages of 33 and 55 and Spanish was their first language. The group consisted of three males and two females, and they had no linguistic educational background and were not teachers of Spanish. They came from similar socioeconomic backgrounds and were all born in Mexico. Some had knowledge of languages other than Spanish (i.e. English they were not monolingual speakers) but were asked to rate the speakers from the rubric provided.

To summarize, this section included a description of the three different participant groups that were involved in this study. The section describes the language profiles of the participants and highlights this as a multilingual study with novel language pairings. Having described the

different participant groups, the next section describes the analysis, results and interpretations of the tasks.

3.3   Tasks

This section is a review of the tasks that were completed by the participants. It includes a description of the seven tasks that were provided across the study and it states which tasks were completed by which participant group. These tasks examine the research questions concerning the production of the /ɾ-r/ contrast and whether these sounds will be difficult for the learners to produce. Moreover, these tasks were employed to evaluate the effect of orthographic input, language attitude and education.

At the beginning of the study session, the participants were provided with a letter of information and consent (Appendix I) in which they received information regarding the experiment. The letter outlined the goals of the experiment, the activities they would be completing, and solicited any and all questions from participants. When the study began, the participants were not completely informed about the intended objective (i.e., the examination of the rhotics) so they would produce the words in the most naturalistic way possible. Written consent was obtained from each participant.

The first task presented was a language background questionnaire (see Appendix A) where they were asked to answer various questions that examined their socioeconomic background, language history, and language proficiency. Alongside the language background questionnaire, a rubric was provided for the Haitian participants to measure their proficiency levels in Spanish on a scale from 1 to 7 (see Appendix F). The language background questionnaire task lasted 15-30 minutes. The language background questionnaire was adapted from the Language Experience and Proficiency Questionnaire (LEAP-Q) that was been designed by Marian, Blumenfeld and Kaushanskaya (2007). This questionnaire was developed as a resource specifically for psycholinguists to create a consistent and valid questionnaire. The LEAP-Q was designed to efficiently examine bilingual language status using probable relationships between self-reported and behavioural measures (Marian, Blumenfeld & Kaushanskaya, 2007). This questionnaire was selected for this study because it uses three distinct ways to measure a bilingual's language

competence whereas other studies have not been consistent. The questionnaire was created to assess (a) language proficiency, (b) language dominance, and (c) language preference. The LEAP-Q was created to gauge proficiency levels in speaking, listening, reading and writing. The original authors suggested to not collapse the proficiency ratings along the different performance domains into one cumulative score as had been done in other studies but that the ratings obtained should be analyzed separately. The questionnaire was originally created for adult and adolescent bilinguals and multilinguals who had varying language experiences and proficiency levels, much like the target population in the current study. This task was completed to collect information on their education background which would be considered as an influencing factor in the results of the experiment. The original questionnaire had ten levels of proficiency but for the current study it was created with seven levels to allow for the more varied learner backgrounds. The seven levels were created are as follows: 1= beginner low, 2= beginner high, 3= intermediate low, 4= intermediate high, 5= advanced low, 6= advanced high, and 7= native-like. The learners were asked to rate themselves in each question according to this scale. For example, they were asked the amount of time they are currently exposed to their languages and the order of acquisition and dominance of the languages they speak. The questionnaire asked them to rate themselves on a scale from 1 to 7. In order for participants to rate themselves, they were provided with a rubric describing the different levels.

The rubric (see Appendix F) was created to adhere to the different level in the LEAP-Q questionnaire that was provided. It was fashioned after reviewing how various levels of Spanish are graded at an international and national level (see HABLA YA, ACTFL, ALTE, CET, DELE[1]). This task was provided to consider the different proficiency levels among the participants which will be further examined as an influencing factor in a future paper. Included in the rubric were different descriptions considering the different levels of speaking, listening, writing and reading. The rubric was also provided to Spanish speaking judges to state the level of

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[1]

- **Habla Ya**: Levels at Habla Ya Spanish Schools
- **ACTFL**: American Council on the Teaching of Foreign Languages
- **ALTE**: Association of Language Testers in Europe
- **CEF**: Common European Framework of Reference for Languages
- **DELE**: Diplomas de Español como Lengua Extranjera

each speaker. However, the judges only focused on the aspects of the learner's speech as they were judging the oral production of the Haitian participants. The rubric considered features of their speech such as pronunciation, understanding, making mistakes, and verb conjugation.

The second task was a word naming activity, where the participants were shown an image or were given a sentence with a fill in the blank to prompt the desired word, (e.g., *Es muy____ que llueve en el desierto*. 'It's very ___that it rains in the desert.' Target response: *raro* 'odd'). If the participants were not able to identify the image, they were given 2-3 oral prompts; if they still were not able to answer, they moved onto the next image. In total they were 93 images that included 33 distractor words and 60 target words. The participants were shown the images on a MacBook Air through the use of PowerPoint presentations. The first slide included instructions followed by two practice slides. The participants were instructed to orally say the word and once they had said it, they were asked to say the word again in the sentence *Digo…otra vez* "I say…again". They were audio recorded during this task. This task was repeated twice and lasted 30-60 minutes.

The third task was a semi-directed sociolinguistic interview (see Appendix B), where the participants were asked a number of questions to examine their naturalistic speech and linguistic attitudes. The study was run this way to make the participants feel at ease when answering detailed questions about their experience in Mexico. The researcher spoke with each participant for about 15 minutes before the controlled tasks were completed at the beginning to establish a personal connection with each participant. The semi-directed interview was designed to observe their language attitudes and perspectives about the Spanish language and living in Mexico. The semi-directed sociolinguistic interview was created to allow for a comparison of the results of the written language attitude questionnaire to gauge if the responses were the same across both tasks. Additionally, it was used to (a) elicit naturalistic data, to be able to further examine participants' attitudes, and (b) to later examine the learners' proficiency in Spanish. The recorded interviews were later rated by native judges to gauge for proficiency levels. The naturalistic data was not examined for rhotic production in this study but will be analyzed in a future study. This task was also created so that Mexican judges could later evaluate the spoken level of the participants. The questions were based on the language attitude questionnaire. It asked about the participants' immigration experience in Tijuana in a more in-depth nature than the questionnaire as well as

their experience learning Spanish. The questions were meant as prompts for participants to elicit their speech. The interview began with asking simple questions so that the participants were set at ease: they were asked to compare the weather in Haiti with that in Mexico, then the interview would progress to more opinionated questions. Target responses were about language experience and attitudes towards Spanish and Mexico. If participants started talking about unrelated topics, the interviewer would attempt to slowly guide them back to the desired topics in a nonforceful manner. One question would ask them what their learning experience of Spanish consisted of; answers could range from school experiences to living in Spanish-speaking countries. After the third task was completed, five Mexican judges were asked to grade the interview. The judges individually listened to the complete interview from each participant and at the end of the recording were asked to provide a number between 1-7 based from the rubric that was provided. This rubric for judges was an adapted version of the one that was provided to the Haitian participants. The task for the Haitian participants lasted 10-15 minutes. The task for the Mexican judges was completed in one sitting per judge (a total of 5 sittings) and took approximately 2-2.5 hours.

The fourth task was a reading aloud task (see Appendix E). The participants were provided with a printed list of the same stimuli from the picture naming task in the same order. They were asked to read slowly and clearly but as natural as possible. The first part of the task provided instructions and two example sentences. Participants were asked to complete the activity twice. They were audio recorded, the task lasted 10-15 minutes. The target word was named within a context sentence. This was the same sentence used in the picture naming task: *Digo ___ otra vez* 'I say ___ again'. This task was completed two times as well.

The fifth task was a written language attitude/perspective questionnaire (see Appendix D). The participants were provided with a printed questionnaire that examined their attitudes towards their native languages, Spanish and their experience in Mexico. This procedure lasted 15-30 minutes. The language attitude questionnaire was adapted from a study completed by Barbosa (2015) which examined the attitudes towards Spanish and language maintenance in bilinguals in the United States. The questionnaire was adapted to the specific situation of the Haitian population living in Mexico (Appendix D). The questions looked at the positive or negative attitudes this population had towards their native language Haitian Creole and their experience

living in Mexico. The first section was focused specifically on their language perceptions it targeted their motivation and use of Spanish in different realms. As well it attempted to consider the current feelings that they may have towards Haitian Creole. For example, they were asked, "Do you like speaking Spanish?" and they were asked to circle either 'Very much,' 'Some,' 'Not much,' and 'Not very much.' The second section attempted to judge their experience using Spanish in Mexico. They were provided with a scale from 1 to 7, 1= completely, 2= disagree, 3= slightly disagree, 4= neither disagree nor agree, 5= slightly agree, 6= agree, 7= strongly agree. For example, they were asked, "I feel that people treat me better in Mexico when I speak Spanish." Their responses were then added up on how they had responded to the question either positively, negatively or neutrally.

The sixth and seventh task was a read aloud activity completed in Haitian Creole and then French (see Appendix G and H, respectively). The participants were provided with a list of 10 phrases in Haitian Creole that had the <r> sounds in various positions. The French list contained 5 distractor phrases and 10 target phrases. The participants were asked to read aloud in a clear and slow manner but in the most natural way possible. They were audio recorded and asked to complete this task twice. This procedure lasted 5-10 minutes. They were then compensated for their time with the equivalent of $30 Canadian and asked to sign a receipt acknowledging their participation.

The participants were individually recorded in Tijuana, Mexico. The participants completed all of the tasks in one session, lasting approximately 2.5-3 hours. They were interviewed individually in a quiet room. The recording equipment used was a head mounted microphone, Audio Technica USB Cardioid Condenser Microphone, and a Zoom H5 recorder. The participants were recorded using a measure of 44.1 kHz and 16 bits into a .wav format, they were then later analyzed using PRAAT (Boersma & Weenink, 2017).

3.4   Stimuli

What follows is a detailed explanation of the instruments that were used in these tasks and how they were designed. Furthermore, the explanation details which factors were controlled for to test the hypotheses that were suggested for this study.

For the picture-naming and reading task, as mentioned above, the participants were asked to name a list of images and sentences based from a list of words that were used in two separate tasks (Appendix C). The analysis sought the different sounds that were produced when the <r> sound was present and to consider the different patterns that emerged across both tasks. The original list included 60 target words and 33 distractor words (Appendix C). For this study however, only a subsection of the stimuli was considered; 20 target words were examined to consider the intervocalic /ɾ-r/ contrast (see Table 1). The other words will be considered in a future experiment. The 60 target words were distributed randomly throughout the picture naming task and reading task to avoid the participant guessing the objective of the procedure. The design controlled for linguistic effects that may influence production, such as (a) word position (i.e., word initial, intervocalic and word final), (b) stress (in each word position the target word either had the stress on the <r> or another syllable within the word), and (c) number of syllables (i.e., bi- or tri-syllabic). Word stress was also considered (e.g., <guerra> [ˈgɛ.ra] 'war' compared to <arroz> [a.'ros] 'rice', and <claro> [ˈkla. ɾo] 'clear' and <perú> [pɛ.ˈɾu] 'Peru'). The stress was either on the syllable that contained the <r> as the onset or was on the preceding syllable that did not contain the <r>. If a target word could not be demonstrated by a simple picture, a written phrase was shown instead of a picture. For example, when the target word was *pero* 'but', the participant would see the phrase *Quiero ir a la playa …. está lloviendo* "I want to go to the beach… it's raining." The desired response would have been *pero* 'but'. The target words were used for both the picture naming activity and the read aloud task.

Table 2: *List of stimuli used in reading and picture-naming task*

VCV	Stress (-)	Stress (+)
Tap	<Claro> [ˈkla.ɾo] 'clear' <Oro> [ˈo.ɾo] 'gold' <Cero> [ˈsɛ.ɾo] 'zero' <Mira> [ˈmi.ɾa] 'look' <Pero> [ˈpɛ.ɾo] 'but'	<Nariz> [ˈna.ɾis] 'nose' <Paró> [pa.ˈɾo] 'stopped' <Coral> [ko.ˈɾal] 'coral' <Perú> [pɛ.ˈɾu] 'Peru' <Pared> [pa.ˈɾɛð] 'wall'
Trill	<Perro> [ˈpɛ.ro] 'dog' <Guerra> [ˈgɛ.ra] 'war' <Gorro> [ˈgo.ro] 'hat' <Carro>[ˈka.ro] 'car' <Burro> [ˈbu.ro] 'donkey'	<Arruga> [ɑ.ˈru.ɣa] 'wrinkle' <Arroz> [a.ˈros] 'rice' <Corrió>[ko.ˈrjo] 'run' <Barril> [ba.ˈril] 'barrel' <Carril> [ka.ˈril] 'lane'

The read aloud task, which included a reading list in Haitian Creole and French were both created by native speakers of the language. Both lists included the rhotic sounds in varying word positions to consider further in the discussion section the role of language transfer (see Tables 3 and 4).

Table 3: *List of Haitian Creole stimuli used in reading task check IPA to see if you need italics*

Creole Stimuli	English Translation
Mare chijen an	Tie the dog up
Dirije yon riyinyon	Direct a meeting
Resevwa yon etranje	To receive a stranger
De montre ki saw kopran	To show what you know
Mwen resevwa ou la kay mwen	I receive you at my house
Poukisa ou pa rete	Why don't you stay
Kikote ou rete	Where do you live
Ki jan ou rele	What's your name

Table 4: *List of French stimuli used in reading task*

French Stimuli	English Translation
Je dis terminer encore un fois.	I say to finish again.
Je dis rouge encore un fois.	I say red again.

Je dis embraser encore un fois.	I say to set fire to again.
Je dis ruminant encore un fois.	I say graze again.
Je dis harmoniser encore un fois.	I say harmonize again.
Je dis entrée encore un fois.	I say entrance again.
Je dis charrue encore un foit.	I say cart again.
Je dis braise encore un fois.	I say ember again.

This section was a review of the tasks and the instruments used to complete during the current study. It included a description of the stimuli that were designed to test the first research question; would the participants would be able to produce the Spanish rhotics. The following section will be a review of the participants that were involved.

In conclusion, this chapter has reviewed the methodology used in this study to examine the production of the Spanish rhotics in Haitian Creole learners of Spanish. The extralinguistic social factors that could influence their acquisition were measured using questionnaires, which included: age, social class, places of residence and proficiency levels. Their language attitudes and perspectives were measured using two separate tasks (language attitude questionnaire and semi-directed social interview). This section also examined the tasks and stimuli that were used to consider research questions 1-3. These tasks will be used to either confirm or contest the suggested hypotheses in Chapter 4.

Chapter 4

4 Data analysis and results

The following chapter will be an analysis of the tasks that were completed during this study. In the current study only the intervocalic position of the Spanish <r> was considered. This position was chosen because /ɾ-r/ are contrastive in the word-medial position only. The first section will be a description of how the data was analyzed. Followed by a detailed examination: the first section of the results will be an examination of the production of the Spanish rhotics per task and sound. The second section will be a report on the effect of the task examining the combination segments that were produced by the Haitian Creole-speaking learners. The third section will report on duration and voicing of the [ɾ]s and [r]s and the number of closures produced. The fourth section will be an acoustic analysis of the Haitian Creole stimuli to determine influence from Haitian Creole into their Spanish. Followed by a report of the acoustic measurements taken of the native speakers' productions. Finally, a sociolinguistic analysis will be provided, observing the influence of education and the fifth and final section will be a review of the results found across the language attitude tasks.

Initially 2400 tokens were produced by the learners (see Figures1-9) for the target rhotic sounds. An additional 480 tokens were analyzed using the productions of the native speaker group (see Figures 21-22) and another 300 tokens were analyzed regarding the Haitian Creole stimuli (see Figure 27). This thesis is a subset of the data, comprised of 1616 tokens as produced by the learners were analyzed in this study. Moreover, the subset included tokens produced by the native speaker tokens as well (160 tokens). These were tokens for the stimuli with [ɾ] and [r] in the intervocalic position (e.g.: <carro> [ˈka.ro] 'car' vs. <caro> [ˈka.ɾo] 'expensive'). The learners' productions were transcribed and analyzed using PRAAT (Boersma & Weenink, 2017) by the author, whose native language is English but has near-native fluency in Spanish. The acoustic parameters analyzed were manner, duration, voicing and number of closures. Responses were either coded as a [ɾ], [r], fricative rhotic [ř] approximant rhotic [ɹ], deletion, voiced lateral approximant [l], voiced dental stop [d̪], a voiced labial-velar glide [w], aspiration [h], voiceless

velar fricative [χ], voiced velar fricative [ɣ], a "combination" consisting of a sequence of sounds/two sounds (e.g., the production of [h]+[l]), and "other". Figures 1-9 show a series of spectrograms of the sounds produced by the Haitian Creole-speaking learners of Spanish. The "other" category included realizations such as an approximant <d> (i.e., [ð]), and [v].
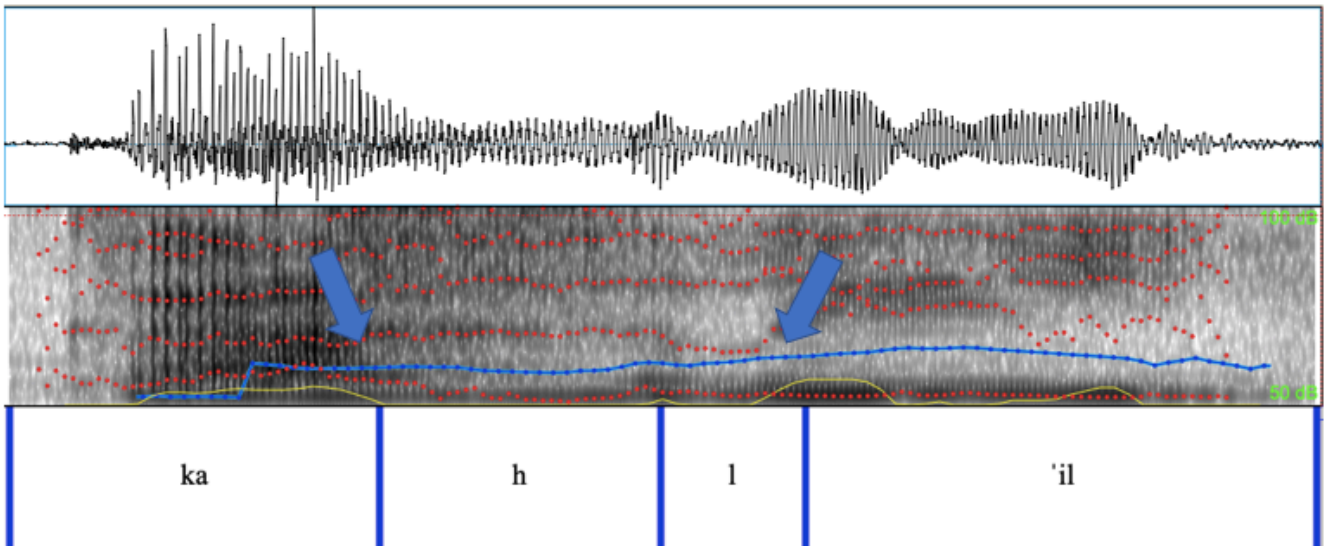
Figure 1. Participant 113. Reading Task. <carril> [ka.**h.l**.ˈil] 'lane'.
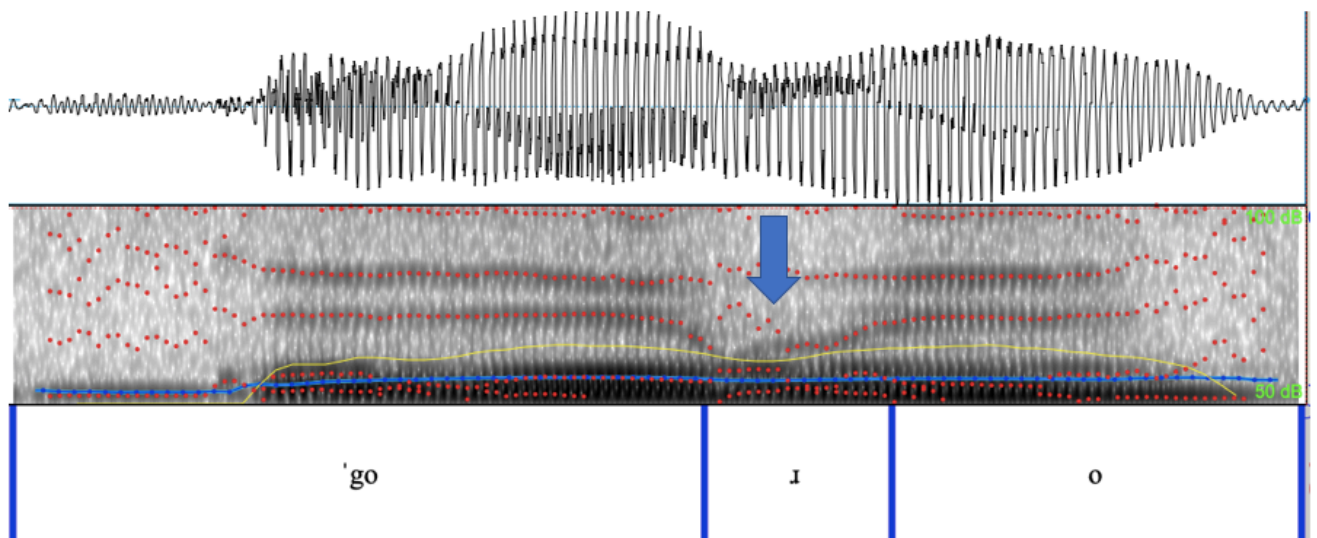
Figure 2. Participant 104 example of [ɹ] production. Reading Task. <gorro> [ˈgo**.ɹ.**o] 'hat'.

Figure 3. Participant 108 example of deletion production. Picture Task. <guerra> [ˈgɛ.a] 'war'.
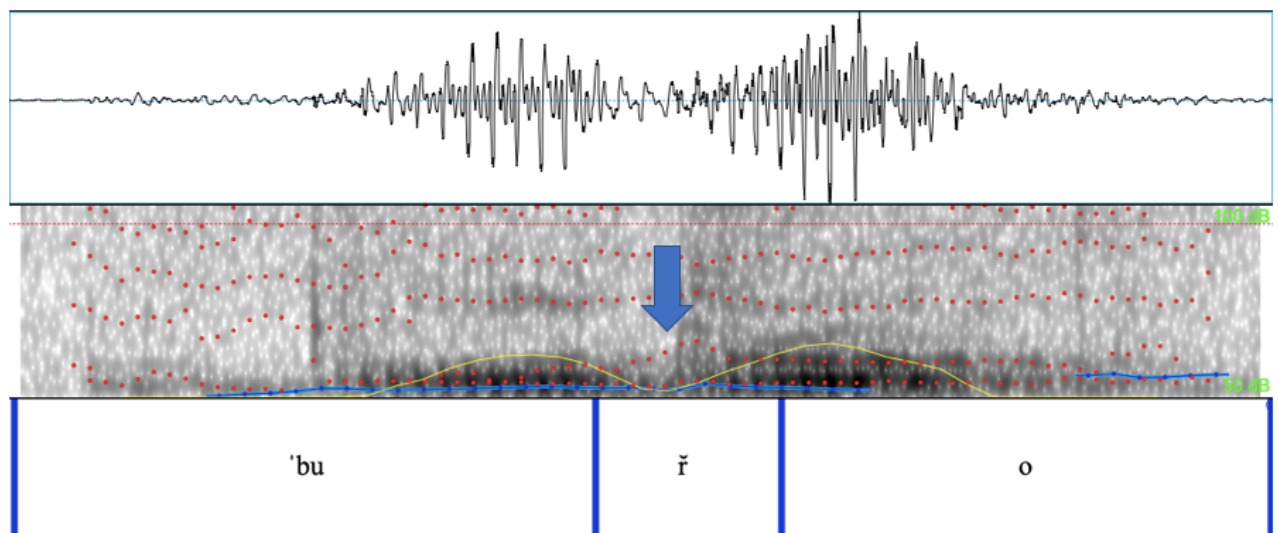
Figure 4. Participant 119 example of [ř] production. Picture Task. <burro> [ˈbu.ř.o] 'donkey'.
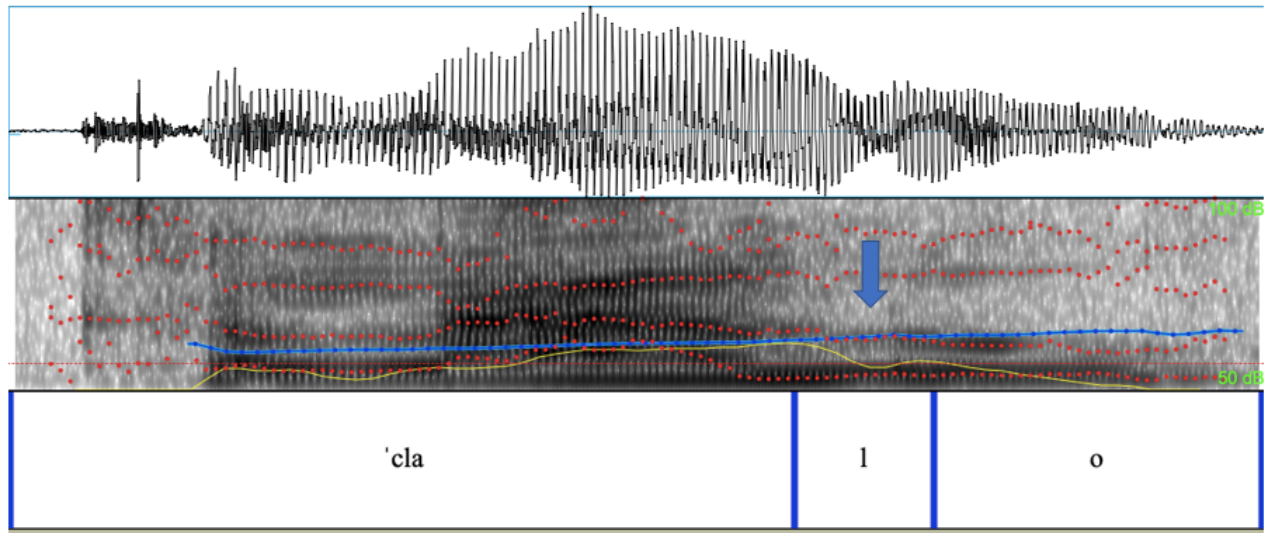
Figure 5. Participant 113 example of [l] production. Reading Task. <claro> [ˈcla.**l**.o] 'clear'.
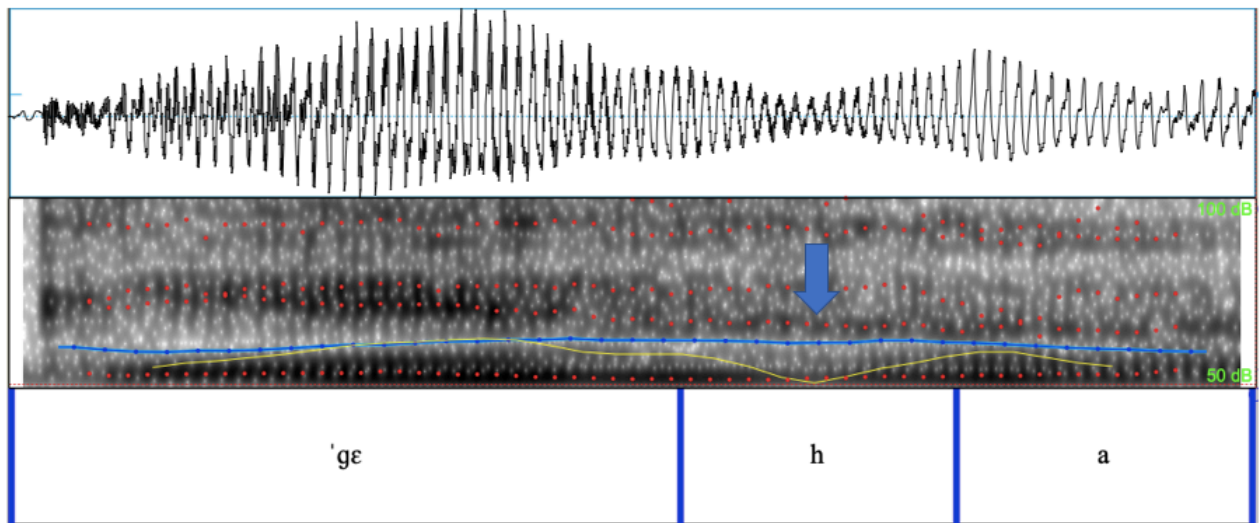
Figure 6. Participant 111 example of [h] production. Reading Task. <guerra> [ˈgɛ.**h**.a] 'war'.
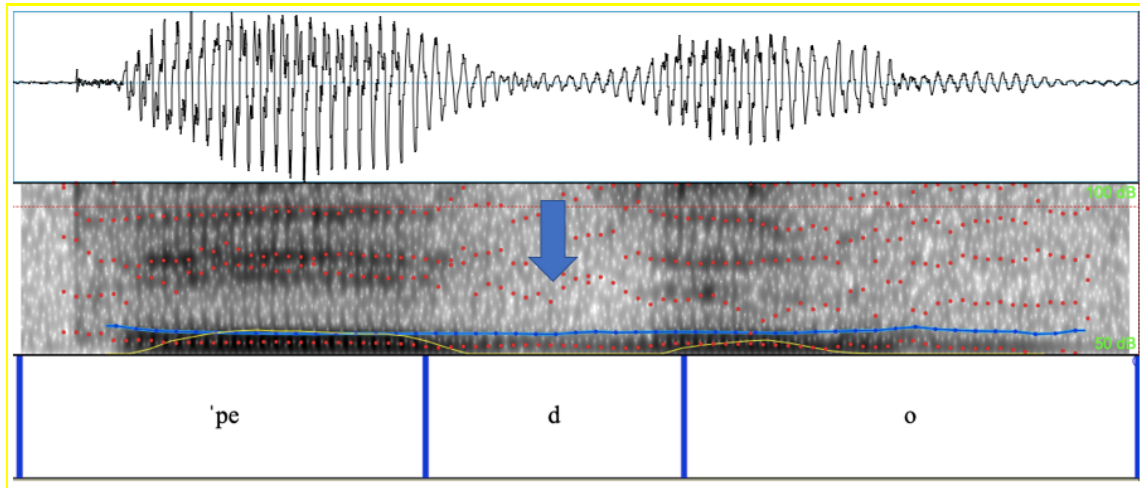
Figure 7. Participant 107 example of [d̪] production. Picture Task. <perro> [ˈpe.**d**.o] 'dog'.
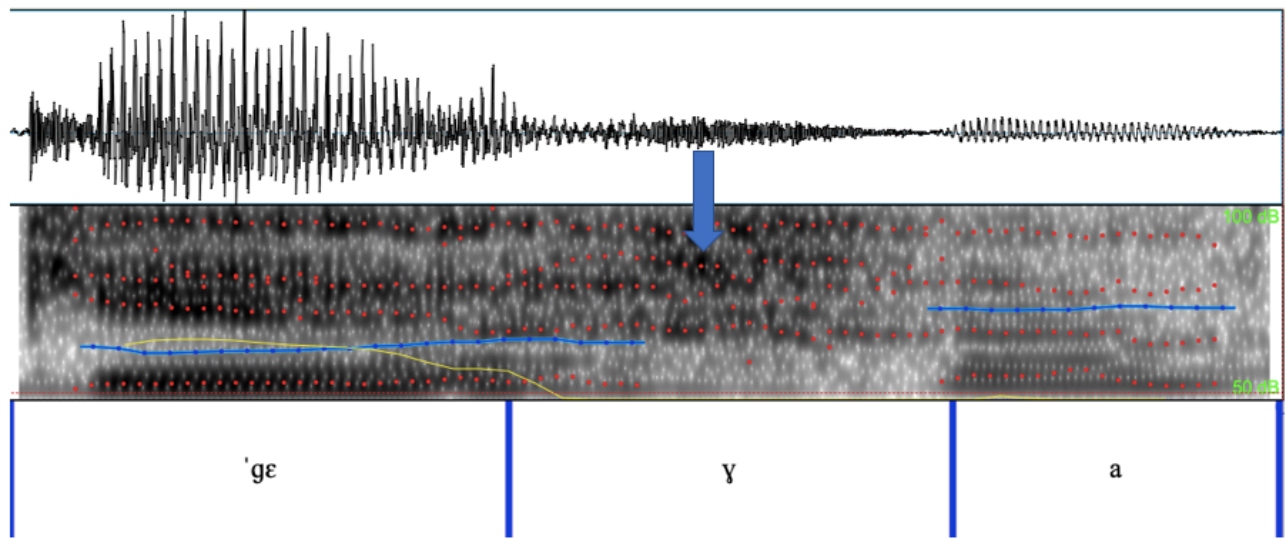
Figure 8. Participant 111 example of [ɣ] production. Picture Task. <guerra> [ˈgɛ.**ɣ**.a] 'war'.
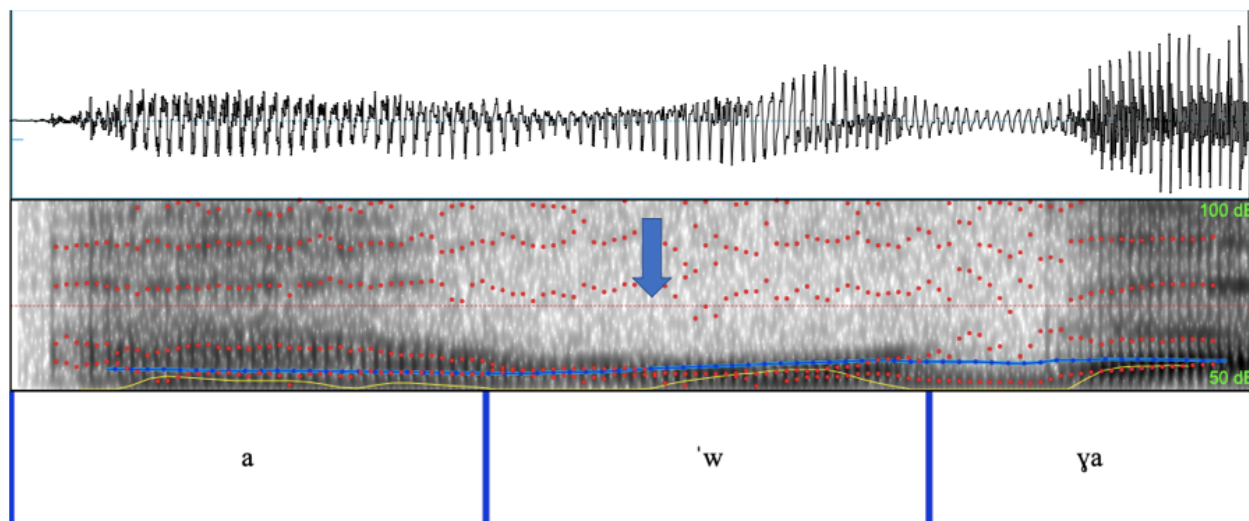
Figure 9. Participant 107 example of [w] production. Reading Task. <arruga> [a.ˈw.ɣa]. 'wrinkle'.

4.1   Results

The following sections are a presentation of the results, starting with the results per task (i.e., reading and picture-naming tasks) per the target sound (refer to Figures 21 and 22 for a native-like production of the sounds). In this section I examine each rhotic per task, concluding with a comparison of the findings across both rhotic sounds. I then move on to a more detailed analysis of the sounds produced across both tasks and the two target sounds. Thirdly, I provide an examination of the mean duration, percentage of voicing for the [ɾ] and the [r] produced by the learners. Then an acoustic analysis was completed on the Haitian Creole stimuli to determine influence from Haitian Creole into their Spanish. Followed by a report on the mean duration, percentage of voicing for the [ɾ] and the [r] produced by the native speaker group. Finally, a review is presented of the results that considered the sociolinguistic factors that were suggested in the hypotheses.

4.1.1   Effect of task: [ɾ] in the picture-naming task

Whereas, H1 predicted that both the [ɾ] and [r] would be easily acquired by the learners (Flege, 1995), H2 predicted that the [ɾ] and [r] would be difficult to produce, however that the [ɾ] would be easier (Rose, 2012). The sounds produced by the learners for the target [ɾ] are demonstrated in Figure 10. Results of the picture naming task showed that at the group level, the [ɾ] was the most frequent realization in this task (37%). The second most frequently produced sound in place of the [ɾ] targets were [l] productions (26%). The remaining 37% was comprised of an [ɹ] (15.3%), combinations segments (7.4%), deletion (6%), [ř] (4.3%), [r] (2%) and "other" (2%). The deletion could be transferred from Haitian Creole and will be further discussed in section 4.14. The other category was made up of two sounds [ḏ]and [ð]; each were only produced once. There is also some evidence of transfer in the combination productions that will be discussed in section 4.14.

Figure 10. Percentage type of production of Haitian Creole-speaking learners for the [ɾ] in the picture-naming task

4.1.2   Effect of task: [ɾ] in the reading task

It was expected that orthographic exposure to the <r> would result in more transfer from the L1 (Rafat, 2015). Results of the reading task (Figure 11) once again analyzed at a group level show that when the [ɾ] was the expected target sound, the top two sounds produced were [ɾ] (41%) and [l] (29%). The remaining 30% included [ɹ] (11%), [r] (6%), [r] (5%), [ř] (3%), deletion (3%), other (3%), and combinations (2%). The other category was comprised of two realizations of [v] and [w] which were only produced once across the group. No production of French rhotics was found however the [w] and deletion suggest transfer from Haitian Creole and will be discussed further in the following section 4.14.

When comparing the effect of the two tasks, the percentage of [ɾ] and [l] production is very similar across both tasks, although [ɾ] was produced at a slightly higher rate in the reading task, 4% more often than in the picture naming task. The [l] was produced frequently across both tasks suggesting it could be a simplification strategy that the learners employed (Patience, 2018). Similar sounds were produced across both tasks with [l] and [ɹ] being the most frequently produced sounds following the [ɾ]. Other realizations included, but were not limited to, deletion, [ř], and combination segments. Notably, the [ɾ] was deleted at a slightly lower rate in the reading task. As previously highlighted the rate of deletion was slightly lower in this task (3%) than the reading task (6%).
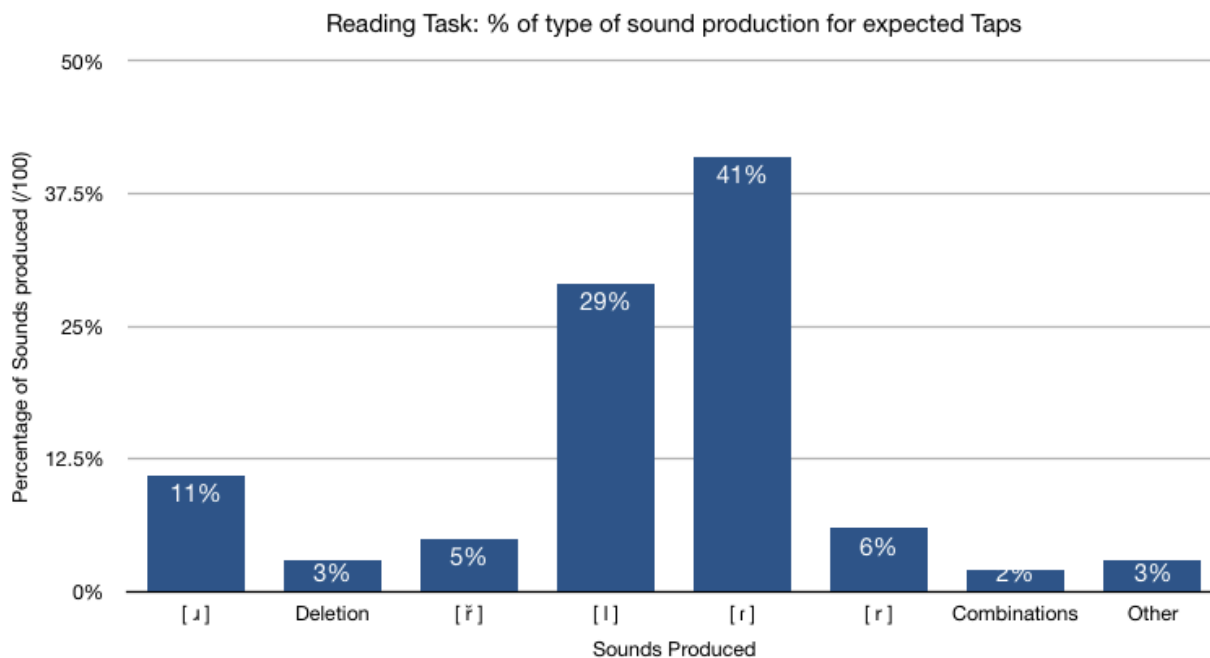
Figure 11. Percentage type of production of Haitian Creole-speaking learners for the [ɾ] in the reading task

4.1.3   Effect of task: [r] in the picture-naming task

The present section outlines the results of the Spanish [r] production by Haitian Creole learners of SPanish in Tijuana, Mexico. Whereas H1 predicted that [r] would be easily acquired, H2 predicted that both [ɾ] and [r] would both be difficult to produce, though the [r] would be more difficult to due to its' articulatory difficulty (Olsen, 2012; Stockwell, Bowen & Martin, 1965) and would be substituted by [ɾ] (Weech 2009). Results, presented once more at a group level, show that the [ɾ] was the highest produced sound (37%) followed by [ɣ] (13%), [r̆] (10%) and [l] (10%.) The other 30% included: [ɹ] (9%), [r] (6%) (which was the target sound), [d̞] (4%), other (4%), deletion (3%), [h] (2%), and combinations (2%). The other category was defined by [w] and [z] realizations, however each sound was only produced once. No production of the French rhotics was found and once again the [w], deletion and [ɣ] indicate transfer from L1 (i.e., Haitian Creole). This will be further discussed in section 4.14. The sounds that were produced during the picture-naming task in regard to an expected [r] are shown in Figure 12.
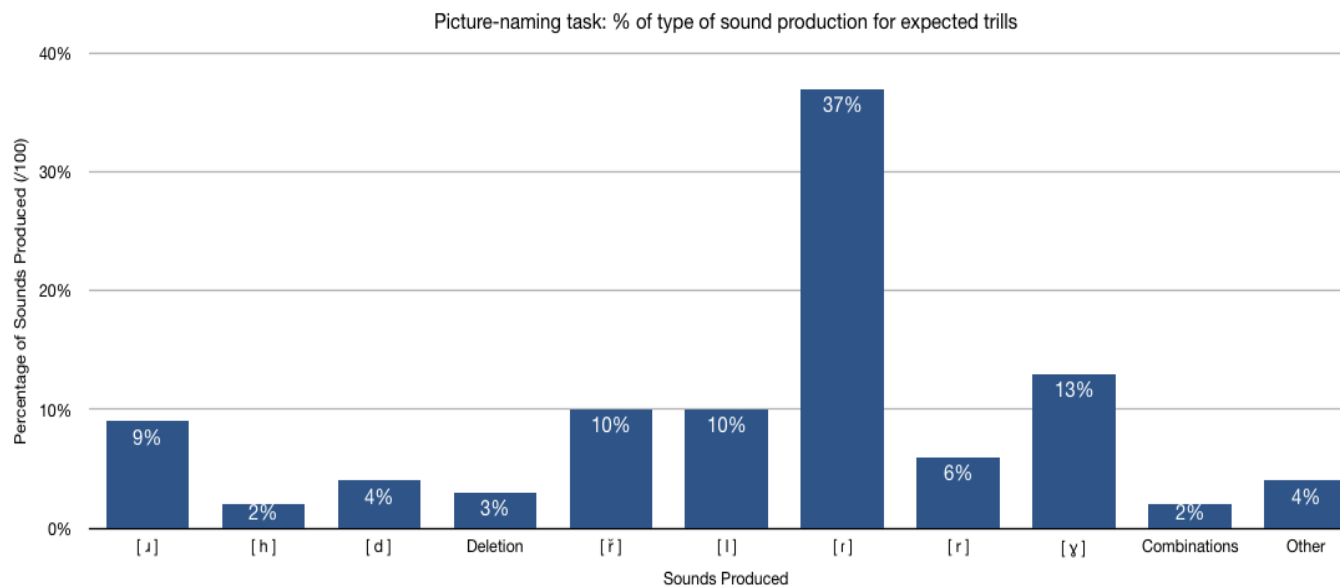
Figure 12. Percentage type of production of Haitian Creole-speaking learners for the [r] in the picture-naming task

4.1.4   Effect of task: [r] in the reading task

Figure 13 displays the sounds that the learners used in the reading task when [r] was the target sound. Figure 13 shows that the [ɾ] was the most frequently produced sound (40%), similarly to the results of the picture-naming task. This was followed by the [r] production being the second highest produced sound (16%), which was produced at a lower rate (6% (% of how much less)) in the picture-naming task. This suggests a positive effect of exposure to <rr>. The other 44% of were made up of the following realizations: combinations (10%), [ɹ] (9%), [l] (8%), [ɣ] (7%), [ř] (4%), [w] (3%), and other (3%). The other segments were realized as [h] and [ɖ], each only occurring once. [ɣ] and [w] productions are attributed to L1 transfer. Finally, there was no evidence of deletion in this task.
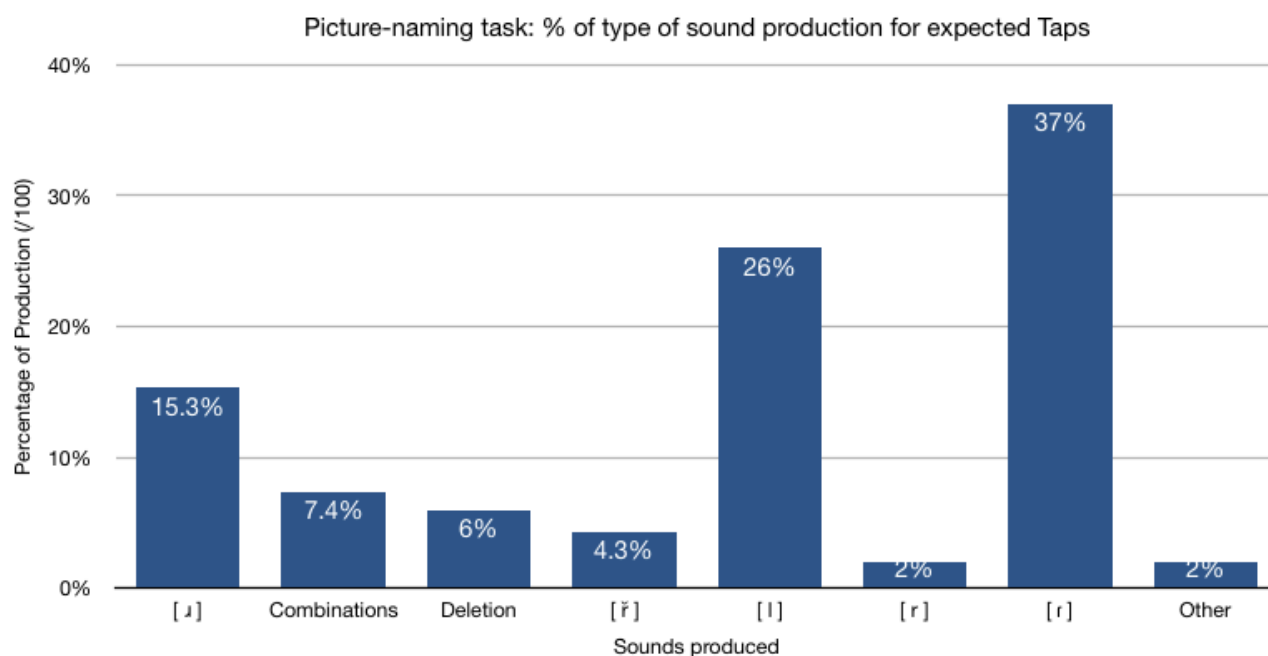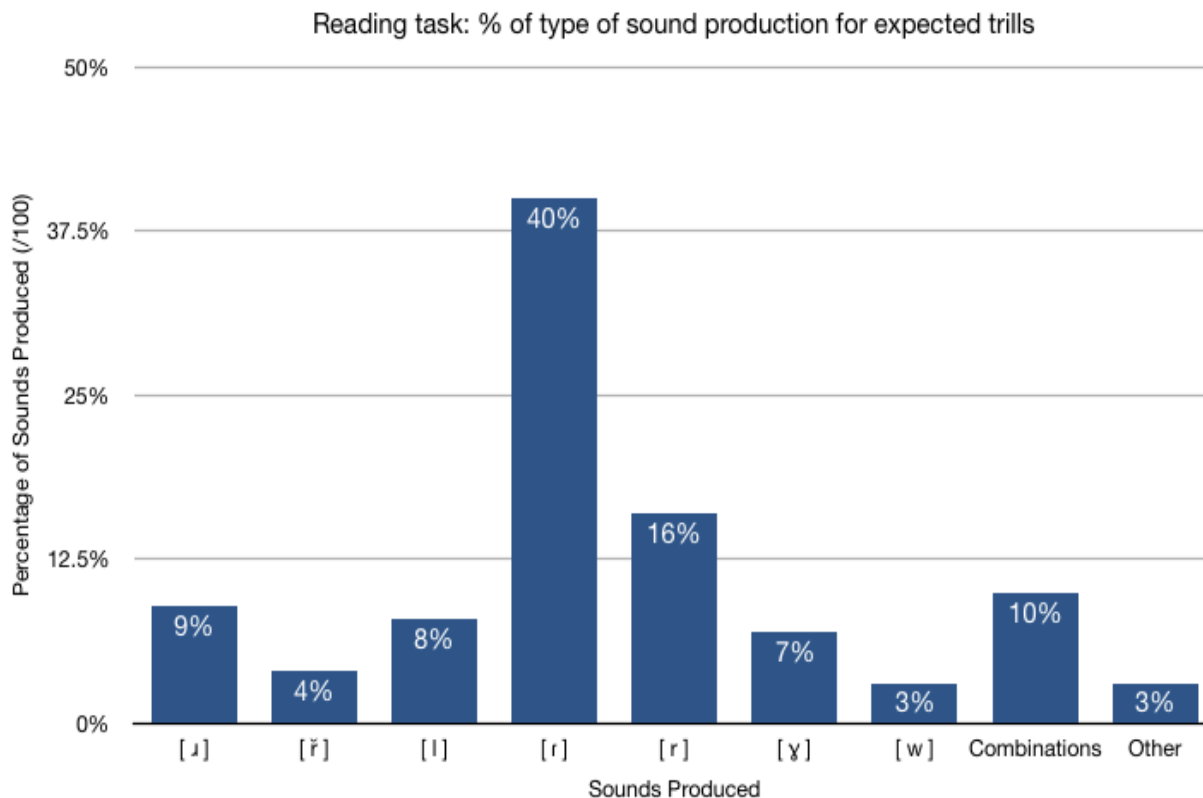
Figure 13. Percentage type of production of Haitian Creole-speaking learners for the [ɾ] in the reading task

4.2   Effect of tasks on combination productions by Haitian Creole learners

This section of the results will be an analysis of the combinations segments that were produced across both tasks and both target sounds. Each section will be a review of the expected sound ([ɾ] and [r]) across both tasks.

4.2.1   Picture-naming task: Combination sounds produced by Haitian Creole learners [ɾ] target

Figure 14 presents the combination sounds that the Haitian Creole-speaking learners of Spanish produced in the picture-naming task when the [ɾ] was the target sound. Combination sounds made up 7.4% of the sounds produced. The highest produced sounds were [l] + [r̃] (22.5%) and [ɣ] + [w] (22.5%). The rest of the combination sounds included: [r̃]+ [l] (11%), [y] + [h] (11%),

[h] + [ř] (11%), [ɣ] + [h] (11%) and [ɾ]+ [l] (11%). This task had the second highest rate of combination segments produced. These sounds were composed of a sequence of two sounds that at times included an epenthetic vowel ([a] or [e]). The [w] and [ɣ] segments were one of the highest produced in this task indicating transfer from their L1 (see section 4.19).
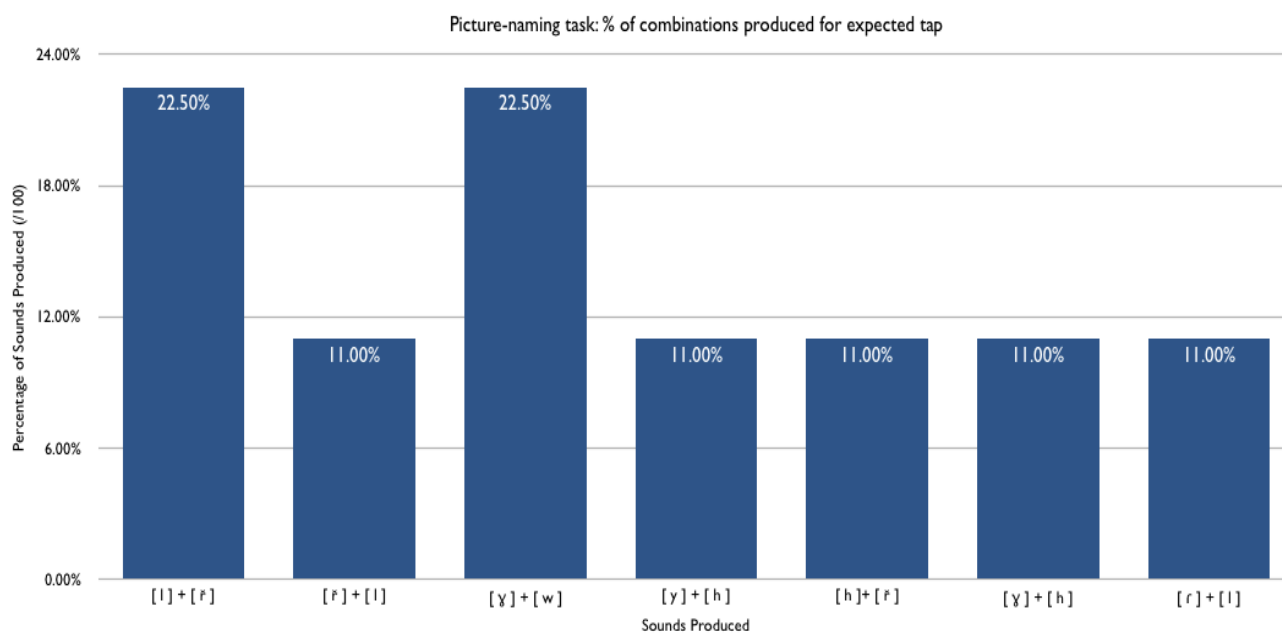
Figure 14. Percentage type of production of combinations of Haitian Creole-speaking learners for [ɾ] in the picture-naming task

4.2.2 Reading task: Combination sounds produced by Haitian Creole learners for [ɾ] target

Figure 15 displays the different variations of the combination segments that the Haitian Creole learners of Spanish articulated in the reading task when the [ɾ] was expected. Combination sounds made up 2% of the sounds produced in this task. All combination segments were produced once thus each equalling 25% of the realizations in the combination column of Figure 15. The realizations were: [h] + [l] (25%), [ɣ] + [l] (25%), [h] + [ɣ] (25%), and [ɾ] + [ɣ] (25%). The Spanish learners produced two-segment combinations. In comparison to the picture task, the common sounds found across both were [ř]+ [l], [h] + [ɣ] or [ř], and [l] combinations. A higher number of combination segments were produced in the picture naming task than the reading task.

Reading task: % of combinations produced for expected tap
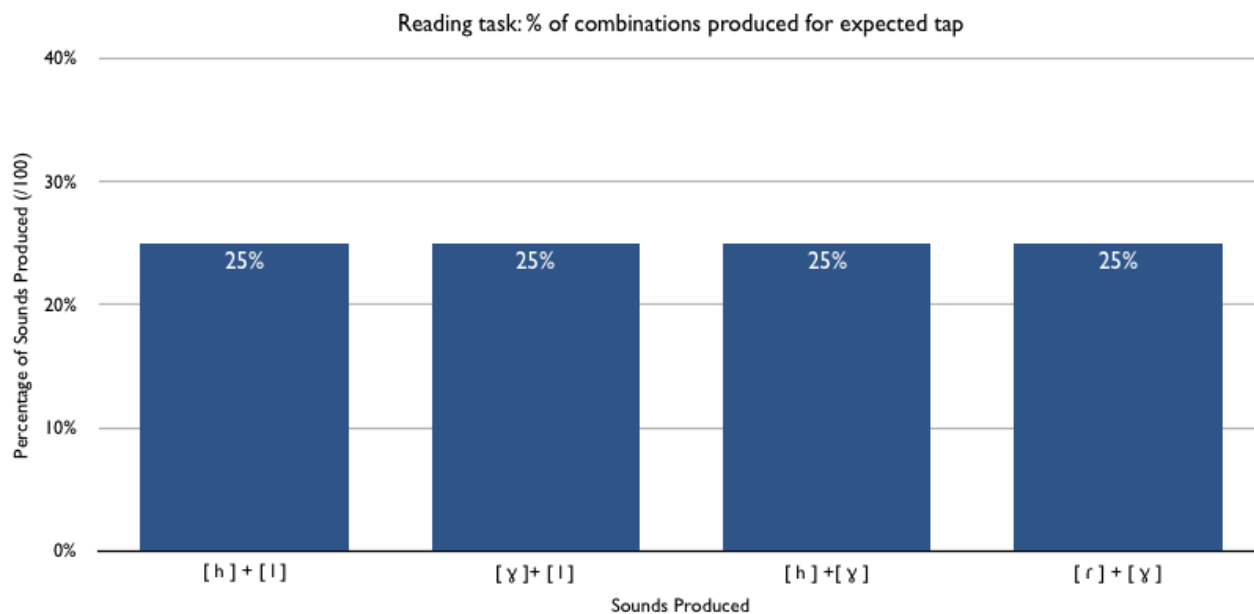
Figure 15. Percentage type of production of combinations of Haitian Creole-speaking learners for [ɾ] in the reading task

4.2.3 Picture-naming task: Combination sounds produced by Haitian Creole learners for [r] target

The results shown in Figure 16 are the combination segments that were produced in the picture naming task when the [r] was the expected sound. The results are shown at a group level, where various combination sounds were produced. Each combination was two segments long with varied sound combinations. The total percentage of combinations produced in this task were the lowest across both tasks and sounds (i.e., 2% in picture naming vs. 10% in reading). The following combinations made up this 2%. The pattern that occurred at the highest rate was [h] + [ř] (24%) followed by: [ř] + [j] (16%), [ɣ] + [h] (12%), [h] + [l] (6%), [ɣ] + [r] (6%), [r] + [h] (6%), [l] + [ɣ] (6%), [ɾ] + [ř] (6%), [ɾ] + [h] (6%), [ɣ] + [ɹ] (6%), and [ř] + [ɣ] (6%). There were a high number of [ɣ] sounds produced which indicates strong transfer from their L1 and will be discussed further in section 4.14.

Picture-naming task: % of combinations produced for expected trill
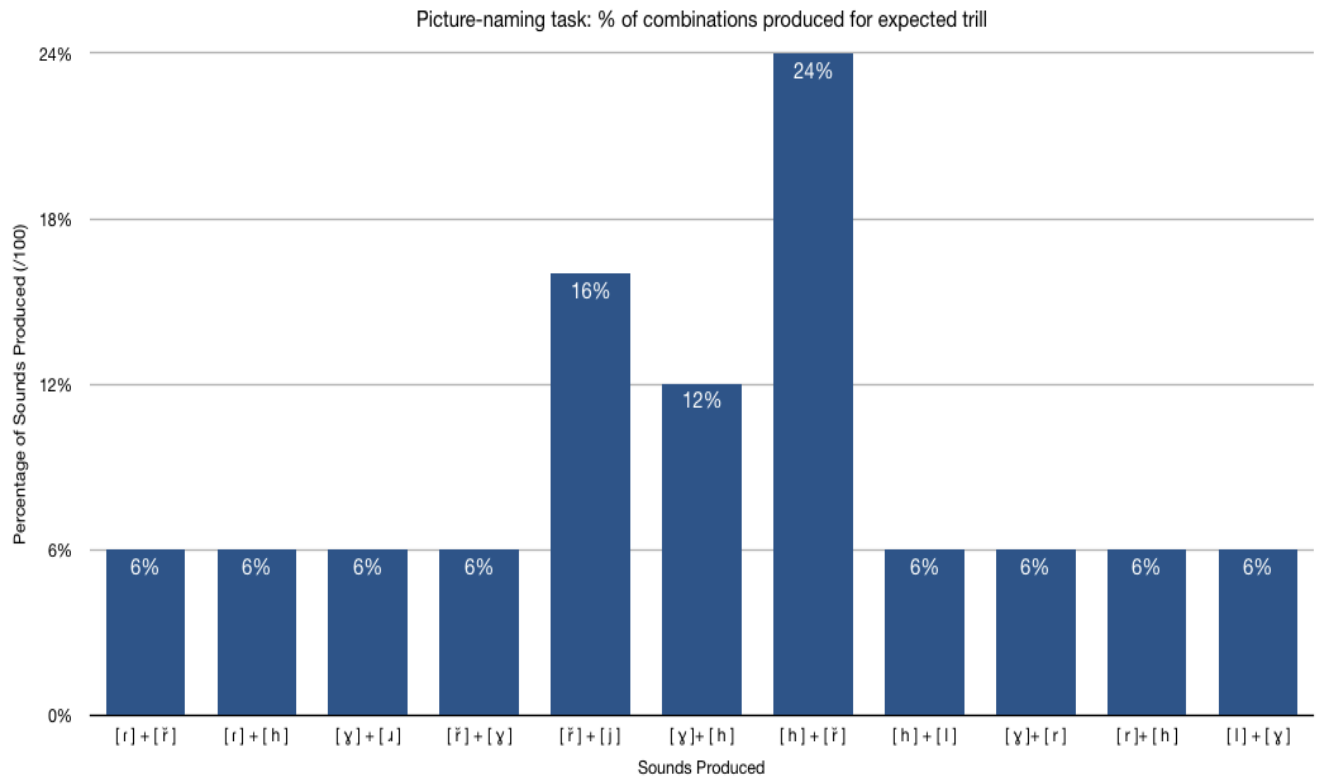
Figure 16. Percentage type of production of combinations of Haitian Creole-speaking learners for [r] in the picture-naming task

4.2.4 Reading task: Combination sounds produced by Haitian Creole learners for [r] target

This task had the highest percentage of combinations segments: 10% of the productions during this task were made up of combinations. This could be due to the articulatory difficulty of the [r] and the presence of a digraph. Exposure to <rr> may have cued the learners to produce a combination production. The different combinations realized were as follows: [h] + [l] (18.5%), [h] + [ř] (18.5%), [h] + [ɹ] (11%), [ɣ] + [ɾ] (7%), [w]+ [ɹ] (7%), [ɾ] + [l] (9%), [h] + [ř] (7%), [ɹ] + [l] (6%), je + [h] + [r] (4%), [h] + [ɣ] (4%), and [ř] + [j] (4%). Common segments found across both tasks were: [l] combinations (see Figure 18-20 for examples). This was followed by [ř], [ɣ], [h] and [ɾ] combinations. The [w] and [ɣ] combinations will later be analyzed to

determine influence from Haitian Creole (section 4.14). The [w] and [ɣ] combinations only

appeared in the reading task. Figures 18-20 are examples of combination segments.
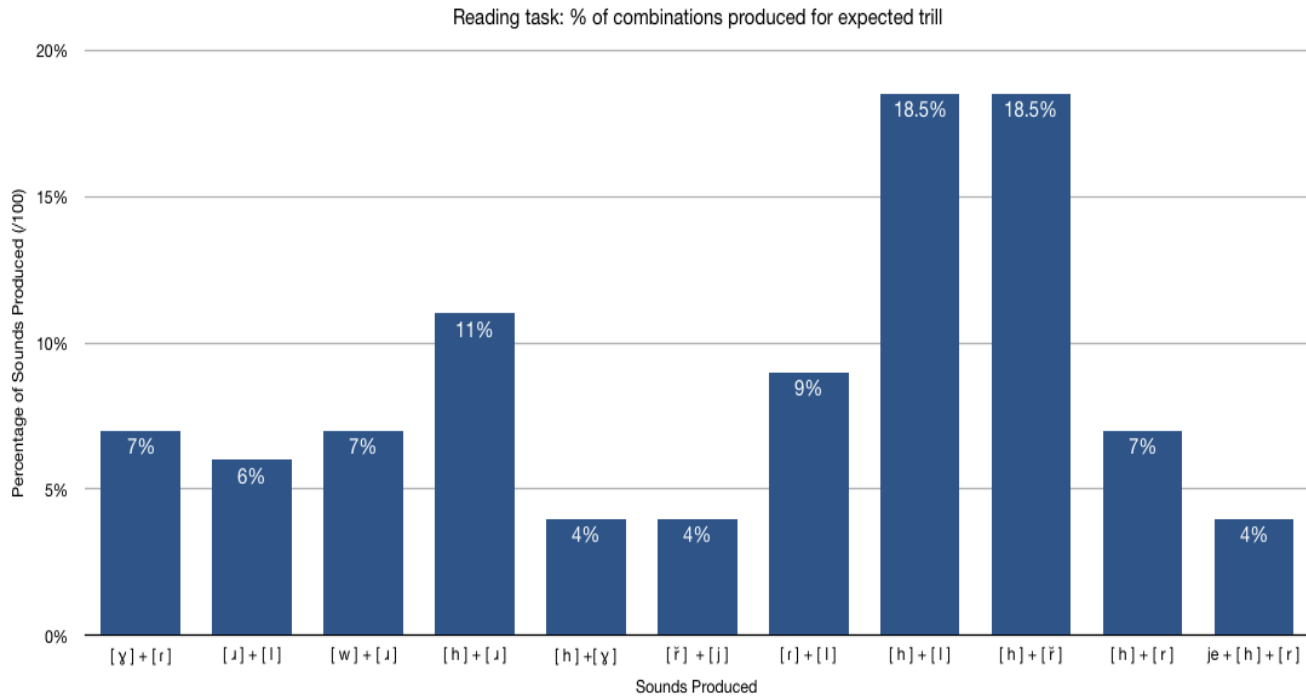
Figure 17. Percentage type of production of combinations of Haitian Creole-speaking learners
for [r] in the reading task
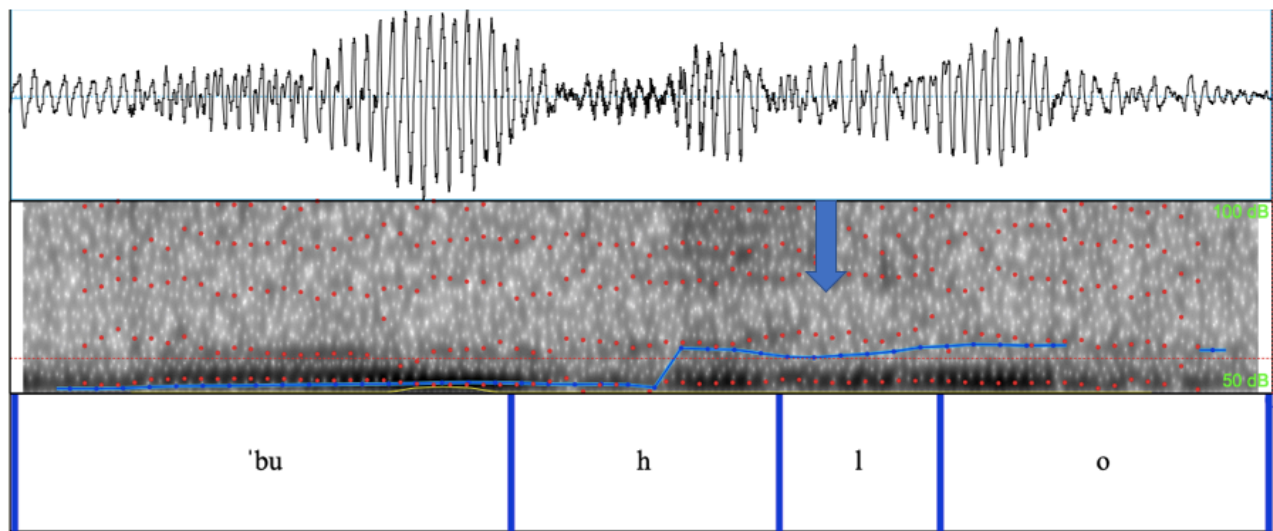
Figure 18. Participant 113 example of [h+ l] combination. Picture Task. <burro> [ˈbu.**h.l**.o]
'donkey'
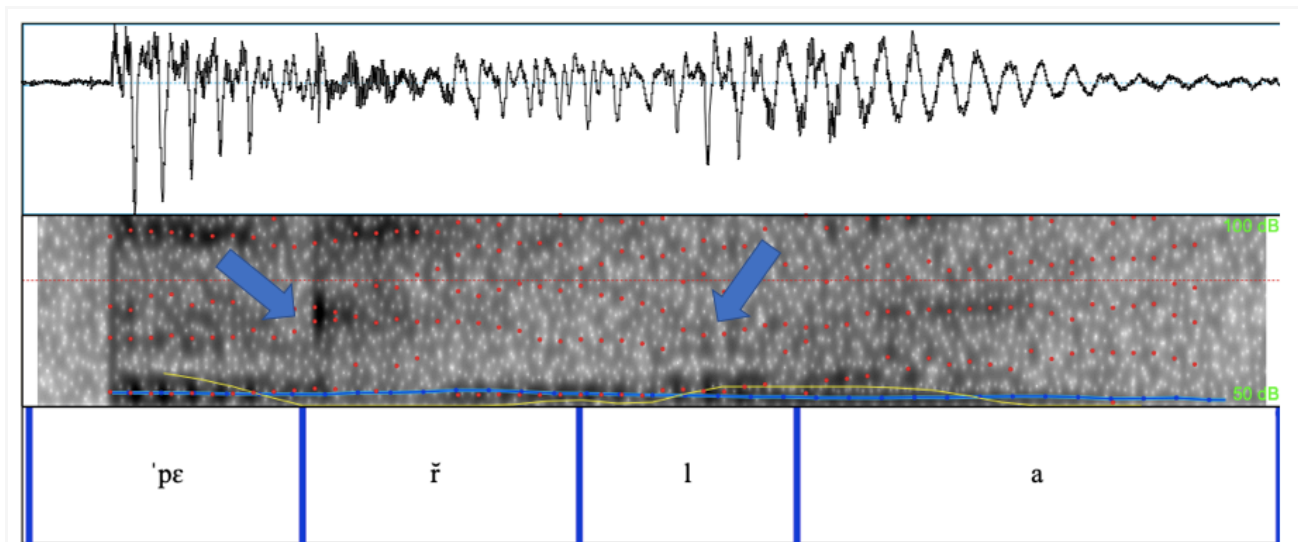
Figure 19. Participant 109 example of [ř+l] combination. Picture task. <pera> [ˈpɛ.**ř.l**.a] 'pear'.
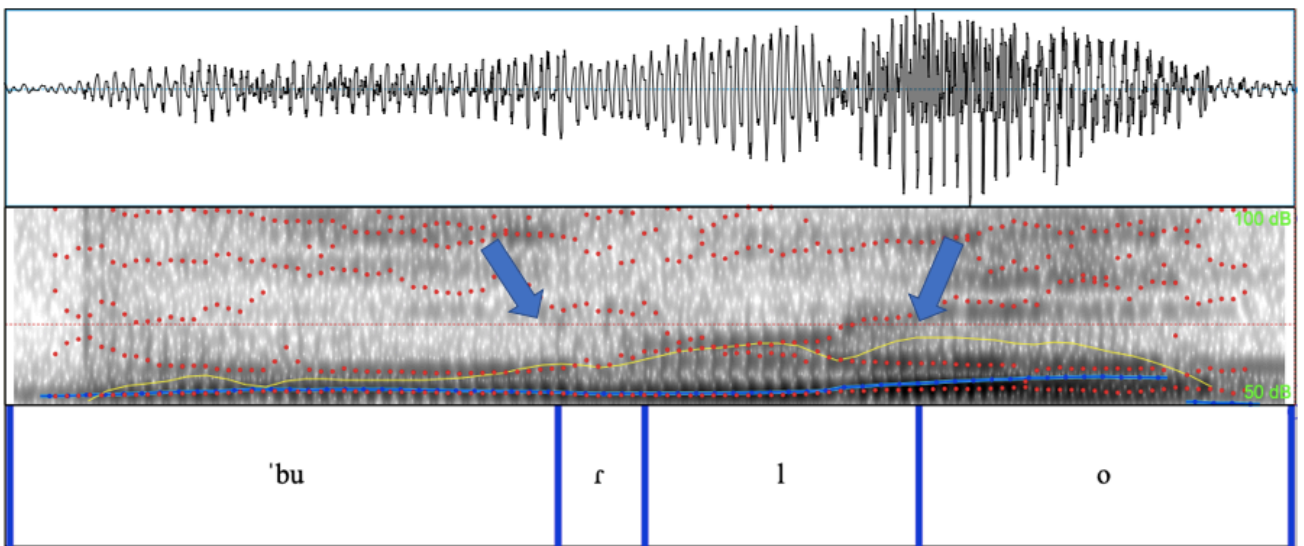
Figure 20. Participant 112 Example of [ɾ+l] combination. Read task. <burro> [ˈbu.**ɾ.l**.o] 'donkey'.

4.3   Mean duration, percentage voicing and number of closures

This section is a phonetic examination of the mean duration, percentage of voicing for the [ɾ] and the [r] and the number of closures for the [r] in both tasks. The first section reports on the mean duration, percentage of voicing and mean number of closures of the [ɾ]. The second section reports mean duration and percentage of voicing for the [r].

4.3.1   Effect of task on duration and voicing: [ɾ]

Table 5 shows the mean duration, the range and the percentage of voicing of the [ɾ] across the two tasks. Results show that the mean duration of the [ɾ] in the picture naming task was 38ms and the range of duration was 27ms-55ms. Moreover, all the tokens were voiced except 2, and the mean duration for voicing was 37ms and the mean percentage of voicing was 95%. As for the reading task, the mean [ɾ] duration was 41 ms and the range was 26-57ms. The mean duration voicing was 40ms. Only one token was not voiced and the mean percentage voicing in the reading task was 97%. There was not a large difference between the two tasks with respect to these parameters.

4.3.2   Mean duration, percentage voicing and number of closures: [r]

Table 5 shows the findings on duration, percentage of voicing, and number of closures regarding the production of the [r] across both tasks. Results show that the [r] was always voiced or partially voiced, and no voiceless tokens were found across either task. Regarding the picture-naming task, the mean duration found across the group was 91.5ms, and the duration range was 40ms –135ms. The mean duration of voicing in the picture task was 86ms and the mean percentage voicing was 82%. The number of closures that were commonly found in their production was 2. Only one token had 3 closures. In the reading task, however, the mean duration of the [r] was still 91.5ms but the duration range was 54-140ms. The mean duration voicing time was 63.3ms and the mean percentage of voicing was 91%. The mean number of closures in the reading task was the same, namely 2.5 (30% of the tokens were produced with 3

closures whereas 70% were produced with 2 closures). It seems that orthography exerted an influence with not only the manner of articulation but also the duration range, number of closures, and percentage of voicing, triggering a more articulated trill than in the picture-naming task.

Table 5: *Phonetic measures of [ɾ] and [r] across both tasks for Haitian Creole learners of Spanish*

	Mean duration Reading task	Mean duration Picture Task	Duration Range Reading Task	Duration Range Picture Task	Mean % of Voicing Reading Task	Mean % of Voicing Picture Task	# of Closures Reading Task	# of Closures Picture Task
[ɾ]	40ms	38ms	26ms-57ms	27ms-55ms	97%	95%	1	1
[r]	91.5ms	84ms	54ms-140ms	40ms – 135ms	91%	82%	2.5	2

This section reported on voicing, duration and closure differences between the two tasks for the [r] and voicing and duration for the [ɾ] produced by the Haitian Creole learners of Spanish.

4.4   Haitian Creole rhotics

This section outlines an acoustic analysis that was completed on the Haitian Creole stimuli to determine influence from Haitian Creole into their Spanish. The responses were analyzed individually and then reported at group level. The results in Figure 21 show three different realizations of rhotics that characterize the Haitian Creole stimuli: [ɣ] (66%), [w] (25%), and deletion (9%). A larger influence from Tijuana Spanish was found across all tasks, which can be seen with the high number of Spanish realizations found (e.g., [ɾ]) in all tasks. The three Haitian Creole rhotic sounds were found across all tasks varying in the number produced. The results suggest that some of the productions previously observed in the above sections might have been

due to transfer from the Haitian Creole L1 into the learners' Spanish which will be discussed further in Chapter 5. The next section provides an analysis of the same parameters in the realizations of the [ɾ] and [r] in the native speakers' group from Tijuana Spanish.
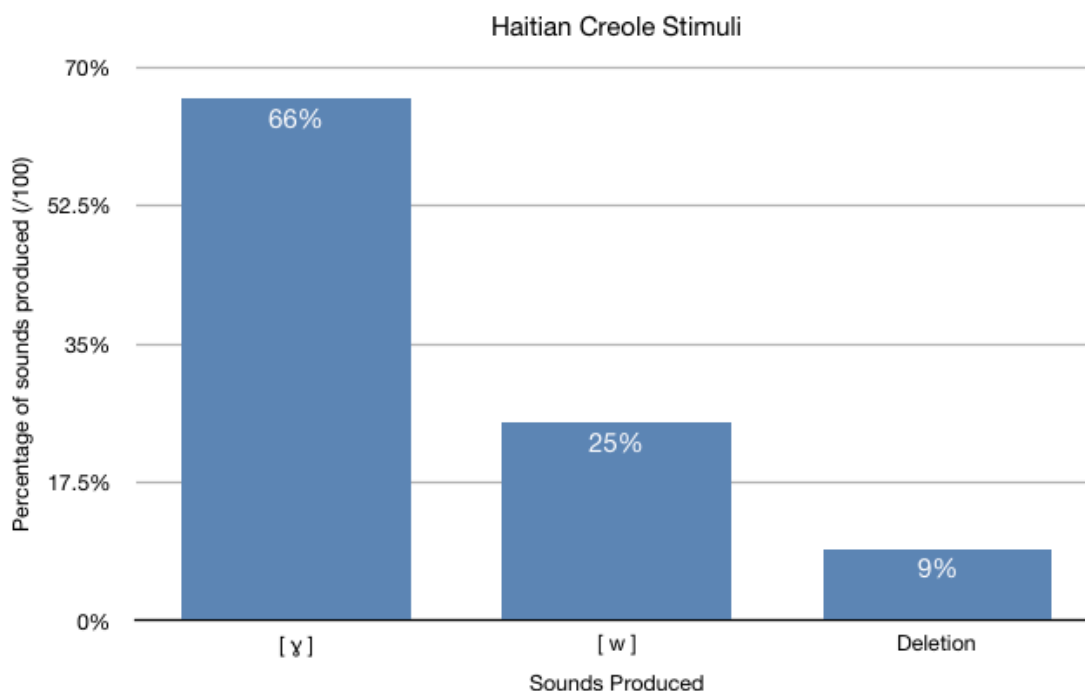
Figure 21. Results of Haitian Creole reading tasks: percentages of sounds produced

4.5 Native speaker results of Spanish rhotics

The productions of four native monolingual Spanish speakers from Tijuana, Mexico were tested. The 320 utterances were analyzed acoustically using PRAAT (Boersma & Weenink, 2017) to determine whether the /ɾ-r/ contrast existed in the input that the Haitian Creole learners of Spanish may have been receiving (i.e., the type of rhotics that are found in Tijuana Spanish). Figure 22 shows that the [r] was produced at a 97% rate in the picture task and 100% in the reading task. The other 3% in the picture task was produced as [ɾ] in place of the [r]. Furthermore, Figure 22 reports the realization of the [ɾ] in both the reading task and picture naming task. In the picture task it was produced 98% correctly. The other 2% in the picture naming task was comprised of the [r]. In the reading task it was realized at 90%. The other 10%

was comprised of [r] productions. When the [ɾ] was not realized it was being produced as the Spanish [r] instead.
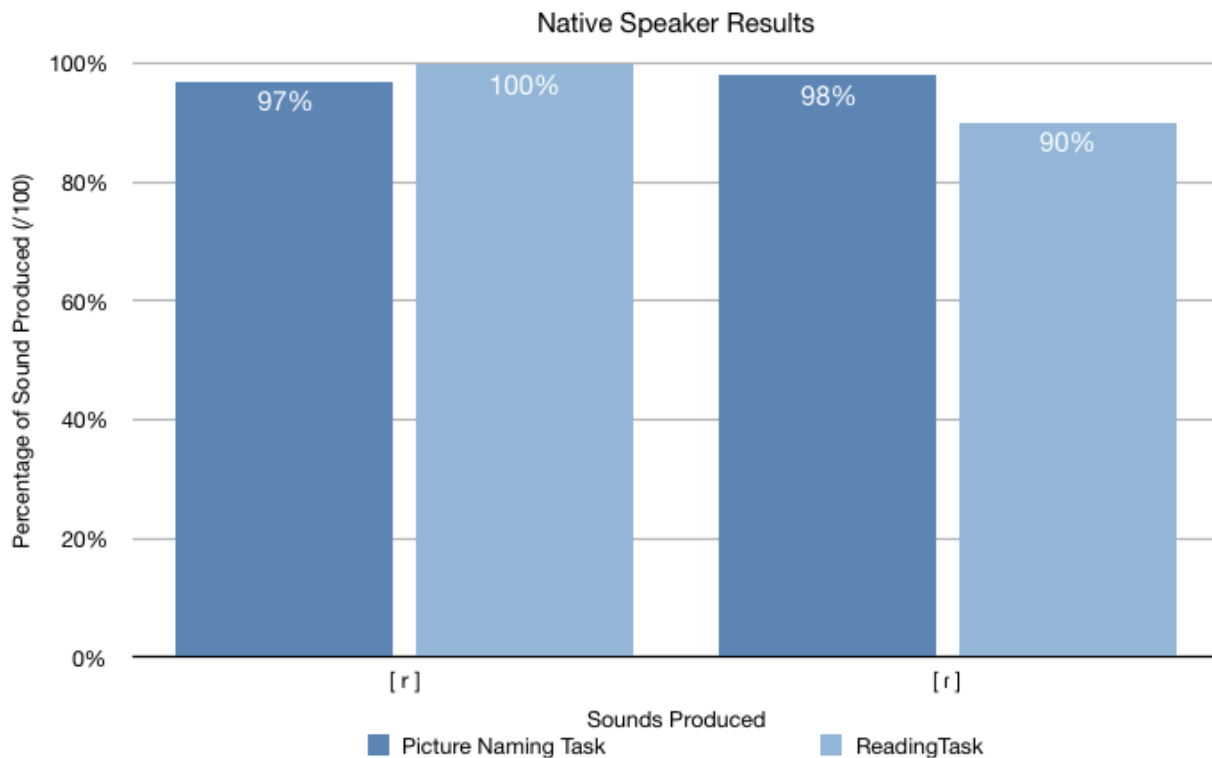
Figure 22. Native speaker results for / ɾ/ and /r/ productions

4.5.1   Native speaker results: duration, voicing and number of closures

This section examines the mean duration, range, percentage of voicing, and the mean number of closures by the native group for both Spanish rhotics. The results are shown in Table 6. The mean number of closures for the [r] in both tasks was 3 (see Figure 24). The percentage number of closures produced in the reading task were as follows: 1 closure (2.5%), 2 closures (38%), 3 closures (38%) and 4 closures (20.5%). In other words, there was variability in the production of the [r]. In the picture-naming task, the range was: 2 closures (44%), 3 closures (41%), 4 closures (9%) and 5 closures (6%). The mean duration for voicing for the [r] in the picture-naming task was 81ms and the mean percentage of voicing was 88%. In the reading task, the [r] production mean voicing time was 94ms and the mean percentage of voicing was 85%. The mean duration for the [r] was 93ms and 97ms in the picture-naming and reading tasks, respectively. The

duration of the [ɾ] ranged between 58-160ms in the picture naming task and 62-150ms in the reading task.

The mean duration of [ɾ] (see Figure 23) in the picture naming task was 48ms with a range of 30-48ms. The mean duration of voicing for the [ɾ] in the picture task was 37ms and the mean percentage of voicing was 88%. The mean duration for the [ɾ] in the reading task was 47ms and the range was 21-50ms. The mean duration of voicing was 36ms and the overall percentage of voicing in the reading task was 85%. Only 1 closure was found across both tasks when analyzing the production of the [ɾ] (see Figure 23).

What follows is a comparison of the most significant findings between the native speaker group with the Haitian Creole group. Overall the findings show that the learners were able to get the [ɾ] 40% of the time. In terms of manner there was no large difference between the native speaker group and the learners. Regarding the production of the [r], the largest difference was the number of closures: the mean for the learners in the picture-naming task was 2 closures and 2.5 in the reading task, but native speakers had a mean of 3. The learners produced fewer closures than the native speakers. Moreover, whereas duration for the [r] in the native speaker group ranged between 62ms-150ms in the picture-naming task and 58ms -160ms in the reading task, for the learner group it ranged between 54ms-140ms in the picture-naming task and 40ms – 135ms for the reading task. The [r] in the native speaker group was longer in both tasks than the [r] produced by the learner group.
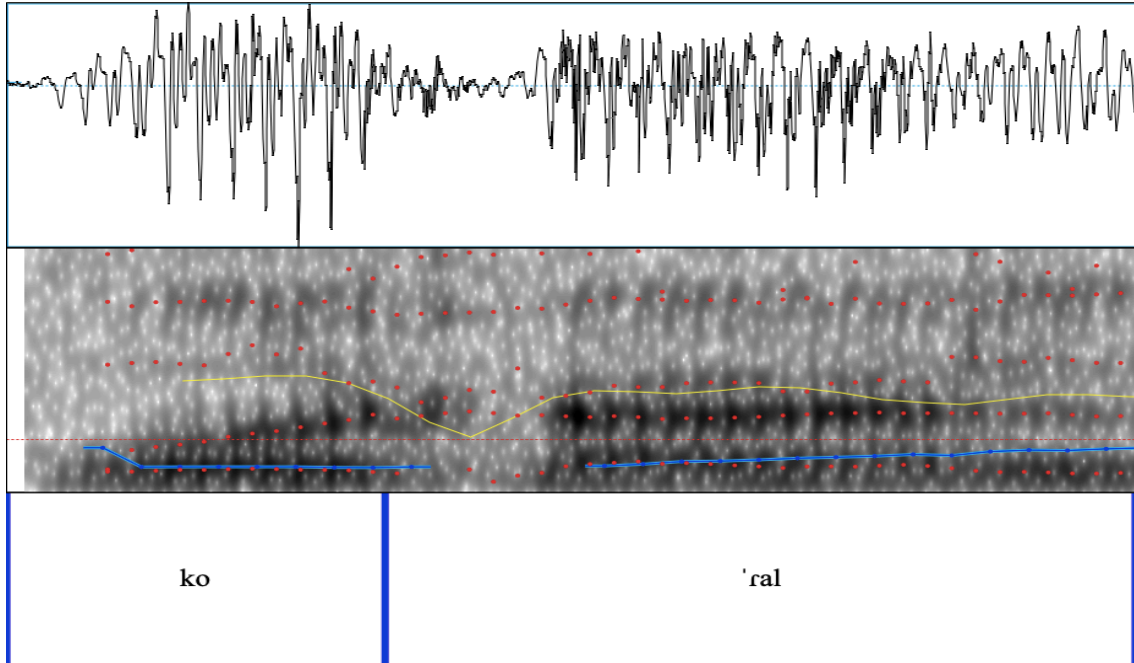
Figure 23. Native speaker of Spanish target [ɾ]. Reading Task. word. <coral> [ko. ˈ ɾal] 'coral'
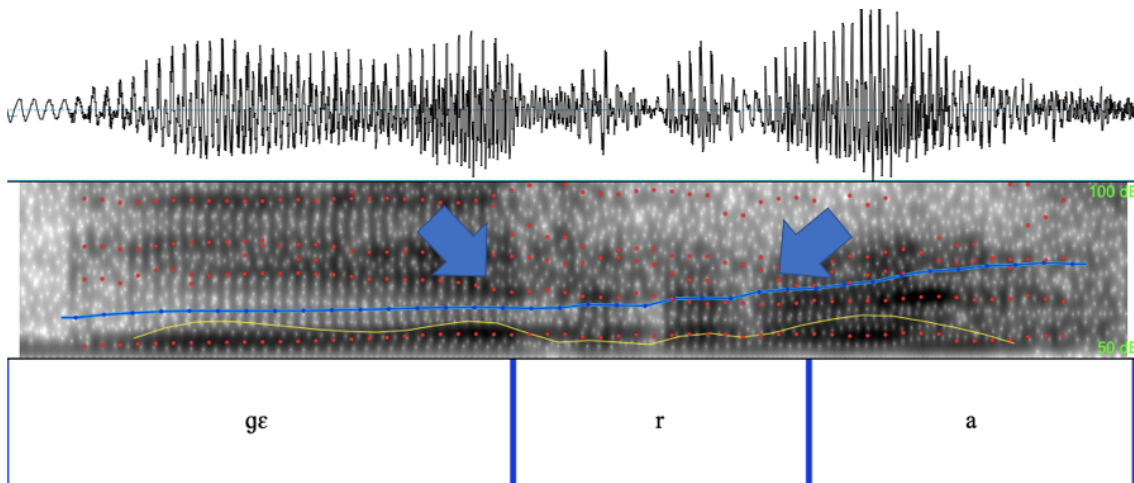
Figure 24. Native speaker of Spanish target [r]. Reading Task. word. <guerra> [ˈgɛ.**r**a] 'war'

Table 6: *Phonetic measures of [ɾ] and [r] across both tasks for native speakers*

	Mean duration Reading task	Mean duration Picture Task	Duration Range Reading Task	Duration Range Picture Task	Mean % of Voicing Reading Task	Mean % of Voicing Picture Task	# of Closures Reading Task	# of Closures Picture Task
[ɾ]	47ms	48ms	21ms-50ms	30ms-48ms	85%	88%	1	1
[r]	97ms	93ms	62ms-150ms	58ms - 160ms	89%	91%	3	3

This section was a review of the phonetic analysis that was completed for the /ɾ-r/ contrast productions across both tasks and groups. The following will be a description of the results founds regarding the effect of education.

4.6   The effect of education

The language background and attitude questionnaires that provided information concerning the learner's education background were coded by the author. All participants were provided with a participant number in order to guarantee confidentiality. The questionnaires were then examined to determine the education level of each participant (see Table 7 below for number of participants per education level). The Spanish-learners were then sorted into four groups (Figure 25). Education Group 1 included participants that had attended both elementary and middle school together due to the low number of participants who only attended elementary school. Education Group 2 was high school, Education Group 3 was university or college, and Education Group 4 was postgraduate which included Masters, PhD, and a postdoc. Elementary and middle school were collapsed into one category because there was only a small number of participants that had only attended elementary school. As the table shows, 3 participants attended elementary school, 9 went to middle school, 9 attended high school, 5 finished either college or university, and 4 completed some type of post graduate studies.

Figure 25 displays the combination of the results across each education level and analyzing the data at a group level. The number of productions of [r] and [ɾ] across both tasks per participant

were calculated and then averaged depending on the number of tokens each participant produced. Regarding [ɾ] production, Education 1 produced 25% of their tokes as [ɾ], Education 2 produced 50% and Education 3 only produced 25% of their tokens as [ɾ]. Education 4 production was the highest at 59%. Regarding the realization of the [r] across the group levels, the results are as follows: Education 1 produced the fewest number of productions of [r] (3%), Education 2 produced [r] more than Education 1(8%), Education 3 produced a higher number than both the Education 1 and 2 (12%), and Group 4 had the highest number of productions of [r] (18%).

To test the hypothesis that education level would positively influence the /ɾ-r/ contrast production in the participants a correlation test was run at an individual level. A Pearson correlational analysis was conducted between the results of the positive attitude raw data and the production of the [ɾ] and [r], at an individual level. The percentages of [ɾ] and [r] productions were calculated per participant. The participants were then categorized into education groups. The test was then run to compare the overall results of each education group among one another. For example, the results for education group one was totaled depending on the number of [r] productions. The overall results were then compared to the results of those in education group 2. The correlation or coefficient value was then calculated using excel which gave us the value of R. The R value indicated how associated or related the two values are and whether or not there was a significant statistical relationship between these two values. This test was run until all of R values were calculated between education level resulting in 10 R values. Table 8 and 9 show the different R values of the production of the [ɾ] and [r] per education level. To understand the R value, if it was negative this indicates a negative relationship between the two education levels if it was positive, then there was a positive influence. The closer the R value was to 1 or -1 the stronger the relationship, the closer to zero the weaker the relationship. The results of the R values were then compared to the graph in Figure 23. The varying R values suggest there is a no significant relationship between the education levels and [ɾ] and [r] production.

The Pearson correlation analysis has its caveats. While it calculates the r value, describing the relationship between two variables, it does not indicate which way the relationship is being calculated. Although the Figure 23 makes suggestions towards a trend between education level

and production of the [ɾ] and [r], the current R values shown no significant relationship. However, further statistical analysis is required to review whether there is a significant relationship or not. This will be done by running a significance test, to get a p-value

Table 7: *Number of participants per education level*

Education Level	Elementary School	Middle School	High School	University	Postgraduate
Number of Participants	3	9	9	5	4
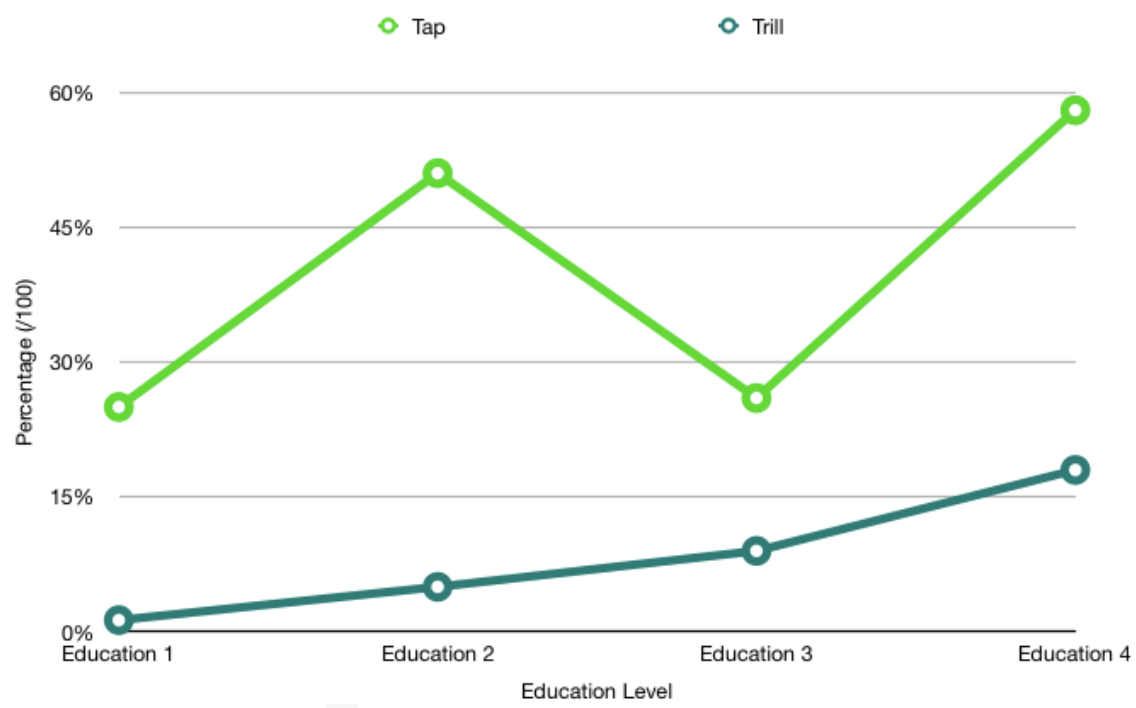
Figure 25. Production of [ɾ] and [r] across education level

Table 8: *R value of [ɾ] production per education level*

	Elementary School	Middle School	High school	University	Postgraduate
Elementary School	-	-	-	-	-
Middle School	-0.5236517	-	-	-	-
High School	0.48022382	0.2567435	-	-	-
University	0.84197815	0.5348573	0.21894918	-	-
Postgraduate	0.36932848	-0.8708831	-0.1498703	0.82768663	

Table 9: *R value of [r] production per education level*

	Elementary School	Middle School	High school	University	Postgraduate
Elementary School	-	-	-	-	-
Middle School	0.43355498	-	-	-	-
High School	-0.5	0.20346284	-	-	-
University	-0.5	0.62637169	0.74199208	-	-
Postgraduate	0.30699919	-0.5560304	-0.924145	0.8998455	-

4.7 The effect of language attitudes

This section is a review of the influence of language attitudes on the production of the Spanish [ɾ] and [r] sounds. It was predicted that a strong relationship would be found between the participants language attitudes and the production of the Spanish rhotics. Their responses to the questionnaires and their responses to the semi-directed interview to see if the pattern was consistent across both tasks. Research question 4 sought to find out whether there was a

relationship between language attitudes and their production of the Spanish rhotics. The overall majority answered positively to questions such as (1) and (2)

    (1) ¿Cuánto disfruta hablando español?

       (How much do you enjoy speaking in Spanish?)

    (2) El español es una lengua importante, al igual que su cultura y su identidad

       (The Spanish language, Mexican culture and identity are important).

Figure 26 shows the positive, negative, and neutral responses across the group levels towards Spanish and Haitian Creole. Results showed that overall the participants displayed mostly positive attitudes towards both Spanish and Haitian Creole calculated at around 80% and negative attitudes for both languages were under 20%. The semi-directed interview indicated the same results, where only a few participants expressed negative attitudes towards Spanish or their experience in Mexico.

Overall most participants were highly motivated to learn Spanish and responded with positive attitudes to the questions. To test the hypothesis that positive attitudes would show a strong relationship in the production of the rhotics, a Pearson correlation test was run between the results of the positive attitude raw data and the production of the [ɾ] and [r]. This was run through the use of individual results, the number of positive responses per participant was compared first to the number of [ɾ]s they had produced and then against the number of [r]s they had produced. The results showed that the R value for the [ɾ] production when compared to the positive attitude responses was -.025 with an R^2 of 0.0657 (see Figure 27). As Figure 27 highlights there is no relationship found between the positive responses and the [ɾ] productions. Moreoever to understand Figures 27 and 28 it is important to note that when the dots are clustered closer together this implies there is in fact a relationship. However, when the dots are dispersed randomly there is no significant correlation. The number of [r] tokens were then compared using the same test to the positive attitude responses. Similarly, no significant relationship was found with an R value of -.087 and an R^2 value of 0.0077 as shown in Figure

28. As shown in Figure 28s, the dots are scattered randomly highlighting that the findings that there is no relationship.
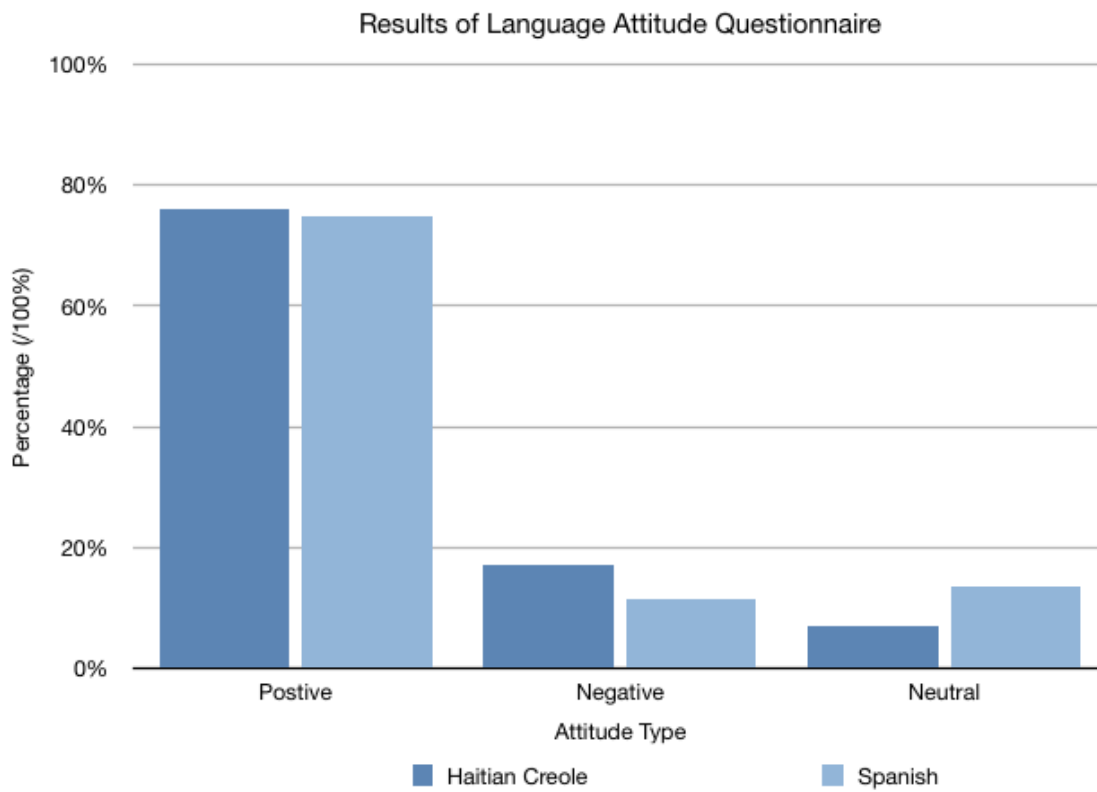
Figure 26. Results of language attitude tasks towards Spanish and Haitian Creole
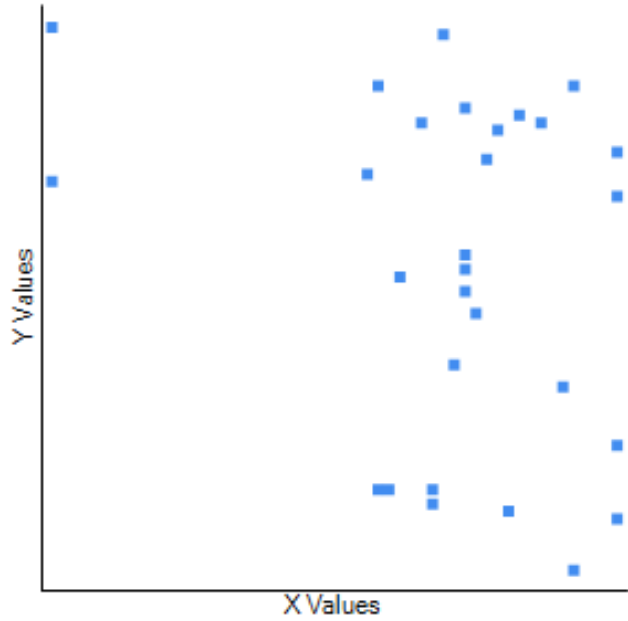
Figure 27. Pearson Correlation Test for [ɾ] production. Y is positive attitudes; X is number of [ɾ] realizations that were produced across both tasks

Figure 28. Pearson Correlation Test for [r] production. Y is positive attitudes; X is number of [r] realizations that were produced across both tasks

4.8   Summary of results

As displayed by the findings in this chapter, the [ɾ] appeared to be more easily acquired than the [r] generally speaking. Moreover, there was evidence of effects of transfer, developmental patterns, and combination sounds. A simplification strategy was apparently employed with the difficult [r] sound, commonly replaced by the [ɾ] across the two tasks along with the use of [l]. Both tasks also found combination realizations that contained various sound combinations. The most common combination segments included variations of [l], [ɣ] and [ř] segments. The results also provided an acoustic analysis reporting on the mean voicing time and range, mean duration and range, and the number of closures. Regarding the production of the [r], the [r] in the native speaker group were on average longer in both tasks than the learner group but the largest difference was the number of closures. Whereas the mean number of closures for the native speakers was 3, for the learners, the mean number of closures was 2 in the picture-naming task, and 2.5 in the reading task. It was also shown that there tended to be an overall positive influence of orthographic input for the [r] in Spanish. This effect was less robust for [ɾ] production. The [r] is a longer and more complex sound than the [ɾ] and the results show that exposure to a digraph can trigger a higher rate of it. This asymmetry was also demonstrated when the presence of the <rr> in the reading task yielded a higher rate of combination segments for the [r], whereas exposure to <r> reduced the rate of combination segments for the [ɾ]. This increase in combination segments is also attributed to <rr> being a digraph. Furthermore, exposure to orthography resulted in a lower rate of deletion for both the [ɾ] and the [r]. Orthography also exerted an influence with not only the manner of articulation but also the duration range, number of closures and percentage of voicing, triggering a more articulated [r] than in the picture-naming task. The results sections also examined the productions in Haitian Creole to measure for transfer from their L1 into their Spanish. Findings confirmed that the source of [w], deletion and [ɣ] productions in their Spanish were indeed Haitian Creole. However, transfer was also found at a higher rate in the combination segments than the overall data. Furthermore, an analysis of the native speaker productions was completed test if the Spanish rhotic contrast existed in this variety of Spanish. The [ɾ] and [r] indeed exist in the Tijuana, Mexican variety. Furthermore, a sociolinguistic analysis was completed by examining the influence of education background and language attitudes in comparison to the learners' productions of the /ɾ-r/ contrast. Results showed

that a higher level of education tended to predict more [r] productions, however no significant relationship was found for either social factor (education and language attitudes) that was measured and their rhotic productions. In this chapter, I have assessed the results for both the picture-naming and reading tasks. It was found that the [ɾ] was easier to acquire than the [r]. The second most common realization was [l], and transfer from their L1 was found with the presence of Haitian Creole rhotics. All things considered, there was a clear effect of orthography in their Spanish. It had a positive effect for the [ɾ] and the [r] although more so for the [r]. Regarding H4 and H5 it was predicted that a higher level of education and positive language attitudes would result in more accurate [ɾ]-[r] productions. However, no significant trend was found, and the R values found across both tasks were generally small and indicated no significant relationship between accurate production and these social factors. All of these findings will be discussed further in Chapter 5 and will be considered in light of previous research completed on the acquisition of the Spanish rhotics by foreign language learners. Moreover, it will consider the findings of previous studies that have examined the effect of orthography on phonological production, the role of language transfer and social influences. Additionally, in Chapter 5 I will highlight the contributions of these findings in relation to present work and make suggestions for future directions of study.

Chapter 5

5   Discussions and conclusions

In Chapter 4, the results showed that the production of the [ɾ] and the [r] were both difficult sounds for the learners as predicted by H2. Furthermore, the [ɾ] was produced more accurately and at a higher rate than the [r]. Additionally, the [ɾ] was the most frequent sound produced across all tasks. I also presented the results at a phonetic level to allow for a clearer analysis of the leaners' production of the Spanish [ɾ] and [r]. I analyzed the native speakers' realizations from the region of Tijuana to discover whether and how the Spanish /ɾ-r/ contrast existed in this variety of Spanish. Secondly, I described the findings of this study that confirmed H3, which stated that exposure to orthography would lead to a higher rate and a more target-like productions in the reading task than the picture-naming task for the [r] and transfer for the [ɾ]. A positive effect of orthography was found for both sounds although mostly for the [r] rather than the [ɾ]. The [r] productions were produced at a higher rate in the reading task. Moreover, orthographic input not only had an influence on the manner of articulation but also the duration range, number of closures, and percentage of voicing, triggering the production of a more articulated [r] than in the picture-naming task. Overall, exposure to orthographic input reduced the rate of deletion for both the [ɾ] and the [r] but had a more robust effect on the [r] than the [ɾ] in terms of the rate of the production of these sounds. Exposure to <rr> and <r> also resulted in differing effects in terms of the combination productions. Finally, I measured the influence of social factors, specifically education and language attitudes in comparison with their productions. Overall no significant relationship was found between education level or language attitude and the learners' productions. These findings will be compared to previous research, the contributions to the field will be stressed and further areas of research will be proposed in this Chapter.

The rest of the chapter is structured as follows. In Section 5.1, I address the issue of the production of the Spanish rhotics in Haitian-Creole speaking Spanish learners. 5.1.1 focuses on the developmental patterns found across tasks and sounds. In Section, 5.1.2, I remark on the results of the acoustic measurements that were taken and the target-like production of the [ɾ] and

[ɾ]. 5.1.3 examines the role of transfer. 5.2 presents the results regarding the role of orthographic input. In section 5.3 the influence of the following social factors: (a) education and (b) language attitude are considered. Finally, in section 5.4 I conclude by highlighting the contributions and implications of this study for our understanding of the acquisition and production of the Spanish rhotics in a multilingual context.

5.1 Acquisition of the Spanish /ɾ-r/ contrast: transfer and developmental patterns

5.1.1 Ease of acquisition and developmental patterns

Most studies regarding the production or acquisition of the Spanish rhotics have focused on an L1 English speaking population, however, this study provides a novel language pairing by examining the acquisition and production of the Spanish rhotics in a multilingual, multicultural context, where the learners' L1 was Haitian Creole. This was accomplished by examining how Haitian Creole learners of Spanish living in Tijuana Mexico produce the Spanish rhotics. I tested Flege's SLM (H1) that predicted that the learners would not have any difficulty acquiring the [ɾ] and the [r] because they are new sounds, distinct from the participants' L1. I also tested another hypothesis that based on previous empirical evidence (Olsen, 2012; Stockwell, Bowen and Martin, 1965) predicted that both the [ɾ] and the [r] would be difficult to acquire, although the [r] would be more difficult than the [ɾ] (H2). As highlighted above, the results did not verify Flege's hypothesis as the learners did have difficulty producing the [ɾ] and the [r]. The [ɾ] was only produced at most, 41% of the time and the highest rate of [r] production was 16% in the reading task. These results confirm H2 and are in line with findings from previous studies. Olsen (2012) examined the production of the /ɾ-r/ intervocalic contrast in L1 English speakers and found that the L1 influenced the outcome of the L2. The [ɾ] was easier and produced more often than the [r]. Olsen found that the L1 influenced the outcome of the L2. The results as found by Olsen were suggested to have been caused by the occurrence of articulatory similar allophonic tap in English. Major (1986) also completed a study of the acquisition of the Spanish [ɾ] and the [r] in native speakers of American English. Major found that the participants were clearly better at producing the intervocalic [ɾ] than any other sound, in any position. Like Olsen (2012) he also

proposed that this was because the [ɾ] sound already exists in English. Most importantly his findings are in line with this study. The [ɾ] was an easier sound than the [r] for learners to produce. Additionally, in the present study, the learners tended to overgeneralize the use of the [ɾ] to [r] contexts. This pattern was also found in a study completed by Weech (2009) who examined the production of the /ɾ-r/ contrast in English-speaking L2 learners of Spanish, who were living in a Spanish-speaking environment for an extended period of time. The results from the previous study revealed that although the participants were generally successful in producing the rhotic sounds in a target like manner (80%) they tended to replace the [r] with the [ɾ]. Moreover, a study completed by Rose (2012) suggested that learners would go through three stages of rhotic acquisition. First, they would employ the English [ɹ] in all Spanish rhotics contexts, then they would produce an [ɾ] dominant articulation and ultimately, they would produce the contrast of [ɾ] and [r] at a more advanced level. The Haitian Creole-speaking learners of Spanish in this study did tend to produce [ɾ] dominant realizations, followed by [l], [r̃] and [ɹ] across all tasks.

As mentioned above, another simplification/developmental strategy that was employed by the learners in this study was a substitution of the <r> sounds with an [l]. This was found by Patience (2018) in his study that examined L3 Mandarin speakers of Spanish. He found the [l] was a simplification strategy that was employed by less proficient learners. However, the findings of the previous studies on rhotic acquisition for the most part, with the exception of Patience (2018) have been on L2 learners. The findings of the current study further confirm that the universal tendency of rhotic simplification [ɾ] also applies to multilingual leaners.

The learners in this study employed various coping strategies and developmental strategies for the Spanish rhotics. Thus, this study adds to the body of knowledge on the strategies that learners may employ when faced with difficult sounds (Colantoni, 2015). Colantoni (2015) suggests that learners employ four types of coping strategies when they are presented with complex sounds: (1) epenthesis or the insertion of a vowel or consonant, (2) deletion of one or more of the segments, (3) substitution of one or more of the segments, and (4) metathesis or re-ordering of the segments. It was also predicted that the learners would employ a simplification strategy that

would be found across all tasks (e.g., replacing the [r] with the [ɾ] or variants such as [l] (Patience, 2018)). The learners substituted the /r/ sounds with either an overgeneralized use of the [ɾ] or an [l] as predicted. The use of [l] production is consistent with the findings of Patience (2018), who found that the less proficient speakers produced a single substitution. However, the current study presented evidence of a new strategy, which was the substitution of either the [ɾ] and [r] by two different segments, which I have called combination segments in this study. This will be further discussed below.

5.1.2   Acoustic measures and target-like production of the tap and trill

While some L2 studies have only conducted an auditory analysis to better understand the development of the Spanish rhotics in L2 learners (Rose, 2012; Bradley & Willis, 2012), this study aimed to provide a more fine-grained picture of the learners' ability to accurately produce the acoustic features of the [ɾ] and the [r]. This was accomplished by examining the phonetic measures of their productions as well as providing an acoustic analysis. By examining the native speaker results in comparison to the Haitian Creole-speaking learners of Spanish, variation in the phonetic results is found. As shown in the results, the main source of difficulty for the learners in terms of the /r/ sounds was the [r], specifically the number of closures. The range of duration was another factor although it did not vary much on average. This was similar to the findings of Ruiz-Peña, Sevilla and Rafat (2018) who studied the acquisition of second dialect (Ecuadorian Spanish) rhotics by Andalusian Spanish-speaking participants. They measured the duration values of the productions and found that the distributions of duration for both participant groups were similar. However, the duration values of the Andalusian Spanish-speaking participants were different from the Ecuadorian speaker. Specifically, the Andalusian participants ranged between 119-283ms where the Ecuadorian speaker ranged between 90-390ms. The participants hypo-articulated the duration of the sound. This verifies the hypothesis in this study that the learners of Spanish would produce non-canonical variations of the [ɾ] and the [r] as found by Bradley & Willis (2012), Colantoni (2006) and Henriksen (2014), which was supported by the results of the Haitian Creole learners' productions. The learners produced an average 2 closures in the picture-naming task and 2.5 closures in the reading task when the [r] was the expected sound. These findings are consistent with previous literature as it highlights that the learners

produced non-canonical as was hypothesized, also found in a study completed by Henriksen (2014). Henriksen analyzed the production of the [r] as produced by 24 learners of northern and central Peninsular Spanish. An acoustic analysis was completed that showed a varying number of non-canonical variants that contained 0-1 apical closures. He suggests this could be due to social factors such as dialect, and/or gender, and the proceeding vowel. Another study that examined the variation of closures in Spanish was Amengual (2013), who looked at the acoustic correlation of the [ɾ] and the [r] in Spanish heritage speakers in Northern California. His study is also in line with the current one as Amengual shows that there is variation of the Spanish [ɾ] and [r]. Showing that heritage speakers also produce non-canonical phonemic [r]s with 0-1 closures.

As hypothesized the learners did produce non-canonical variations of the [ɾ] and the [r] which has been found in previous studies as highlighted above. Moreover, it was also found in past studies that a universal tendency employed by bilingual learners exists with the use of rhotic simplification of the [ɾ] in place of the [r]. It has been found in the current study that this also applies to multilingual leaners. Another aspect that this thesis aimed to examine was the role of transfer in the learners' Spanish productions.

5.1.3　Transfer

Language transfer was another important factor to consider in the results and the learners' productions to better understand the patterns that emerged. In this study, there was evidence of [ɣ], [h], and [w] production as well as deletion. Productions of [ɣ], [h],[w], and deletion were found both as single segments (<guerra> [ˈgɛ.**ɣ**.a] 'war'.; <guerra> [ˈgɛ.**h**.a] 'war'.; <arruga> [a.ˈ**w**.ɣa] 'wrinkle'), and in combination with other segments (<guerra> [ˈgɛ.**ɣ**.**h**.a] 'war'.; <carril> [ka.**h.l**.ˈil] 'lane'.; <barril> [ba.ˈ**w.ɹ**.il] 'barrel'). The presence of [ɣ], [w] as well as deletion is consistent with the production of <r> in Haitian Creole. Although the production of these sounds has been attributed to transfer from Haitian Creole here, although it is possible that there influence from other languages is present in the data as well. First, [ɣ] may also exist in the learners' French as well as Portuguese. Moreover, the [h], the [ɾ], the [r] and the [ɹ] have also been reported as possible realizations of the Portuguese rhotics (Osborne 2010; Rennicke 2015).

However, because I do not have any Portuguese data from the participants, the potential effect of Portuguese will have to be investigated in future work.

In terms of English, is also possible that the presence of [ɹ] is due to transfer from English. However, only four learners had knowledge of English. In order to determine whether there was influence of Portuguese, English, or a developmental effect, individual analysis will have to be conducted in the future. Finally, although various studies have examined the production of rhotics in Spanish (Menke 2018; Neumann 2018; Balam 2013), this is the first study to have found combination productions. Previous studies have mostly been done on L2 learners of Spanish; however, this study was conducted on multilingual learners of Spanish. Therefore, it is postulated that the combination effect to some extent might be a result of multilingualism as well, where learners may be experiencing transfer in production from more than one language and/or are perceiving a percept that is a result of transfer from more than one language. This claim will have to be further investigated in future studies.

The findings in this thesis confirmed the findings in Colantoni, Steele and Escudero (2015) which discovered that learners will substitute a complex sound with one or more segments. Moreover, this study confirms recent findings that an L1 language can be a strong source of cross linguistic influence in learners. Which Kopečková (2014) primarily found in her investigation of the Spanish rhotics, that L2 German learners and L3 English learners of Spanish had a higher influence from their L1 than L2 in their production of the Spanish rhotics. This section has described the coping or developmental techniques that these learners have employed to cope with the complexities of the rhotics in Spanish (e.g., combination segments, overgeneralized use of [ɾ]).

These findings contribute to our understanding of the production and acquisition of the Spanish rhotics in foreign language learners. Moreover, it provides us with a better understanding of coping mechanisms that learners of Spanish may employ when they are unable to produce the target sounds. The findings in this study are in line with previous findings that suggested that the [ɾ] and the [r] are difficult sounds to acquire/produce and that the leaners may produce the [ɾ] with more ease than the [r]. Moreover, the learners in this study spoke French, Portuguese and

some English, whose influence also needs to be considered in the future. Including proficiency levels in the analysis would lead to implications for foreign language pedagogy, (specifically Spanish) of how learners are acquiring and producing the Spanish. This section was a review of the results in regard to the first hypothesis regarding the acquisition of the [ɾ] and the [r] in general. The next section will be a discussion regarding influence of orthography.

5.2   The influence of exposure to orthographic input

This section will be an overview of the results presented regarding the effect of tasks and the implications of these findings in light of past studies. H3 suggested that exposure to <r> and <rr> would both result in some transfer because <r> corresponds to a [ɣ] in Haitian Creole, but there would be a higher rate of transfer for <r>. Moreover, it was also predicted that exposure to the digraph <rr> would cue the learner that the [r] is a longer sound and has vibrations and could increase the rate of [r] production in the reading task. Exposure to <rr> indeed increased the rate of [r] production. This finding is consistent with the findings of Escudero and Wanrooij (2010) who found that orthography helped in the contrast of non-native vowel contrast. They examined the vowel categorization across tasks, testing difficult vowels in an auditory task and easier ones in an orthographic task. Vowels that occurred only in the auditory task were poorly classified in the orthographic task. Results showed that when only providing auditory input in regard to stimuli caused great difficulty classifying certain Dutch vowels for the native speakers of Spanish. In conditions where the orthographic input was paired with the auditory stimuli, this pairing helped in some cases with the vowel contrast. The results in the current study also indicated that although there was limited [r] production in the picture-naming task, the [r] was produced at a higher rate of 16% in the reading task, evidencing a positive effect of orthography. Moreover, there was an overall lower rate of transfer of the [ɣ] and [w] for [r] and deletion in the reading task. As for the [ɾ], there did not appear to be a robust difference between the two tasks, although a slightly higher rate of [ɾ] production was observed in the reading task, despite the prediction. This was coupled by the fact that there was a lower rate of deletion in the reading task, which might account for the higher rate of [ɾ] production. Orthography or the existence of a grapheme or a digraph appears to have reduced the rate of deletion.

In the current study another pattern that emerged was that exposure to the digraph <rr> increased the rate of combination productions but exposure to <r> decreased the rate of combination productions. In regard to the combination segments in the orthography task, when the participants were exposed to one segment <r> they tended to produce a lower rate of combinations in general with less variation. Turning to the production of the [r], when the learners were exposed to a digraph <rr> instead of just one grapheme (<r>) they tended to produce a higher rate of combinations with more variations. What this shows is that the learners are prone to analyzing or producing a sound (either the [ɾ] or [r]) as two segments and orthographic input can modulate this response. Previously, Rafat & Stevenson (2018) also found that exposure to the digraph <ll> resulted in combination productions in the case of incongruent auditory-orthographic input. They found that exposure to auditory [j] and orthographic <ll> resulted in the combination [lj] in naïve English-speaking learners of Spanish. They attributed these findings to a perceptual illusion effect, namely orthographic McGurk. Rafat (2016) also proposed that exposure to orthographic input will exacerbate the possibility of mis-production or misperception when the difference between the L1 and the L2 sound is small. In this study, we also see that the learners have a tendency to analyze or produce the [ɾ] and the [r] as a combination sound. However, exposure to orthographic input depending on whether it is a digraph, or a single grapheme can modulate this tendency. Whether this is happening at the production or the perception level will have to be further investigated in future studies. Moreover, if it is the case that combination productions are a result of multilingualism, then this study is the first to show how orthography can modulate a special effect produced as a result of multilingualism.

Although orthography did not have a very robust influence on acoustic parameters, both the [ɾ] and the [r] appeared to be slightly more hyper-articulated in the reading task, although this effect was more evident for the [r] than the [ɾ]. Although the body of literature on the interaction between auditory and acoustic input is growing (Bassetti, Escudero & Hayes-Harb, 2015; Rafat 2015; Rafat & Stevenson, 2018; Burki, Welby, Clement & Spinelli, in press), this study is the first of its kind to have examined the interaction between acoustic and orthographic input with respect to the production of the /ɾ-r/ contrast and adds to our understanding of the effect of digraphs on the production of Spanish.

Overall the results suggest there were four effects of exposure to orthographic input: (1) a higher rate of the target sound productions; (2) a more articulated rhotic in terms of duration, voicing and number of closures, although this was more evident for the [r] than the [ɾ]; (3) a reduction in the rate of deletion; and (4) a differing effect of the <r> and the <rr> on combination productions for the [ɾ] and the [r], where exposure to <rr> increased the rate of combination productions but <r> decreased the rate of combination productions. The findings in this study are consistent with previous research, which suggest a positive effect of orthography. These findings also provide evidence for a new way in which exposure to orthographic input may modulate combination productions, showing a differing effect of the <r> and <rr>. Investigating the role of orthographic input is important because it has implications for foreign language teaching in the aspects of pronunciation. The presence of these combinations segments which have not been reported previously could be a result of multilingualism. This study did not investigate the role of orthographic input in the perception of the Spanish rhotics, but this could be a future study that further considers the role of orthographic influence in foreign speech learning, perception and production. However, the claims put forth in this study should be further examined using further statistical analysis beyond the descriptive statistics used in the present analysis.

5.3   The role of social factors: Education and language attitudes

Another aim of this thesis was to determine the role of social factors in Haitian Creole-speaking learners of Spanish production of the Spanish rhotics. There are very few studies that combine a social linguistic approach with a phonetic approach, thus this study aims to fill that gap. Past studies have tended to only focus on the acquisition of the Spanish rhotics at a phonetic level (Olsen, 2012, 2016; Balam, 2013) or have concentrated only on social factors, such as gender, identity and class, that may influence foreign language learning and production, (Nance, McLeod, O'Rourke & Dunmore, 2016; Gao, 2014; Kobayashi, 2002). The current study attempts to combine these two methods and fill this gap by considering (a) the influence of education and (b) the influence of language attitudes. It was predicted that the learners of Spanish with a higher level of education would exhibit more target-like production of the [ɾ] and the [r] (Le Dorze & Bédard, 1998). Moreover, the language attitudes and perceptions of this population were predicted to highly influence production of the [ɾ] and the [r]. Specifically, those with a more

positive attitude towards Spanish would exhibit more target-like productions of the /ɾ-r/ contrast (Gardner, 2010). However, neither of these predictions were confirmed. After running a Pearson Correlation analysis, it was confirmed that there was no significant relationship between either of these two factors and the production of the [ɾ] and the [r]. Previous studies have confirmed that attitude can play a role in production (Tararova, 2016; Moyer, 2007) whereas this study currently has found no relationship. This could be due to the articulatory difficulty of the [ɾ] and the [r]. However, a limitation to the education analysis was that participant numbers across education groups were not equal in number. Future studies can compare equal numbers of participants per education group and their production to see if a change is found in the correlation or not. This study only examined the production of the /ɾ-r/ contrast with the positive attitude responses. Further statistical analysis will need to consider the negative attitudes as well as the responses towards Haitian Creole and compare these results to have a clearer picture of the role that language attitude plays in their production of the Spanish rhotics. Even though no significant relationship has currently been found between education level and [ɾ] and [r] production, there was a trend found. The trend showed that a higher number of accurate [r]s was produced at higher education levels than lower education levels. This trend indicates that there could be a positive trend, but that further statistical analysis is required.

In conclusion this section reviewed the results found regarding the influence of (a) education level and (b) language attitudes. There are few studies that consider take a socio-phonetic approach such as this. The following section contains concluding remarks, contributions and suggestions towards future studies.

5.4   Conclusions and future directions

This study is the first to examine the production of the Spanish rhotics sounds by speakers of Haitian Creole living in Tijuana Mexico. The current study had 3 main objectives (1) to test Flege's (1995) Speech Learning hypothesis. This was accomplished by defining the degree of accurate production, the transfer from Haitian Creole, and the developmental patterns in their Spanish rhotic production, (2) to determine whether exposure to orthography promotes or hinders /ɾ-r/ contrast production in Spanish, (3) to investigate the effect of social factors, namely

level of education and attitudes towards Spanish on Spanish rhotic production. It revealed that the /ɾ-r/contrast was difficult for these learners but the [ɾ] was an easier sound as predicted. Moreover, that the learners were frequently substituting the [r] with the [ɾ] or [l], as well as many other realizations as previously mentioned. Participants also produced combination segments with varying sound combinations, suggesting that misperception is not the only root cause of difficulty of acquisition as per suggested by Flege's SLM. The findings also revealed that overall orthographic input had four effects (1) a higher rate of the target sound productions , (2) a more articulated rhotic in terms of duration, voicing and number of closures, although this was more evident for the [r] than the [ɾ], (3) a reduction in the rate of deletion and (4) a differing effect of the <r> and the <rr> on combination productions for the [ɾ] and the [r], where exposure to <rr> increased the rate of combination productions but <r> decreased the rate of combination productions. Finally, this study focused on the role of social factors. There were no significant relationships found between either (a) education level and (b) language attitudes on accurate rhotic production. Although no significant relationship has currently been found between education level and [ɾ]and [r] production, there was a trend found. The trend showed that a higher number of accurate [r]s were produced at higher education levels than lower education levels. This suggests that there could be a positive trend, but that further statistical analysis is required. As previously considered in the discussion section, future research will examine the role of proficiency levels among the learners and individual differences. Furthermore, a more complex statistical analysis of the social factors is needed to consider a higher rate of social influence. Moreover, although language attitudes and motivations were elicited in both a semi-spontaneous task and a written task, a future study also will examine the comparison of the written language attitude questionnaire with the oral results. A continuation of this study should include the other word positions (e.g., word-initial and word-final rhotics). As mentioned, there is a need for studies that consider cross-linguistic influence such as this one, however further analysis is needed of the other languages that the participants may have spoken too. Overall, this study is important because it has conducted both an acoustic and phonetic analysis of the production of the /ɾ-r/ contrast in adult learners of Mexican Spanish in a multilingual, multicultural environment. By providing an examination of the role of language transfer and orthographic input, is has shown that transfer exists from their Haitian Creole into their Spanish and that orthography had a positive influence in their production. This study has added to the

small but growing body of literature, especially regarding Spanish in a multilingual, boarder context, and provided a fine-grained picture of factors that influence the production of the Spanish rhotics.

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Appendices

Appendix A: Language Background Questionnaires (LEAP-Q)

Haitian Participant Language Background Questionnaire: Parte 1: Información personal
1. Número de participante: _____
2. Sexo:
    masculino
    femenino
    Otro: _____
3. Edad (en años): _____
4. Lugar de nacimiento (ciudad, país): _____
5. Nivel educativo (el último alcanzado):
    Primaria
    Secundaria
    Preparatoria
    Universidad
    Estudios de posgrado
    Otro (especificar): _____
6. Nivel educativo de la madre:
    Primaria
    Secundaria
    Preparatoria
    Universidad
    Estudios de posgrado
    Otro (especificar): _____
7. Nivel educativo del padre:
    Primaria
    Secundaria
    Preparatoria
    Universidad
    Estudios de posgrado
    Otro (especificar):
8. Total de años en educación formal:
9. ¿Cuál es o era tu ocupación o profesión?
10. ¿Cuál es o era la ocupación o profesión de tu madre?
11. ¿Cuál es o era la ocupación o profesión de tu padre?
12. ¿Si no naciste en México, a qué edad llegaste aquí?
13. Si no naciste en México, ¿cuánto tiempo has vivido aquí?
14. ¿Alguna vez has vivido en otros países? ¿Si es si ,donde? ¿Por cuánto tiempo?
15. ¿Has vivido alguna vez en algún otro país o países de habla hispana? Si tu respuesta es afirmativa, ¿dónde has vivido y por cuánto tiempo?

Parte 2: Preguntas generales sobre el idioma
16. Por favor especifica los idiomas que habla…
Tu madre:

Bilingüe: creole y francés con predominio del creole
Bilingüe: creole y francés con predominio del francés
Monolingüe: creole
Monolingüe: francés
Otro (especificar):

Tu padre:

Bilingüe: creole y francés con predominio del creole
Bilingüe: creole y francés con predominio del francés
Monolingüe: creole
Monolingüe: francés
Otro (especificar):

17. En general, ¿qué idioma prefiere usar? (solos circule uno)
1. español 2. creole 3. ambos 4. depende de con quién hables

18. ¿En qué idioma cursaste los siguientes niveles educativos?

	Únicamente creole	Únicamente francés	Otro: _____
Primaria			
Secundaria			
Preparatoria			
Universidad			
Otro:_____			

¿Cuánto tiempo estudiaste creole en los siguientes niveles educativos?

	Menos de un año	1-2 años	Más de 2 años
Primaria			
Secundaria			
Preparatoria			
Universidad			
Otro:_____			

18. ¿Cuánto tiempo estudiaste francés en los siguientes niveles educativos?

	Menos de un año	1-2 años	Más de 2 años
Primaria			
`Secundaria			
Preparatoria			
Universidad			
Otro:_____			

19. Por favor, enumera todos los idiomas que hablas EN ORDEN DE PREDOMINIO:

Más predominante	

Menos predominante	

20. Por favor, enumera todos los idiomas que sabes EN ORDEN DE APRENDIZAJE:

Aprendido primero	
Aprendido al final	

21. Por favor especifica la edad que tenías cuando…
- Comenzaste a aprender creole:
- Tu creole se volvió fluido:
- Comenzaste a leer creole:
- Tu lectura en creole se volvió fluida:

22. Por favor especifica la edad que tenías cuando…
- Comenzaste a aprender francés:
- Tu francés se volvió fluido:
- Comenzaste a leer francés:
- Tu lectura en francés se volvió fluida:

23. Por favor especifica la edad que tenías cuando…
- Comenzaste a aprender español:
- Tu español se volvió fluido:
- Comenzaste a leer español:
- Tu lectura en español se volvió fluida:

24. Por favor enumera el porcentaje de tiempo que EN PROMEDIO estás ACTUALMENTE expuesto a los siguientes idiomas (la suma de los porcentajes debe ser 100):
Creole:
Francés:
Español:
Otro:

25. Cuando eliges leer un texto disponible en todos los idiomas que hablas, ¿Qué porcentaje de probabilidades hay que elijas leerlo en cada uno de ellos? Debes asumir que el original está escrito en otro idioma que no conoces (La suma de los porcentajes debe ser 100)
Creole:
Francés:
Español:
Otro:

26. Cuando eliges un idioma para hablar con una persona que habla todos tus idiomas con fluidez ¿Qué porcentaje de tiempo elegirías para hablar cada uno de ellos? (La suma de los porcentajes debe ser 100)
Creole:

Francés:
Español:
Otro:

27. Por favor, indica la proporción de tiempo para cada idioma que usas EN CASA: ? (La suma de los porcentajes debe ser 100)

	1 Nada	2	3	4	5	6	7 La gran mayoría
Creole							
Francés							
Español							
Otro:							

28. Por favor, indica la proporción de tiempo para cada idioma que usas EN EL TRABAJO:

	1 Nada	2	3	4	5	6	7 La gran mayoría
Creole							
Francés							
Español							
Otro:							

29. Por favor, indica la proporción de tiempo para cada idioma que usas EN SITUACIONES SOCIALES:

	1 Nada	2	3	4	5	6	7 La gran mayoría
Creole							
Francés							
Español							
Otro:							

30. Por favor califica tu habilidad lingüística en CREOLE de acuerdo a la siguiente escala:

1 Paricipante	2	3 Intermedio	4	5 Advanzado	6	7 Nativo

Habilidad para hablar:
Habilidad para leer:
Habilidad para escribir:
Habilidad para traduir:
Comprensión oral:
Pronunciación:
Fluidez:
Vocabulario:
Habilidad grammatical:
Capacidad general:

31. Por favor califica tu habilidad lingüística en FRANCÉS de acuerdo a la siguiente escala:
Habilidad para hablar:
Habilidad para leer:
Habilidad para escribir:
Habilidad para traduir:
Comprensión oral:
Pronunciación:
Fluidez:
Vocabulario:
Habilidad grammatical:
Capacidad general:

32. Por favor califica tu habilidad lingüística en ESPAÑOL de acuerdo a la siguiente escala:
Habilidad para hablar:
Habilidad para leer:
Habilidad para escribir:
Habilidad para traduir:
Comprensión oral:

	1 Nada	2	3	4	5	6	7 Mucho
Interacción con amigos							
Interacción con la familia							
Trabajo							
Lectura							
Audiolibros o autoenseñanza							
Ver la televisión / Escuchar la radio							

	1 Nada	2	3	4	5	6	7
Cursos formales							

Pronunciación:
Fluidez:
Vocabulario:
Habilidad grammatical:
Capacidad general:

33. Por favor califica el papel que cada uno de estos factores jugó en tu aprendizaje del CREOLE:

34. Por favor califica el papel que cada uno de estos factores jugó en tu aprendizaje del FRANCÉS:

	1 Nada	2	3	4	5	6	7 Mucho
Interacción con amigos							
Interacción con la familia							
Trabajo							
Lectura							
Audiolibros o autoenseñanza							
Ver la televisión / Escuchar la radio							
Cursos formales							

35. Por favor califica el papel que cada uno de estos factores jugó en tu aprendizaje del ESPAÑOL:

	1 Nada	2	3	4	5	6	7 Mucho
Interacción con amigos							
Interacción con la familia							
Trabajo							
Lectura							
Audiolibros o autoenseñanza							
Ver la televisión / Escuchar la radio							

Control Group Language Background Questionnaire: Parte 1: Información Personal

1. Número de participante: _____

2. Sexo:
   Masculino
   Femenino
   Otro: _____

3. Edad (en años): _____
4. Lugar de nacimiento (ciudad, país):

   _____
5. Nivel educativo (el último alcanzado):
   Primaria
   Secundaria
   Preparatoria
   Universidad
   Estudios de posgrado
   Otro (especificar): _____
6. Nivel educativo de la madre:
   Primaria
   Secundaria
   Preparatoria
   Universidad
   Estudios de posgrado
   Otro (especificar):

7. Nivel educativo del padre:
   Primaria
   Secundaria
   Preparatoria
   Universidad
   Estudios de posgrado
   Otro (especificar):

8. Total de años en educación formal:
9. ¿Cuál es o era tu ocupación o profesión?
10. ¿Cuál es o era la ocupación o profesión de tu madre?
11. ¿Cuál es o era la ocupación o profesión de tu padre?
12. ¿Si no naciste en México, a qué edad llegaste aquí?

Parte 2: Preguntas general sobre el idioma

13. Por favor especifica los idiomas

que habla…

Tu madre:

Monolingüe: español

Otro (especificar):

_____

Tu padre:

Monolingüe: español

Otro (especificar):

_____

14. ¿En qué idioma cursaste los siguientes niveles educativos?

	Solo español	Otro:
Primaria		
Secundaria		
Preparatoria		
Universidad		
Otro:_____		

15. ¿Cuánto tiempo estudiaste español en los siguientes niveles educativos?

	Solo español	Otro: _____
Primaria		
Secundaria		
Preparatoria		
Universidad		
Otro:_____		

16. Por favor, enumera todos los idiomas que hablas EN ORDEN DE PREDOMINIO:

Más predominante	
Menos predominante	

17. Por favor, enumera todos los idiomas que sabes EN ORDEN DE APRENDIZAJE:

Aprendido primero	
Aprendido al final	

18. Por favor especifica la edad que tenías cuando…

- Comenzaste a aprender español:
- Tu español se volvió fluido:
- Comenzaste a leer español:
- Tu lectura en español se volvió fluida:

19. Por favor enumera el porcentaje de tiempo que EN PROMEDIO estás ACTUALMENTE expuesto a los siguientes idiomas (la suma de los porcentajes debe ser 100):
    Español:
    Otro:

20. Cuando eliges leer un texto disponible en todos los idiomas que hablas, ¿Qué porcentaje de probabilidades hay que elijas leerlo en cada uno de ellos? Debes asumir que el original está escrito en otro idioma que no conoces (La suma de los porcentajes debe ser 100)
    Español:
    Otro:

21. Cuando eliges un idioma para hablar con una persona que habla todos tus idiomas con fluidez ¿Qué porcentaje de tiempo elegirías para hablar cada uno de ellos?
    Español:
    Otro:

22. Por favor, indica la proporción de tiempo para cada idioma que usas EN CASA:

	1 Nada	2	3	4	5	6	7 La gran mayoría
Español							
Otro:							

23. Por favor, indica la proporción de tiempor para cada idioma que usas EN EL TRABAJO:

	1 Nada	2	3	4	5	6	7 La gran mayoría
Español							
Otro:							

24. Por favor, indica la proporción de tiempo para cada idioma que usas EN SITUACIONES SOCIALES:

	1 Nada	2	3	4	5	6	7 La gran mayoría
Español							
Otro:							

25. Por favor califica tu habilidad lingüística en ESPAÑOL de acuerdo a la siguiente

escala:

1	2	3	4	5	6	7
Paricipante		Intermedio		Advanzado		Nativo

Habilidad para hablar:
Habilidad para leer:
Habilidad para escribir:
Habilidad para traduir:
Comprensión oral:
Pronunciación:
Fluidez:
Vocabulario:
Habilidad grammatical:
Capacidad general:

26. Por favor califica el papel que cada uno de estos factores jugó en tu aprendizaje del ESPAÑOL:

	1 Nada	2	3	4	5	6	7 Mucho
Interacción con amigos							
Interacción con la familia							
Trabajo							
Lectura							
Audiolibros o autoenseñanza							
Ver la televisión / Escuchar la radio							
Cursos formales							

Appendix B: Semi-directed interview questions

1. Describe el clima de tu país comparado al clima en México.
2. ¿Qué es lo que disfrutas más de Tijuana?
3. ¿Cuál ha sido tú experiencia aprendiendo español?
4. ¿Qué es lo que está haciendo legalmente México para ayudarles con su situación migratoria?
Por ejemplo: Les han ayudado a conseguir empleo, permisos de trabajo, residencia permanente...
5. ¿Cómo describirías tu experiencia en Tijuana?
6. ¿Ha sido difícil la adaptación en Tijuana?

Appendix C: Entire list of Stimuli and Distractor words

List of Stimuli

	Initial		VCV		Final	
	Stress (-)	Stress (+)	Stress (-)	Stress (+)	Stress (-)	Stress (+)
Tap			1. Claro 2. Oro 3. Cero 4. Mira 5. Pero	1. Nariz 2. Paró 3. Coral 4. Perú 5. Pared		
Trill	1. Riñón 2. Reloj 3. Ratón 4. Ramón 5. Razón	1. Rayo 2. Rosa 3. Rana 4. Ropa 5. Rizo	1. Zorro 2. Perro 3. Guerra 4. Perra 5. Cerro	1. Arruga 2. Arroz 3. Corrió 4. Barril 5. Carril	1. Héctor 2. Suéter 3. Óscar 4. Líder 5. Ámbar	1. Comer 2. Bailar 3. Leer 4. Hablar 5. Jugar
Tap-trill	1. Regar 2. Rogar 3. Romper 4. Reír 5. Rural	1. Rara 2. Raro	1. Corredor 2. Corregir 3. Enterrar 4. Irritar 5. Narrador	1. Carrera 2. Terror 3. Horror 4. Cerrar 5. Error	Extra Words 1.Corrieron 2.Ferrocarril 3.Extraterrestre	

List of Distractor Words

Tía	Mango	Nuez	Vaca	Salsa	Montañas	Tienda	Banana	Pluma	Llaves
Ojo	Mamá	Manzana	Lápiz	Caballo	Pan	Teléfono	Mesa	Pelota	Primo
Gato	Cama	Bicicleta	Boca	Sal	Silla	Plato	Sillón	Agua	Amarillo
Morado	Tenedor	Libro							

Appendix D: Language Attitude Questionnaire

La información que provea se mantendrá en confidencialidad.
Número de participante: _____
****

I. Perspectivas del lenguaje

1. ¿Le gustaría mejorar sus habilidades lingüísticas/ del lenguaje en español?

       Si   No   ¿Por que?

2. ¿Qué aspecto del lenguaje del español le gustaría mejorar?

3. ¿Considera que es importante mantener y mejorar su español durante su vida?

4. ¿Cómo considera que puede utilizar el español en un futuro?

5. Qué lengua utiliza con mayor frecuencia cuando está con:
   a) su familia:
   b) sus amigos:
   c) sus hijos:
   d) en su casa:
   e) en su trabajo:
   f) en la calle:

6. ¿Le gusta hablar en Creole?
   Mucho   No mucho   Nada

7. Si tiene hijos, ¿Cómo de importante es para usted que ellos aprendan y utilicen el español?
   ¿Por qué?
   Mucho   No mucho   Nada

8. Si tiene hijos, ¿Cómo de importante es para usted que ellos aprendan y utilicen el criollo?
   ¿Por qué?
   Mucho   No mucho   Nada

9. ¿En qué lengua prefiere que le hablen sus hijos en la casa?

10. ¿Es importante preservar el creole? ¿Por qué o por qué no?

11. ¿Cuál lengua debe aprender el bebé primero?

12. ¿Cuánta importancia tiene el español en su vida?
   Mucho   No mucho   Nada

13. ¿Cuánto considera que disfruta aprendiendo español?
   Mucho   No mucho   Nada

14. ¿Cuánto disfruta hablando español?
   Mucho   No mucho   Nada

15. ¿Cómo de motivado/a está para aprender español?

| Mucho | No mucho | Nada |

16. Si tuviera que describir la lengua española a alguien, ¿Qué palabras usaría?

17. ¿Por qué razón es importante hablar el español?

18. ¿Por qué razón es importante hablar el criollo?

****

II. Experiencia del uso del español en México

19. Por favor responda a las siguientes preguntas utilizando una escala del 1-7 como se indica a continuación:

      1= completamente en desacuerdo   2= desacuerdo   3= ligeramente en desacuerdo o no   4= Neutral   5= ligeramente de acuerdo   6= en acuerdo   7= en desacuerdo total

20. ¿Siente que cuando habla español en México es tratado mejor?

1	2	3	4	5	6	7

21. ¿Considera que es tratado de manera injusta porque el español no es su primera lengua?

1	2	3	4	5	6	7

22. Los mexicanos son personas muy tolerantes y comprensivos con las personas que no hablan español en México

1	2	3	4	5	6	7

23. ¿Se siente juzgado/a o desaprobado/a por otras personas cuando habla creole en México?

1	2	3	4	5	6	7

24. A los mexicanos, les desagrada que los inmigrantes usen otra lengua que no sea el español en lugares públicos.

1	2	3	4	5	6	7

25. Comparando su competencia lingüística entre español y creole, prefiere hablar español.

1	2	3	4	5	6	7

26. ¿En qué grado de comodidad se siente cuando habla español?

1	2	3	4	5	6	7

27. El español es una lengua importante, al igual que su cultura y su identidad

1	2	3	4	5	6	7

28. ¿Siente vergüenza de que Creole sea su primera lengua?

1	2	3	4	5	6	7

29. El español suena rudo y áspero.

1	2	3	4	5	6	7

30. Estaría conforme/ No me importaría si nunca más tuviera que volver a hablar español

1	2	3	4	5	6	7

31. Hablar español en México es necesario para mantener un sentido de unidad con otros hablantes de español.

1	2	3	4	5	6	7

32. Los hablantes de Creole deben intentar mantener su lengua e identidad a pesar de que ellos vivan en México

1	2	3	4	5	6	7

33. Estaría conforme/ No me importaría si la próxima generación de mi familia (ej., mis hijos, mis nietos) no hablara Creole.

1	2	3	4	5	6	7

34. Creole no es una lengua de México, por lo que sería natural si se dejase de usar/ hablar en algún momento en el futuro.

1	2	3	4	5	6	7

35. Hablar ambas lenguas, creole y español es una ventaja.

1	2	3	4	5	6	7

36. Es imposible hablar ambas lenguas, creole y español, correctamente.

1	2	3	4	5	6	7

37. ¿Cambia la actitud de los mexicanos cuando se encuentren con un creole? ¿En qué?

sentido?

38. ¿Los creoles tienen los mismos derechos que los mexicanos? ¿Por qué, si o no?

39 ¿Ha escuchado usted críticas hacia un creole o su idioma? ¿Qué tipo?

40. ¿Cómo reacciona si se critica el creole?

Appendix E: Reading Task

PRÁCTICA- Lee, en voz alta, cada enunciado y también el número. Lee lenta y claramente.
1. Digo mochila otra vez.
2. Digo caja otra vez.
INICIO-
Digo horror otra vez.

Digo rojo otra vez.

Digo tía otra vez.

Digo claro otra vez.

Digo mango otra vez.

Digo Perú otra vez.

Digo rayo otra vez.

Digo nuez otra vez.

Digo narizotra vez.

Digo perro otra vez.

Digo coral otra vez.

Digo cerdo otra vez.

Digo oro otra vez.

Digo vaca otra vez.

Digo Ramón otra vez.

Digo rizo otra vez.

Digo amarillo otra vez.

Digo cerro otra vez.

Digo mira otra vez.

Digo ropa otra vez.

Digo paró otra vez.

Digo perro otra vez.

Digo salsa otra vez.

Digo pero otra vez.

Digo zorro otra vez.

Digo reloj otra vez.

Digo montañas otra vez.

Digo pared otra vez.

Digo churro otra vez.

Digo ratón otra vez.

Digo tienda otra vez.

Digo gorro otra vez.

Digo banana otra vez.

Digo arrugas otra vez.

Digo pluma otra vez.

Digo burro otra vez.

Digo rosa otra vez.

Digo corrieron otra vez.

Digo cero otra vez.

Digo morado otra vez.

Digo Héctor otra vez.

Digo carro otra vez.

Digo suéter otra vez.

Digo líder otra vez.

Digo llaves otra vez.

Digo leer otra vez.

Digo ámbar otra vez.

Digo romper otra vez.

Digo ojo otra vez.

Digo correr otra vez.

Digo regla otra vez.

Digo árbol otra vez.

Digo rana otra vez.

Digo bailar otra vez.

Digo mamá otra vez.

Digo jugar otra vez.

Digo raro otra vez.

Digo guerra otra vez.

Digo manzana otra vez.

Digo rara otra vez.

Digo rentar otra vez.

Digo Rogar otra vez.

Digo lápiz otra vez.

Digo caballo otra vez.

Digo llorar otra vez.

Digo pan otra vez.

Digo ferrocarril otra vez.

Digo robar otra vez.

Digo teléfono otra vez.

Digo tenedor otra vez.

Digo mesa otra vez

Digo reír otra vez.

Digo error otra vez.

Digo pelota otra vez.

Digo rezar otra vez.

Digo primo otra vez.

Digo terror otra vez.

Digo gato otra vez.

Digo carrera otra vez.

Digo cama otra vez.

Digo hablar otra vez.

Digo cáncer otra vez.

Digo Óscar otra vez.

Digo bicicleta otra vez.

Digo riñón otra vez.

Digo boca otra vez.

Digo razón otra vez.

Digo arroz otra vez.

Digo corrió otra vez.

Digo sal otra vez.

Digo barril otra vez.

Digo carril otra vez.

Digo comer otra vez.

Digo corredor otra vez.

Digo rural otra vez.

Digo silla otra vez.

Digo cerrar otra vez.

Digo corregir otra vez.

Digo plato otra vez.

Digo enterrar otra vez.

Digo sillón otra vez.

Digo irritar otra vez.

Digo narrador otra vez.

Digo extraterrestre otra vez.

Digo agua otra vez.

Appendix F: Rubric used for assessing proficiency level

1=Principiante nivel bajo: Puede interactuar de una manera simple ya que tiene dificultades entendiendo el idioma. El emisor necesita hablar despacio y de forma clara. Necesita mucha ayuda para hacerse entender y comete muchos errores en varios aspectos del habla incluyendo la pronunciación. Tiene vocabulario limitado y gramática básica. No puede leer ni escribir en español.

2= Principiante nivel alto: Es capaz de describir de manera simple y con ayuda la respuesta a una pregunta. Cometerá varios errores en diferentes partes del habla incluyendo la pronunciación. Tiene un vocabulario limitado y gramática básica y tiene dificultades entendiendo el tema principal de una conversación o pregunta. Solo puede leer y escribir frases simples en español en tiempo presente.

3= Nivel intermedio bajo: Son capaces de entender preguntas sin ninguna ayuda. Pueden hacerse entender de forma clara en temas cotidianos (su vocabulario es bueno discutiendo temas cotidianos). Pueden describir sus experiencias, dar razones o explicaciones breves acerca de su opinión. Pueden cometer errores de pronunciación o al conjugar verbos. Pueden leer y escribir en español con un poco de dificultad, entienden textos simples como libros para niños.

4= Nivel intermedio alto: Son capaces de entender la idea principal de preguntas complejas, pueden interactuar con cierto nivel de fluidez y espontaneidad que hace la interacción posible y regular sin poner tensión en ninguno de los individuos. Cometerán pocos errores y dependiendo del tema tendrán poco vocabulario y cometerán errores de pronunciación pues todavía está aprendiendo. Pueden entender textos y deben de poder leer en todos los tiempos gramaticales sin ningún problema. Pueden escribir bien en español, saben conjugar los verbos en todos los tiempos gramaticales cometiendo errores mínimos. Pueden escribir bien sobre temas que les son familiares.

5= Nivel avanzado bajo: Son capaces de expresarse de manera casi fluida y espontánea sin una notoria tensión en su habla, Su habilidad con el lenguaje es flexible y efectivo en esta situación. Pueden producir respuestas claras y bien estructuradas, cometerán pocos errores y serán mínimos. Si cometen errores de habla serán mínimos y cometerán errores de pronunciación cuando intenten usar un vocabulario complejo. Pueden entender textos con un poco de ayuda. Son capaces de producir respuestas claras y bien estructuradas, cometerán pocos errores. Si cometen errores será usando vocabulario complejo.

6=Nivel avanzado alto: Son capaces de expresarse con fluidez y espontaneidad, su habilidad en el lenguaje es efectiva en este nivel. Pueden producir respuestas claras y bien estructuradas a

preguntas, cometen errores poco notorios y si cometen errores son de pronunciación, no de conjugación de verbos. Pueden leer casi todos los textos y si leen un texto poco familiar pueden pedir ayuda a alguien acerca del vocabulario. Son capaces de expresarse con fluidez y espontaneidad, su habilidad en el lenguaje es efectiva en este nivel. Pueden producir respuestas claras y bien estructuradas a preguntas.

7= Nivel nativo: Tienen la capacidad de leer, escribir y hablar en un nivel nativo sin cometer errores notorios.

Appendix G: French Task

1. Je dis terminer encore une fois.
2. Je dis rouge encore une fois.
3. Je dis embraser encore une fois.
4. Je dis ruminant encore une fois.
5. Je dis harmoniser encore une fois.
6. Je dis entrée encore une fois.
7. Je dis charrue encore une fois.
8. Je dis braise encore une fois.
9. Je dis tirailleur encore une fois.
10. Je dis emmerde encore une fois.
11. Je dis chaîne encore une fois.
12. Je dis fatigue encore une fois.

13. Je dis téléphone encore une fois.

14. Je dis éléphant encore une fois.

15. Je dis demelant encore une fois.

16. Je dis chien encoire un fois.

Appendix H: Haitian Creole Task

1. Mare chijen an

2. Dirije yon riyinyon

3. Resevwa yon etranje

4. De montre ki saw kopran

5. Mwen resevwa ou la kay mwen

6. Poukisa ou pa rete

7. Kikote ou rete

8. Ki jan ou rele

Appendix I: Letters of Information and Consent

Control Group: Letter of Information and Consent

Carta de información y consentimiento

1. **Título del proyecto:** La adquisición de róticas del español por hablantes de creole haitiano en un contexto multilingüe: un enfoque socio-fonético

Título del documento: Carta de información y consentimiento
Principal Investigador + Contacto:

Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
Western University,

2. **Invitación a participar**
Usted está siendo invitado a participar en este studio sobre la producción de sonidos del español en hablantes de este idioma como segunda o tercera lengua. Se le invita a participar porque es un hablante nativo de Tijuana español y sus datos se usaran como grupo de control.

3. **¿Por qué se hace este studio?**
El propósito de este estudio es investigar cómo los estudiantes haitianos de español en México aprendedn español como su segundo o tercer idioma.

4. **¿Cuánto tiempo durará este estudio?**
Las pruebas pueden durar 1-1.5 horas. Ésta será la única vez que tendrá que venir al estudio para realizarlas.

5. **¿Cuáles son los procedimientos?**
Si accede a participar se le pedirá que complete una erie de actividades. Se le pedirá:

1. Contestar un cuestionario sobre su uso del idioma.
2. Completar una actividad oral en la que se le pedirá describir imágenes.
3. Leer en voz alta una lista de enunciados en español.

Su voz se grabará durante todas las actividades orales, la grabación de audio es un componente obligatorio de la participación. El orden de las actividades puede variar

de acuerdo a lo que se presenta en esta lista. Todas las actividades se llevarán a cabo en Tijuana, México.

6. ¿Cuáles son los riesgos o daños asociados a este estudio?
No existen daños asociados a este estudio además de la fatiga que puedan ocasionarle las pruebas. Sin embargo, se le otorgarán descansos para prevenirla y se le anima a que tome los descansos adicionales que necesite.

7. ¿Cuáles son los beneficios asociados a este estudio?
Usted no se beneficiará directamente por su participación en el estudio, pero la información recabada podría traer beneficios a la sociedad en conjunto que podrían incluir un mayor conocimiento sobre la adquisición del español como segunda y tercera lengua en hablantes del creole.

8. ¿Pueden los participantes abandonar el estudio?
En caso de que decida abandonar el estudio, usted tiene el derecho de pedir que los datos recabados sobre su persona sean también eliminados. Si desea que su información se elimine, por favor hágaselo saber al investigador.

9. ¿Cómo se garantizará la confidencialidad de sus datos?
Representantes de la Junta de Ética No-Médica de la Universidad de Western Ontario pueden pedir acceso a sus datos recabados en este estudio para monitorear cómo éste se está llevando a cabo.

Aunque nosotros hacemos lo posible por proteger su información, no existe garantía de que seremos capaces de hacerlo. Las grabaciones de sonido y video producidas para este estudio podrían servir para identificarlo. En caso de que sea legalmente necesario reportar información recabada en este estudio, tenemos la obligación de hacerlo.
El investigador mantendrá su información personal en un lugar seguro y confidencial por un mínimo de 7 años. Una lista en la que se relaciona su número de participante con su nombre se guardará en un lugar seguro, separada del expediente de sus pruebas.

En caso de que los resultados del estudio se publicaran, su nombre no será usado.

10. ¿Se les compensa a los participantes de este estudio?
Se le compensará con 15-30 dólares (canadiense) por su participación en este estudio. Si no complete todas las pruebas, de todas formas se le compensará en un prorrateo de 15 dólares por 60 minutos.

11. ¿Cuáles son sus derechos como participante?
Su participación en este estudio es voluntaria. Incluso si accede a participar, usted tiene el derecho de no contestar alguna de las preguntas o retirarse del estudio en cualquier momento.

En caso de que, durante el estudio, existan nuevas condiciones que afecten su decisión de participar, nosotros lo mantedremos informado.

Usted no cede ningún derecho legal al firmar esta carta de consentimiento.

12. ¿Con quén se puede contactar en caso de que exista alguna duda sobre el estudio?
Si usted tiene preguntas sobre esta investigación, favor de comunicarse con:

Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
Western University,

Natasha Swiderski, Estudiante de maestría, Literatura y lenguas modernas
Western University,

Si usted tiene alguna pregunta sobre sus derechos como participante en este estudio, también puede comunicarse con la Oficina de Ética Humana de la Investigación

Esta carta es suya y debe conservarla para cualquier duda que tenga en un futuro.

Título del proyecto: La adquisición de róticas del español por hablantes de creole haitiano en un contexto multilingüe: un enfoque socio-fonético

Título del documento: Formulario de consentimiento

Investigador principal + Contactos
Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
Western University,

Natasha Swiderski, estudiante de maestría, Literatura y lenguas modernas
Western University,

He leído la Carta de información, me explicaron la naturaleza del estudio y acepté participar. Todas mis preguntas han sido respondidas a mi entera satisfacción.

En caso de que se requiera más información en el futuro, acepto ser contactado para este estudio.

☐ **SÍ** ☐ **NO**

(Nombre en letra de molde): _____

(Firma): _____

(Fecha): _____

Mi firma significa que he explicado el estudio al participante mencionado anteriormente y he respondido todas las preguntas.

(Nombre en letra de molde): _____

(Firma): _____

(Fecha): _____

Correo electrónico: _____

Haitian Participant Group: Letter of Information and Consent

<u>**Carta de información y consentimiento**</u>

1. **Título del proyecto:** La adquisición de róticas del español por hablantes de creole haitiano en un contexto multilingüe: un enfoque socio-fonético

   Título del documento: Carta de información y consentimiento
   Principal Investigador + Contacto:

   Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
   Western University,

2. **Invitación a participar**
   Usted está siendo invitado a participar en este studio sobre la producción de sonidos del español en hablantes de este idioma como segunda o tercera lengua. Se le invita a participar porque está aprendiendo español y su lengua maternal es el creole haitiano.

3. **¿Por qué se hace este studio?**
   El propósito de este estudio es investigar cómo los estudiantes haitianos de español en México aprendedn español como su segundo o tercer idioma.

4. **¿Cuánto tiempo durará este estudio?**
   Las pruebas pueden durar 2-2.5 horas. Ésta será la única vez que tendrá que venir al estudio para realizarlas.

5. **¿Cuáles son los procedimientos?**
   Si accede a participar se le pedirá que complete una erie de actividades. Se le pedirá:

   1. Contestar un cuestionario sobre su uso del idioma.
   2. Contestar un cuestionario sobre su percepción y punto de vista sobre el idioma.
   3. Completar una actividad oral en la que se le pedirá describir imágenes.
   4. Completar una actividad de enunciación. Se le harán preguntas sobre una imagen para que usted conteste con una palabra en español de acuerdo a lo que ve.
   5. Leer en voz alta una lista de enunciados en español, francés y criollo.
   6. Participar en una entrevista semi-dirigida en la que se le pedirá que describa el clima en su país y en México.

   Su voz se grabará durante todas las actividades orales, la grabación de audio es un componente obligatorio de la participación. El orden de las actividades puede variar de acuerdo a lo que se presenta en esta lista. Todas las actividades se llevarán a cabo en Tijuana, México.

6. **¿Cuáles son los riesgos o daños asociados a este estudio?**

No existen daños asociados a este estudio además de la fatiga que puedan ocasionarle las pruebas. Sin embargo, se le otorgarán descansos para prevenirla y se le anima a que tome los descansos adicionales que necesite.

7. ¿Cuáles son los beneficios asociados a este estudio?
Usted no se beneficiará directamente por su participación en el estudio, pero la información recabada podría traer beneficios a la sociedad en conjunto que podrían incluir un mayor conocimiento sobre la adquisición del español como segunda y tercera lengua en hablantes del creole.

8. Pueden los participantes abandonar el estudio?
En caso de que decida abandonar el estudio, usted tiene el derecho de pedir que los datos recabados sobre su persona sean también eliminados. Si desea que su información se elimine, por favor hágaselo saber al investigador.

9. ¿Cómo se garantizará la confidencialidad de sus datos?
Representantes de la Junta de Ética No-Médica de la Universidad de Western Ontario pueden pedir acceso a sus datos recabados en este estudio para monitorear cómo éste se está llevando a cabo.

Aunque nosotros hacemos lo posible por proteger su información, no existe garantía de que seremos capaces de hacerlo. Las grabaciones de sonido y video producidas para este estudio podrían servir para identificarlo. En caso de que sea legalmente necesario reportar información recabada en este estudio, tenemos la obligación de hacerlo.

El investigador mantendrá su información personal en un lugar seguro y confidencial por un mínimo de 7 años. Una lista en la que se relaciona su número de participante con su nombre se guardará en un lugar seguro, separada del expediente de sus pruebas.

En caso de que los resultados del estudio se publicaran, su nombre no será usado.

10. ¿Se les compensa a los participantes de este estudio?
Se le compensará con 300 pesos dólares por su participación en este estudio. Si no complete todas las pruebas, de todas formas se le compensará en un prorrateo de 150 pesos por 60 minutos.

11. ¿Cuáles son sus derechos como participante?
Su participación en este estudio es voluntaria. Incluso si accede a participar, usted tiene el derecho de no contestar alguna de las preguntas o retirarse del estudio en cualquier momento.

En caso de que, durante el estudio, existan nuevas condiciones que afecten su decisión de participar, nosotros lo mantedremos informado.

Usted no cede ningún derecho legal al firmar esta carta de consentimiento.

12. ¿Con quén se puede contactar en caso de que exista alguna duda sobre el estudio?

Si usted tiene preguntas sobre esta investigación, favor de comunicarse con:

Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
Western University,

Natasha Swiderski, Estudiante de maestría, Literatura y lenguas modernas
Western University,

Si usted tiene alguna pregunta sobre sus derechos como participante en este estudio, también puede comunicarse con la Oficina de Ética Humana de la Investigación

Esta carta es suya y debe conservarla para cualquier duda que tenga en un futuro.

Título del proyecto: La adquisición de róticas del español por hablantes de creole haitiano en un contexto multilingüe: un enfoque socio-fonético

Título del documento: Formulario de consentimiento

Investigador principal + Contactos

Dr. Yasaman Rafat, PhD, Literatura y lenguas modernas
Western University,

Natasha Swiderski, estudiante de maestría, Literatura y lenguas modernas
Western University,

He leído la Carta de información, me explicaron la naturaleza del estudio y acepté participar. Todas mis preguntas han sido respondidas a mi entera satisfacción.

En caso de que se requiera más información en el futuro, acepto ser contactado para este estudio.

☐ **SÍ** ☐ **NO**

(Nombre en letra de molde): _____

(Firma): _____

(Fecha): _____

Mi firma significa que he explicado el estudio al participante mencionado anteriormente y he respondido todas las preguntas.

(Nombre en letra de molde): _____

(Firma): _____

(Fecha): _____

Correo electrónico: _____

Curriculum Vitae

Name:	Natasha Anne Swiderski

Post-secondary Education and Degrees:

Western University
London, Ontario, Canada
2013-2017 B.A. of Arts Honor,
Honors Specialization in Anthropology

Western University
London, Ontario, Canada
2017-Present M.A. in Arts, Hispanic Studies
(Migration and Ethnic Relations)

Honours and Awards

Social Science and Humanities Research Council (SSHRC)
Masters, September 2018-May 2019
Western University, Project: The acquisition of Mexican Rhotics
by Haitian Creole speakers in Tijuana Mexico: a sociophonetic approach

Related Work Experience

Teaching Assistant
Western University
January 2019-April 2019, Spanish in Contact under Dr. Yasaman Rafat

Teaching Assistant
Western University
September 2017-April 2018, Spanish for Beginners under Ana Garcia

Research Assistant
Western University
September 2017-April 2019
The Canadian multilingual speech database under Dr. Yasaman Rafat

Research Assistant
Western University
August 2016-June 2019
Orthographic processing in Korean-English and Farsi-English
Bilinguals under Dr. Yasaman Rafat and Dr. Veronica Whitford