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Acquisition of Spanish Intonation by Native Korean Speakers

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in Hispanic Languages and Literatures

by

JyEun Son

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ABSTRACT OF THE DISSERTATION

Acquisition of Spanish Intonation by Native Korean Speakers

by

JyEun Son

Doctor in Philosophy in Hispanic Languages and Literatures

University of California, Los Angeles, 2018

Professor Sun-Ah Jun, Co-Chair

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Acquiring native-like proficiency in a second language (L2) is difficult to achieve after the critical period (Lenneberg 1967). Acquisition of L2 intonation and prosody has been assumed to be the last stage of L2 acquisition and is one of the least explored areas of intonation research. Languages differ in their prosody, especially in the way they mark prominence. Languages like English and Spanish mark word prominence by pitch accent realized on the stressed syllable of a word (most often a content word). Languages like Korean, which does not have lexical or postlexical stress, mark word prominence by forming the word into one prosodic unit called the Accentual Phrase (AP) or by locating the word at the beginning of an AP (Jun 1993). In Jun's prosodic typology (Jun 2005b, 2014b), the former type belongs to a head-prominence language, and the latter type belongs to an edge-prominence language.

In addition to this prosodic difference, Spanish and Korean differ in the division of

lexicon. Spanish distinguishes between a content word and a function word, but Korean does not have function words. Instead, all words in Korean are content words, consisting of a lexical item plus a case marker or postpositions, which do not form a separate AP, but always form an AP together with the preceding lexical item.

Given these prosodic and morphological difference between the two languages, the present study is divided into four fundamental components. First, I posit that Korean Accentual Phrase (AP) initial tone-segment mapping will be applied to Spanish, in that the High tone will be applied when the phrase-initial segment is aspirated (/p^h, t^h, k^h, $tʃ^h$/), tense (/p*, t*, k*, s*, tʃ*/) or /h/ or /s/; otherwise, Low tone will be applied (Jun 1993, 1998, 2000, 2005). Secondly, I hypothesize that nuclear and pre-nuclear Pitch Accents in Spanish will be realized differently since Korean does not have this distinction. Thirdly, I posit that Korean learners will tend to produce an AP-like tonal unit over a function word as well as a content word. Lastly, I hypothesize that the boundary tones in Spanish in information-seeking yes-no questions and wh-questions, invitation yes-no questions and wh-questions will be realized as HH% or LH% due to L1 influence.

Twenty-one L2 participants representing three proficiency levels (seven beginners, seven intermediates, and seven advanced learners) recorded themselves reading words, phrases, and sentences in Spanish in as naturally as possible. Native Mexican and Peninsular Spanish speakers (three participants each) also participated as a control group.

Praat was used to analyze the intonation, and the pitch contour was labeled following the Spanish ToBI (Tones and Break Indices) (Beckman et al. 2002, Prieto & Roseano 2010) and Korean ToBI (Jun 2000, 2005) transcription conventions, which are based on the Autosegmental-

Metrical model of intonational phonology (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Ladd 1996/2008) of each language.

The results showed that the Korean Accentual Phrase (AP) initial tone-segment mapping had a stronger effect on beginner and intermediate groups than advanced learners. Also, L1 Korean speakers had difficulties in marking prominence according to Spanish conventions and had a strong tendency to produce an "L H" (rising) tonal pattern over a word, i.e., the AP tone pattern, regardless of the location of stress. Stress-based pitch accent in Spanish is difficult to acquire for speakers of L1 Korean, which has no word-prosody. Korean AP tones, which cue word prominence via edge marking, are negatively transferred in producing a word and pitch accent in Spanish. Also, in Seoul Korean, as each word forms one Accentual Phrase (AP), L2 learners produced AP-like tonal units especially on monosyllabic function words in Spanish. It is interesting that the majority of the intermediate and advanced Native Korean Speakers (NKS) produced L% in information-seeking wh-questions and in invitation wh-questions, which is not what I had predicted based on previous research. This may be due to the English intonation of information-seeking wh-questions and invitation wh-questions, which use a falling tone. Future studies are needed to confirm these initial findings of the influence of English on L1 Koreans' production. Additionally, according to the results, beginners tend to commit more errors, and I posit that this is because these types of sentences require conveying of meaning through intonation, beyond simple lexical items. According to these results, the four dimensions of Mennen (2015)'s L2 Intonation Learning theory (LILt)) were supported.

So far, no study has been carried out regarding the Acquisition of Spanish intonation by Native Korean Speakers based on the Autosegmental-Metrical model of intonational phonology,

using Spanish ToBI and Korean ToBI transcription conventions. This study offers significant contributions to the field of L2 prosody acquisition of native Korean speakers learning Spanish, as my analysis is not limited to boundary tone realization, but extended to the inventory of structural phonological elements such as Pitch Accents in Spanish and Accentual Phrases in Korean. In general, L2 learners are not aware of the prosodic characteristics of their second language and tend to apply their native language's prosodic features to their L2.

The dissertation of JyEun Son is approved.

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To my family

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CHAPTER 1 Introduction

Spanish is one of the most popular Romance languages to learn in Korea, especially in universities. There are about 15 universities that have a Spanish Department. Though the names of these departments vary, the focus is on Hispanic language and literature. Students take English as a mandatory subject beginning in elementary school, and Chinese and Japanese are also very popular as foreign language subjects in high school and college/universities. However, as in Lee & Son (2009), when undergraduate students have Spanish as an option among many other foreign languages, they tend to choose Spanish due to the large population of native Spanish speakers in the world, cultural attraction, and also to obtain a job related to commercial trades between Korea and Spanish speaking countries.

The majority of studies in Spanish linguistics in Korea have focused on syntax, specifically cross-linguistic syntactic differences between Spanish and Korean, as well as second language acquisition and education. Many studies in the area of phonetics and phonology have focused on segmental differences between Spanish and Korean (Kim 1984; Kim 2005, 2013, 2014; and Mun 2015).

However, there have been no studies on the influence of the Korean (L1) prosodic system on Spanish (L2) intonation, especially within the framework of the Autosegmental-Metrical (AM) model of intonational phonology (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Ladd 1996/2008) of each language. The present study analyzes the phonology and phonetics of the intonation patterns of each language via the use of the phonological transcription system of each language: Spanish ToBI (Tones and Break Indices)

system proposed in Beckman et al. (2002), and Prieto & Roseano (2010), and the Korean ToBI proposed in Jun (2000, 2005) based on the Autosegmental-Metrical (AM) model of intonational phonology.

1.1 Literature review on the Influence of L1 Korean on L2 Spanish Sound

Among L1 Korean speakers learning L2 Spanish, it is believed that Spanish is easier to acquire than English due to its relatively simple phonetic structure. Naïve speakers assume that it is simpler because the most of Spanish sounds can be transcribed using the Korean alphabet *Hangul* (or *Hangeul*) except the following consonant sounds: /f/, /rr/, /θ/, /ll/, / ɲ/.[1] The phonetic features of Spanish and Korean do not match exactly. However, L1 Korean learners can transcribe Spanish sounds which are assimilated to a native category (Best (1995), Perceptual Assimilation Model). For detailed comparison in consonants and vowels between Korean and Spanish, see Shin et al. (2003: 152-173), Kim (1984), Kim (2005, 2013, 2014) and Mun (2015).

Additionally, Spanish has only five vowels while Korean has seven (Shin, Jiyoung et al. 2012: 102) excluding the diphthongs.

[1] Shin, Ja Young et al. (2003: 170) says that these are the phonemes that Korean does not have: /f, x, ɾ, r, ʧ, ɲ, ʎ, θ/. However, [x, ɾ, ʎ] sounds can be assimilated to Korean consonant categories.

	Front	Back	
	Unrounded	Unrounded	Rounded
High	i	ɯ	u
Mid	ɛ	ʌ	o
Low		ɑ	

Table 1. Monophthongs in Standard Korean, extracted from Shin, Jiyoung et al. (2012: 102, Table 5.3)

Kim (1984) and Kim (2005, 2013, 2014; Mun 2015) provide more details of segmental differences between Spanish and Korean, including segmental and stress errors produced by L1 Korean speakers learning L2 Spanish.

In Hualde and Kim (2015), the authors examined the acquisition of Spanish lexical stress by L1 Korean learners. The authors confirmed that in phrase-initial position, the peak of rising accents of Native Korean Speakers (NKS) is usually displaced to the following syllable more than Native Spanish Speakers (NSS). Their prediction with Native Korean Speakers (NKS) was that the transfer from Korean should result in peak displacement in pre-nuclear[2] position (words in nonfinal position), but with even greater displacement in proparoxytones (stress on the antepenultimate syllable, e.g., número (*number*)) than paroxytones (stress on the penultimate syllable). After the experiment, they concluded that the Korean subjects displaced the accentual peak in proparoxytones in pre-nuclear position significantly further to the right than the Native Spanish Speakers (NSS), indicating a tendency to align the high tone with the end of the word

[2] As mentioned in D'Imperio et al. (2007: 94), according to the British tradition (Cruttenden 1997), the level of phrasing defined by the IP (Intonation Phrase) is also the domain of the "nuclear accent", which is positionally defined as being the last accent within this constituent, as well as being the most prominent one in the prosodic hierarchy. Any preceding accent in the intonation phrase is defined as "pre-nuclear".

both in paroxytones and in proparoxytones.

Park (2012)'s study is the first attempt to analyze the Spanish boundary tone realizations (pitch movement of the final part of the utterance) by Native Korean Speakers (NKS) based on the traditional methodology of Quilis (1975) using *Praat*, a free computer software package for the scientific analysis of speech in phonetics. She examined 13 Spanish sentences produced by Native Korean Speakers (NKS), and her sentence design was based on Quilis (1975)'s description of Spanish intonation as follows.

1. Statement: Tengo que hacerlo ahora. (*I have to do it now*.)
2. Information seeking wh-question: ¿Dónde está tu padre? (*Where's your father?*)
3. Absolute (Yes-no) question: ¿Hay muchos alumnos en su clase? (*Are there many students in your class?*)
4. Disjunctive question: ¿Te quedas o te vas? (*Are you staying or leaving?*)
5. Confirmation yes-no question (Tag question): Es estupendo, ¿verdad? (*It's great, right?*)
6. Exclamation: ¡Qué aburrimiento! (*What a bore!*)
7. Coordinated sentence: Hablan francés y entienden alemán. (*They speak French and they understand German.*)
8. Enumeration with a coordinate conjunction: Esto es práctico, elegante y barato. (*This is practical, elegant and cheap*.)
9. Enumeration without a coordinate conjunction: Mi novia es atractiva, simpática, muy lista. (*My girlfriend is attractive, nice, very smart*.)
10. Enumeration: Manolo, Carlos y Carmen cantaron en la fiesta. (*Manolo, Carlos and Carmen sang at the party*.)
11. Commands (simple imperative structure): ¡Come aquí con nosotros! (*Eat here with us*.)
12. Commands (imperative with a tag): Baja la música, por favor. (*Lower the volume of*

music, please.)

13. Explanation clause: La obra, que se representó en el teatro, fue un auténtico fracaso. (*The play, which was performed in the theater, was a real failure*.)

Park (2012) did not divide the proficiency level of participants who were all university students from the Department of Spanish. After recording the reading of the sentences above, she used *Praat* to analyze the pitch movement, and labeled according to Quilis (1975) as follows:

Quilis (1975)	**Park (2012)'s convention**[3]
Cadencia (falling tone)	HL
Semicadencia (semi-falling tone)	ML or HM
Anticadencia (rising tone)	LH
Semianticadencia (semi-rising tone)	LM or MH
Suspensión (level tone)	MM

Table 2. Intonation labeling convention from Quilis (1975) and Park (2012)

She also used numbers to indicate the tone level (Park 2012: 32).

1 - (Very) Low tone

2 - Mid tone

3 - (Very) High tone (This tone is used only for focus or emphasis)

[3] Park (2012: 37)'s convention for H, M, and L are: H for High tone, M for Mid tone and L for Low tone.

For boundary tone indication, she used the following arrows: ↑, ↗, ↓, ↘, →

One of the example analyses is:

9. Enumeration without a coordinate conjunction: Mi novia es atractiva, simpática, muy lista. (*My girlfriend is attractive, nice, very smart*.)

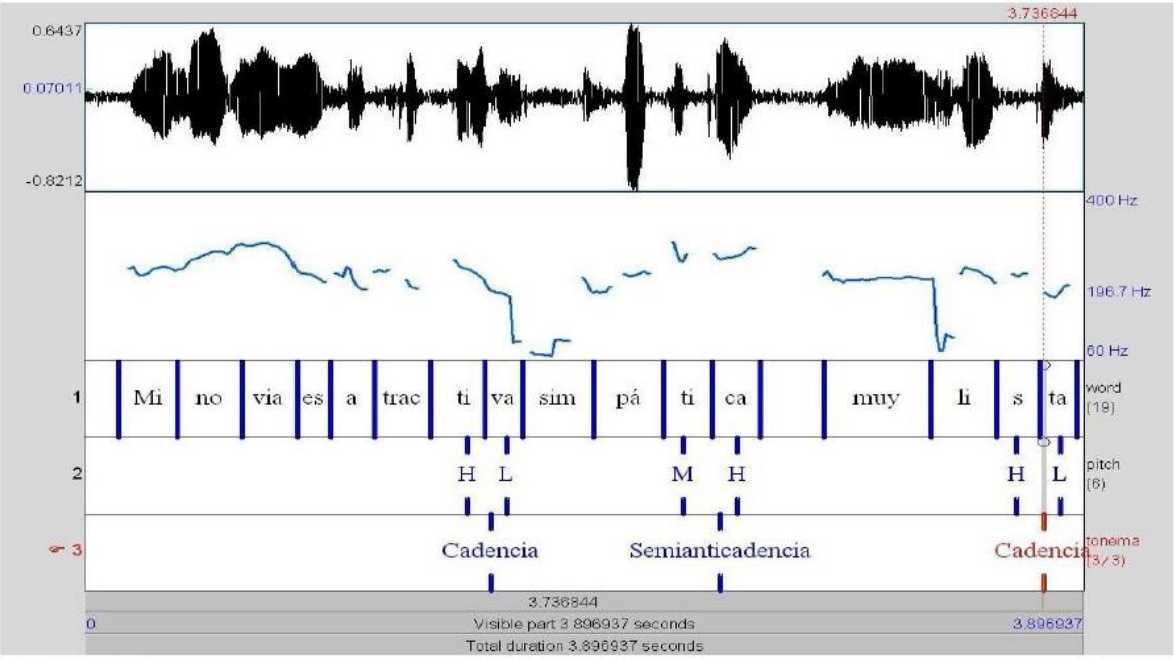

Figure 1. Enumeration without a coordinate conjunction from a female Korean speaker, extracted from Park (2012: 70, Figure 4-41[4])

In the case of Figure 1, she used /221↓21↓21↑121↓/ to describe the f0 contour and a combination of H, M and L. Only the boundary tones were analyzed, without describing the pitch accents in the middle of the sentences. The boundary tone realizations of the 13 sentences mentioned above produced by Korean L2 learners were compared to those of one native Spanish speaker's utterance to see the percentage of the errors made by L2 learners.

[4] The Figure number inside the parenthesis means its original number from the author.

Choi (2018) compared and analyzed Korean intonation between Korean-learning Spaniards (beginner level) and native Korean speakers. Mainly, she compared the Intonation Phrase (IP) boundary tones of Spaniards' Korean and Spanish using the ToBI (Tones and Break Indices) systems for both Korean and Spanish which will be presented in Chapter 2. In contrast with Choi (2018), in this dissertation I analyze the intonation of native Koreans learning L2 Spanish, incorporating analysis of pitch accents, boundary tones, and other elements of L1 Korean speakers' acquisition of Spanish intonation.

1.2 Literature Review on the Acquisition of L2 prosody

In this section, I introduce studies on the acquisition of L2 prosody and interference of native language intonation on the second language. When we learn a second language after a certain age, the so-called "critical period," it is tough to achieve a native-like fluency (Lenneberg: 1967). It is said that first language acquisition must occur before cerebral lateralization is complete, at about the age of puberty. Even if people spend much time studying grammar and memorizing vocabularies of a second language, it is not easy to have a fluent conversation and sound like a native in that language. Furthermore, it is known that acquiring the intonation of L2 is the last stage of language acquisition because intonation delivers semantic and pragmatic information as well as discourse information, and the categories of intonation are not as discrete as segmental categories.

As mentioned in Mennen (2004: 544), most studies on L2 production of intonation are restricted to studies of the errors made by learners from various language backgrounds when they

acquire English as a L2 (Backman, 1979; Buysschaert, 1990; De Bot, 1986; Grover, Jamieson, & Dobrovolsky, 1987; Jenner, 1976; Jilka, 2000; McGory, 1997; Willems, 1982). These studies suggest that L2 intonation patterns are often influenced by the L1 of the speaker.

The acquisition of Spanish intonation as L2 by adult learners is one of the least explored areas of intonation research and second language acquisition (SLA). There are some studies on acquiring L2 Spanish intonation by L1 English speakers (Nibert 2005, 2006; Henriksen et al. 2010; Thornberry 2014; Craft 2015), by L1 Chinese speakers (Cortés Moreno 1999, 2004, 2006), and by L1 Taiwanese speakers (Cortés Moreno 2001, 2003). Other studies have been carried out on the L2 acquisition of French intonation (cf. Ramsey 1997, Konopczynski 1998) and L2 acquisition of Korean intonation (Jun & Oh 2000, Lee 2018).

Although there have been various studies on the acquisition of individual Spanish sounds (e.g., Zampini 1994, 1998a, 1998b, Elliott 1997, and González-Bueno 1997, to name a few) at the segmental level, suprasegmental acquisition is not widely studied. In Nibert (2006), the author mentions that this paucity of SLA research on Spanish intonation is in part due to the less transparent nature of the structure and meaning of intonation in general (as opposed to the structure of the segment or the syllable, for example).

Jun & Oh (2000) examined the intonation structure of Seoul Standard Korean produced by American English speakers to investigate the interference from the phonological system and phonetic realization of the speaker's first language (L1). Results showed that more advanced speakers of second language (L2) were better at grouping or phrasing words, whether triggered by the length of the phrase or by meaning, than less advanced speakers. However, even advanced speakers produced stress in Korean following English rhythmic patterns, though not as often as

less advanced speakers. The authors suggested that a lexically linked prosodic feature in L1 is more likely to be transferred to L2 prosody and is difficult to suppress. Also, the authors found that phonological properties of intonation are acquired earlier than phonetic properties of intonation.

Craft (2015) investigated the acquisition of intonation by L2 Spanish speakers while they were on a six week study abroad program in Valencia, Spain. This study aimed to examine proficiency (intonation) development in non-native speakers. She focused on the delayed peak pitch accent (L+>H*) and the rising peak pitch accent (L*+H) used by native speakers in declarative and absolute interrogative sentences in the pre-nuclear position, the correct usage of the high and low boundary tones, and the avoidance of pitch contours typical of English (such as up-speak).

The results showed that the participants were not using native-like intonation after only six weeks in the study abroad program. This demonstrates how difficult it is to master native-like pronunciation, as well as how long it may take. She concluded that neither intonation instruction nor immersion had much of an effect on the non-native group's intonational development due to the weak versions of instruction and immersion that the students experienced.

Thornberry (2014) conducted a study on the L2 acquisition of Buenos Aires Spanish intonation by L1 English speakers during a study abroad semester. This longitudinal study described and categorized the primary changes in L2 Spanish intonation over time by 11 learners studying abroad in Buenos Aires. He tested intonational contours for absolute interrogatives and declarative statements at the beginning and end of the semester in a variety of speech styles.

Results showed that learners' absolute interrogative intonation (L*+H L* H%) was considerably different from that of their native Buenos Aires Spanish-speaking peers (L+H* L+¡H* L%). Only two learners began to approximate native norms by producing an interrogative contour characterized as L*+H L*+H L% in all speech contexts. In case of declarative sentences (L*+H L* L%), all 11 learners produced this contour both at the beginning and end of the semester.

So far, the only theory that explains the acquisition of L2 intonation is that of Mennen (2015). She presented a working model of the L2 Intonation Learning theory (LILt) by expanding Ladd's theory of prosodic typology (Ladd 2001). LILt aims to account for the difficulties that L2 learners encounter in producing L2 intonation. The LILt recognizes the four dimensions (modified from Ladd 1996) along which similarities and differences between L1 and L2 intonation:

1. the inventory and distribution of categorical phonological elements ('systemic dimension')
2. the phonetic implementation of these categorical elements ('realizational dimension')
3. the functionality of the categorical elements or tunes ('semantic' dimension)
4. the frequency of use of the categorical elements ('frequency' dimension)

So far, no study has been carried out regarding the Acquisition of Spanish intonation by Native Korean Speakers based on the Autosegmental-Metrical model of intonational phonology (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Ladd 1996/2008). Park (2012) used the traditional method of Quilis (1975) instead of the ToBI system when analyzing L2 Spanish

boundary tones produced by L1 Korean speakers. While Choi (2018) used both K-ToBI and Sp_ToBI systems, the direction of acquisition was opposite of the present study: L1 Castilian Spanish speakers learning Korean as their L2. This study will contribute to the field of L2 prosody acquisition of native Korean speakers learning Spanish as this analysis is not limited to boundary tone realization, but extended to the inventory of structural phonological elements such as Pitch Accents in Spanish and Accentual Phrases in Korean.

CHAPTER 2 Theoretical Framework

2.1 Autosegmental-Metrical (AM) model of Intonational Phonology

According to Jun (2009: 423), "prosody refers to a grouping within an utterance and the prominence relation among the members within the group. Groupings within an utterance, called prosodic units, are hierarchically organized so that a prosodic unit can include one or more smaller prosodic units. Since the grouping and the prominence relation among the members are often marked by intonation, the terms 'intonation' and 'prosody' are often used interchangeably. Intonation, though traditionally defined as the global changes in pitch over the course of a sentence or a phrase, has an internal structure. Some pitch events mark the boundaries between groupings, either small or large, while others mark the prominent member within a group".

In this way, intonation contours mark a hierarchy a hierarchy of groupings and reflects the metrical structure of the group. The pitch events marking the internal structure of intonation can be represented by two distinct pitch levels, High (H) or Low (L) and their combinations (e.g., HL for falling and LH for rising). This view of intonation is known as an Autosegmental-Metrical (AM) model of intonation or intonational phonology, started in late 1970s and early 1980s through the seminal works of Bruce (1977) on Swedish intonation and Pierrehumbert and her colleagues on English intonation (e.g., Pierrehumbert 1980, Beckman and Pierrehumbert 1986, Liberman and Pierrehumbert 1986, Pierrehumbert and Hirschberg 1990).

As described in Khan (2008: 5-10), while previous descriptions of English (e.g., Trager & Smith 1951) described four or more contrastive levels of pitch, transcribed with numbers

representing their relative height, this inventory was reduced to only two opposing tonal targets in Pierrehumbert's (1980) analysis of English: High (H) and Low (L).

The tonal targets are aligned to designated parts of the segmental string, and all intervening pitch is derived by phonetic interpolation between the targets. Complex contours are analyzed as a linear sequence of two tonal targets, L and H.

In the AM model of intonational phonology, an important distinction is made between two different kinds of tones: head-marking tones (i.e., pitch accents) and edge-marking tones (i.e., boundary tones). Head-marking tones are associated to metrically-prominent positions in the utterance, while edge-marking tones are associated to the edges of prosodic boundaries. The pitch contour, or "tune," is made up of these pitch accents and boundary tones, represented on a tier separated from the segments, or "text." This separation in tiers is familiar from analyses of lexical tone, rooted in Goldsmith's (1976) work on autosegmental phonology. The "tune tier" is aligned to the "text tier" at metrically-prominent heads or phrasally-defined edges; at the post-lexical stage of derivation, the segments located at these prosodic positions and the tones associated to those positions are realized simultaneously (see Selkirk 1984 for a more detailed description of this pairing of tune and text).

The AM model of intonational phonology also draws upon the metrical phonology representation of relative prominence among syllables, words, and phrases. Pitch accents (i.e., head-marking tones) can only align to prominent syllables. The exact type of prominence differs across languages - some languages mark their prominent syllables lexically for stress (e.g., English, Spanish), which can attract a variety of post-lexical pitch accents, while other languages mark prominent syllables with a predetermined pitch contour (e.g., Japanese, Serbo-Croatian).

Some languages use a combination of stress and lexically-specified pitch contour to mark syllable prominence (e.g., Swedish, Norwegian). On the other hand, if a language has no head-marking prominent syllable, a prominent syllable is located at the edge of a prosodic unit (e.g., Korean, W. Greenlandic).

The location of prominent syllables (i.e., stress accent, lexical pitch accent, stressed lexical pitch accent) are specified in the lexicon. The tones that are attracted to these prominent, lexically-specified locations are traditionally labeled with an asterisk (*) next to the tonal target (e.g., L* for a low pitch accent). Complex tones can include "leading" or "trailing" components, where the prominent syllable bears the tone marked by the asterisk (*) and the preceding or following syllable bears the unmarked tone, separated by a plus sign (+) from the tone bearing the asterisk.

2.2 Tones and Break Indices (ToBI) System

One of the most widely-used transcription systems based on the AM model of intonation is Tones and Break Indices (ToBI), created by a team of linguists, speech scientists, and engineers, and laid out in Silverman et al. (1992) and Beckman & Hirschberg (1994). The first ToBI system was based on English data. Specifically, the 'To' part was developed from the AM model of English intonation proposed in Pierrehumbert (1980) and Beckman & Pierrehumbert (1986), and the 'BI' part was developed from works on juncture by Price et al. (1990) and Wightman et al. (1991).

Since ToBI is a phonological transcription system of prosody, developing a ToBI system for a language required developing an AM model of intonation for that language. Since the initial

development of ToBI based on English data, linguists have developed an AM model of intonation for various languages and applied the ToBI principles to these languages, creating a ToBI system for many languages. Jun (2005) and Jun (2014) together introduce twenty-six ToBI systems, Frota & Prieto (2015) include nine ToBI systems for Romance languages, and Prieto and Roseano (2010) introduce ToBI systems for ten dialects of Spanish. Below is a list of languages whose AM model of intonation and ToBI systems are available in each publication.

- Thirteen languages in Jun (2005): German, Greek, Dutch, Serbo-Croatian, Japanese, Korean, Pan-Mandarin, Cantonese, Chickasaw, Bininj Gun-wok, Italian, four dialects of English, Swedish
- Ten varieties of Spanish intonations in Prieto & Roseano (2010): Castilian, Cantabrian, Canarian, Dominican, Puerto Rican, Venezuelan Andean, Ecuadorian Andean, Chilean, Argentinian and Mexican Spanish
- Fourteen languages in Jun (2014a): European Portuguese, Catalan, Bangladeshi Standard Bengali, Tamil, Georgian, Mongolian, West Greenlandic, Dalabon, Jamaican Creole, Papiamentu (Curacao Dialect), some tonal dialects in the Netherlands, Lebanese and Egyptian Arabic, Basque, Japanese Dialects
- Nine varieties of Romance languages in Frota & Prieto (2015): Catalan and its dialects, French, Friulian and its dialects, regional varieties of Italian, Occitan, European and Brazilian Portuguese, Romanian, Sardinian, European and American varieties of Spanish

According to Beckman & Ayers-Elam (1997) and Beckman et al. (2014), there are six components of ToBI transcription: an audio recording of the utterance, the F0 contour (usually

superimposed on a spectrogram or waveform), and four transcription tiers (i.e., words, tones, break indices, and miscellaneous). The word tier includes the orthographic (or transliterated, for non-Roman scripts) representation of the segments in the utterance. The tone tier includes the distinctive tonal events, including pitch accents and boundary tones. The break index tier includes integer numbers corresponding to the perceived juncture size between words. Finally, the miscellaneous tier may include any additional information about the utterance (e.g., paralinguistic information such as stuttering or laughing), or other information such as the transcriber's notes to colleagues regarding a troublesome contour. An example of English ToBI is shown in Figure 2 taken from Beckman et al. (2005: 22).

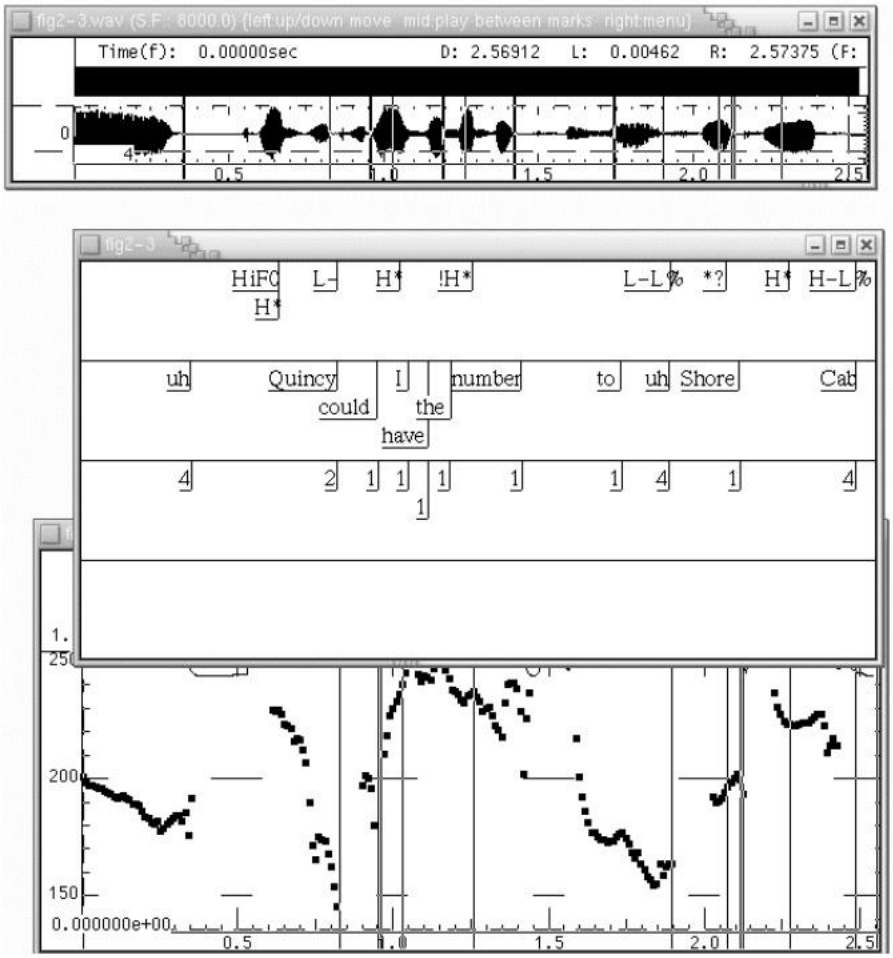

Figure 2. Audio waveform, f0 contour, and MAE_ToBI xlabel windows for utterance *Uhh... Quincy. Could I have the number to uh...Shore Cab?* Extracted from Beckman et al. (2005: 22, Figure 2.3)

As mentioned on the ToBI website[5], ToBI is not an International Phonetic Alphabet for prosody. Instead, different ToBI systems are created specific to a particular language variety. Intonation and prosodic organization differ from language to language, and often from dialect to

[5] See Beckman et al. (2005) and ToBI website for more details: https://www.ling.ohio-state.edu/~tobi/

dialect within a language. Since a ToBI-framework system is a community-wide standard, it must also conform to the following five principles[6]:

- The conventions are as accurate as possible, given the current state of knowledge. Ideally, they will be based on a large and long-established body of research in intonational phonology, dialectology, pragmatics and discourse analysis for the language variety, but at the very least, they are based on a rigorous analysis of the intonational phonology.
- The conventions do not replace a permanent record of the speech signal with a symbolic record. An electronic recording of the transcribed utterance is an essential component of a complete ToBI framework transcription.
- The conventions are efficient. They do not waste transcriber time by requiring the transcriber to symbolically mark non-distinctive pitch rises and falls that can be extracted from the signal automatically, or anything else that could be extracted from resources such as online pronunciation dictionaries.
- The conventions are easy enough to teach that their use is not limited to a few experts to do the transcription. Therefore, there must be a freely available manual for teaching the system to new transcribers, with many recorded examples of transcribed utterances graded from easy to difficult.
- The conventions are used and maintained consistently across transcription sites. Therefore, in the course of developing a ToBI framework system, there must be rigorous

[6] Five principles from the ToBI website: https://www.ling.ohio-state.edu/~tobi/

tests of intertranscriber consistency, and there should be an agreed-upon center for maintaining the standard with periodic rechecks and evaluation of any proposed revisions.

2.3 Studies on Prosodic Typology

Based on the prosodic system of multiple languages described in the same AM framework, Jun (2005a, 2014a) proposed a model of prosodic typology.

The original model of intonational phonology which was based on stress languages (e.g., English, German) and lexical pitch accent languages (e.g., Swedish, Japanese) proposed that intonation is composed of pitch accent and boundary tones, but as has been claimed in Jun (2005b, 2014b) not every language has a pitch accent. For example, tone languages without stress and languages that mark prominence purely by their "edge" tones (e.g., Korean, W. Greenlandic) do not have intonational pitch accents.

The model of prosodic typology proposed in Jun (2005b) included two major parameters of prosody: prominence and phrasing. Each of these were examined at both lexical and post-lexical levels because the prosodic property of an utterance is a combination of prosody at the word level as well as the phrase level, and both word- and phrase-level prosody mark prominence and phrasing.

The prominence marking at the lexical/word level was categorized by the type of lexical prosody, i.e., whether a language has lexical pitch accent, stress, tone, some combination of these, or none of these. The prominence marking at the post-lexical/phrase level was categorized

as head vs. edge, i.e., whether the prominence is cued by the head of a phrase (e.g., a nuclear pitch accent), by a boundary tone at the phrase edge, or by both. The parameter of phrasing was categorized by the types of prosodic units a language has at the lexical and post-lexical levels. Lexical prosodic units include morae, syllables, and feet, and reflect the traditional typology of speech rhythm, e.g., syllable-timed vs. stress-timed. Post-lexical prosodic units include an Accentual Phrase (AP), an Intermediate Phrase (ip), and an Intonational Phrase (IP). In sum, the model combined two traditions of prosodic typology (i.e., typology of word prosody and speech rhythm) with phrasal prosody as defined in the framework of intonational phonology.

According to this model, Spanish (Beckman, Díaz-Campos, McGory, & Morgan 2002; Prieto & Roseano 2010) and Bengali (Hayes & Lahiri 1991a; Khan 2008, Jun 2014b) differ in the prominence type and in what the rising tone is composed of. Spanish, being a head-prominence language, has a rising pitch accent, while Bengali, being a head/edge-prominence language, has a low pitch accent and a high AP boundary tone. However, these two languages are intonationally similar by having a sequence of phrase-medial rising tonal patterns. This suggests that the global tonal pattern of an utterance is another prosodic dimension that is orthogonal to the types of prominence marking. This motivated Jun to revise the model to include the degree of regularity in phrase-medial tonal patterns as a parameter of prosodic typology.

Jun (2014b) proposed a revised model of prosodic typology by considering the phrase-medial, global, tonal pattern of an utterance, called macro-rhythm, together with prominence marking and word prosody. In her earlier model of prosodic typology (Jun 2005b), Jun had used the term macro-rhythm to refer to the rhythm created by a prosodic unit larger than a word, in contrast with the traditional speech rhythm, which she called micro-rhythm as it is created by the

repeated sequence of smaller units such as syllables or feet. Specifically, in the earlier model, macro-rhythm referred to the rhythm created by the regular tonal pattern of a sequence of small prosodic units (e.g., Accentual Phrase (AP)) as well as by a semi-regular tonal pattern of larger prosodic boundaries in an utterance (e.g., Intonational Phrase (IP)). However, in the revised model, macro-rhythm refers to the tonal rhythm created by the small tonal unit, similar to an AP.

Here are illustrations from Jun (2014b: 525) showing macro-rhythm together with rhythm rules.

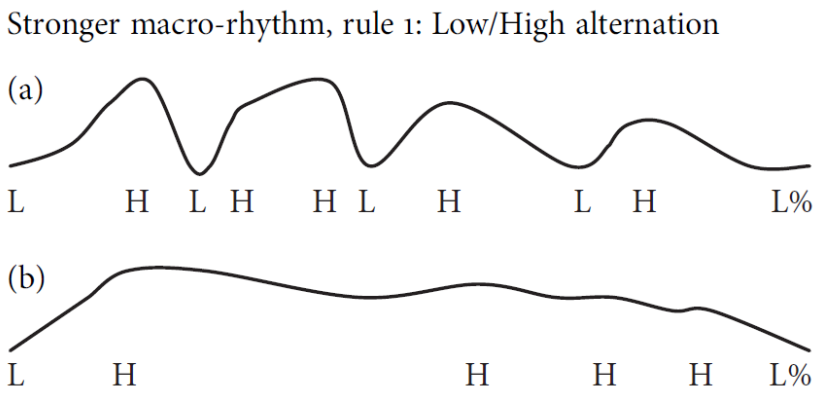

Figure 3. Stronger macro-rhythm, rule 1: Low/High alternation extracted from Jun (2014 b: 525)

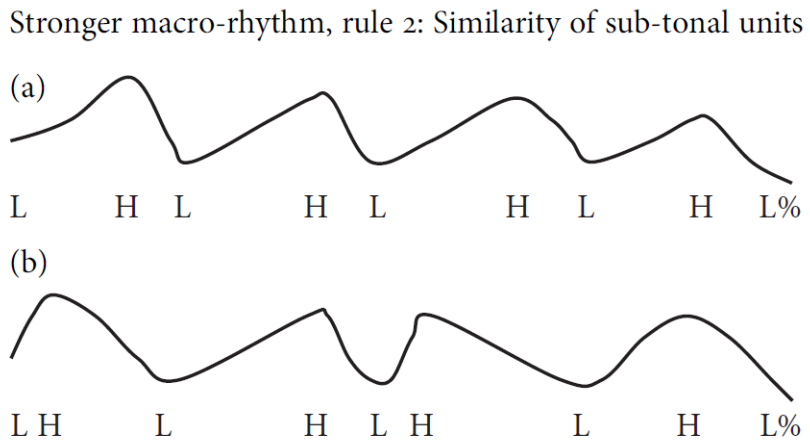

Figure 4. Stronger macro-rhythm, rule 2: Similarity of sub-tonal units extracted from Jun (2014 b: 525)

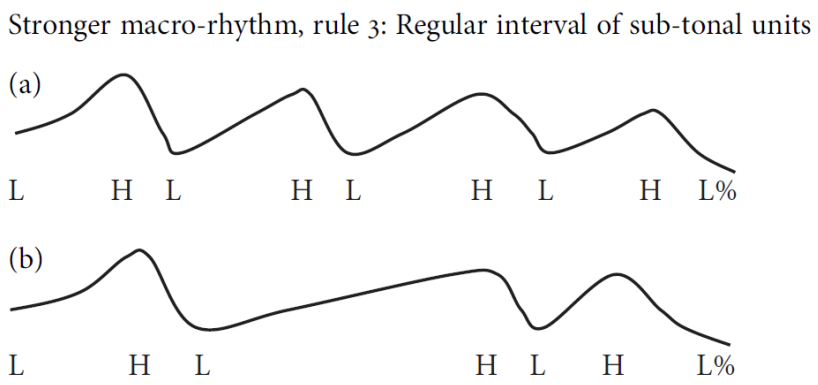

Figure 5. Stronger macro-rhythm, rule 3: Regular interval of sub-tonal units extracted from Jun (2014 b: 525)

In the revised model, Jun (2014 b) narrowed the definition of macro-rhythm to the phrase-medial tonal rhythm whose unit is equal to or slightly larger than a word, regardless of whether the tonal pattern is composed of edge tones (i.e., AP or word tones), head tones (i.e., pitch accents or lexical tones), or both. The tonal rhythm of phrases larger than an AP (e.g., IP or

ip) is not included because the IP or ip tonal rhythm tends to vary more within a language (due to the variable size of IP or ip) and vary less across languages (for both size and the type of boundary tone).

According to this model, languages differ prosodically according to the type of prominence marking as well as macro-rhythm. They also differ in the way they mark head prominence, which can be captured by word prosody. Since word prosody is essential in developing intonational phonology but is not predictable from the type of prominence or macro-rhythm, it is included as a third parameter of prosodic typology. That is, the revised model of typology includes three parameters: type of prominence, degree of macro-rhythm, and word prosody. The first two are phrase level parameters and the last one is a word level parameter. The traditional speech rhythm, i.e., microrhythm (e.g., stress-timed or syllable-timed), is not included in the revised model because it does not play a role in intonational phonology.

Below is Table 3 from Jun (2014b) that summarized the prosodic typology of languages based on three parameters (Prominence Type, Word Prosody, and Macro-rhythm), and listed example languages for each combination. Shaded cells denote combinations of parameters that are expected to have no example languages. The types of macro-rhythm (Strong, Medium, Weak) given in three columns are divided by a dotted vertical line, indicating that the distinction between each type of macro-rhythm is not categorical, but gradient.

Prom. type	Word prosody	Macro-rhythm		
		Strong	Medium	Weak
Head	Stress	Brazilian Portuguese, Castilian Spanish, Catalan, Egyptian Arabic, Greek, Italian, Samoan	Dutch, English, German, Jamaican Creole English, Lebanese Arabic	European Portuguese, Wolof, Kuot
	Tone/lexical pitch accent	*(Kihehe, Safwa*[a]*, Somali*[b]*)*	*(Isthmus Zapotec*[c]*, Kimatuumbi*[a]*, Skou*[d]*)*	Cantonese
	Both	Papiamentu, Swedish		Mandarin
	None			
Head/ Edge	Stress	Bengali, Georgian, Kiche, Tamil, Tongan	Bininj Gun-wok, Dalabon	
	Tone/lexical pitch accent	Japanese, Leketio Basque		
	Both	Serbo-Croatian	Chickasaw[7]	
	None	French, Standard Basque		
Edge	None	Accentless dialects of Japanese, Halh Mongolian, Oirat Mongolian, Seoul Korean, West Greenlandic		

[a] Odden (1988, 1990); [b] Hyman 1981; [c] van der Hulst & Smith (1988); [d] Donohue (2003, cited in Hyman 2006).

Table 3. Prosodic typology based on three parameters (Prominence Type, Word Prosody, and Macro-rhythm) and example languages for each combination, extracted from Jun (2014b: 535, TABLE 17.4)

Based on this prosodic typology, the comparison between Spanish and Korean is summarized in section 2.6.

2.4 Spanish Intonation and Sp_ToBI

Since Navarro (1918, 1939, 1944) and Quilis (1975, 1981), Spanish intonation has been studied using "tonemas" (tones) such as "cadencia" (falling tone), "semicadencia" (semi-falling tone), "anticadencia" (rising tone), "semianticadencia" (semi-rising tone) and "suspension" (level tone).

The Spanish ToBI (Tones and Break Indices) labeling scheme, or Sp_ToBI, is based on the Autosegmental-Metrical (AM) model of intonational phonology (Pierrehumbert 1980, Pierrehumbert and Beckman 1988, Ladd 1996 and Gussenhoven 2004, among others), which describes intonational patterns of two tones, High (H) and Low (L), associated with metrically strong syllables and the edges of the F0 contours. This model draws a clear distinction between the two tonal units; namely, tonal entities associated with prominent or metrically strong syllables (or pitch accents) and tonal entities associated with edges of prosodic domains (or boundary tones) (Prieto & Roseano (2010)).

The hierarchical structure of Spanish intonation in Figure 6 is extracted from Jun et al.'s (2018) presentation at *Speech Prosody 2018*[7] based on the previous studies of Spanish intonation: Castilian Spanish intonation by Estebas-Villaplana and Prieto (2010) and references therein, Mexican Spanish intonation by De la Mota, Butragueño and Prieto (2010) and references therein.

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[7] Jun, Sun-Ah, Heeju Lee & JyEun Son. 2018. Mixing L1 and L2 Intonation: L1 Korean in L2 English and L2 Spanish, Workshop on "Usages and Advantages of categorical phonetic transcription of Prosody: Toward the development of an IPrA". *A satellite meeting of Speech Prosody 2018*, Poznan, Poland. June 14, 2018.

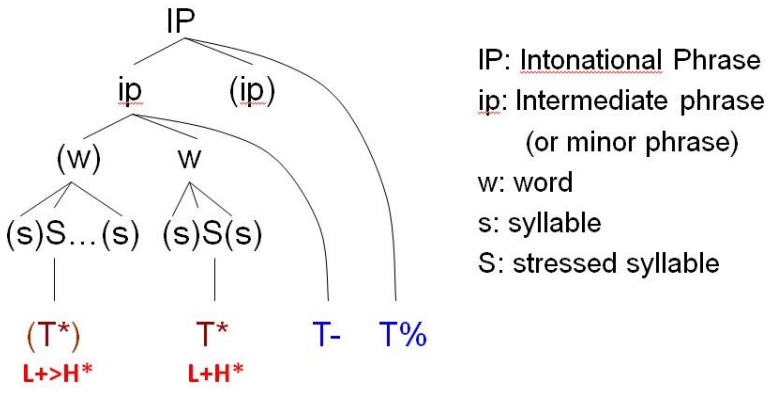


Figure 6. Intonation model of Spanish, extracted from the presentation slides of Jun et al. (2018)

T* (pitch accent): H*, L*, L+H*, L+¡H*, L+>H*, L*+H, H+L*

T- (ip boundary tone): L-, M-, H-, HH-, LH-, HL- LHL-

T% (IP boundary tone): L%, M%, H%, HH%, LH%, HL%, LM%

As a head-prominence language, word prominence in Spanish is marked by pitch accents on the stressed syllable of a prominent word. An ip can have more than one pitch accent, and an IP can have more than one ip. Not all models of Spanish intonation agree as to whether an ip exists, but for the purposes of the present study the model with both an ip and IP is used. [8]

The Spanish ToBI (Tones and Break Indices) labeling scheme, or Sp_ToBI, was developed from the first Sp-ToBI Workshop, held in October 1999, and proposed in Beckman et

[8] Note that the Sp_ToBI website claims that no evidence has been found for the necessity of intermediate phrases in the system to account for all tonal movement on non- accented syllables. However, intermediate phrases are used as one of the inventories in many studies of Spanish intonation, including the Sp_ToBI website itself. See the following website: http://prosodia.upf.edu/sp_tobi/en/labeling_system/tonal_representation/boundary_tones/boundary_tones.html

al. (2002). It was later revised in Estebas Vilaplana and Prieto (2008) to include additional phrase accents and boundary tones. In 2009, the IIV Workshop on Sp_ToBI Transcription of Intonation of the Spanish Language, in conjunction with the Conference Phonetics and Phonology in Iberia 2009 (PaPI 2009), was held. In 2010, the book called *Transcription of Intonation of the Spanish Language* was published, edited by Pilar Prieto and Paolo Roseano, which described the intonation of the following ten varieties of Spanish: Castilian, Cantabrian, Canarian, Dominican, Puerto Rican, Venezuelan Andean, Ecuadorian Andean, Chilean, Argentinian and Mexican Spanish. Further studies focused on Mexican Spanish and Castilian Spanish.

In the present study, I focus on the major prosodic influence of Castilian and Mexican Spanish because college instructors and professors of Spanish in Korea had mostly studied in Spain or Mexico, and the recorded audio samples from textbooks used in the classroom in Korea are mostly based on Castilian Spanish and Mexican Spanish variety.

Castilian and Mexican Spanish sound different impressionistically due to vocabulary use, pronunciation variation, peak alignment in a pitch accent, difference in pitch scaling, and duration and intensity (de-la-Mota 1995, 1997, Face 2002, Cabrera Abreu & García Lecumberri 2003). However, there are not many differences between Castilian and Mexican Spanish regarding schematic representation. Below is a description of monotonal and bitonal pitch accents, and boundary tones of the two varieties: Mexican Spanish (MS) from De la Mota, Butragueño and Prieto (2010) vs. Castilian Spanish (CS) from Estebas-Villaplana and Prieto (2010).

There are seven types of pitch accent in Castilian and Mexican Spanish.

- Two monotonal pitch accents: L* and H*
- Five bitonal pitch accents:
    - L+H* (rising accent with the F0 peak aligned with the end of the accented syllable)
    - L+¡H* (higher peak)
    - L+>H*(delayed peak)
    - L*+H (rising accent with the F0 peak on the postaccentual syllable)
    - H+L* (falling accent within the accented syllable)

Note that the delayed peak symbol “>” is used for Spanish only in L+>H*, whereas in English, the symbol is in the opposite direction “<”, and can be used for any delayed pitch accents.

L+¡H* (higher peak, Figure 7) is not included in the inventory of Mexican Spanish pitch accents (De la Mota, Butragueño and Prieto (2010: 320). However, it is used in the examples of Mexican Spanish in the same article (De la Mota, Butragueño and Prieto (2010: 340, Figure 20)).

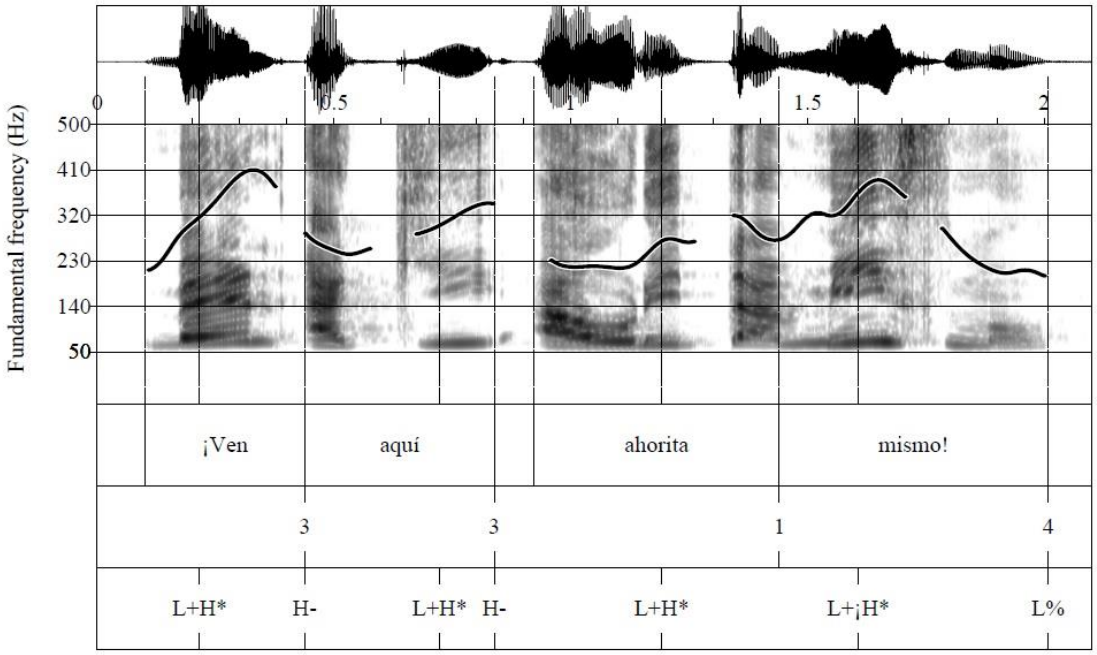
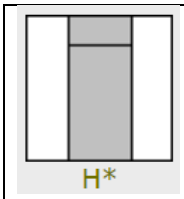
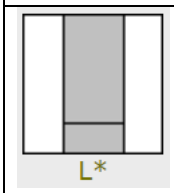
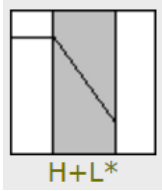
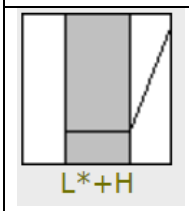
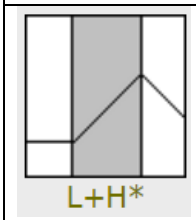
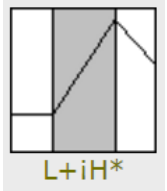


Figure 7. L+¡H* (higher peak) L% nuclear configuration used in Mexican Spanish extracted from De la Mota, Butragueño and Prieto (2010: 340, Figure 20)

Command: ¡Ven aquí ahorita mismo! (Come here right now!)

Also, circumflex configurations such as L+¡H* L% and L+H* L% (with a smaller rising) are the most common and prototypical cases of statement intonation found in Mexican Spanish (MS) (Martín Butragueño, 2004).

The detailed description of each pitch accents and boundary tones are given in the Table 4 below, extracted from Aguilar et al. (2009) and Prieto & Roseano (2010). Pitch accent and boundary tone descriptions have many similarities across Spanish varieties as described in Prieto & Roseano (2010):

	This pitch accent is phonetically realized as a high plateau, and no initial dip is observed. In the corpus, it is found in nuclear position in wh-questions and polite yes-no questions.
	This pitch accent is phonetically realized as a low plateau. It is generally realized as a local pitch minimum in the speaker's range. It is found in nuclear position in broad focus statements.
	This pitch accent is phonetically realized as a fall within the accented syllable. The start of the fall is aligned with the beginning of the accented syllable, and the end of the fall is aligned (roughly) with the end of the stressed syllable. It is found in nuclear position in confirmatory and imperative yes-no questions.
	This pitch accent is realized as a low tone on the accented syllable followed by a rise on the posttonic syllable. The peak is typically realized at the end of the posttonic syllable, and sometimes later. In our corpus, it is found in pre-nuclear position in yes-no questions and requests. It cannot be found in nuclear position.
	This pitch accent is phonetically realized as a rising pitch movement during the accented syllable. The rise starts at the onset of the accented syllable and ends at the end of that syllable. It is found in nuclear position in broad and narrow focus, and in combination with a variety of boundary tones in vocatives, insistent requests, obviousness statements, etc.
	This pitch accent is phonetically realized as a rising pitch movement during the accented syllable. The rise starts at the onset of the accented syllable and ends at the end of that syllable. The pitch range is wider than the one of L+H*. It is found in nuclear position in counter-expectational questions.

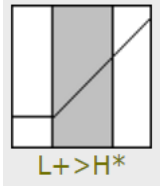
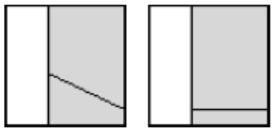
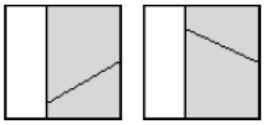
	This pitch accent is phonetically realized as a rising pitch movement. Typically, the L tone is aligned with the onset of the accented syllable, and the H tone is aligned with the postaccentual syllable. This is the predominant choice for pre-nuclear accents in broad focus statements. It cannot be found in nuclear position.

Table 4. Description of Spanish pitch accents

Boundary tones at the end of Intonational Phrases (IPs) are marked with the % symbol after the tone. The inventory of possible boundary tones is different in function from the boundary type. In Spanish, there have been found:

- Three Monotonal boundary tones (with one target): L%, M%, H%
- Four Bitonal boundary tones (with two targets): HH%, LH%, HL%, and LM%
- One with three targets: LHL%

	**L%** is manifested phonetically as a low sustained tone or a low descending tone that attains the baseline of the speaker. It is found at the end of broad and narrow focus statements, imperatives, anti-expectative and imperative yes-no questions, wh-questions, etc.
	**M%** is manifested phonetically as a falling movement to a mid tone target or as a mid level plateau when it occurs after a high tone (the mid tone may spread to the left). It is found in pedagogic enumerations, in hesitation statements, in polite yes-no questions and in stylized vocatives. In this last case, it is normally accompanied by a lengthening of the last syllable and is

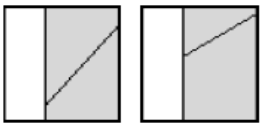
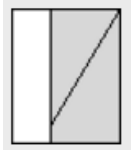
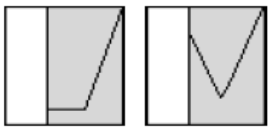
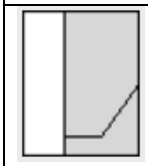
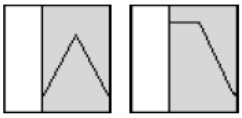
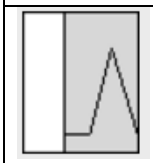
	realized as a sustained mid tone.
	**H%** is phonetically realized as a rising pitch movement coming from a low or high pitch accent. It is attested in confirmation-seeking yes-no questions.
	**HH%** is manifested phonetically as a very sharp rising pitch movement at the end of the phrase, often attaining a very high frequency in the speaker's range. It is found at the end of yes-no questions.
	The **LH%** is manifested phonetically as a dip and then a rise to a high F0 value. It is found in anti-expectative and invitation questions.
	The **LM%** is manifested phonetically as a dip and then a rise to a mid F0 value. It is found in obviousness statements.
	The **HL%** is manifested phonetically as a rise and then a fall to a low F0 value. It is found after high or low pitch accents in exhortative requests, in emphatic exclamatives and in insistent vocatives.
	The **LHL%** is manifested phonetically as a complex pitch movement consisting of a fall plus rise and then a fall to a low F0 value. It is found in exhortative requests. (For Castilian Spanish, described in Sp_ToBI website)

Table 5. Description of Spanish boundary tones

Note that Sp_ToBI website does not describe H%, instead only HH% is described (http://prosodia.upf.edu/sp_tobi/en/labeling_system/tonal_representation/boundary_tones/boundary_tones.html).

In addition, there are seven types of Intermediate Phrases (ips) marked with the '-' symbol after the tone, similar to the inventory of boundary tones.

- 3 with one target: L-, M- and H-
- 3 with two targets: HH-, HL- and LH-
- And 1 with three targets: LHL-

2.5 Korean Intonation and K-ToBI

Korean has no lexical stress, so there is no pitch accent or nuclear pitch accent. Prominent words are prosodically marked by the pitch height of a phrase and phrasing (Jun 1993, 1998, 2000, 2005).

K-ToBI (Korean Tones and Break Indices) is a prosodic transcription convention for standard Seoul Korean, proposed by Jun (2000) based on the AM model of intonational phonology of Korean based on Jun (1990, 1993, 1996, 1998), as described above. In the original model of Korean intonation (Jun 1993, 1998), the intonational structure of the standard dialect Seoul Korean had two intonationally defined prosodic units, i.e., Intonation Phrase (IP) and Accentual Phrase (AP). This model was revised later (Jun 2006, 2011, Jun & Cha 2015) to include an Intermediate Phrase (ip), a prosodic unit smaller than an IP and larger than an AP. In the current work, the earlier model of Seoul Korean intonation is adopted (1993, 1998), and a schematic tree diagram of Korean inonation is given in Figure 8, taken from Jun (2000, Figure 1).

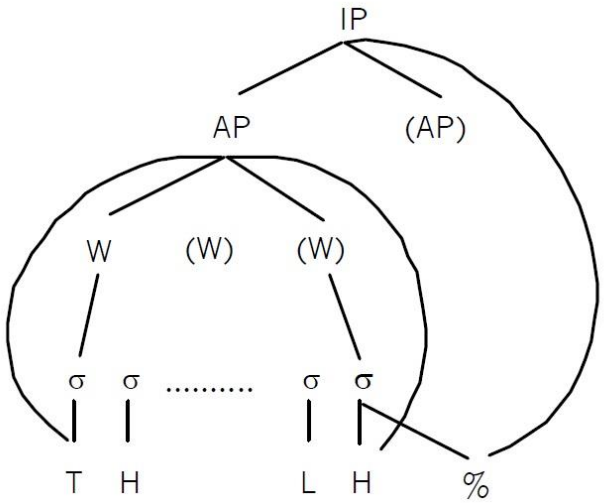


Figure 8. Intonational Structure of Seoul Korean, (Jun 2000, Figure 1)

IP: Intonational Phrase
AP: Accentual Phrase
w: phonological word
σ: syllable
T = H, when the syllable initial segment is aspirated/tense; Otherwise T = L
%: Intonation phrase boundary tone

The highest unit of intonational phrase is an Intonation Phrase, marked by a boundary tone (%) and phrase-final lengthening, and can have one or more Accentual Phrases. Unlike an IP, an Accentual Phrase is marked by a phrasal tone sequence, THLH (where T=H if the AP initial segment is aspirated or tense, and T=L otherwise), but not by final lengthening. Out of the four phrasal tones, the two initial tones mark the beginning of the AP, and the two final tones mark the end of an AP. However, these four tones are not fully realized when the AP is shorter than four syllables. In that case, one or both of the medial two tones (i.e., +H and L+ in the K-ToBI convention) are not realized. The AP-final tone is typically H (i.e., Ha in the K-ToBI convention), but due to some tonal interaction and speech style, the AP-final tone can be L (i.e.,

La). Therefore, even though the underlying AP tone pattern is either LHLH or HHLH, the most common tonal pattern of the AP is a rising tone. There are fourteen different surface tonal patterns of the AP, as shown in Figure 9. The first row shows AP patterns with a high boundary, Ha, and the second row shows AP patterns with a low boundary, La. The third row shows contours of a long AP where all four underlying tones are realized with either a Ha or La boundary. 'T' in the last contour is either H or L (Jun 2000, 2005).

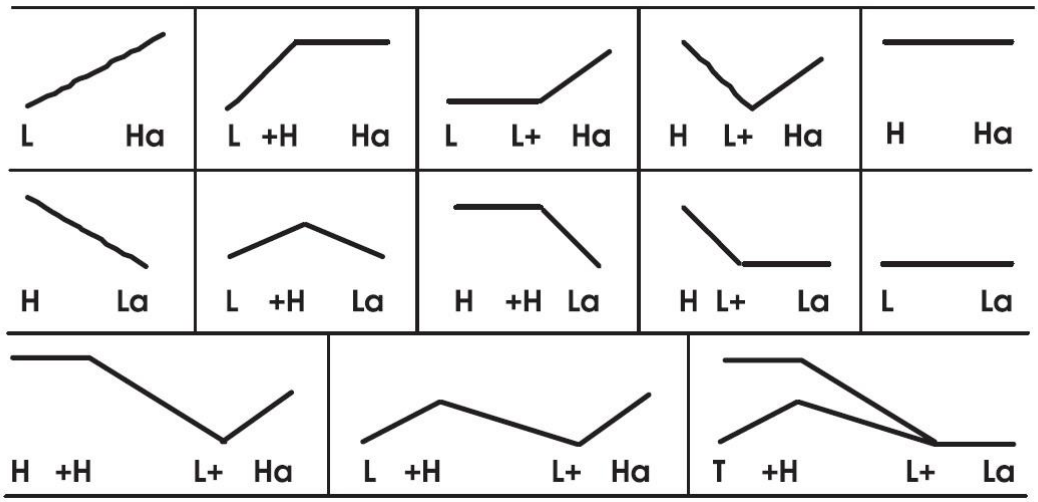


Figure 9. Schematic f0 contours of 14 tonal patters of an AP extracted from Jun (2005: 214, Figure 8.6)

An IP is marked by a boundary tone at the end, but not the beginning of the IP, which delivers various pragmatic meanings as well as information about the sentence type. The boundary tone is realized in the IP-final syllable, and depending on the shape of f0 contour starting from the onset of the IP-final syllable, at least nine boundary tones have been identified in Jun (2000, 2005): L%, H%, LH%, HL%, LHL%, HLH%, HLHL%, LHLH%, LHLHL%. Schematic f0 contours of eight types of IP boundary tone realizations are shown in Figure 10.

The first row shows IP boundaries ending with L% and the second row shows those ending with H%. The vertical line shown in each contour marks the beginning of the IP-final syllable. The f0 scale is not normalized.

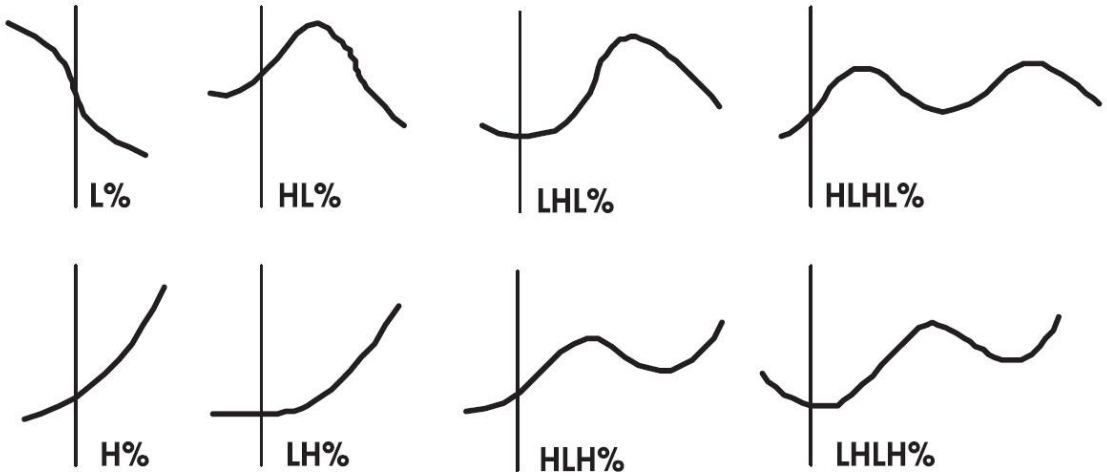


Figure 10. Schematic f0 contours of eight boundary tones of IPs (Jun 2005: 218, Figure 8.10)[9]

LHLHL% is not shown.

Jun (2000) points out that in general, tones ending with H% often have a function of seeking information (i.e., questions) and those ending with L% often have a function of making a statement. However, it is often the case that tones and meaning have a many-to-many relationship. That is, more than one boundary tone can be used to mark the same meaning or sentence type, and more than one meaning is realized by the same boundary tone. For example, a wh-question can be marked by L%, H%, LH%, HL%, or HLH% (see Jun & Oh, 1996), and HL% marks both a declarative and a wh-question. See Park (2003) for more research on

[9] See Jun (2000: 149). H% and LH% differ in the timing of rising; LH% rises later than H%, showing a f0 valley at the beginning of the IP-final syllable. The same is true for HL% vs. LHL% or HLH% vs. LHLH%.

distinctive pragmatic meanings for each boundary tone.

2.6 Prosodic Comparison between Spanish and Korean

In Spanish, word stress is contrastive or phonemic, while tone is not lexically contrastive. Hualde (2005: 2) gives an example of "pan" that Spanish native speakers can say "pan" with a falling tonal contour or with a rising contour and they perceive it as the same word meaning "bread." In Seoul Korean, however, neither stress nor pitch is contrastive. A word does not change its lexical meaning by changing the pitch or amplitude of one syllable over another.

Hualde (2005: 2) mentions that in the conventional orthography of Spanish, there is an almost perfect correspondence in one direction, from written form to pronunciation. It means there is only one possible way to read a given sequence of letters and exceptions are very few[10]. The same is true for Korean. Anyone who has learned the sound system of Korean letters and letter combinations can pronounce any word or text written in Korean, without knowing the meaning of the words. However, there are some combinations of consonants and vowels that require changes in the text to pronunciation mapping that L2 learners must acquire. Although the Korean writing system is phonetically designed, the Korean phonological system is more complicated than that of Spanish.

At the postlexical level, the stressed syllable of a word can be realized with a pitch

[10] Note that Spanish use an accent mark to represent lexical stress, while Korean does not have lexical stress.

accent in Spanish if the word receives prominence. The type of pitch accent differs depending on the location of the accent (i.e., nuclear pitch accent on the phrase-final word, while pre-nuclear pitch accent before the nuclear pitch accented word). The inventory of the nuclear pitch configuration may also differ depending on the sentence type. For example, the nuclear pitch configuration is typically L* L% for broad focus statement, while L* HH% for information-seeking yes-no questions in Castilian Spanish (Estebas-Villaplana and Prieto (2010: 44-45)).

On the other hand, in Seoul Korean where there is no stress, word prominence is not marked by pitch accent but by locating the word at the beginning of an Accentual Phrase (AP). The tonal pattern of the AP is not distinctive and does not change due to the location or sentence type except when the AP is the last AP of an utterance. In this case, the AP-final tone is overridden by the sentence-final boundary tone. Typically, each content word in Spanish receives one Pitch Accent (PA) on the stressed syllable of a word, while each word forms one Accentual Phrase (AP) in Seoul Korean.

For this reason, in Jun's prosodic typology (2005, 2014a), Spanish is a 'head'-prominence language while Korean is an 'edge'-prominence language. Finally, though the means of marking prominence differ between Spanish and Korean, both languages have an Intonational Phrase (IP), the highest prosodic unit marked by intonation. In both languages, the IP is defined by a boundary tone realized on the IP-final syllable, which is substantially lengthened, and followed by an optional pause. However, the types of IP-boundary tones allowed in each language are different.

Below I present a comparison of the smallest unit of f0 contour of Spanish Pitch

Accent[11] and Korean Accentual Phrase. This is not a direct comparison between the two languages because the intonation structure of Spanish differs from that of Seoul Korean. Before looking at the contour comparison, we have to consider that Spanish monotonal Pitch Accents (H*, L*) are realized over one (stressed) syllable. However, when the pitch accent is bitonal or when the f0 peak in the rising pitch accent (L+H*) is delayed, the pitch accent can be realized over two syllables.

On the other hand, the Korean Accentual Phrase (AP) is the tone over a whole word, and sometimes the tone can be realized over one syllable and other times it can be realized over multiple words, marking the edge of each phrase. In other words, Spanish H* is an H tone on the stressed syllable, while "H Ha" in the Korean AP is a high plateau contour and can include multiple syllables.

The schematic diagrams of the pitch contours shown below for the Spanish Pitch Accent and the Korean Accentual Phrase do not represent the case of the same number of syllables.[12]

---

[11] According to Beckman et al. (2002:13), when a word is produced as a complete utterance, the intonation contour of the utterance has at least one tone target that is anchored to the stressed syllable. Following the usage of Bolinger (1958), Bolinger and Hodapp (1961), Pierrehumbert (1980), and all subsequent work in the Autosegmental-Metrical framework (see Ladd 1996/2008), a tone or tone sequence that is anchored to a stressed syllable is called a "Pitch Accent" (PA). A word containing a stressed syllable that is associated to a pitch accent is then accented.

[12] Schematic F0 contours are extracted from the following sources:

- Spanish from Aguilar, Lourdes; De-la-Mota, Carme; Prieto, Pilar (coords) (2009). Sp_ToBI Training Materials. Web page: http://prosodia.upf.edu/sp_tobi/.
- Korean from Jun, Sun-Ah (2005) "Korean Intonational Phonology and Prosodic Transcription" in Sun-Ah Jun (ed.) Prosodic Typology: The Phonology of Intonation and Phrasing. 201-229. Oxford University Press.

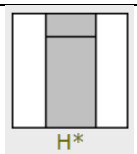
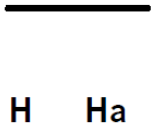
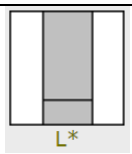
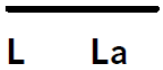
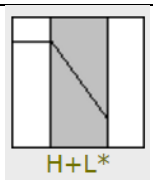
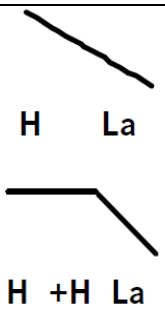
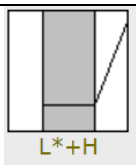
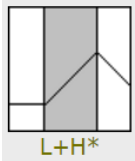
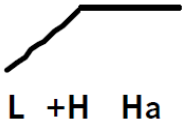
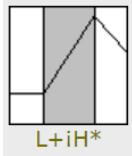
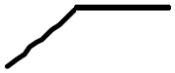
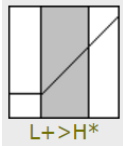
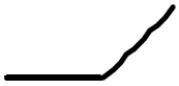
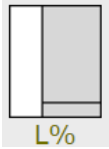
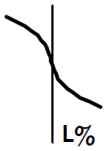
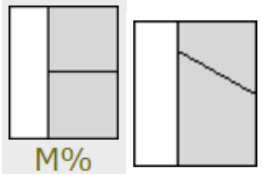
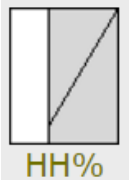
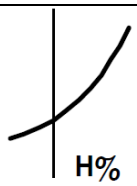
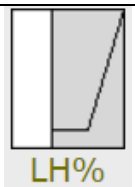
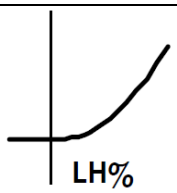
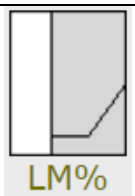
Spanish Pitch accents on the stressed-syllable	Korean Accentual Phrase on multiple syllables
	
	
	
	
	
	
	

Table 6. Spanish Pitch accent vs. Korean Accentual Phrase

Even though the Spanish Pitch Accent and Korean Accentual Phrase do not match in their characteristics, we see that the schematic representation of f0 looks similar. Table 7 below is a comparison of boundary tones between Spanish and Korean.

Spanish on the last syllable	Korean on the last syllable
	
	N/A
	
	
	N/A

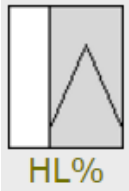
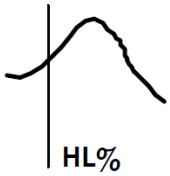
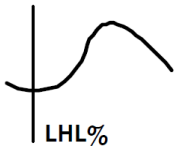
	
	

Table 7. Boundary tones comparison between Spanish and Korean

Other boundary tones that are particular to Korean only are as follows (LHLHL% is not shown):

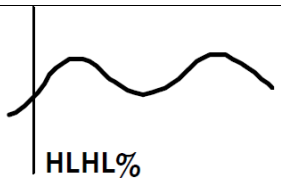
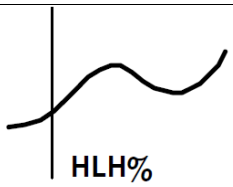
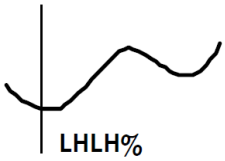
		

Figure 11. Other boundary tones that are particular to Korean, extracted from (Jun 2005: 218)

Based on the Pitch Accents and boundary tones above, here are some spectrogram examples from De la Mota, Butragueño and Prieto (2010), which show H* or L* as monotonal pitch accent contour maintained over a word (or a combination of word strings).

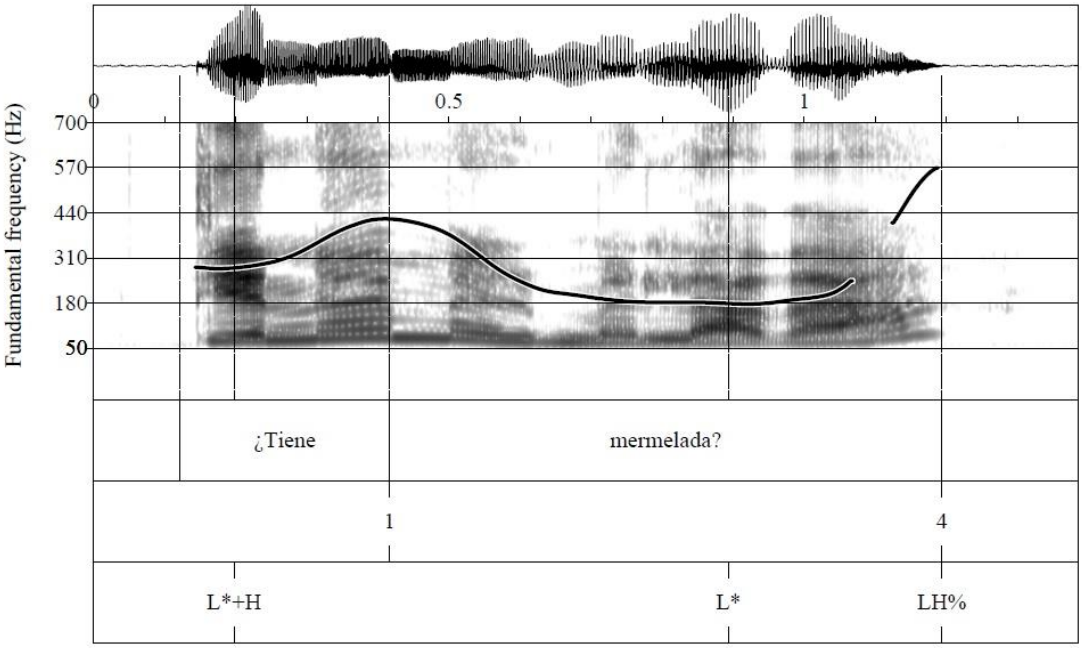


Figure 12. Information-seeking yes-no question, L* LH% nuclear configuration, extracted from De la Mota, Butragueño and Prieto (2010: 330, Figure 8)

¿Tienes mermelada? (*Do you have jam?*)

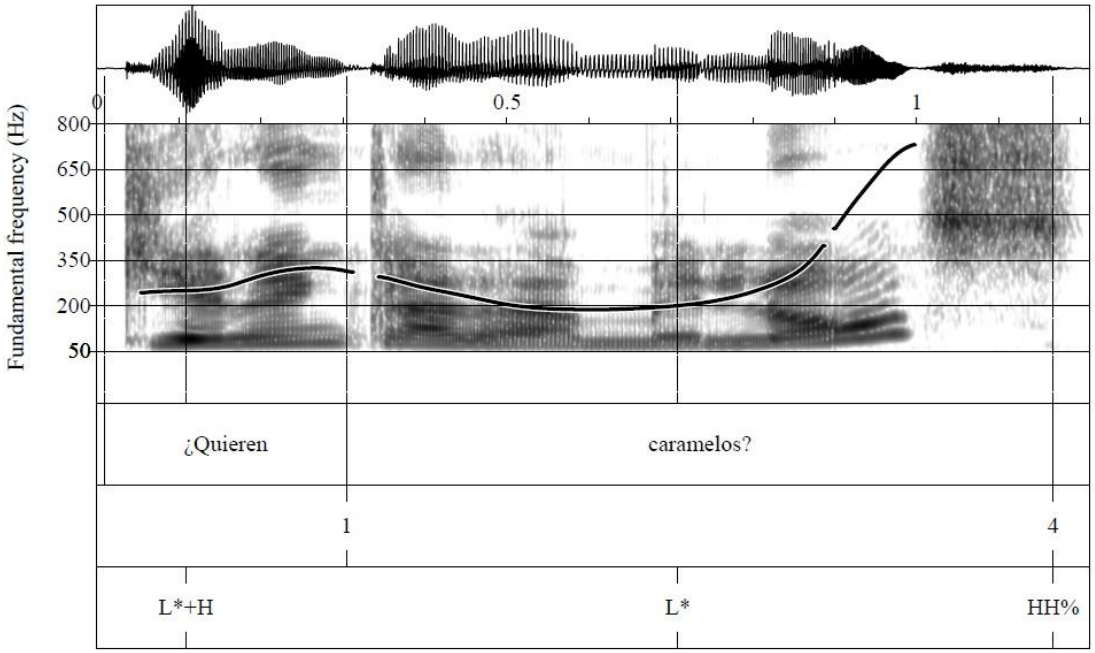


Figure 13. Invitation yes-no question, L* HH% nuclear configuration, extracted from De la Mota, Butragueño and Prieto (2010: 333, Figure 12)

¿Quieren caramelos? (*Do you want candy?*)

The Figure 14 below shows edge-prominence language characteristics of Korean, marking the edge with a phrasal tone (Jun & Jiang (to appear)). This shows that each word forms one AP and each AP shows a rising tonal pattern in which the end of an AP is marked by a high tone (Ha). And the beginning of an AP is marked by an L for LH tone, except for the last AP where the AP-final tone is an L tone, due to the Low IP-boundary tone marking the end of a declarative.

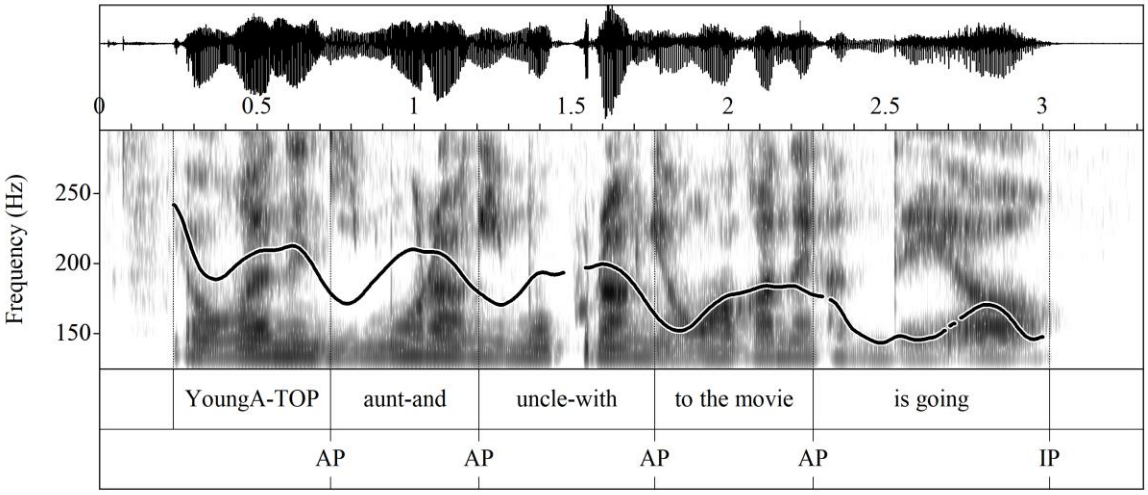


Figure 14. Korean Accentual Phrase (AP) showing a rising tonal pattern except the last AP, from Jun & Jiang (to appear)

Below is a summary of the prosodic differences between Korean and Spanish described in this chapter.

	Korean	**Spanish**
Stress	Non-stress language No lexical stress	Stress language Lexical stress
Prominence	Edge-prominence language	Head-prominence language
Postlexical prosodic units	Accentual Phrase (AP) Intermediate Phrase (ip)[13] Intonational Phrase (IP)	Pitch Accent (PA) Intermediate Phrase (ip) Intonational Phrase (IP)
Phrase-medial Tonal pattern	Rising tonal pattern over each phrase-medial word	Rising pitch accent over each phrase-medial content word

Table 8. A summary of the prosodic differences between Korean and Spanish

[13] Korean intermediate phrase is included in the revised Korean intonation model in Jun (2006, 2007, 2011).

CHAPTER 3 Objective of the study

3.1 Research Questions and Hypotheses

Given the prosodic differences between Spanish and Korean at the lexical and postlexical levels presented at section 2.6, I expected that Korean learners would have difficulty in acquiring the Spanish intonation system, especially pitch accent types and their alignment with the stressed syllable of a prominent word.

My research questions in this dissertation are:

1) What are the prosodic interferences when a Native Korean Speaker (NKS) acquires Spanish intonation as a second language after their critical period?
2) How does the type of interference change as the proficiency level increases?
3) How can we apply Mennen's (2015) L2 Intonation Learning theory (LILt) to the acquisition of Spanish intonation by Native Korean speakers?

To answer the research questions above, I designed four hypotheses below:

Hyphothesis 1: When a Spanish word has no orthographic written accent, Native Korean Speakers (NKS) tend to follow Korean Accentual Phrase (AP) initial tone-segment mapping rule: High tone when the phrase-initial segment is aspirated (/p^h, t^h, k^h, $tʃ^h$/) or tense (/p*, t*, k*, s*, tʃ*/) or /h/ or /s/; otherwise, Low tone (Jun 2000, 2005).

Hyphothesis 2: Korean does not make a distinction between pre-nuclear pitch accent (sentence-initial and medial position) and nuclear pitch accent (sentence-final position). Pitch accent realizations by Native Korean Speakers (NKS) both in pre-nuclear and nuclear position will differ from Native Spanish Speakers (NSS). Also, Native Korean Speakers (NKS) will tend to produce L+H* L% more often than L* L% in nuclear position in broad focus statements due to the AP-initial LH tone (Jun 2000, 2005).

Hypothesis 3: Spanish marks prominence of a word by a pitch accent realized on the stressed syllable of a word (most often a content word), while Korean mark prominence of a word by forming the word in one Accentual Phrase (AP) or by locating the word at the beginning of an AP (Jun 1993). Moreover, given that Korean does not distinguish between a content word and a function word, less advanced Korean learners will produce an AP-like tonal unit over a function word, as well as a content word.

Hypothesis 4: In Korean, the boundary tones in yes-no questions are generally realized as H% or sometimes LH%, and in wh-questions as LH% (although H% and HL% were also observed in Jun & Oh (1996)). When semantic meaning is involved, L1 Korean speakers will tend to apply the most common boundary tone H% or LH% to L2 Spanish questions.

3.2 Data Collection Method

Participants were recruited via online announcement, and whoever volunteered to participate

recorded their voice, reading the given script as naturally as possible. They produced words and sentences in power point slides at their own pace without any practice in advance.

The recording procedure took about 15 to 20 minutes depending on the participant's reading pace. In general, the duration of the recordings decreased as the proficiency level increased. The participants could choose any time and any space to record their voice. In case they mispronounced any word, they were instructed to repeat the word or the whole sentence right after.

Participants used a recording application on their own smartphone and used the smartphone as a microphone. Any recording application (*app*) was allowed as long as it recorded the voice in .wav file format. Since *Praat* could not read mp3 or mp4, I alerted the participants to be aware of the audio file format. However, when some participants recorded in mp4 format, we converted the file to .wav using the online website: https://audio.online-convert.com/convert-to-wav. To compensate participants for their time, participants received the equivalent of US $10 when the audio file was received via email. Also, participants had to send a personal questionnaire which asked the followings[14]:

- How long have you been studying Spanish? Please mention if you learned Spanish in High School or if you have stayed or lived in Spanish speaking countries.
- Please mark red or highlight the Spanish language courses that you have taken so far, or list the Spanish language courses that you have taken so far: Elementary Spanish 1, Elementary Spanish 2, Intermediate Spanish 1, Intermediate Spanish 2, Writing in Spanish, Speaking in Spanish, Current Spanish, Spanish Grammar 1, Spanish Grammar

[14] For the whole questions asked in personal questionnaire, please see the appendix I.

2, Intermediate Spanish Writing, Intermediate Spanish Conversation, Introduction to Spanish Linguistics, Advanced Spanish Writing, Advanced Spanish Conversation, Spanish seminar 1, Spanish Seminar 2

- Please indicate your proficiency level: beginner, intermediate and advanced.
- Where were you born? How long have you lived in Seoul?
- Please list any Korean dialects that you have contacted so far, such as your parents' dialect. *For example*: I was born in Busan and I lived there until my high school years, and my mom speaks Chungcheongnam-do dialect.
- What is the most challenging part when you speak Spanish? (optional)

3.3 Participants

After collecting the data, I carefully examined the personal questionnaire and only used recordings from Korean Native Speakers (NKS) who speak Seoul (Standard) Korean due to the dialectal differences in intonation. Thus, from 47 participants only 21 recordings were analyzed along with six more recordings from the native Spanish speakers, totaling 27 recordings. Among 47 participants, 26 speakers had other Korean dialectal contact variation in their origin, the origin of their parents, cities where they lived before moving to Seoul, etc.

As we can see in Table 9 below, seven participants from each different level of proficiency (beginner, intermediate and advanced) represented their group. Some participants had a very minor influence from their parents' dialects, however, in those cases; the participants

had lived almost of their entire life in Seoul and/or Gyeonggi-do[15] area, the area surrounding the capital. All of the participants were from universities located in Seoul and Gyeonggi-do: Seoul National University, Yonsei University, and Kyung Hee University.

Level	Male	Female	TOTAL
Beginner group	0	7	7
Intermediate group	5	2	7
Advanced group	1	6	7
Native Speakers	1 (Mexico City)	2 (Mexico City) 3 (Madrid)	6
		Total # of participants	27

Table 9. Summary of participants' information

As a control group, I collected the data from three Castilian Spanish speakers from Madrid and three Mexican Spanish speakers from Mexico City to compare with the data from Native Korean Speakers (NKS), L2 learners. These participants were all native speakers of their dialect and at the time of the experiment were residing in the United States completing postgraduate studies or working as faculty, and were highly proficient in English, except one female Mexican speaker (Native6MF[16]) who was residing in Mexico City. Native6MF and I had several communications via email and I thoroughly explained to her about the designed

[15] Gyeonggi-do can be translated as "province surrounding Seoul".

[16] The coding convention for participants is as follows:
For native Spanish speakers: Native, 1 (numbering), M or E (Mexico or España, Spain), Gender (M or F)
For L2 participants: Beg (Beginner) / Inter (Intermediate) / Adv (Advanced), 1 (numbering), Gender (M or F)

sentences in order to elicit her most natural intonation. I received this recording via email.

All of the native speaker participants had completed their primary and secondary education in their country of origin, including undergraduate program and they have continuous contact with other Spanish speakers from their home country as well as Spanish speakers living in the United States. Note that Native5EF is originally from Santander, Spain having lived in Madrid from age 18 to 24, and later moved to United States for academic purposes.

Coding	Origin	Gender	Age	Place of residence
Native1MM	Mexico City, Mexico	male	33	Los Angeles, United States Moved for doctoral degree
Native2MF	Mexico City, Mexico	female	33	Los Angeles, United States Moved for doctoral degree
Native6MF	Mexico City, Mexico	female	30	Mexico City, Mexico Whole life in Mexico City
Native3EF	Madrid, Spain	female	35	Los Angeles, United States Moved for doctoral degree
Native4EF	Madrid, Spain	female	40	Los Angeles, United States Moved for doctoral degree
Native5EF	Santander – Born and raised Madrid – Age 18-24 Spain	female	35	Los Angeles, United States Moved for doctoral degree

Table 10. Background information for native Spanish speakers

I recruited the native Spanish speakers from Madrid (Spain) and Mexico City (Mexico) for the following reasons: most of our L2 participants had contact with Spain or Mexico, either considering the origin of instructors or the place of study abroad. L2 participants had study

abroad experience from the universities given in Table 11 and some other cities, such as Valencia (Spain), mostly in Spain and Mexico. As a particular case, we had one participant having lived in Guatemala for eight years from the age 9 to age 16 (Adv3F).

Spain	Mexico
UAB (Universitat Autònoma de Barcelona)	UAG (Universidad Autónoma de Guadalajara)
UCM (Universidad Complutense de Madrid)	UDG (Universidad de Guadalajara)
USC (Universidad de Santiago de Compostela)	UNAM (Universidad Nacional Autónoma de México)
USAL (Universidad de Salamanca)	

Table 11. Universities where the participants had study abroad program

The language proficiency level of Spanish as L2 was divided as follows:

- **Beginners** - Native Korean Speakers (NKS) who have taken less than one year of Spanish courses in classroom setting, equivalent to one and/or two language courses at the University level (Elementary Spanish 1 & 2) or NKS who only have taken Spanish in High School
- **Intermediate** - Native Korean Speakers (NKS) who have taken more than two years of Spanish courses in classroom setting, equivalent to four language courses at the University level (Elementary Spanish 1 & 2 or High School Spanish plus two more classes among: Intermediate Spanish 1 - Reading, Intermediate Spanish 2 - Reading, Spanish Conversation, Spanish Composition, Spanish Current Issues, etc.) and Study Abroad is optional.

- **Advanced** - Native Korean Speakers (NKS) who have taken more than six years of Spanish courses, including Study Abroad (Third year of Spanish classes can include: Spanish Advanced Grammar 1, Spanish Advanced Grammar 2, Advanced Spanish Conversation, etc.)

A detailed description of participants is below.

Proficiency Level	coding	Affiliation	Gender (M/F)	Age	Years of studying Spanish
Beginner	**Beg1F**	Seoul National University	F	20	Beginning of 2nd semester
	Beg2F	Yonsei University	F	19	Beginning of 2nd semester
	Beg3F	Seoul National University	F	19	Beginning of 2nd semester
	Beg4F	Yonsei University	F	20	Beginning of 2nd semester
	Beg5F	Yonsei University	F	19	Beginning of 2nd semester
	Beg6F	Seoul National University	F	19	Beginning of 2nd semester
	Beg7F	Seoul National University	F	19	Beginning of 2nd semester
Intermediate	**Inter1F**	Kyung Hee University	F	23	About 4 years Study abroad in Mexico for 6 months
	Inter2F	Kyung Hee University	F	23	About 4 years Study abroad in Valencia, Spain for 6 months
	Inter3M	Seoul National University	M	26	3 years
	Inter4M	Seoul National University	M	23	3 years in high school, Study abroad in Spain for 6 months

	Inter5M	Kyung Hee University	M	23	2 years Study abroad in Santiago de Compostela, Spain for 1 month[17]
	Inter6M	Seoul National University	M	22	About 3 years
	Inter7M	Seoul National University	M	23	2 years and half Study abroad in Salamanca, Spain for 1 month 3 months of studying DELE (Diplomas of Spanish as a Foreign Language) exam
Advanced	**Adv1F**	Seoul National University	F	30	More than 10 years of studying, Study abroad in Spain 3 years of High School Spanish
	Adv2M	Seoul National University	M	33	More than 10 years of studying, Study abroad in Peru for 1 month
	Adv3F	Kyung Hee University	F	21	Lived in Guatemala for 8 years
	Adv4F	Seoul National University	F	21	6 years of studying Including 1.5 years at Florida, learning Spanish Including 3 years of High School Spanish Study abroad in Madrid, Spain for 1 month
	Adv5F	Kyung Hee University	F	24	More than 7 years Including 3 years of High School Spanish Including Study abroad in Madrid, Spain for 1 year
	Adv6F	Seoul National University	F	23	6 years Including Study abroad in Barcelona, Spain for 10 months
	Adv7F	Seoul National University	F	23	6 years Including Middle school years

[17] In the case of Inter5M, even though this participant had only studied Spanish for about two years, considering the study abroad experience, I classified him in the intermediate group.

					Including 3 years in the university Study abroad in Madrid, Spain for 70 hours (UCM) Study abroad in Mexico (UNAM) for one semester, economics major

Table 12. Language background information of participants

Table 12 shows how I divided the participants according to their proficiency level. All of the beginners were university students taking Elementary Spanish 2 in their second semester of learning Spanish. The language learning period in the intermediate group varied from two to four years. Among the seven participants in intermediate group, five of them had study abroad experience. The advanced group had studied Spanish for more than six years, and all of them had study abroad experience.

As mentioned above, all the L2 participants filled out a separate language background questionnaire about their Spanish learning experience, courses they had taken, and study abroad experience. Thus, I was able to divide the participants according to their proficiency level based on their Spanish learning experience.

3.4 Procedure

After collecting the audio data and converting all audio files to .wav format, I labeled the sound files of each participant according to the coding in Table 12. *Praat* was used to analyze the intonation, and the pitch contour was labeled following the Spanish ToBI (Tones and Break

Indices) (Beckman et al. 2002, Prieto & Roseano 2010). However, when the intonation pattern of Spanish utterance was very similar to Korean intonation, the pitch contour was also labeled following the Korean ToBI (Jun 2000, 2005) transcription conventions as well. I indicated the accented syllable with upper cases if the word did not have a written accent, for example, El GAto (*the cat*). Detailed method of analysis for each study will be address in each chapter accordingly.

CHAPTER 4 Korean Accentual Phrase (AP) Initial Tone-Segment Mapping Realization in Spanish

4.1 Introduction and Literature Review

In this chapter, I analyze the results relating to hypothesis 1. When a Spanish word has no orthographic written accent, Native Korean Speakers (NKS) tend to follow Korean Accentual Phrase (AP) initial tone-segment mapping rule: High tone when the phrase-initial segment is aspirated (/p^h, t^h, k^h, $tʃ^h$/) or tense (/p*, t*, k*, s*, tʃ*/) or /h/ or /s/; otherwise, Low tone (Jun 1993, 2000, 2005).

Since Spanish voiceless consonants are acoustically similar to Korean tense stops by having almost no Voice Onset Time (VOT)[18], Native Korean Speakers (NKS) may produce Spanish word-initial syllable with a High tone if the syllable begins with a voiceless stop. Also, since all tense and aspirated affricate and fricative-initial APs in Korean are produced with a High tone, Spanish words beginning with voiceless affricate and fricatives /$tʃ^h$/, /x/ and /s/ will be produced with a High tone as well. Even though Korean does not have the voiceless labiodental fricative /f/, this consonant will trigger an initial H tone as it belongs to the voiceless fricative category. Along the same line, Spanish word-initial syllables could be produced with a Low tone by native Korean speakers if the syllable begins with a voiced segment.

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[18] See Mun (2015) for detailed description of Spanish /p, t, k/ sound produced by native Korean speakers. For Korean fortis VOT, see Cho et al. (2002) and Broersma, Mirjam (2010) and for Spanish voiceless stop VOT, see Schoonmaker-Gates, Elena (2015).

Figure 15 and 16 below from Jun (2000) show a clear difference between High tone and Low tone in a Korean AP-initial syllable depending on the laryngeal feature of the AP-initial segment.

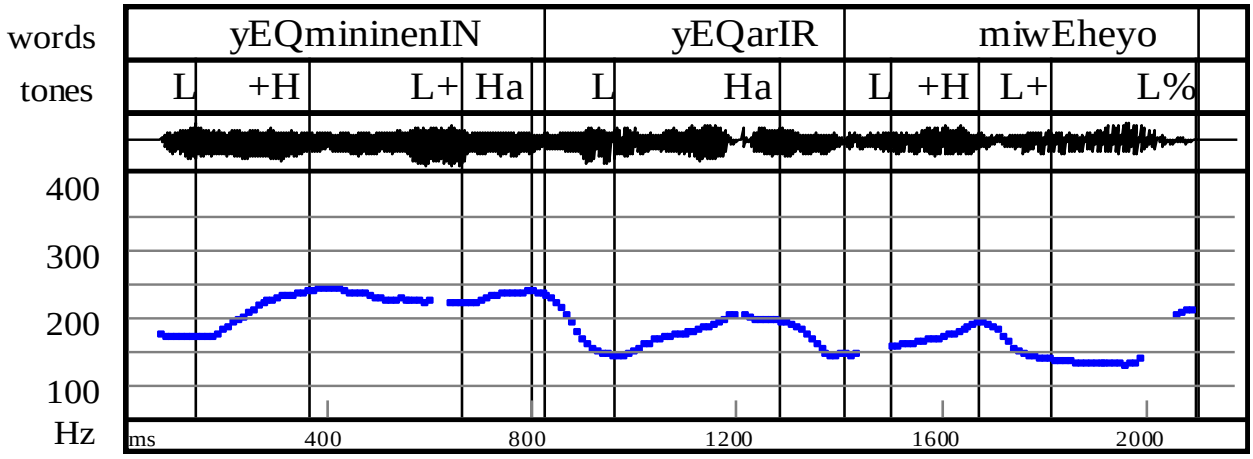

Figure 15. *Youngmin's family hates Younga*. extracted from Jun (2000)

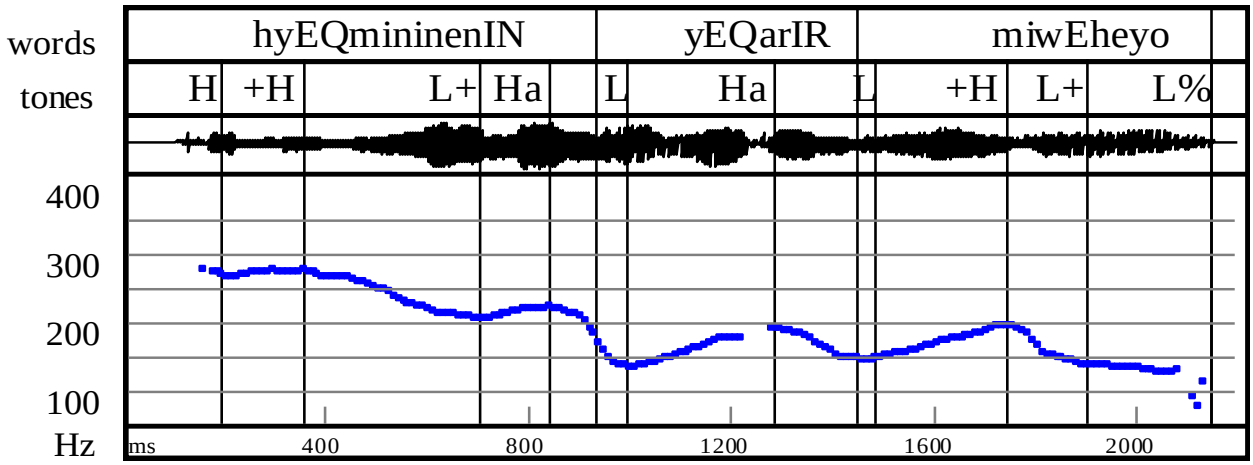

Figure 16. *Hyoungmin's family hates Younga*. extracted from Jun (2000)

The two sentences in Figures 15 and 16 are exactly the same except for the first segment of the

sentence. One begins with ‘y’ [j], a voiced glide, and other begins with ‘h,’ a voiceless fricative. When an utterance begins with ‘y’ as in the first sentence, the tone is Low, creating a LHLH tone pattern of the first AP, but when it begins with ‘h’ as in the second sentence, the tone is High, creating a HHLH tone pattern of the first AP. Based on this fact, I have tested Spanish words produced in isolation by L1 Korean speakers.

4.2 Research Materials

To test Korean Accentual Phrase (AP) tone-segment mapping applied to Spanish, participants recorded 70 words in isolation including fillers, which were presented randomly. They read the words from the power point slides, one word on each page. The participants were told not to practice reading, and record in a natural way possible as though they were answering a question like “What is this?”.

I selected 15 High tone triggering words for each four syllabled-words group and three syllabled-words group, respectively, for a total of 30 words.

5 voiceless stops			**5 affricates**	**5 voiceless fricatives**			
p	**t**	**k**	**tʃ**	**f**	**s**	**x**	TOTAL
2	1	2	5	2	2	1	15

Table 13.The number of High tone triggering words for each type of word-initial segment

Also, I selected 15 Low tone triggering words for each four syllabled-words group and three

syllabled-words group, respectively, for a total of another 30 words.

5 voiced stops			**5 nasals**		**5 liquids (lateral or tap)**		
b	**d**	**g**	**m**	**n**	**l**	**r**	TOTAL
2	1	2	3	2	3	2	15

Table 14. The number of Low tone triggering words for each type of word-initial segment

As presented in Table 15 and 16, we carefully selected 30 four-syllabled words (e.g., mexicano = *Mexican*) and another set of 30 three-syllabled words (e.g., chaqueta = *jacket*) without written accent to avoid orthographic influence when producing. The cases of oxytones (stress on the last syllable, e.g., corazón = *heart*, ciudad = *city*) were excluded as well to avoid any influence of final tone rising.

* unfamiliar words		4-syllabled words	3-syllabled words	fillers
voiceless stops	p*	panadero (*baker*)	pescado (*fish*)	professor (*teacher, professor*)
	p*	pantalones (*pants*)	pequeño (*little*)	tarea (*homework*)
	t*	telegrama (*telegram*)	tesoro (*treasure*)	tenedor (*fork*)
	k*	campesino (*farmer*)	corbata (*necktie*)	
	k*	compañero (*companion, schoolmate*)	cansado (*tired*)	
affricates	tʃʰ	*chapinero (*slipper maker*)	chaqueta (*jacket*)	*chapapote (*tar, asphalt*)
	tʃʰ	chimenea (*chimney*)	chorizo (*spicy pork sausage*)	
	tʃʰ	chirimoya (*custard apple*)	chileno (*Chilean*)	
	tʃʰ	chocolate (*chocolate*)	*chicano (*Chicano, Mexican-American*)	
	tʃʰ	*choricero (‘*chorizo’ (spicy pork sausage) maker*)	chuleta (*chop*)	*chubasquero (*raincoat*)
voiceless fricatives	s	saludable (*healthy*)	cerveza (*beer*)	
	s	*semejanza (*similarity*)	cintura (*waist*)	

	x	*jabonero (*soap maker*)	gigante (*giant*)	
	f	*fabuloso (*fabulous*)	*figura (*figure*)	febrero (*February*)
	f	fontanero (*plumber*)	*festive (*festive, holiday*)	*fascinado (*fascinated*)
		15	15	7
			TOTAL	37

Table 15. High tone triggering Spanish words

* unfamiliar words		4-syllabled words	3-syllabled words	fillers
voiced stops	b	*beneficio (*benefit*)	bebida (*drink*)	
	b	bocadillo (*sandwich*)	ventana (*window*)	
	d	desayuno (*breakfast*)	domingo (*Sunday*)	domicilio (*home address, place of residence*)
	g	*gobernante (*leader / ruler*)	guitarra (*guitar*)	
	g	gasoline (*gasoline*)	galleta (*cookie*)	ganador (*winner*)
nasals	m	maletero (*porter / trunk*)	maestro (*teacher*)	
	m	mexicano (*Mexican*)	maleta (*bag*)	
	m	*moderado (*moderate*)	*mudanza (*move*)	
	n	negative	naranja	*nutritivo

		(*negative*)	(*orange*)	(*nutritious*)
	n	numeroso (*numerous*)	novela (*novel*)	
liquids (lateral or tap)	l	lapicero (*pencil / pencil case*)	latino (*Latin, Latin American*)	
	l	lavadora (*washing machine*)	lavabo (sink, toilet, restroom)	
	l	*luminoso (*illuminated / brilliant*)	lechuga (*lettuce*)	
	r	realism (*realism*)	revista (*magazine*)	
	r	restaurant (*restaurant*)	rebajas (*sales, discount*)	
		15	15	3
			TOTAL	33

Table 16. Low tone triggering Spanish words

The 60 paroxytone target words were selected to control the place of the stressed syllable. Because it was hard to find a basic or intermediate level word under the conditions mentioned above, especially for four-syllabled words starting with /ch/, I included non-familiar words for participants as well. However, since Spanish orthography is mapped to sound, I assumed that participants would have had little problem producing them. There were two additional cases that included diphthongs as I could not find four syllabled-words without diphthongs being familiar to beginners as well.

4.3 Method and Analysis

First, I measured the frequency (in Hz) of the word-initial vowel (mid-point) of each word produced in isolation, and then converted the Hz value to semitones according to Traunmüller, H. (2005) using the function of =LOG((_/127.09),2)*12 in excel. I calculated the average of semitones for High tone triggering words and Low tone triggering words respectively and derived the difference between the two values.

Since the semitone is a well-documented way to normalize pitch differences across speakers (cf. Traunmüller and Eriksson 1995; Nolan, 2003[19]; Traunmüller 2005; Rialland, Annie & Penou-Achille Somé 2010), I adopted to use semitones for my analysis.

An informal observation shows that native speakers do not show much difference in f0 on the word-initial syllable depending on the word-initial segment types (see Figures 17 and 18). However, a big difference in pitch is shown from the Beginner speaker 7, female. The f0 of /chi/ is 256.1 Hz (Figure 19) versus, the Hz of /me/ is 228.5 Hz (Figure 20). The converted values in semitone are 12.13 for /chi/ and 10.16 for /me/, respectively.

[19] Nolan (2003) mentioned that "in the case of pitch perception, the best known such scale is the musical semitone scale. Each musical octave is divided into twelve semitones, easily visualized as the white and black notes on the piano. The semitone scale is a logarithmic transformation of the physical Hertz scale."

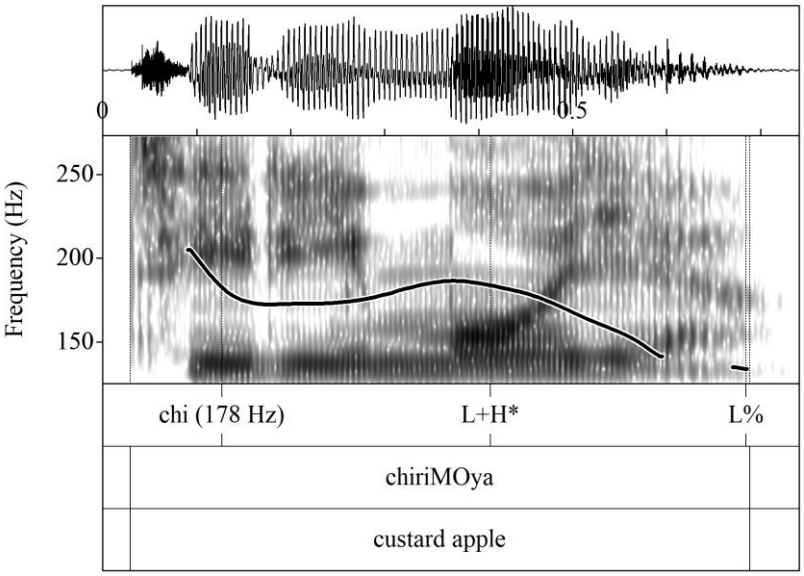

Figure 17. Native3EF chirimoya

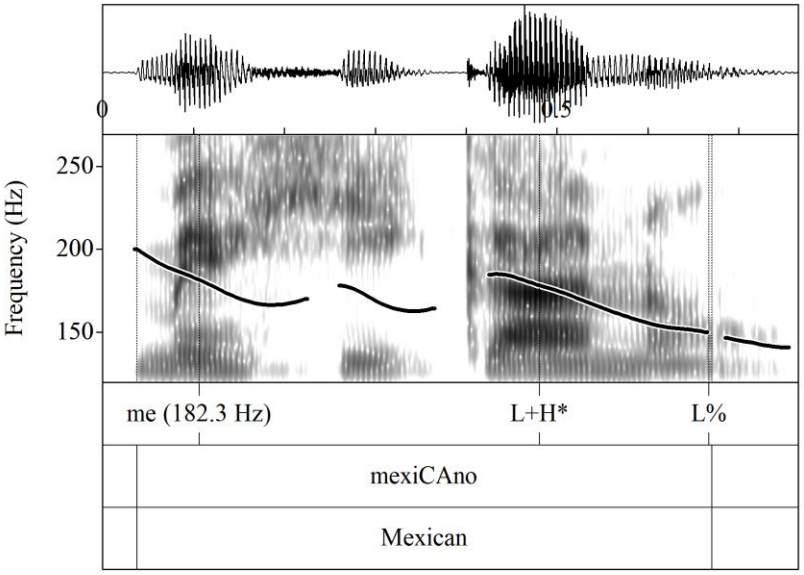

Figure 18. Native3EF mexicano

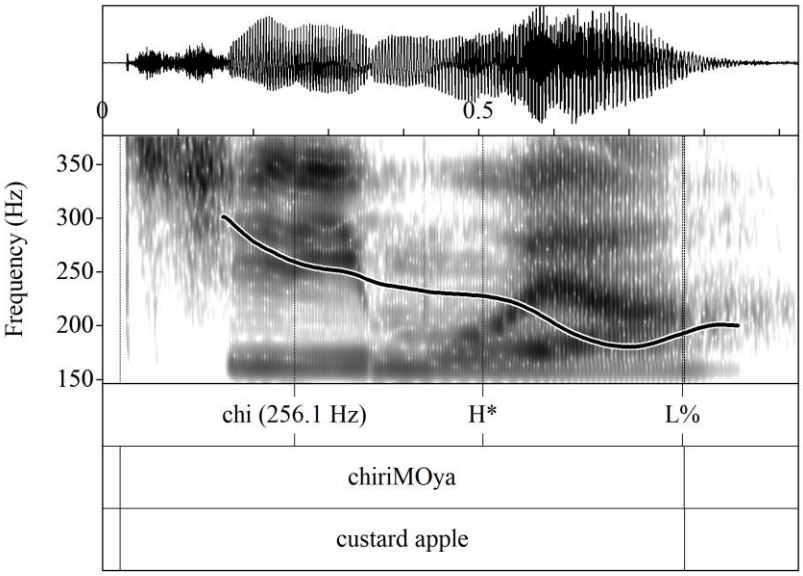

Figure 19. Beg7F chirimoya - High tone mapping

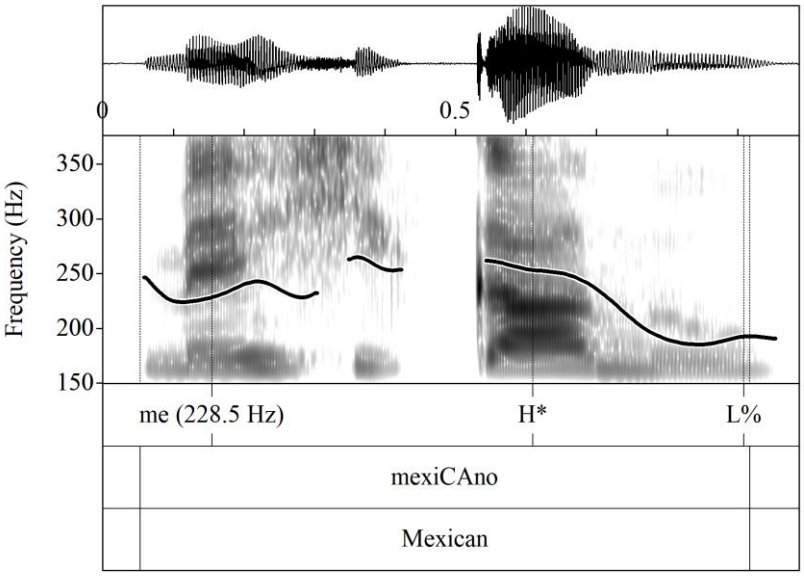

Figure 20. Beg7F mexicano - Low tone mapping

4.4 Results

In this section, I present the results of each group. As can be seen in Figures 21 and 22, the beginner group showed more significant difference between the High tone category and the Low tone category in both three-syllable and four syllable words groups.

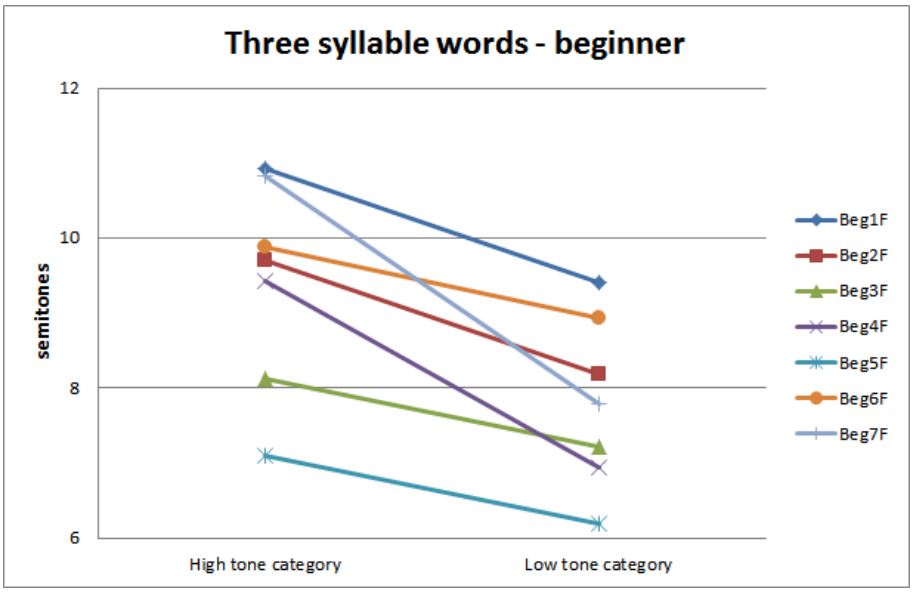

Figure 21. Individual results of three syllable words in the beginner group

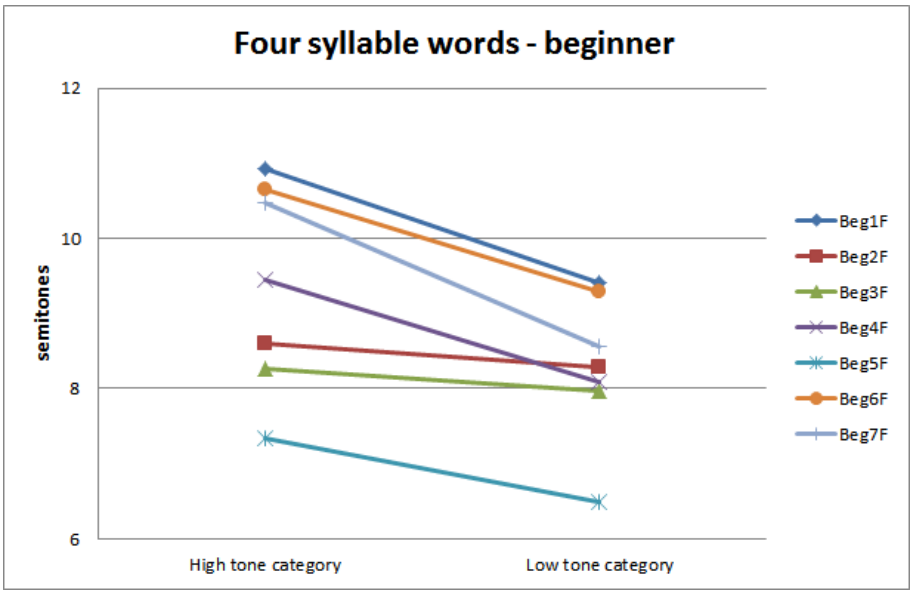

Figure 22. Individual results of four syllable words in the beginner group

In the beginner's group, Beg2F and Beg3F did not show noticeable differences between high tones and low tones in four-syllabled words. I assume that they probably had acquired the intonation pattern of paroxytones, starting with L initial on the first syllable regardless of the type of the word-initial segment and stressing on the penultimate syllable, thus showing very small differences between the two tone groups as an exception to the pattern of others in the same group.

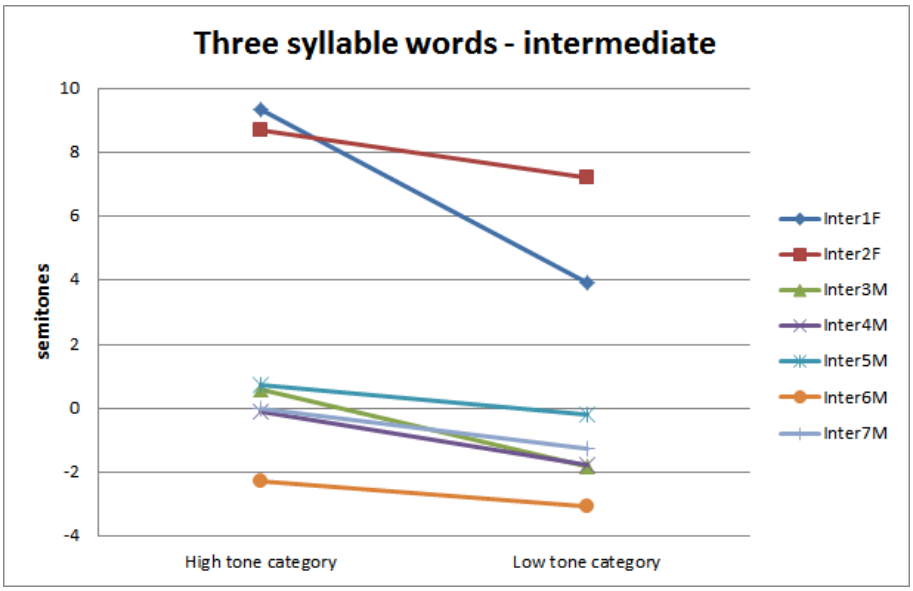

Figure 23. Individual results of three syllable words in the intermediate group

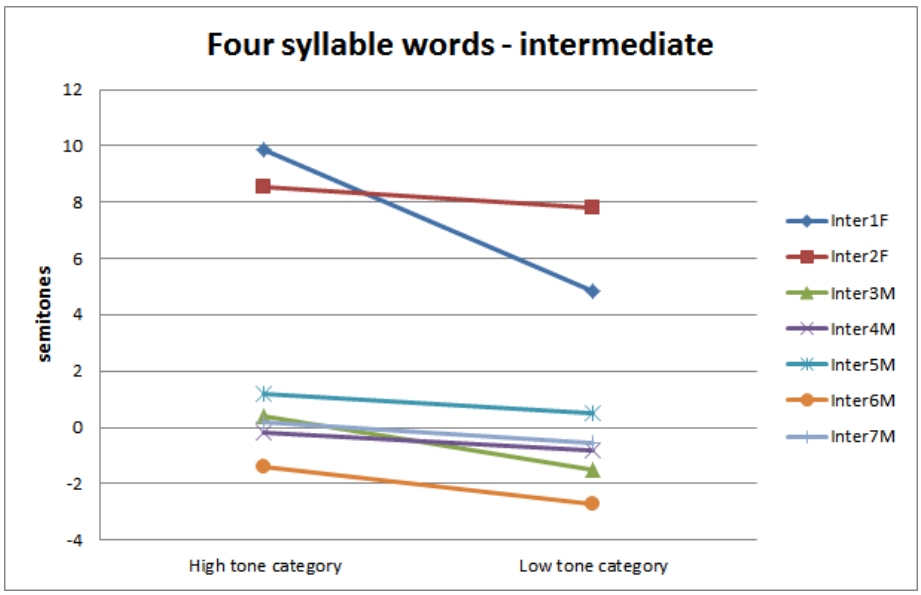

Figure 24. Individual results of four syllable words in the intermediate group

For the intermediate group (see Figures 23 and 24), the case of Inter1F showed a large difference between the two tone groups as if she were a beginner. However, she has studied Spanish about four years including a study abroad program in Mexico for six months. In contrast, Inter4M, Inter5M, and Inter7M, all male speakers, did not show much difference in the four syllable-word groups. They had already acquired the location of stress in Spanish, and they were more skilled at producing the words than expected.

Finally, data from the advanced speakers are shown in Figures 25 and 26, and that of the native speakers are shown in Figures 27 and 28. The Advanced group shows a similar pattern as that of the native Spanish speakers, suggesting that more advanced learners are able to avoid L1 initial segment mapping influence on L2 production.

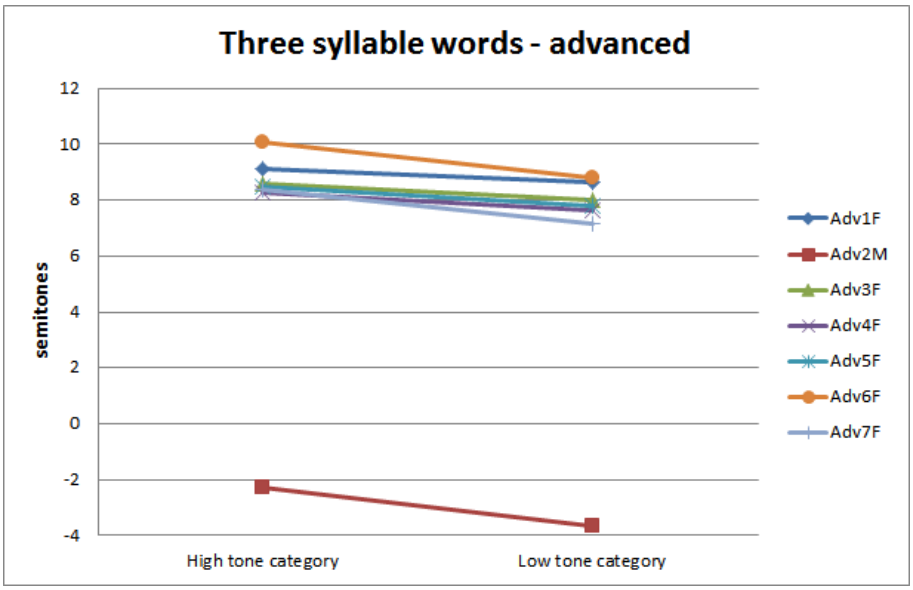

Figure 25. Individual results of three syllable words in the advanced group

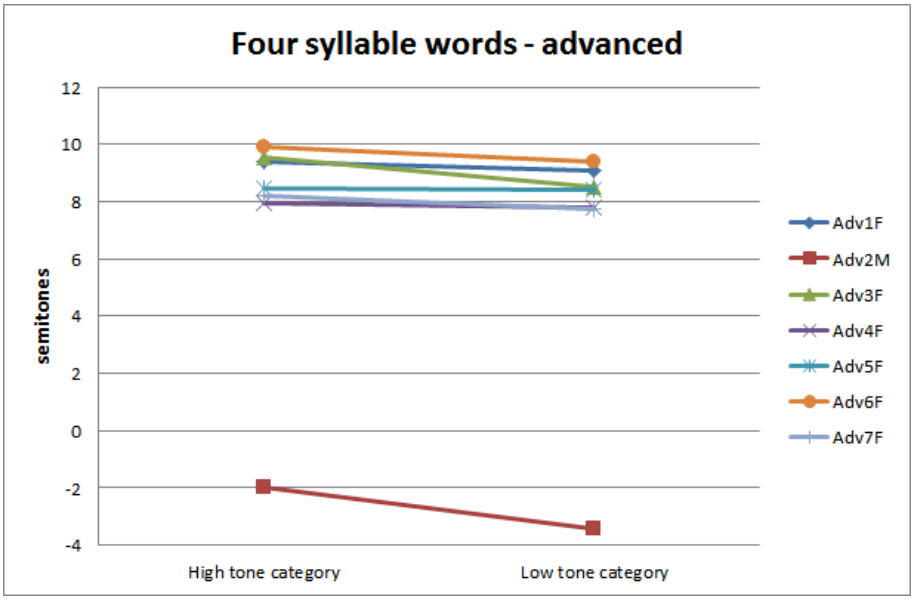

Figure 26. Individual results of four syllable words in the advanced group

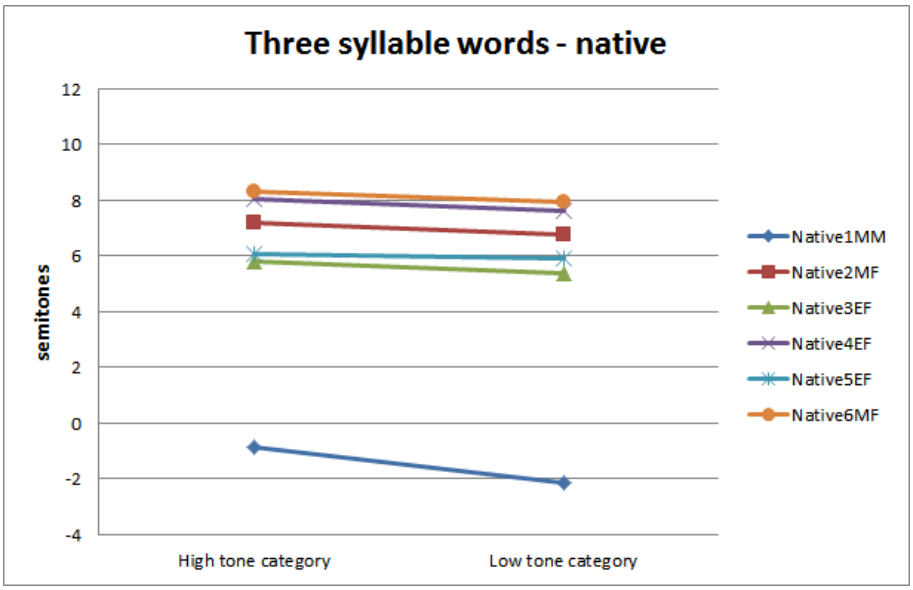

Figure 27. Individual results of three syllable words in the native speakers' group

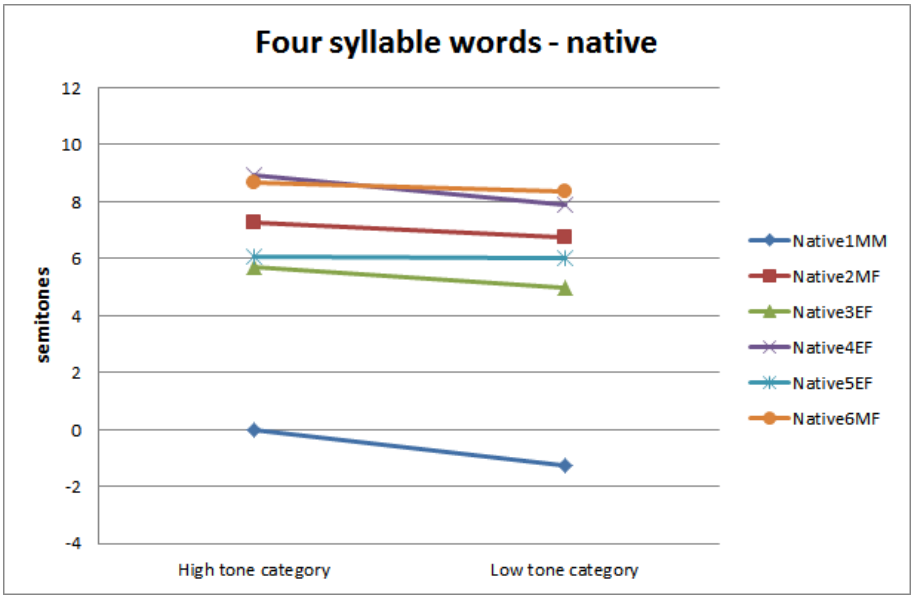

Figure 28. Individual results of four syllable words in the native speakers' group

As shown in Figure 27 and 28, the native speakers' results show a slightly higher values for the

H tone category than the L tone category. This is probably due to the effect of microprosody.

As mentioned in Jun (1996), cross-linguistically, it is widely accepted that the f0 of a vowel onset is influenced by the preceding consonant type. For example, voiceless aspirated or tense consonants raise the f0 of the following vowel while voiced consonants and breathy consonants lower the f0 of the following vowel (Gandour 1974, Hombert 1978, Hombert et al. 1979, cited from Jun 1996). The effect of segment type on the f0 of the AP-initial syllable in Seoul Korean is significantly larger than what is expected from the typical microprosody (see Jun 1996).

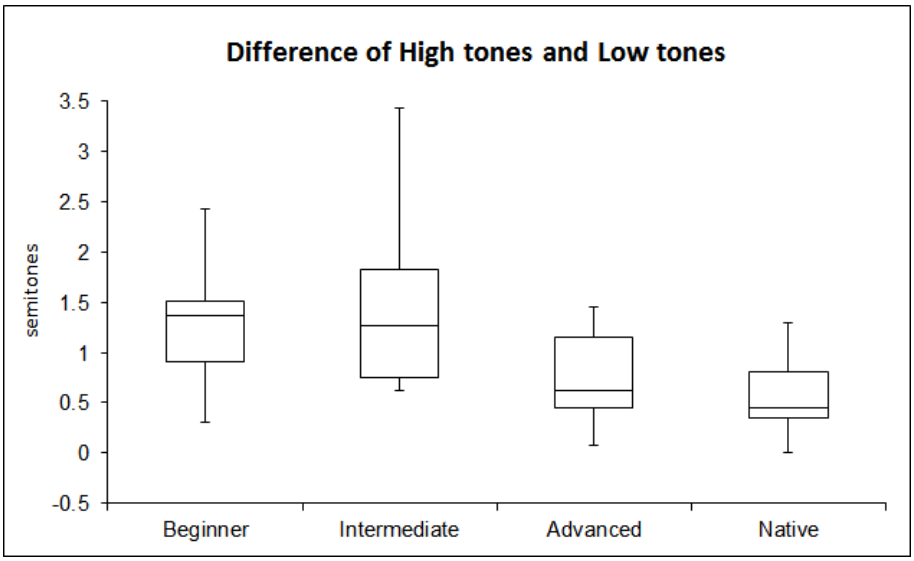

Figure 29. Boxplot of the difference of high tones and low tones from both three and four syllable words[20]

[20] The boxplot in Figure 29 shows the median values (in semitones) of the difference between the high tone and the low tone for each speaker group. The median values are as follows: Beginner (1.36), Intermediate (1.27), Advanced (0.62) and Native (0.46). Overall, the difference between H and L tone groups is higher as the proficiency level decreases. Also, the intermediate group showed the most variation: Most participants have semitones that are between 0.76 (Q1) and 1.82 (Q3), but some

4.5 Discussion

In sum, the results show that the Korean Accentual Phrase (AP) initial tone-segment mapping had a stronger effect on beginner and intermediate groups than advanced learners. I assume that native Spanish speakers do not have this initial tone-segment mapping; however, as mentioned in Section 4.4, this could be possibly due to the effect of microprosody.

I have shown that individual slope in the less advanced group shows a clear gap between High and Low tone mapping segments. Thus, the effect of the Korean Accentual Phrase (AP) initial tone-segment mapping applied to Spanish is more salient in less advanced groups and over time, the advanced group could improve at this skill.

Also, I showed that four syllable words showed a smaller effect of Korean than the three syllable words. In general, four syllable words tested were less familiar than three syllable words. Finding paroxytone, four syllable words without a written accent was not an easy task. When reading less familiar words, it is possible that L2 participants were more careful when producing the words. They could have considered the sound pattern, starting with L initial tone and putting the stress on the penultimate syllable, resulting in a rhythmical sound.

Future studies could analyze the AP initial tone of the words, while varying the position of in a sentence: sentence initial position, medial position and final position. Also, I predict that the productions in natural speech would show a stronger effect of Korean Accentual Phrase

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participants have semitones that are as low as 0.61 (min) and as high as 5.40 (max).

initial tone-segment mapping.

CHAPTER 5 Spanish Pre-nuclear and Nuclear Pitch Accent Realization by L1 Korean Speakers

5.1 Introduction and Literature Review

As mentioned in section 2.6, at the postlexical level, the stressed syllable of a word can be realized with a pitch accent in Spanish if the word receives prominence. The type of pitch accent differs depending on the location of the accent (i.e., nuclear pitch accent on the phrase-final word, while pre-nuclear pitch accent before the nuclear pitch accented word).

According to Estebas-Villaplana and Prieto (2010: 44-46, Table 3), in Spanish, L+H* is used as the most common nuclear pitch accent among 22 nuclear pitch configurations of different types of sentences. In nuclear positions, the following number of pitch accents in parenthesis were used together with the boundary tones: L+H* (9), L* (7), L+¡H* (2), H+L* (2), H* (1), !H* (1), total 22, while the delayed peak rising accent L+>H* is the most prevailing pre-nuclear pitch accent. See Jun (2014b: 528, Table 17.1).

On the other hand, Seoul Korean does not have a distinction between pre-nuclear pitch accent (sentence-initial and medial position) and nuclear pitch accent (sentence-final position). Also, there is no stress, and the word prominence is not marked by pitch accent but by locating the word at the beginning of an Accentual Phrase (AP). The tonal pattern of the AP is not distinctive and does not change due to the location or sentence type except for when the AP is the last AP of an utterance. In this case, the AP-final tone is overridden by the sentence-final

boundary tone.

Thus, in this chapter, I analyze the pitch accent realizations in Spanish by Native Korean Speakers (NKS) in both pre-nuclear and nuclear position.

5.2 Research Materials

I used declaratives and questions which were designed to provide evidence for hypotheses 3 and 4. I selected the following cases:

1) Word-final stress in pre-nuclear position

2) Penultimate stress in pre-nuclear position

3) Nuclear configuration in broad focus statements

Since the stress location in Spanish words affects the Pitch Accent realization, I compared the case of word-final stress and penultimate stress in pre-nuclear position. Also, I have observed the commonly used nuclear pitch accent by L1 Korean speakers.

5.3 Method and Analysis

After carefully labeling the sentences using the Sp_ToBI system, I described the typical cases in which Native Korean Speakers (NKS) sounded different from Native Spanish Speakers (NSS). Intonation contours were analyzed and labeled according to the Sp_ToBI conventions (Estebas-

Villaplana and Prieto (2010) for Castilian Spanish; De la Mota, Butragueño and Prieto (2010) for Mexican Spanish).

5.4 Results

5.4.1 Word-final Stress in Pre-nuclear Position

The invitation wh-question below is an example of word-final stress in pre-nuclear position:

¿Por qué no vamos al cine? (*Why don't we go to the movies?*).

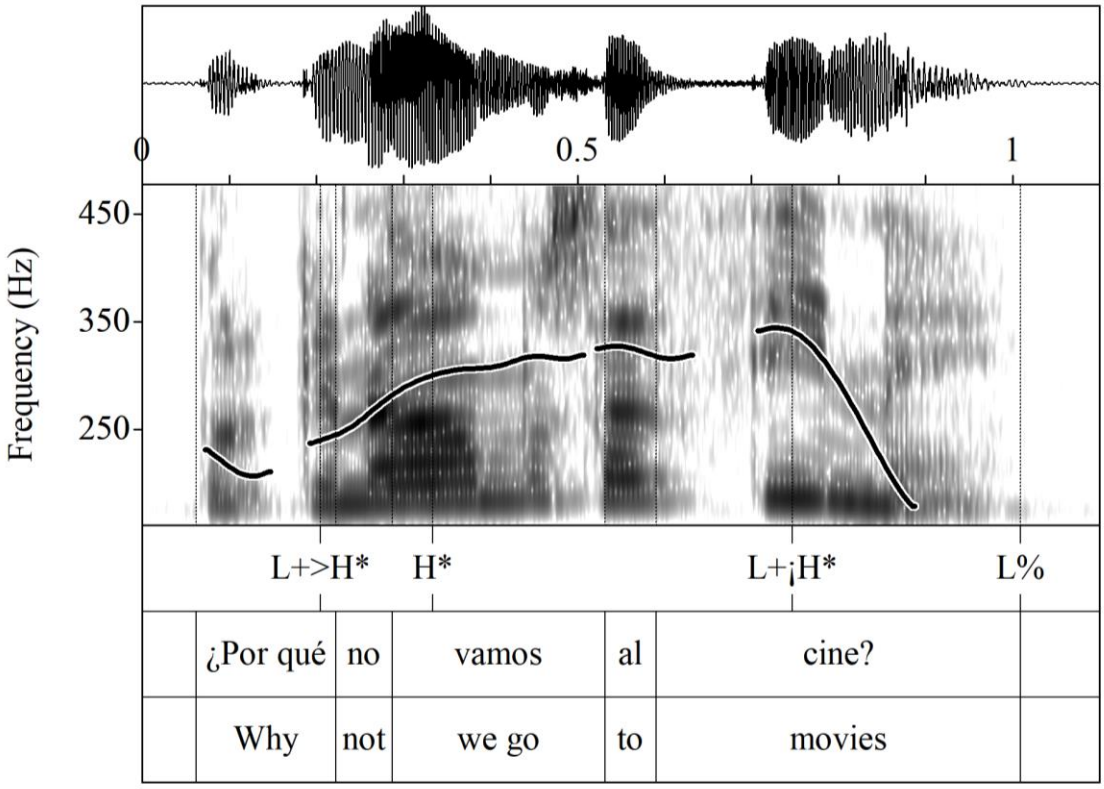

Figure 30. Native3EF, a female from Madrid, showing a delayed peak L+>H* in pre-nuclear position

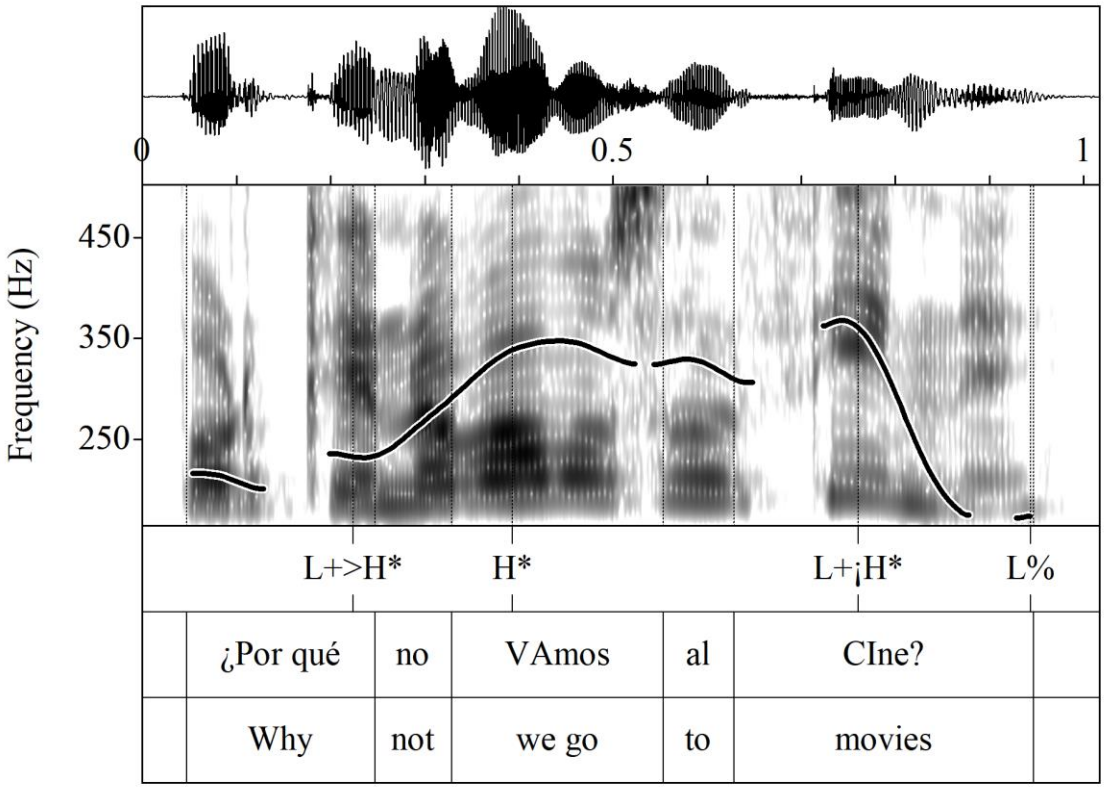

Figure 31. Native4EF, a female from Madrid, showing a delayed peak L+>H* in pre-nuclear position

Native3EF (Figure 30) and Native4EF (Figure 31) have the same intonation contour, which are labeled with the same Pitch Accents and boundary tones. These two contours show a clear f0 rise from the initial word "Por qué" (*Why*) continuing to "no," having a delayed peak rising accent L+>H*. In nuclear position, the nuclear pitch accent is L+¡H*, which is a type of rising pitch accent L+H.

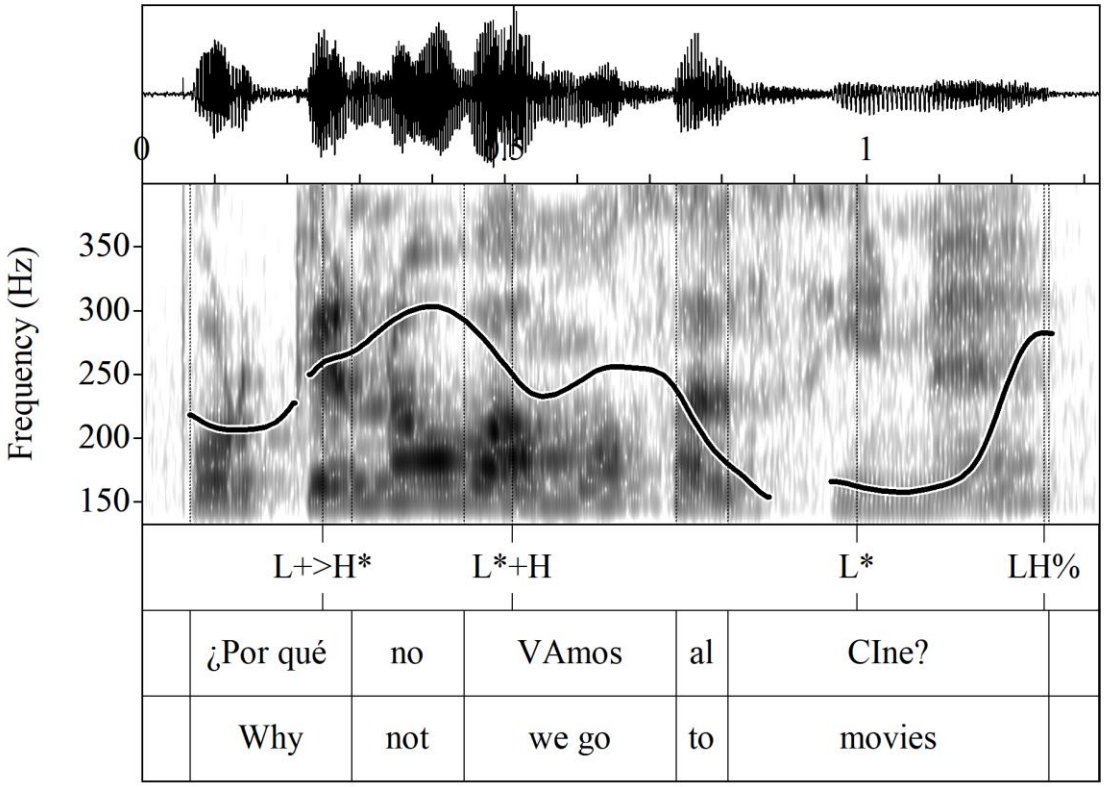

Figure 32. Native2MF, a female from Mexico City, showing a delayed peak L+>H* in pre-nuclear position[21]

As shown in Figure 32, Native2MF also used a delayed peak rising accent L+>H* in the pre-nuclear position as well.

However, in many cases of Native Korean Speakers (NKS), they did not use a delayed peak rising accent L+>H*. Instead they aligned an H tone at the end of "Por qué" (*Why*) marking

[21] The boundary tone is realized as LH%, different from Castilian Spanish speakers' production (L%). Note that LH% is a frequent boundary tone in questions in Mexican Spanish (De la Mota, Butragueño and Prieto (2010)).

an edge, i.e., AP tone pattern. This can be confirmed by pitch resetting (low f0) in “no”. In Figure 33, Adv1F used L+H* for both pre-nuclear and nuclear pitch accents. Even at the advanced level, Adv1F did not fully acquire the different pitch accent types depending on the position in a sentence. Since “Por qué” (*Why*) and “no” are in two syntactically different units, it is possible that native Korean speakers placed the edge marking tone after “Por qué” (*Why*).

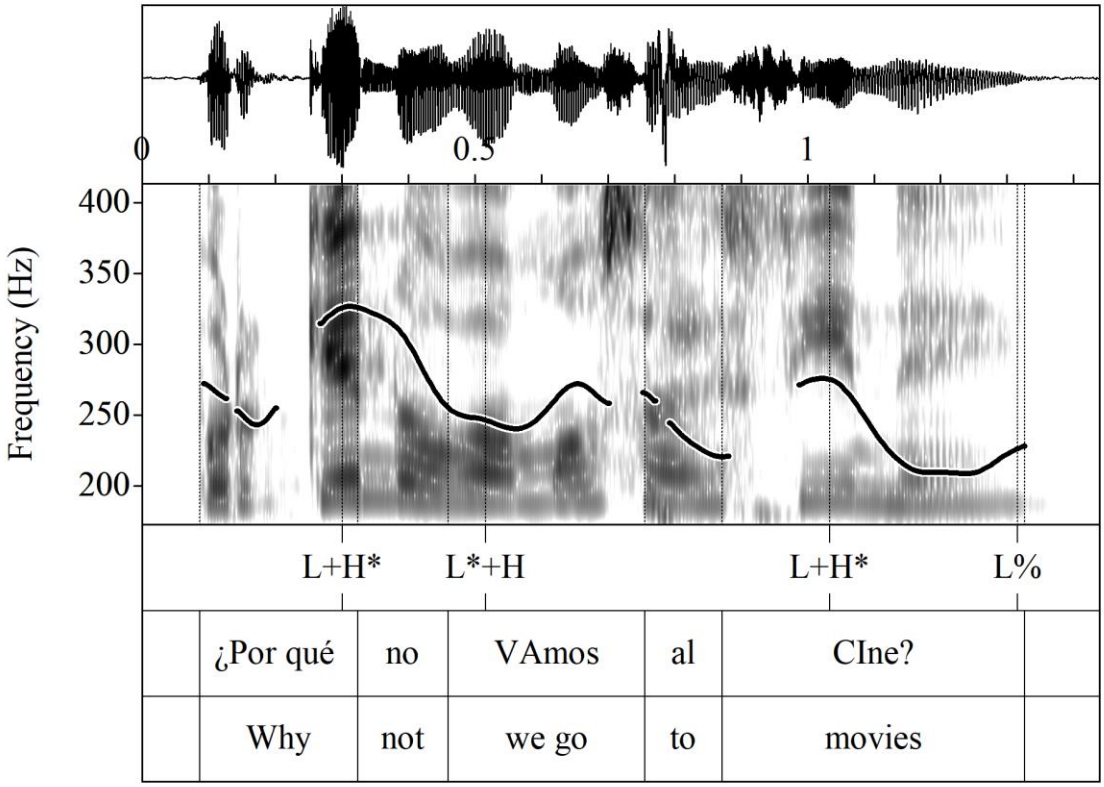

Figure 33. Adv1F not showing a delayed peak L+>H* in pre-nuclear position

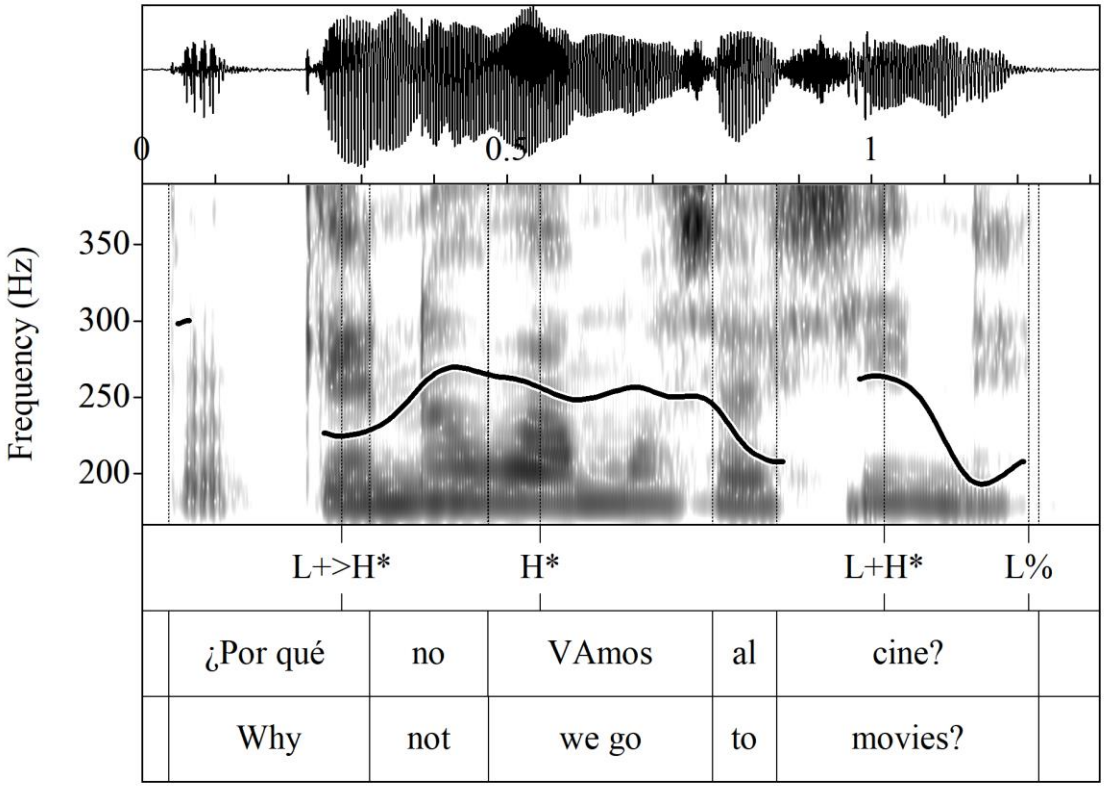

Figure 34. Adv4F showing a delayed peak L+>H* in pre-nuclear position

In the case of Adv4F (Figure 34), a delayed peak rising accent L+>H* was produced in "Por qué" (*Why*) followed by an H*. She produced a similar pre-nuclear pitch accent as in natives' production. This example demonstrates that some advanced speakers are able to produce a delayed peak in pre-nuclear position. However, in most cases of L2 participants, L+H* was the dominant pre-nuclear pitch accent. The stress on the last syllable in "Por qué" (*Why*) could also have affected the alignment of the rising tone H at the edge.

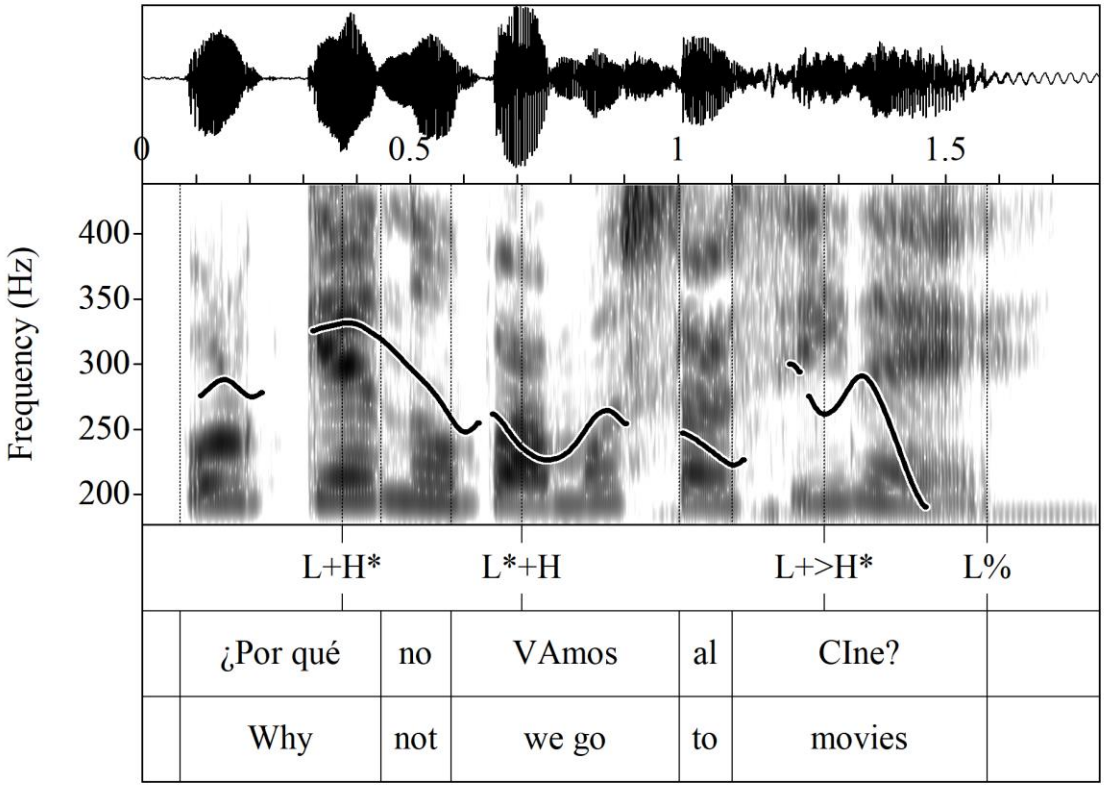

Figure 35. Inter1F No delayed peak in pre-nuclear position and a delayed peak in nuclear position

In the case of Inter1F (Figure 35), this speaker did not use a delayed peak in pre-nuclear position. Instead, a delayed peak was observed in nuclear position.

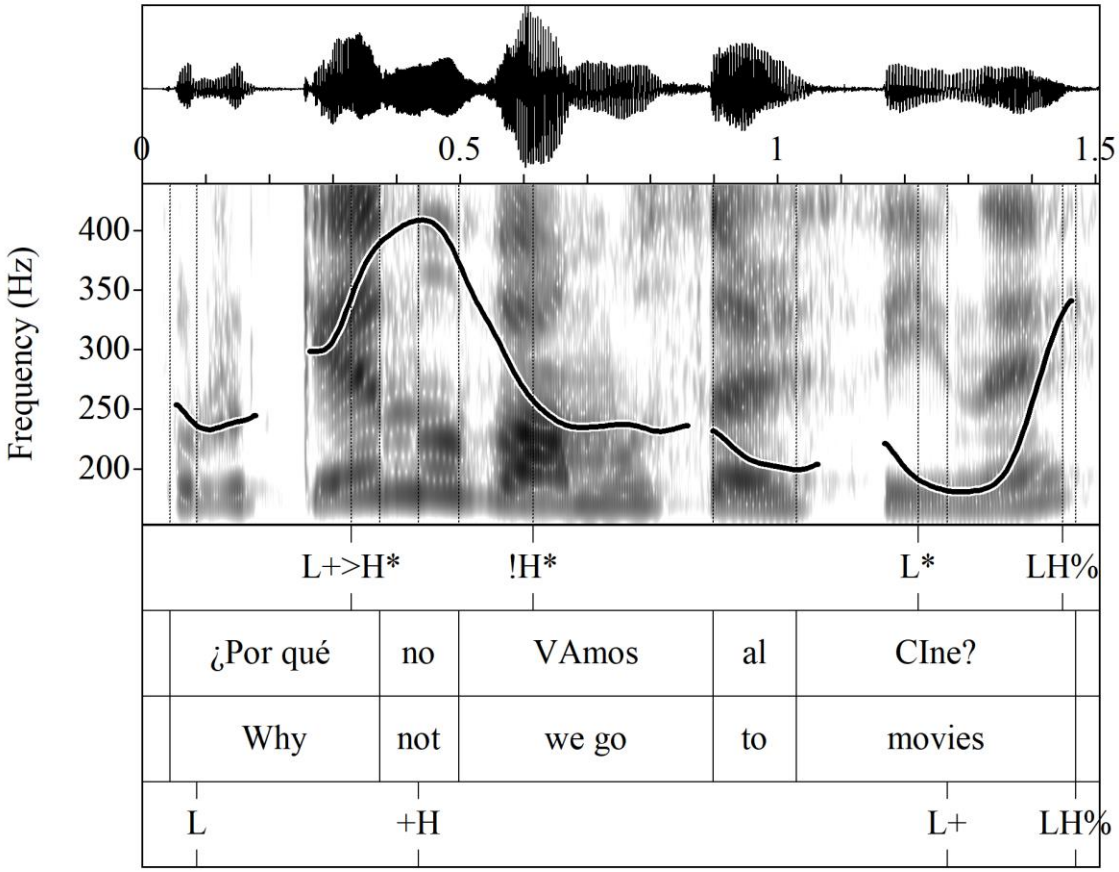

Figure 36. Beg7F showing a delayed peak L+>H* in pre-nuclear position

As shown in Figure 36, interestingly, there was a case of a beginner speaker (Beg7F) producing a delayed peak in the first pre-nuclear position. However, the phonetic realization of Beg7F's pitch contour was not native-like. This contour is similar to Korean L +H L+ LH% according to K-ToBI. Thus, Beg7F's produced the question as if it were a Korean wh-question. In Seoul Korean, the whole wh-question forms one AP with focus on the wh-word. The following words get dephrased after the wh-word, so the f0 slowly falls after the peak and reaches the Low toward the

end of the phrase.

5.4.2 Penultimate Stress in Pre-nuclear Position

Below is an example of a declarative sentence with a penultimate stress in pre-nuclear position.

El gato está enfrente de la ventana. (*The cat is in front of the window*.)

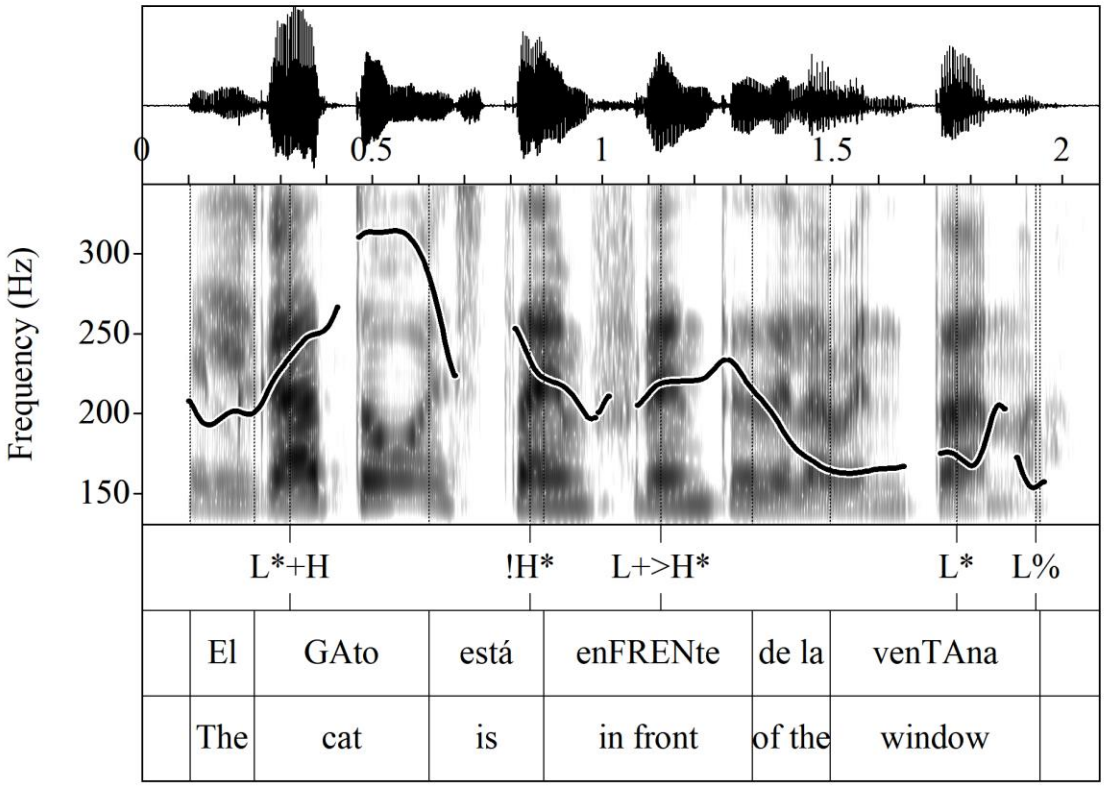

Figure 37. Native4EF, a female from Madrid, L*+H in pre-nuclear position

In the case of Figure 37, Native4EF used L*+H in the first pre-nuclear position while, Native3EF used a typical delayed peak pitch accent L+>H* in the same position. These two pitch accents are often observed in native Spanish speaker speech in pre-nuclear position.

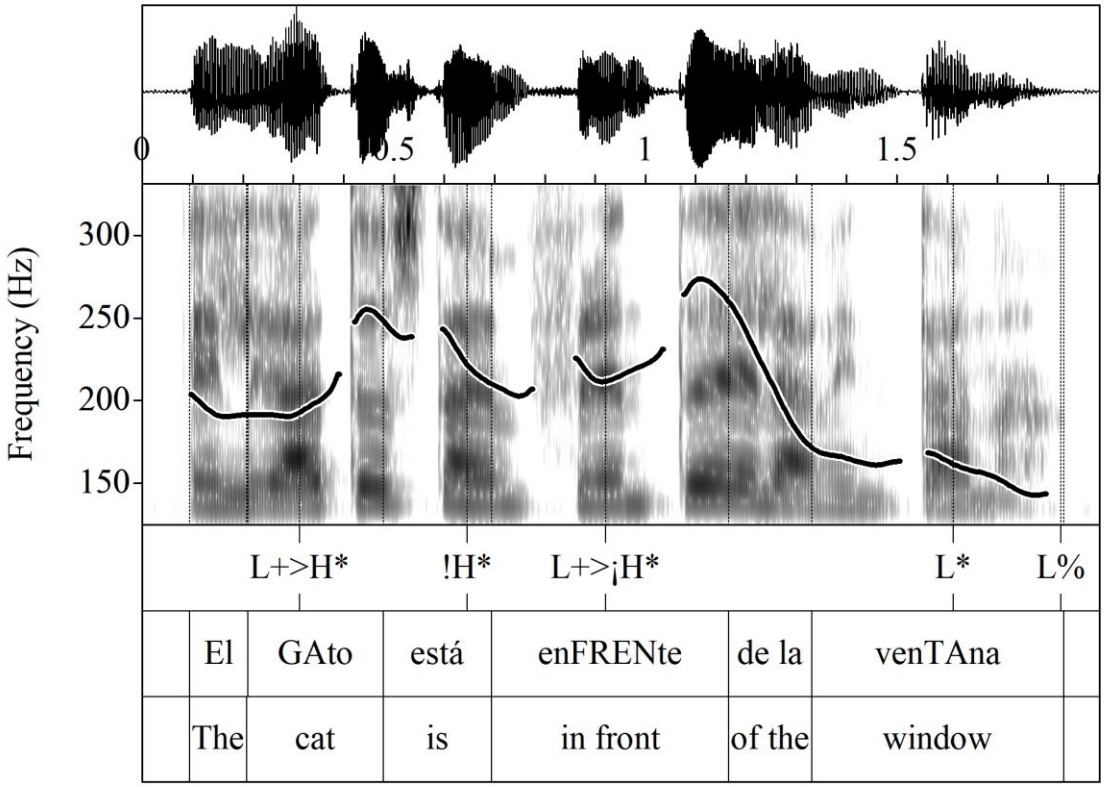

Figure 38. Native3EF, a female from Madrid, L+>H* in pre-nuclear position

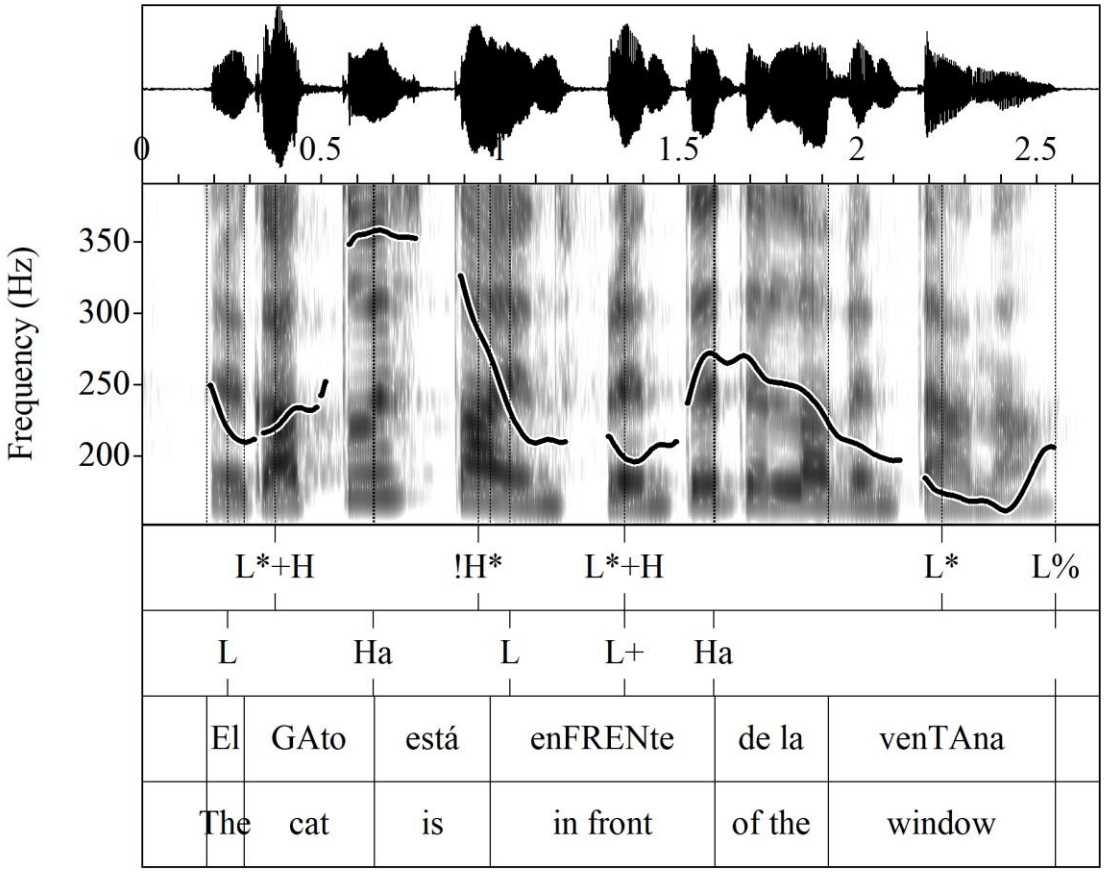

Figure 39. Beg7F, a female from beginner group, L*+H in pre-nuclear position as Native4EF

The pre-nuclear pitch accent type of Native3EF (Figure 38) of “El gato” and “enfrente” are L+>H*, while Beg7F used L*+H as Native4EF (Figure 37) and the number of pitch accents in these two utterances is the same. However, Beg7F’s production could be labeled using K-ToBI, which is why she sounds different from the Native4EF’s one, since ToBI is a phonological transcription system, but not a phonetic transcription system.

Here, I show a case by L1 Korean (Adv1F) showing a distribution of L+H* when the word is stressed on the final syllable, and L*+H when the word stress is on the penultimate

syllable in pre-nuclear position as shown in Figure 40. This speaker shows the Korean AP rising tone which is transcribed in K-ToBI in the second tier.

The example is Daniel vive en una ciudad grande. (*Daniel lives in a big city*)

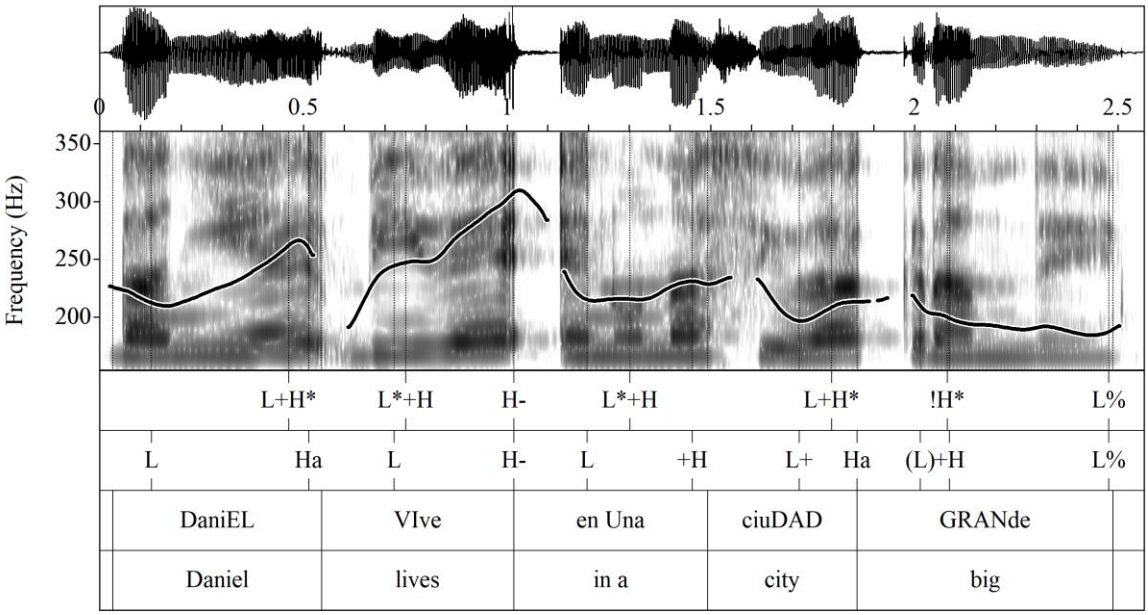

Figure 40. Adv1F, L+H* when the stress is final, and L*+H when the stress is penult

Compared to Adv1F's production in Figure 40, Native3EF (Figure 41) shows Pitch Accent variation when the stress is penult. Also, Native3EF's nuclear configuration is L* L%. The Pitch Accent on "en una" (*in a*) is the same phenomenon as in Figure 46.

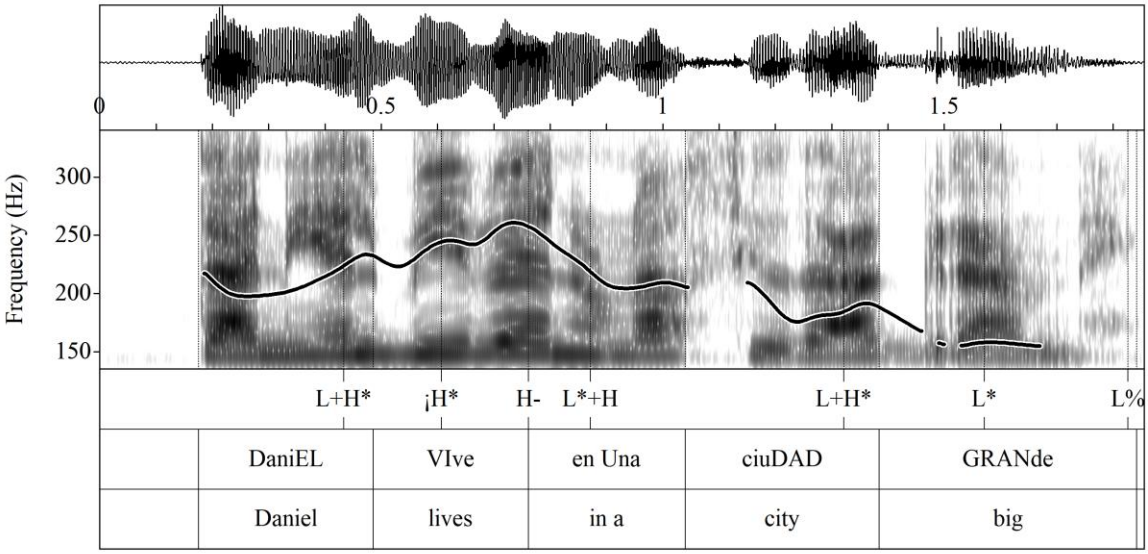

Figure 41. Native3EF, L+H* when the stress is final, with Pitch Accent variations when the stress is penult

So far, the data suggest that L1 Korean speakers have a strong tendency to produce a "L H" (rising) tonal pattern over a word, i.e., the AP tone pattern, regardless of the location of stress. Thus, the word-final syllable was always mapped to a "High" tone regardless of whether the stress was final (in which case, speakers produced L+H*) or penult (producing L*+H). Based on the results in this chapter, I conclude that this edge is marked by rising H tone, by the influence of L1 Korean. In addition, a tendency of Korean speakers to align the high tone with the end of the word is confirmed as in Hualde & Kim (2015).

5.4.3 Nuclear Configuration in Broad Focus Statements: L* L% vs. L+H* L%

According to Estebas-Villaplana and Prieto (2010), the nuclear configuration of broad focus statement in Castilian Spanish is L* L%. However, in Mexican Spanish, both L* L% and L+H*

L% are the common nuclear configurations of broad focus statements (De la Mota, Butragueño and Prieto (2010)).

Native Korean Speakers (NKS) tend to produce L+H* L% more often than L* L% in nuclear position in broad focus statements due to the AP-initial LH tone (Jun 2000, 2005). The example below shows the sentence María tiene su clase a las nueve. (*Mary has her class at nine*.)

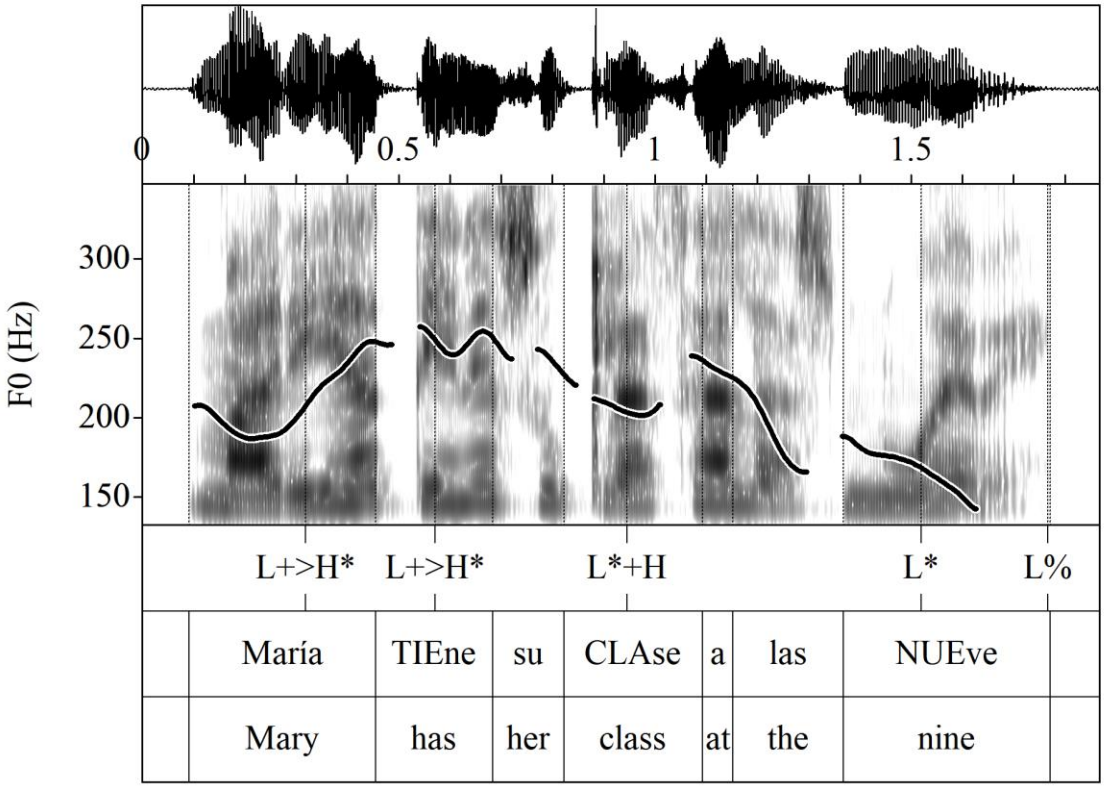

Figure 42. Native3EF, María tiene su clase a las nueve with L* L% configuration

Native Castilian speakers produced L+>H* and L*+H in pre-nuclear position and L* L% in nuclear position, which are typically found in broad focus statements (Figure 42 and 43).

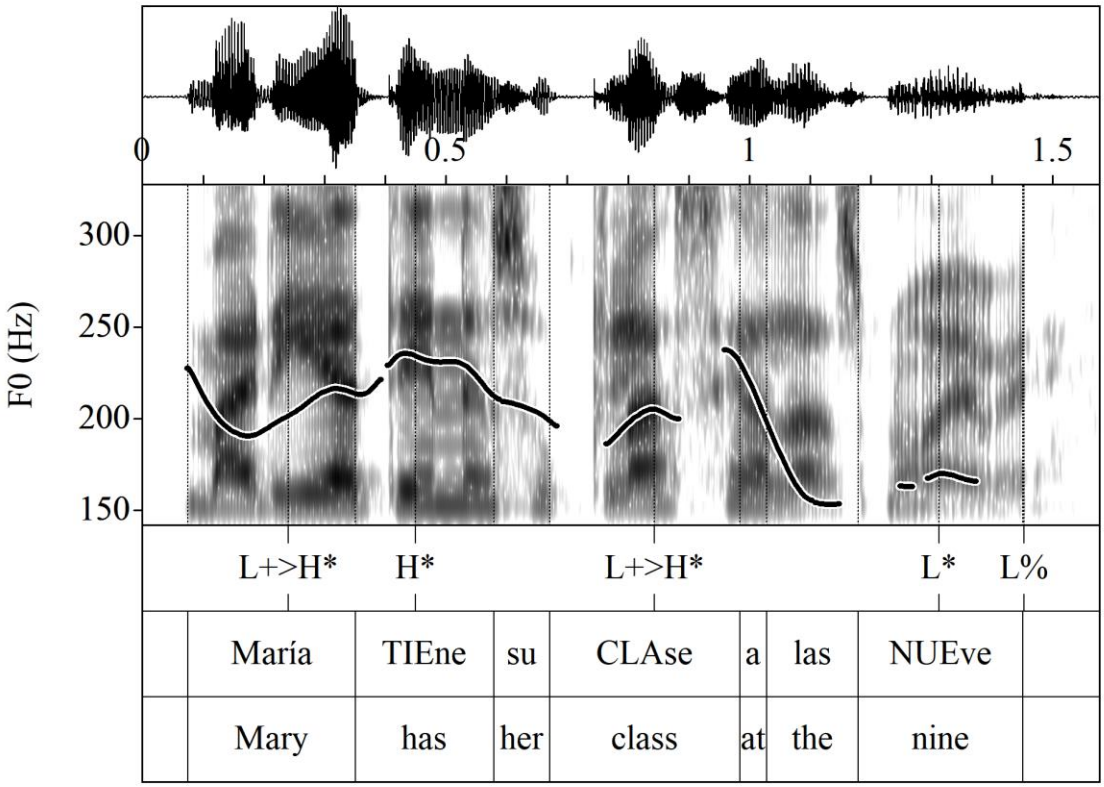

Figure 43. Native4EF, María tiene su clase a las nueve with L* L% configuration

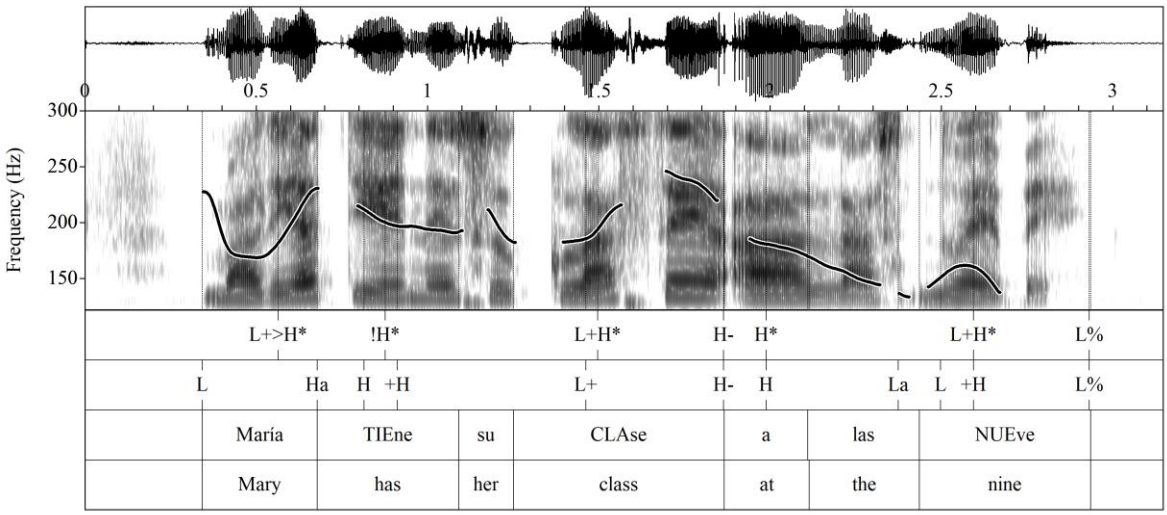

Figure 44. Inter1F, María tiene su clase a las nueve with L+H* L% configuration[22]

Unlike the native Castilian speakers' production (L* L%), Inter1F in Figure 44 showed L+H* L% nuclear configuration. Although this nuclear configuration is found in Mexican Spanish (De la Mota, Butragueño and Prieto (2010: 345)), I do not believe that inter1F acquired this feature of L2 prosody. Rather, it is more likely that transfer from the L1 Korean AP-initial LH tone has occurred.

5.5 Discussion

Based on the data, I conclude that delayed peak pitch accent (L+>H*) in pre-nuclear position

[22] Inter1F produced the second vowel [e] of [clase] with lengthening, thus it is marked by an intermediate phrase tone H-. In addition, she formed 'has her class' in one AP (H+H L+H) as in Korean. The f0 is slightly falling from [a] to [las] though on the whole the f0 on [a] itself is not very high. However, the f0 peak is slightly higher than the f0 peak on 'NUEve', which is labeled as L+H*.

was not fully acquired even among advanced speakers, and L+H* L% was the most commonly found nuclear pitch configuration of broad focus statements for Native Korean Speakers (NKS). Additionally, L2 learners occasionally used L+H* for both pre-nuclear and nuclear pitch accents. In other cases, they sometimes switched the pitch accent types. For example, participants occasionally used L+H* for pre-nuclear and L+>H* for the nuclear pitch accent.

Stress-based pitch accent in Spanish is difficult to acquire for speakers of L1 Korean, which has no word-prosody. Korean AP tones, which cue word prominence via edge marking, are negatively transferred in producing a word and pitch accent in Spanish. When the surface tonal category chosen by L1 Korean speakers is part of the tonal inventory of L2 Spanish, we can still label the tonal category using Sp-ToBI.

CHAPTER 6 AP-Like Tonal Unit Applied in Spanish Function Words by L1 Korean Speakers

6.1 Introduction and Literature Review

Languages differ in their prosody, especially in the ways in which they mark prominence. Languages like English and Spanish mark word prominence via pitch accent, which is realized on the stressed syllable of a word (most often a content word). Languages like Korean, which does not have lexical or postlexical stress, mark word prominence by forming the word into one prosodic unit called the Accentual Phrase (AP) or by locating the word at the beginning of an AP (Jun 1993). In Jun's prosodic typology (Jun 2005, 2014), the former type belongs to a head-prominence language and the latter type belongs to an edge-prominence language.

Apart from this prosodic difference, Spanish and Korean differ in the division of lexicon. Spanish distinguishes between a content word and a function word, but Korean does not have function words. Instead, all words in Korean are content words, consisting of a lexical item plus a case marker or postpositions, which do not form a separate AP, but always form an AP together with the preceding lexical item. See the Figure 45 below from Jun (2000, Figure 23).

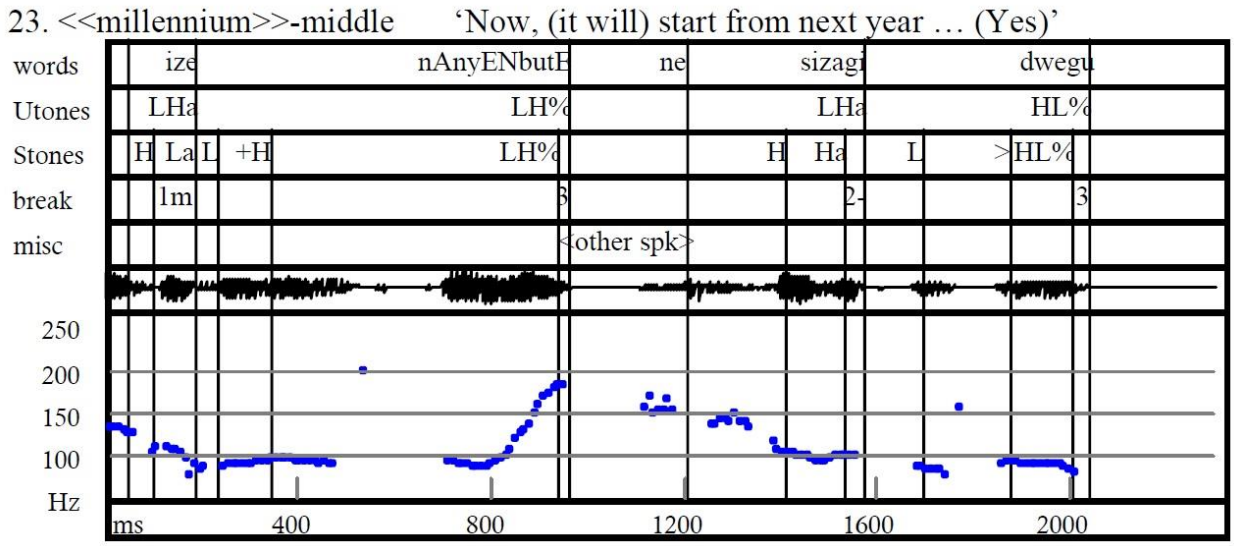

Figure 45. "From next year" in Korean, extracted from Jun (2000, #23)

As shown in Figure 45, the word 'nAnyENbutE' (from next year) is produced as one AP: lexical item "nAnyEN (next year)" + postposition "butE (from)".

Given these prosodic and morphological differences between the two languages, this chapter examines how Korean learners of Spanish produce the intonation of Spanish sentences, especially Spanish function words. I hypothesize that less advanced Korean learners will produce an AP-like tonal unit over a function word as well as a content word.

6.2 Research Materials

I designed 30 sentences total for this task: 10 sentences with monosyllabic prepositions (a, con, de, en, por) with definite articles; 10 sentences with monosyllabic prepositions (a, con, de, en,

por) with indefinite articles; 10 sentences with multisyllabic preposition and monosyllabic prepositions (a, con, de, en, por) with definite and indefinite articles. We wanted to see how L2 learners group these function words into a prosodic unit.

10 Sentences with monosyllabic preposition (a, con, de, en, por) with <u>definite articles</u>:

1) Su compañía está **en el** Paraguay. (*His/her company is in Paraguay*.)
2) No funciona la fotocopiadora **de la** oficina. (*The office photocopier does not work*.)
3) Marta y Francisco corren **por la** playa. (*Martha and Francisco run through the beach*.)
4) Esteban tenía una entrevista **con el** director. (*Esteban had an interview with the director*.)
5) María tiene su clase **a las** nueve. (*Maria has her class at nine*.)
6) Los padres de Juan viven **en el** extrajero. (*John's parents live abroad*.)
7) A Roberto le gusta jugar **con los** (sus) amigos. (*Roberto likes to play with friends.*)
8) Pedro es estudiante **de la** facultad de filosofía. (*Peter is a student of the college of philosophy*.)
9) David llega tarde **por el** tráfico. (*David is late because of traffic*.)
10) A Juan le gusta correr **por el** parque. (*Juan likes to run/through in the park*.)

10 Sentences with monosyllabic preposition (a, con, de, en, por) with <u>indefinite articles</u>:

1) Mario trabaja **en una** compañía internacional. (*Mario works in an international company*.)

2) Oliver está hablando **con una** profesora. (*Oliver is talking to/with a teacher*.)

3) Daniel vive **en una** ciudad grande. (*Daniel lives in a big city*.)

4) Emilio pagó veinte dólares **por una** camisa. (*Emilio paid twenty dollars for a shirt*.)

5) Rafael compró una rosa **en una** tienda. (*Rafael bought a rose in a shop*.)

6) Esta casa es **de una** habitación. (*This house has one room*.)

7) A Manuel le gusta cenar **en un** restaurante italiano. (*Manuel likes to dine at an Italian restaurant*.)

8) A Marcos le gusta pasar tiempo **con unos** amigos[23]. (*Marcos likes to spend time with his friends*.)

9) Juan necesita los consejos **de un** experto. (*Juan needs the advice of an expert*.)

10) Felipe vive **con unos** compañeros. (*Felipe lives with his classmates*.)

10 Sentences with multisyllabic preposition + de + <u>in/definite articles</u>:

1) Leonardo está nervioso **antes de la** reunión. (*Leonardo is nervous before the meeting*.)

2) El gato está **encima de la** casa. (*The cat is on top of the house*.)

3) Santiago va a su casa **después de la** clase. (*Santiago goes home after class*.)

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[23] In the following cases:

A Marcos le gusta pasar tiempo **con unos** amigos. (*Marcos likes to spend time with his friends*.)

Felipe vive **con unos** compañeros. (*Felipe lives with his classmates*.)

"con sus amigos/compañeros" (with his friends) sounds more natural. However, we wanted to be consistent using indefinite articles. For L2 learners, this subtle difference of meaning between "unos" and "sus" would not affect their production. While, we noticed that "unos" are more marked in prosody than "sus", but more studies are needed to confirm the idea.

4) El perro está **detrás de la** puerta. (*The dog is behind the door*.)

5) El gato está **enfrente de la** ventana. (*The cat is in front of the window*.)

6) Marcos vive **cerca de la** escuela. (*Marcos lives near the school*.)

7) El león está **dentro de la** jaula. (*The lion is inside the cage*.)

8) El restaurante está **enfrente de la** librería. (*The restaurant is in front of the library*.)

9) La computadora está **encima de la** mesa. (*The computer is on the table*.)

10) Hay muchas botellas de vino **además de la** cerveza. (*There are many bottles of wine, besides beer*.)

6.3 Method and Analysis

After carefully labeling the sentences with Sp_ToBI system, I described the typical cases in which Native Korean Speakers (NKS) sounded different from Native Spanish Speakers (NSS). Intonation contours were analyzed and labeled according to the Sp_ToBI conventions (Estebas-Villaplana and Prieto (2010) for Castilian Spanish; De la Mota, Butragueño and Prieto (2010) for Mexican Spanish).

6.4 Results

6.4.1 AP-like Tonal Unit on Monosyllabic Function Words

In this section, I demonstrate the production of AP-like tonal unit on Spanish monosyllabic

function words produced by L1 Korean speakers.

The first example is: Oliver está hablando con una profesora. (*Oliver is talking to/with a teacher*.)

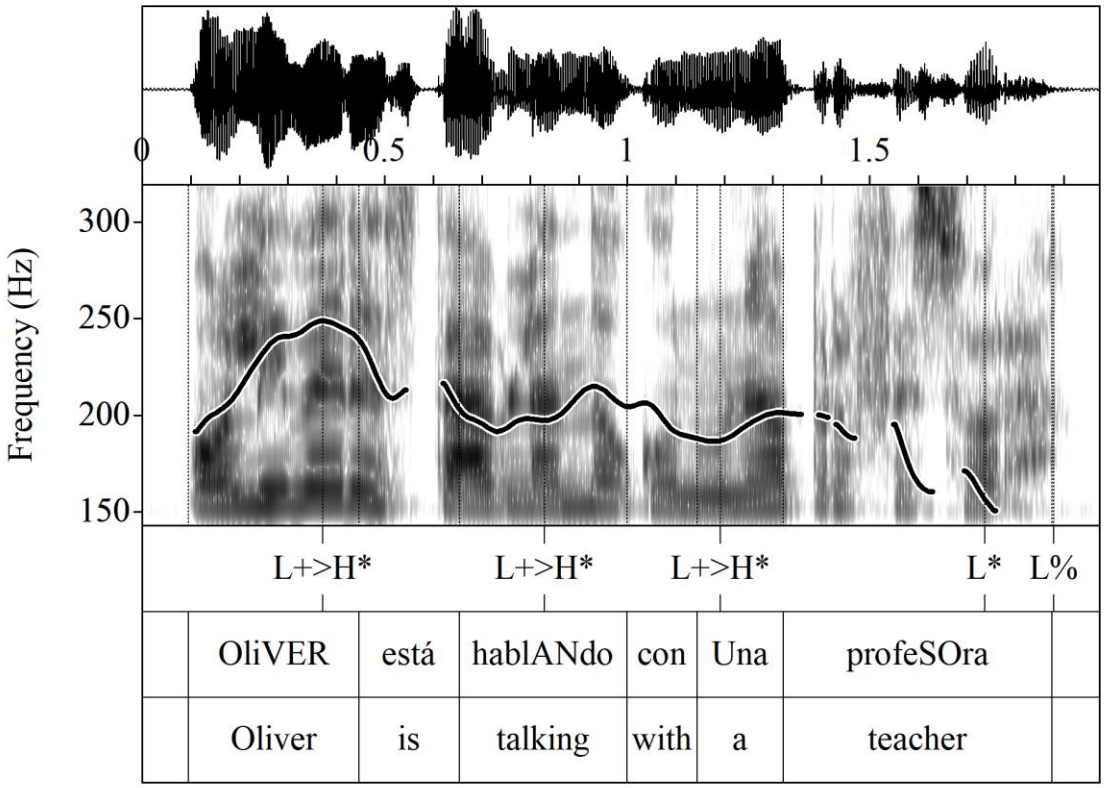

Figure 46. Native3EF, a delayed peak rising accent L+>H* on [con una]

Native3EF produced a pitch accent on "con una" (*with a*) shown in Figure 46, while Native4EF did not produce any pitch accent on "con una" (*with a*), in Figure 47.

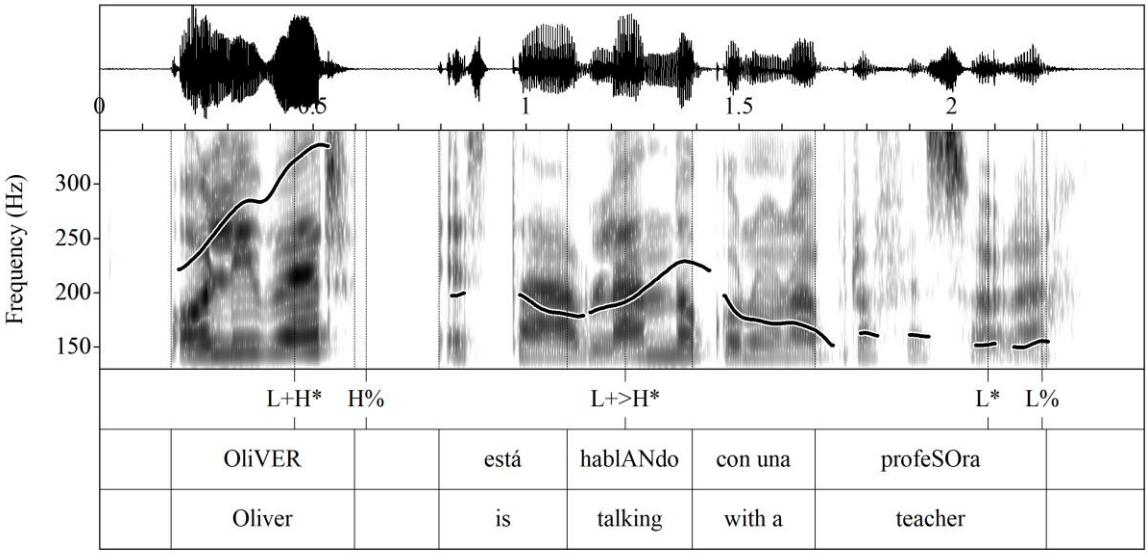

Figure 47. Native4EF, no pitch accent on [con una][24]

These two examples of native Castilian speakers show variation of pitch accents on function words. I predicted that native Spanish speakers would not put a pitch accent on each function word. Harris (1983: 94) argued that "Normally, in nonmetalinguistic discourse, prepositions are stressless in Spanish." However, I found that "con + una" (preposition + indefinite article) can receive one pitch accent even by native Spanish speakers, but not two pitch accents. Note that "una" can be interpreted either as an indefinite article 'a' or as a number 'one'. The multiple meanings of "una" may have influenced the variation in native speakers' speech. This can also be a rhythmic pitch accent marking rhythm as in French (Jun & Fougeron 2002).

[24] Native 4EF put a boundary tone H% after the subject "Oliver". During the recording procedure, Native 4EF tended to have a boundary tone after subject and that was the way she produced in a natural setting.

The example below produced by Beg5F represents a typical pattern of beginner learners producing each Spanish word as an AP-like tonal unit regardless of whether it is a content word or a function word.

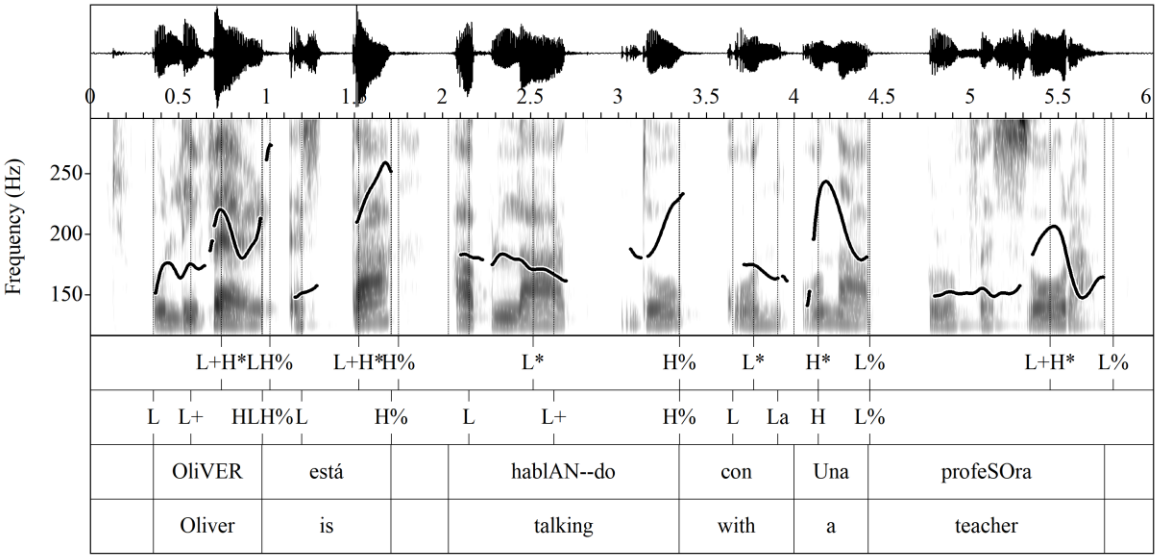

Figure 48. Beg5F, AP-like tonal unit on function words

In this case, Beg5F used HLH% (which is a Korean boundary tone) after the subject "Oliver". Also, there was a short pause after the verb "está" which demonstrates disfluency, producing five boundary tones in a sentence. L2 learners tend to use a mixture of Spanish Pitch Accents and Korean Accentual Phrases. While native speakers produced three to four pitch accents in this sentence, Beg5F produced six pitch accents including AP-like tonal units which is double the amount used by native speakers.

The next example is A Juan le gusta correr por el parque. (*John likes to run through/around the park*).

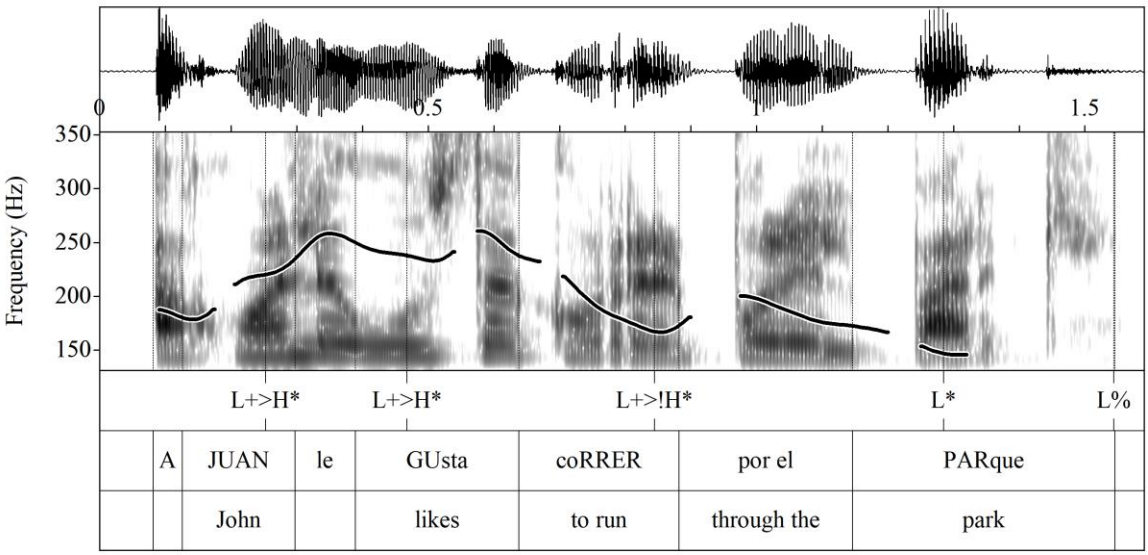

Figure 49. Native3EF, four pitch accents on content words only

Native 3EF produced four pitch accents (Figure 49) while Inter1F produced six pitch accents (Figure 50). Thus, Inter1F consistently showed Korean intonation. From the examples seen thus far, even intermediate level participants maintain AP-like tonal units on function words as well as content words.

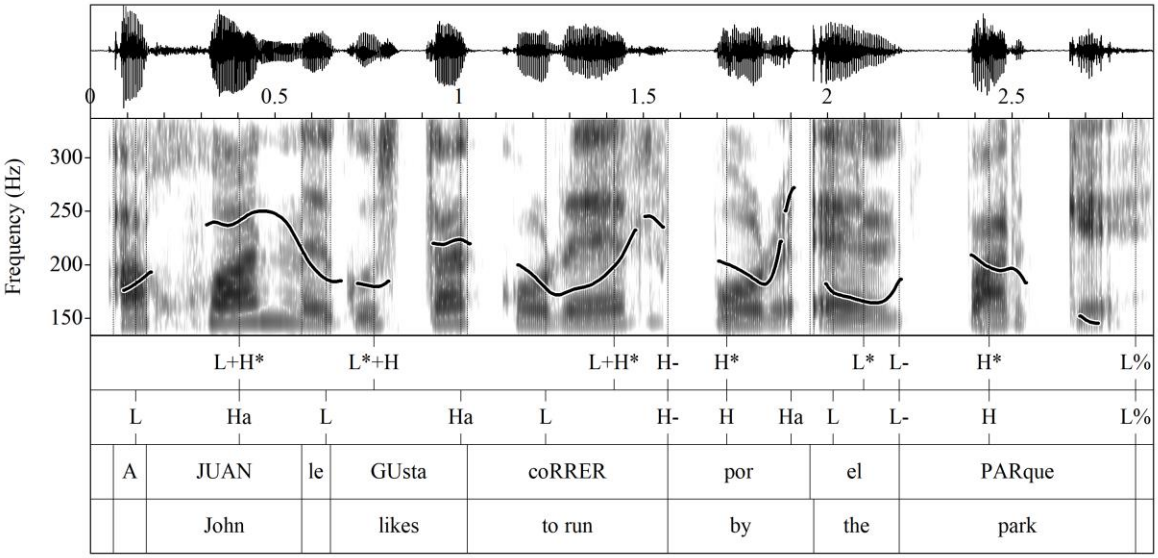

Figure 50. Inter1F, six pitch accents on content words and function words

As we can see in Inter1F's example (Figure 50), almost every single word received a pitch accent. Looking at "por" and "el" marked by edge tones (Accentual Phrase and Intermediate Phrase, respectively), we may assume that the L1 writing system may have influenced L2 production, since a space between words marks an AP/ip boundary. Jun (2010) considered a 'word' as a sequence of characters separated by a space in a written Hangul text. Thus, as long as the prepositions and particles are written independently, in general, less advanced speakers put pitch accents or AP-like units on each function word. As speakers' proficiency level increases, they tend to group the prosodic units better, so that the number of IPs and APs were reduced with proficiency.

6.4.2 Pitch Accent on Multisyllabic Preposition

I found that when the preposition is multisyllabic (e.g., three-syllable words), native speakers produced the preposition with a pitch accent as well. The example is: “El gato está enfrente de la ventana.” (*The cat is in front of the window*.)

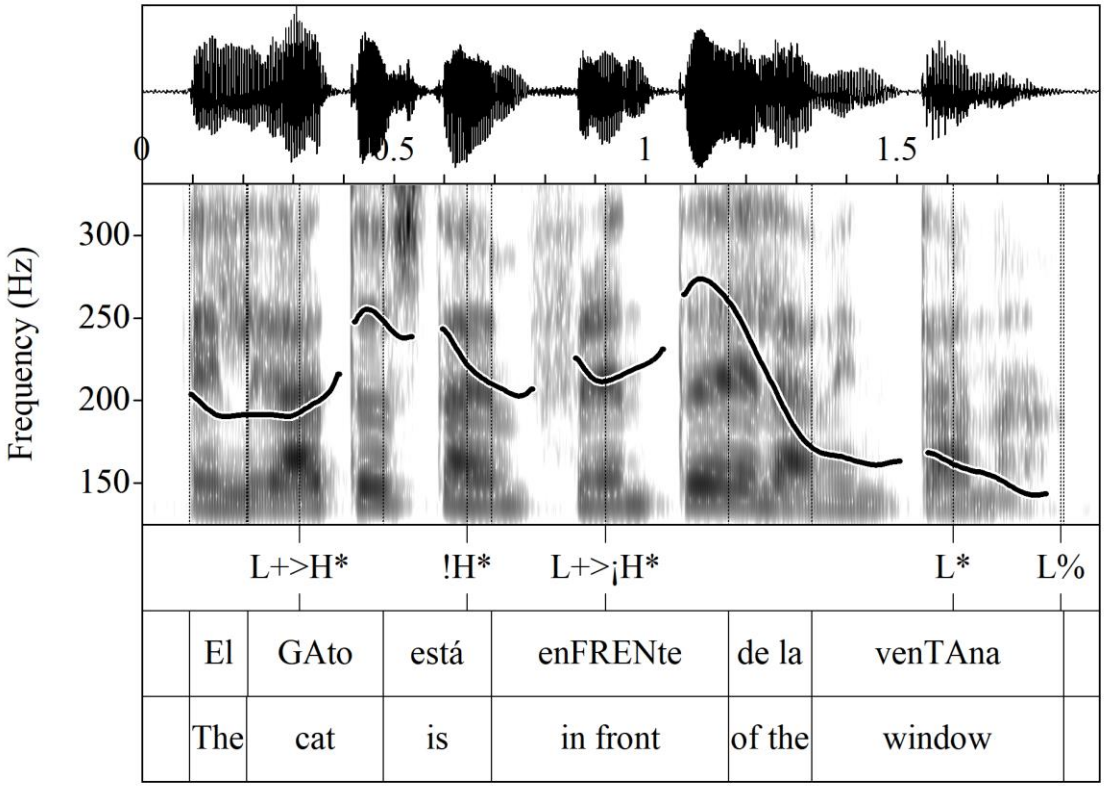

Figure 51. Native3EF, three-syllabled preposition with pitch accent

As seen in Figure 51, although enfrente (*in front of*) is not a content word, since it is multisyllabic, native Spanish speakers produced it with a pitch accent. Still, native speakers did not produce a pitch accent on “de la” (*of the*), only L2 learners did produce a questionable pitch

accent in Figure 52.

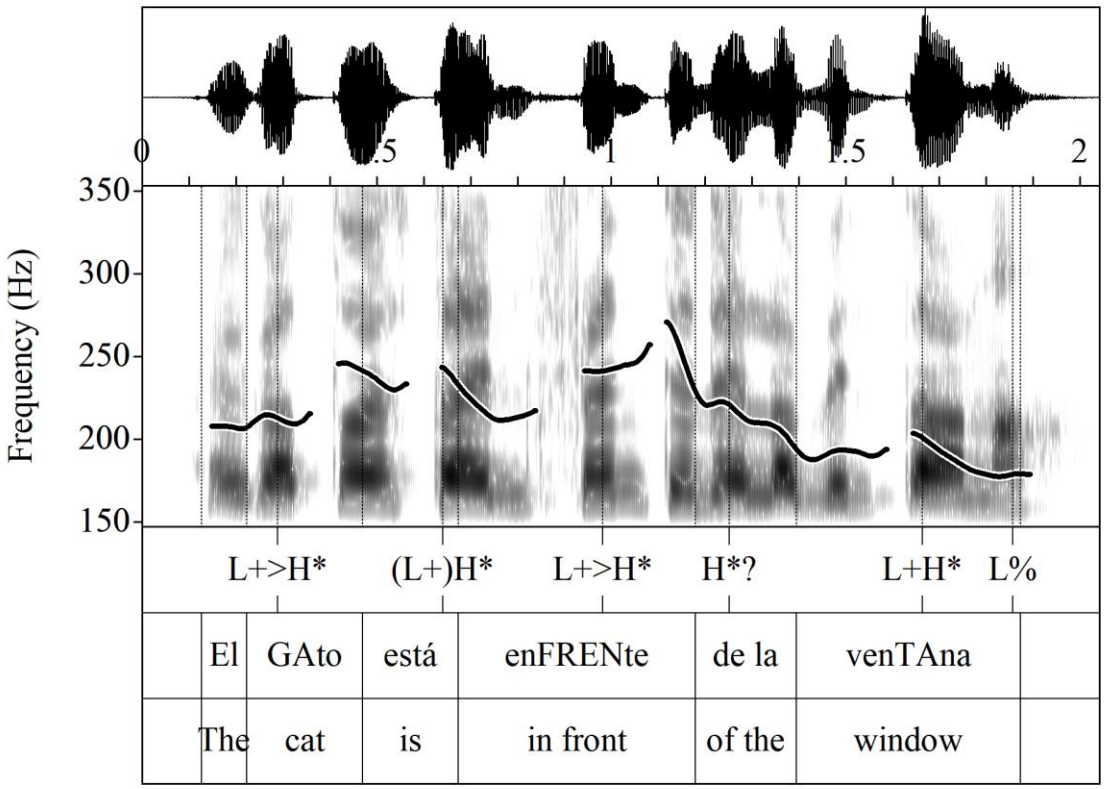

Figure 52. Beg6F, a probable pitch accent on “de la” (*of the*)

The results showed that Korean learners in beginning levels tend to produce each Spanish word as an AP-like tonal unit regardless of whether it is a content word or a function word, whereas more advanced learners produced one tonal unit over two monosyllabic function words, showing they are better at grouping monosyllabic function words into phrases, confirming findings from Jun & Oh (2000).

6.3 Discussion

More advanced Korean learners also put pitch accents on function words more frequently than native Spanish speakers, suggesting that Korean speakers equated Korean Accentual Phrases (AP) with Spanish Pitch Accents (PA). This supports the parallelism between the Accentual Phrase and the Pitch Accent, mentioned in Jun (1993, 1996) and Ladd (1996/2008).

Generally speaking, in Korean, words with or without a particle or postpositions are produced as one AP. Also, space in Korean orthography is often mapped to the Accentual Phrase boundary. As speakers' proficiency level increases, this phenomenon tends to reduce, but not completely disappear.

CHAPTER 7 Boundary Tone Realizations in Four Types of Questions by L1 Korean Speakers

7.1 Introduction and Literature Review

According to De la Mota, Butragueño and Prieto (2010), the nuclear pitch contour of question intonation in Mexican Spanish is realized as follows: information-seeking yes-no questions (L* LH%), information-seeking wh-questions (L+H* HL%), invitation yes-no questions (L* HH%) and invitation wh-questions (L+H* M%). These intonations are not exactly the same in Castilian Spanish according to Estebas-Villaplana and Prieto (2010) who describe: information-seeking yes-no questions (L* HH%), information-seeking wh-questions (L* L%, L* HH%), invitation yes-no questions (L+H* HH%) and invitation wh-questions (L+¡H* HL%) as compared below (Table 17).

In this chapter, I analyze the production of these sentence types to observe boundary tone realization by Native Korean Speakers (NKS). In many L2 learning classes, instructions learners are instructed that: most of the question sentences in Spanish will have a rising contour. Since Spanish word order is not strict compared to English, the same sentence can be a declarative "Bebe una limonada." (*She is drinking a lemonade.*) or a question ¿Bebe una limonada? (*Is she drinking a lemonade?*) depending on the intonation.[25]

In Korean, the boundary tones in yes-no questions are generally realized as H% or sometimes LH%, and in wh-questions as LH% (although H% and HL% were also observed in

[25] In Trimble (2013), 20 pairs of lexically and grammatically identical sentences were tested in speaking task as the word order did not affect the meaning of the sentence whether a declarative or a interrogative.

Jun & Oh (1996)). Based on this study, I predicted that boundary tones in questions would be either HH% or LH% in most cases.

Sentence types	**Mexican Spanish**	**Castilian Spanish**	**General prediction of boundary tones by Native Korean Speakers (NKS)**
[1] information-seeking yes-no questions	L* LH%	L* HH%	HH% or LH%
[2] information-seeking wh-questions	L+H* **HL%**	L* **L%** L* HH%	HH% or LH%
[3] invitation yes-no questions	L* HH%	L+H* HH%	HH% or LH%
[4] invitation wh-questions	L+H* **M%** L+¡H* **M%**	L+¡H* **HL%**	HH% or LH%

Table 17. Boundary tone realization on four types of questions

7.2 Research Materials

For each type of question, five sentences in four categories (total 20 sentences) were analyzed in this study. Since the number of the syllables and the stress pattern of the final word can affect the realization of the boundary tones, I only used multisyllabic paroxytones in nuclear position.

7.2.1 Information-seeking Yes-No questions

All the examples were designed following the sentence pattern of previous studies (Estebas-

Villaplana and Prieto (2010), De la Mota, Butragueño and Prieto (2010)), to elicit the typical nuclear pitch accent and its boundary tone as clearly as possible.

The sentences used for this section were as follows:

¿Tienes mermelada? (*Do you have jam?*)

¿Te gusta la comida española? (*Do you like Spanish food?*)

¿Habla Juan coreano? (*Does John speak Korean?*)

¿Es María abogada? (*Is Mary a lawyer?*)

¿Es Luis mexicano? (*Is Luis Mexican?*)

Note that all of these sentences start with the verb, except the case of ¿Te gusta la comida española? (*Do you like Spanish food?*), which starts with a clitic. Since "¿Tienes mermelada?" (*Do you have jam?*) from previous studies was the first example used during the recording procedure, I maintained this subject-verb inversion structure for each of the stimuli. I do note that in general, the "¿Juan habla coreano?" (*Does John Speak Korean?*) structure sounds natural for native Castilian and Mexican Spanish speakers. Additionally, all the final words in nuclear position are four-syllabled paroxytones.

7.2.2 Information-seeking Wh-Questions

In information-seeking wh-questions, one of the sentences from Castilian Spanish in Estebas & Prieto (2010) was "¿Qué hora es?" (*What time is it*?). The nuclear configuration was realized as both L* L% (falling contour) and L* HH% (rising contour) which expresses a nuance of interest

and greater speaker involvement in the speech act (Estebas & Prieto (2010: 35))[26]. The two examples of "¿Qué hora es?" (*What time is it?*) in Estebas & Prieto (2010: 36, Figure 16) are presented below:

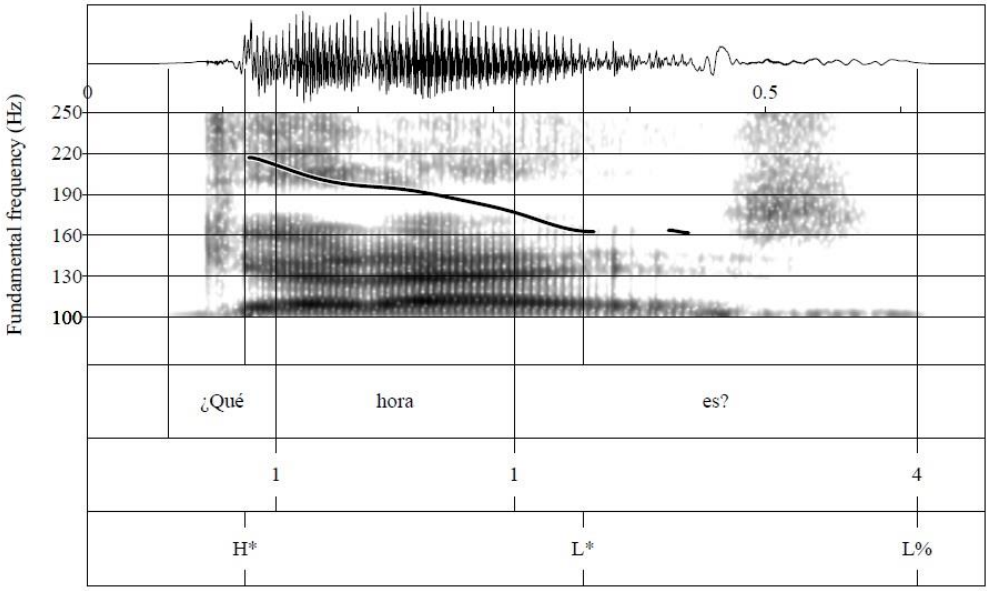

Figure 53. "¿Qué hora es?" (*What time is it?*) extracted from Estebas & Prieto (2010: 36, Figure 16) with L%

[26] See Sosa (2003: 247). "The difference in use of rising vs. falling wh-questions in read and naturally occurring speech was of no significance for the speakers of Caribbean Spanish."

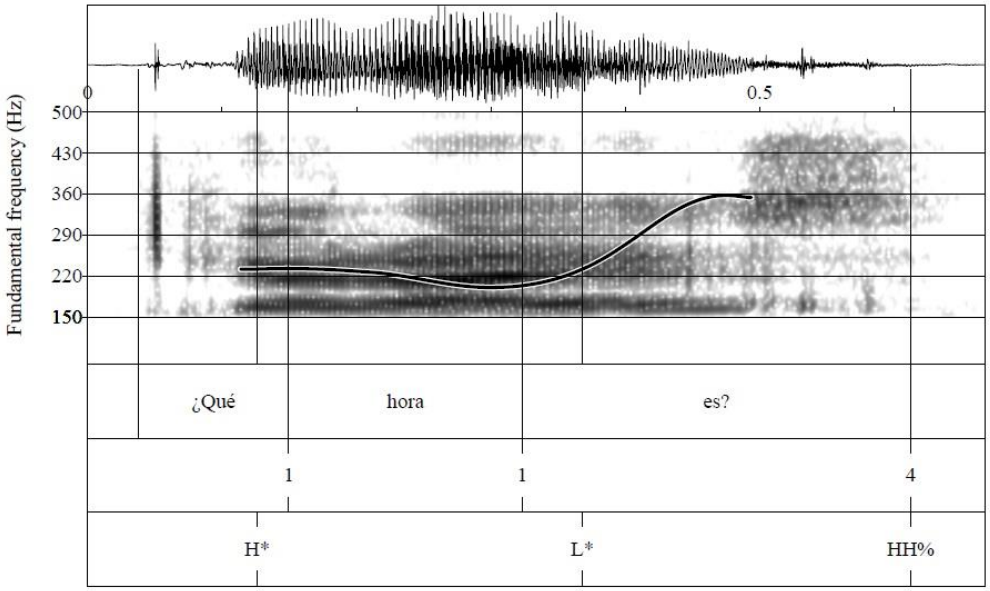

Figure 54. "¿Qué hora es?" (*What time is it?*) in Estebas & Prieto (2010: 36, Figure 16) with HH%

According to De la Mota, Butragueño and Prieto (2010: 336, Figure 15), nuclear pitch configuration for information-seeking wh-questions in Mexican Spanish is L+H* HL%, shown in Figure 55 (though the nuclear configuration cannot be directly compared in the two studies because different sentences were used).

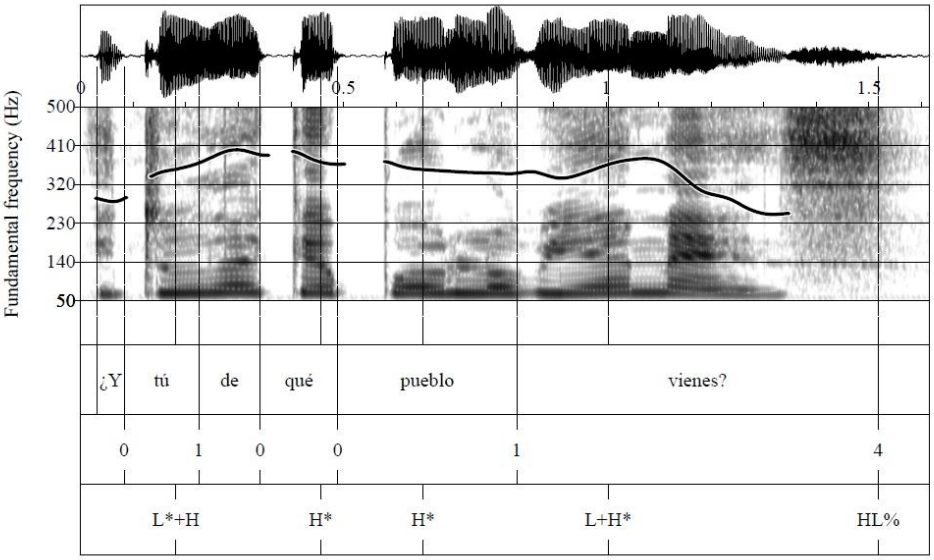

Figure 55. Information-seeking wh-question, L+H* HL%, extracted from De la Mota, Butragueño and Prieto (2010: 336, Figure 15)

The sentences used in the study are presented below.

¿Qué hora tienes? (*What time is it?*)[27]

¿Dónde vives? (*Where do you live?*)

¿De dónde eres? (*Where are you from?*)

¿Cómo te llamas? (*What is your name?*)

---

[27] Although ¿Qué hora es? (*What time is it?*) is used more frequently, ¿Qué hora tienes? (*What time is it?*) is also used, and it is understandable. We used the ¿Qué hora tienes? (*What time is it?*) version, in order to ensure that the number of syllables of the final word in nuclear position was two syllables.
This phrase is included as an example from an ebook, Learn Spanish - Level 4: Beginner: Volume 1: Lessons 1-25, By Innovative Language Learning:
E.g., ¿Qué hora tienes? Es que mi reloj está atrasado. (*What time do you have? My watch is slow.*)

¿Quién es ella? (*Who is she?*)

7.2.3 Invitation Yes-No Questions

I designed five sentences including the one from De-la-Mota et al. (2010: 333): "¿Quieren caramelos?" (*Do you want some sweets*?) L* HH%.

¿Quieren caramelos? (*Do you want candy?*)

¿Quieren comer caramelos? (*Do you want some candy?*)

¿Quieren bocadillos? (*Do you want sandwiches?*)

¿Quieren comer bocadillos? (*Do you want to eat some sandwiches?*)

¿Quieren venir a la fiesta? (*Do you want to come to the party?*)

7.2.4 Invitation Wh-Questions

I compared the examples tested in this section with the example from De la Mota, Butragueño and Prieto (2010: 338, Figure 19) of "¿Por qué no van a venir?" (*Why aren't you going to come*?) L+¡H* M% as in the following Figure 56.

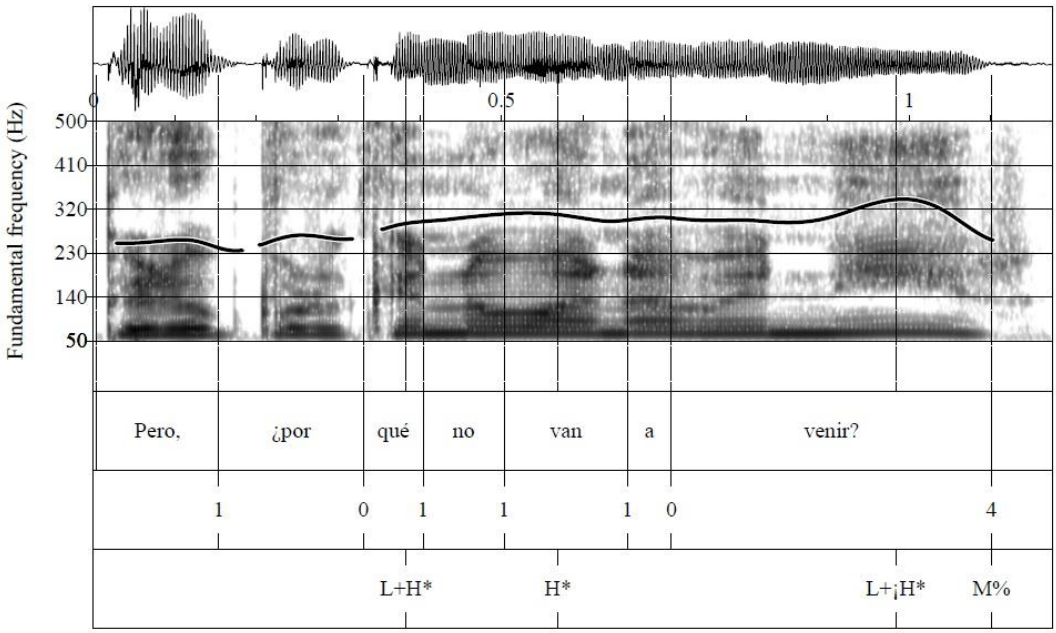

Figure 56. ¿Por qué no van a venir? (*Why aren't you going to come?*) L+¡H* M%, extracted from from De la Mota, Butragueño and Prieto (2010: 338, Figure 19)

Since the last word (nuclear pitch accent) of the sentence "veNIR" has its accent on the last syllable, I assumed that other examples from this section with paroxytone words in sentence final position would show different boundary tone realizations.

¿Por qué no van a venir? (*Why don't you come?*)[28]

¿Por qué no van a venir a la fiesta? (*Why don't you come to the party?*)

¿Por qué no vamos al cine? (*Why don't we go to the movies?*)

¿Por qué no escuchamos música? (*Why don't we listen to music?*)

[28] This sentence was used only to compare the results with previous studies. The production of the boundary tone will not be taken into account.

¿Por qué no vamos a la playa? (*Why don't we go to the beach?*)

¿Por qué no jugamos al tenis? (*Why don't we play tennis?*)

Figure 56 "¿Por qué no van a venir?" (*Why don't you come?*) from De la Mota, Butragueño and Prieto (2010: 338) and Figure 57 of Native4EF's production show the same nuclear configuration. In section 7.4.4, I will show the results from the sentences designed above with the paroxytone words in sentence final position.

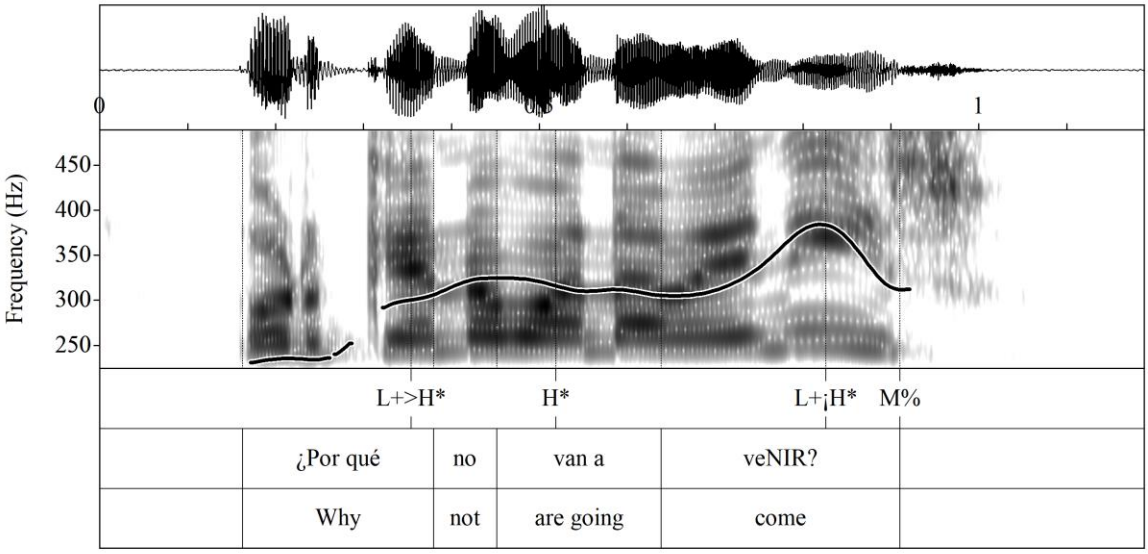

Figure 57. Native4EF, ¿Por qué no van a venir? (*Why aren't you going to come?*) L+¡H* M%

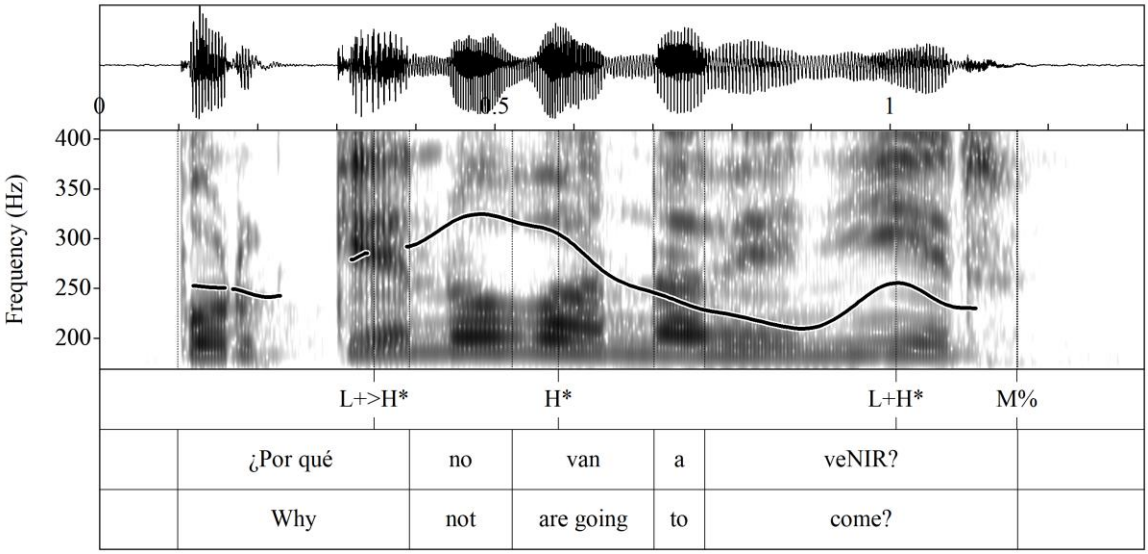

Figure 58. Adv1F ¿Por qué no van a venir? (*Why aren't you going to come?*) L+H* M%

Native4EF produced the exactly the same nuclear configuration as in De la Mota, Butragueño and Prieto (2010: 338), and Adv1F also produced a similar contour as well.

7.3 Method and Analysis

For this component of the study, intonation contours on boundary tones were analyzed and labeled according to the Sp_ToBI conventions (Estebas-Villaplana and Prieto (2010) for Castilian Spanish; De la Mota, Butragueño and Prieto (2010) for Mexican Spanish).

Note that the boundary tones in information-seeking yes-no questions are realized differently in Mexican Spanish (LH%, De la Mota, Butragueño and Prieto (2010)) and Castilian

Spanish (HH%, Estebas-Villaplana and Prieto (2010)) (See Figures 59 and 60).

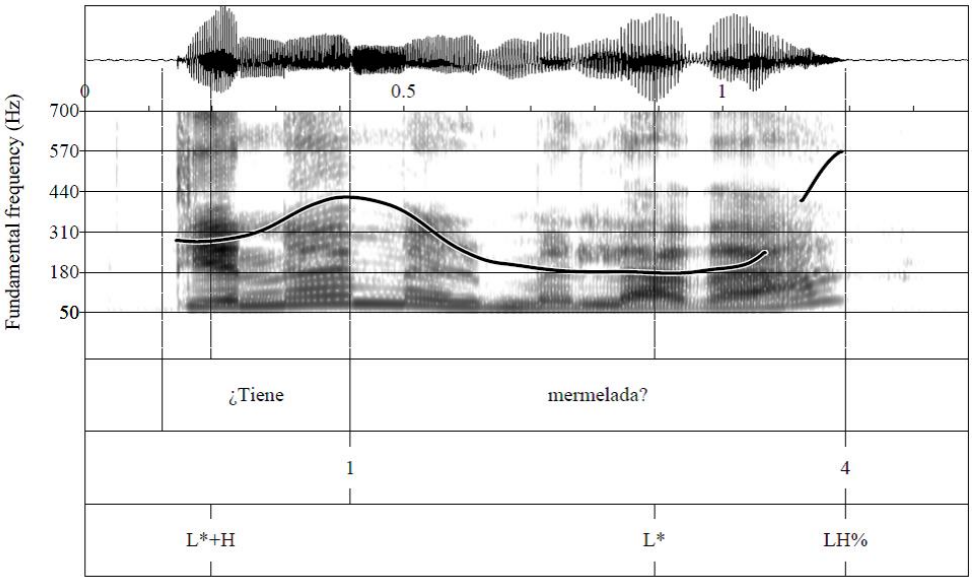

Figure 59. Information-seeking yes-no question, extracted from De la Mota, Butragueño and Prieto (2010: 330, Figure 8)

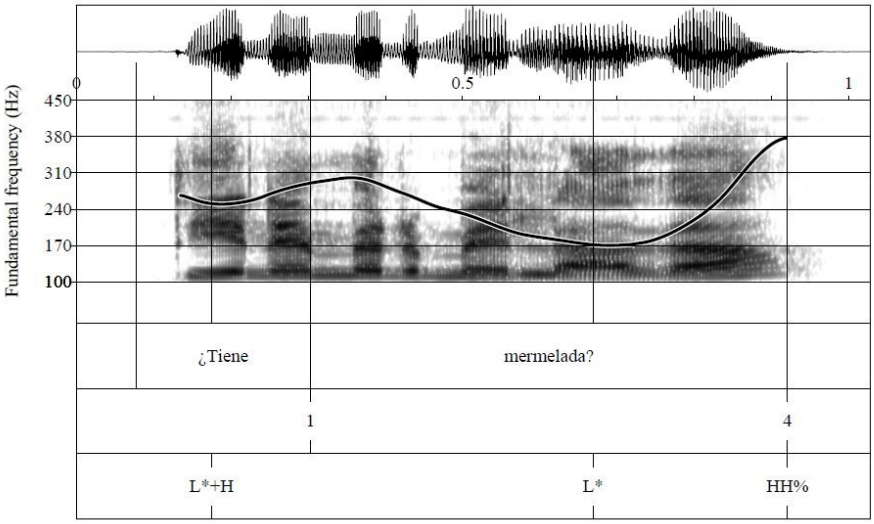

Figure 60. Information-seeking yes-no question, extracted from Estebas-Villaplana and Prieto (2010: 30, Figure 8)

Boundary tones by L2 learners that were not found in the native speaker data were considered to be errors.

7.4 Results

7.4.1 Information-seeking Yes-No Questions

Upon examination of the results of the native speakers below, I found that among the Mexican native speakers, the boundary tone realizations varied. In the case of native speakers of Castilian Spanish, they all produced HH% with no exceptions, while only Native2MF used the LH% tone and self-identified as "*Fresa*" Spanish Speaker[29].

It is interesting that De la Mota, Butragueño and Prieto (2010) reported nuclear pitch configuration for information-seeking yes-no questions to be L* LH%, while two of my participants used HH%, although all of the three participants were born and raised in Mexico City.

	Native1MM	Native2MF	Native6MF	Native3EF	Native4EF	Native5EF
¿Tienes mermelada? (*Do you have jam?*)	HH%	LH%	HH%	HH%	HH%	HH%
¿Te gusta la comida española?	HH%	LH%	HH%	HH%	HH%	HH%

[29] "*Fresa*" means strawberry literally and in Martínez (2014), the author informed that this group has been perceived as privileged Mexican youth, who have an expensive lifestyle, behave pretentiously and who speak Mexican Spanish very distinctively (Córdova Abundis & Corona Zenil, 2002).
cf. "*Fresa*" is a slang social term used in Mexico to describe a cultural stereotype of superficial youngsters who, by the traditional definition of the word, came from an educated, upper class family. See more datails in Martínez Gómez, Rebeca (2014).

(*Do you like Spanish food?*)						
¿Habla Juan coreano? (*Does John speak Korean?*)	HH%	LH%	HH%	HH%	HH%	HH%
¿Es María abogada? (*Is Mary a lawyer?*)	HH%	LH%	HH%	HH%	HH%	HH%
¿Es Luis mexicano? (*Is Luis Mexican?*)	HH%	LH%	HH%	HH%	HH%	HH%

Table 18. Boundary tones in information-seeking yes-no questions by native Spanish speakers

The boundary tone comparisons among the native Mexican speakers are presented below.

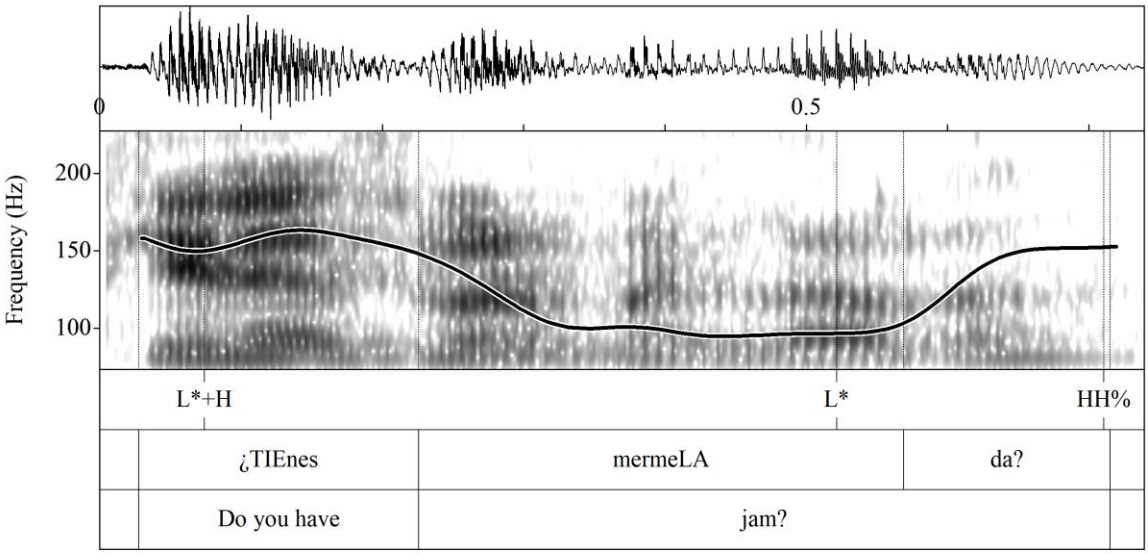

Figure 61. Native1MM ¿Tienes Mermelada? HH%

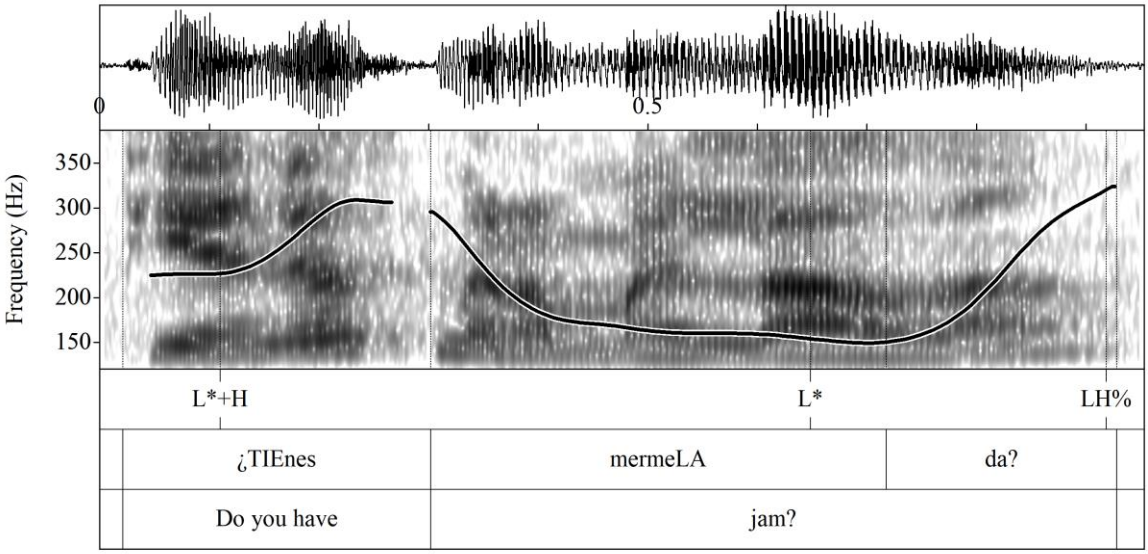

Figure 62. Native2MF ¿Tienes Mermelada? LH%

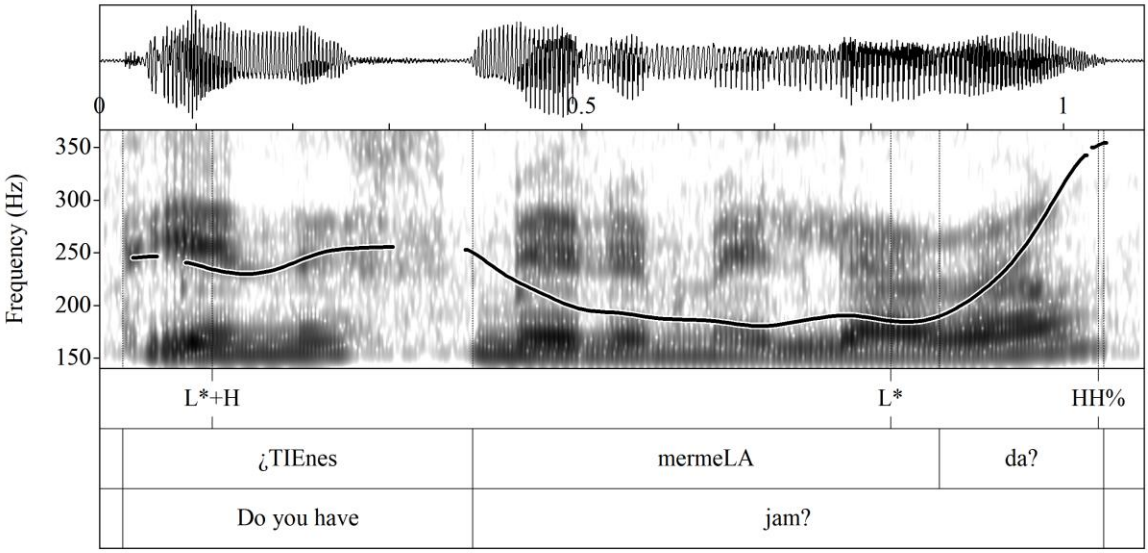

Figure 63. Native6MF ¿Tienes Mermelada? HH%

As the results show in Figure 64 and Table 19, the predominant boundary tone was

HH%. In this case, LH% is not an error since it is a typical boundary tone in Mexican Spanish. Interestingly, there were only four cases of LH% among Native Korean Speakers (NKS), and the advanced group (19.99%) produced more errors than the intermediate group (5.72%). Although participants received the directions stating, "Please produce the sentences in questions, as naturally as possible," this finding shows that beginners failed to make a natural question contour, thereby failing to deliver semantic meaning.

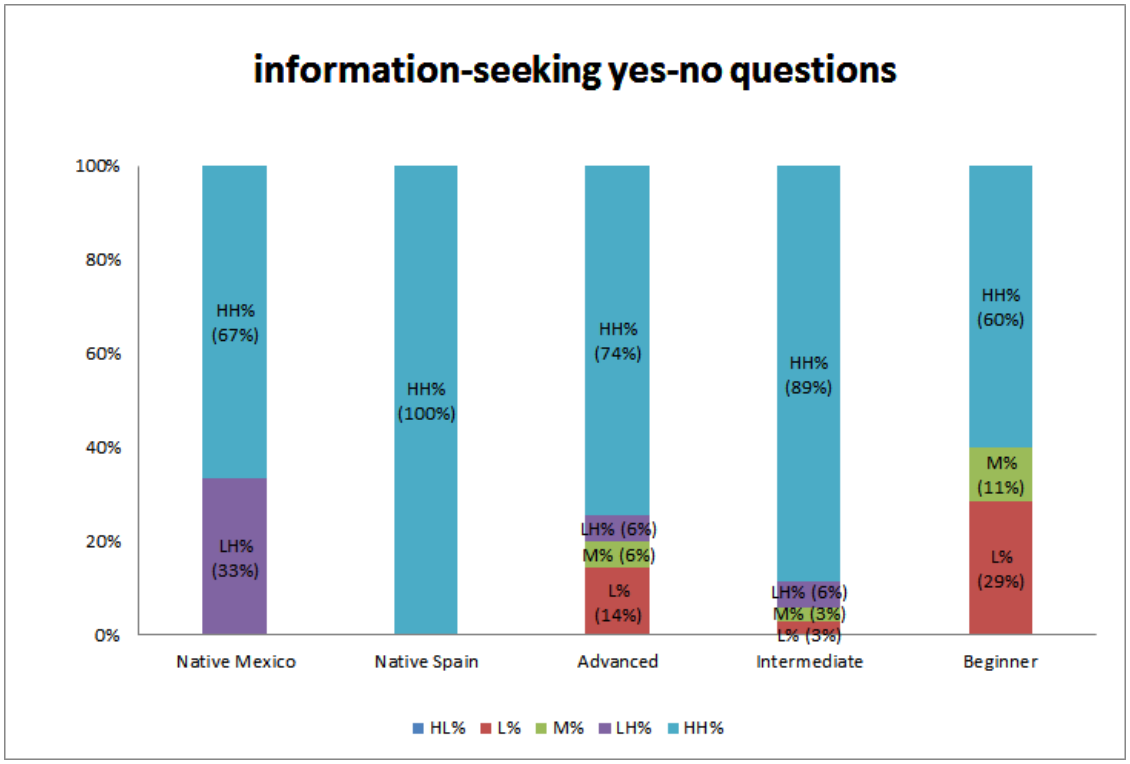

Figure 64. Boundary tone realization in information-seeking yes-no questions

	Native Mexico (n = 3)	Native Spain (n = 3)	Advanced (n = 7)	Intermediate (n = 7)	Beginner (n = 7)
HH%	66.7% (n = 10)	100% (n = 15)	74.3% (n = 26)	88.57% (n = 31)	60% (n = 21)
LH%	33.3% (n = 5)	0%	5.71% (n = 2)	5.71% (n = 2)	0%
M%	0%	0%	5.71% (n = 2)	2.86% (n = 1)	11.43% (n = 4)
L%	0%	0%	14.28% (n = 5)	2.86% (n = 1)	28.57% (n = 10)
TOTAL (n = 135)	100% (n = 15)	100% (n = 15)	100% (n = 35)	100% (n = 35)	100% (n = 35)

Table 19. Boundary tone realization in information-seeking yes-no questions

7.4.2 Information-seeking Wh-Questions

Native speakers showed variations in their production of boundary tones. Each speaker had a clear preference for L%, LH% or HH% and they were always consistent producing only one type of boundary tones.

Native2MF and Native6MF, both females from Mexico, produced the LH% boundary tone, while Native1MM, a male speaker from Mexico, produced L%. Since LH% is a rising tone, I posit that in information-seeking wh-questions, both rising tone (LH%, HH%) and falling tone (L%) are obtained as in Castilian Spanish (Estebas-Villaplana and Prieto (2010: 36). According to De la Mota, Butragueño and Prieto (2010: 336, Figure 15), the nuclear configuration of this type of sentence in Mexican Spanish is L+H* HL% as in Figure 65.

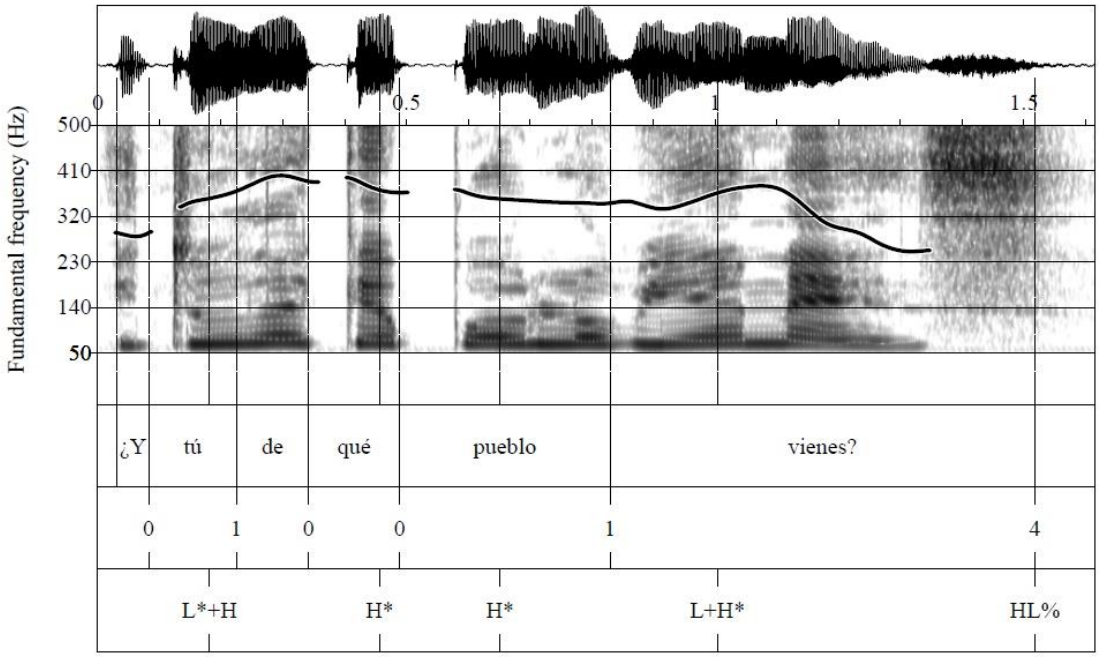

Figure 65. Information-seeking wh-question, L+H* HL%, extracted from De la Mota, Butragueño and Prieto (2010: 336, Figure 15)

Interestingly, the majority of Native Korean Spakers (NKS) of the intermediate and advanced learners produced L%, and the proportion of rising tone (HH%, LH%) is less than that of native Spanish speakers.

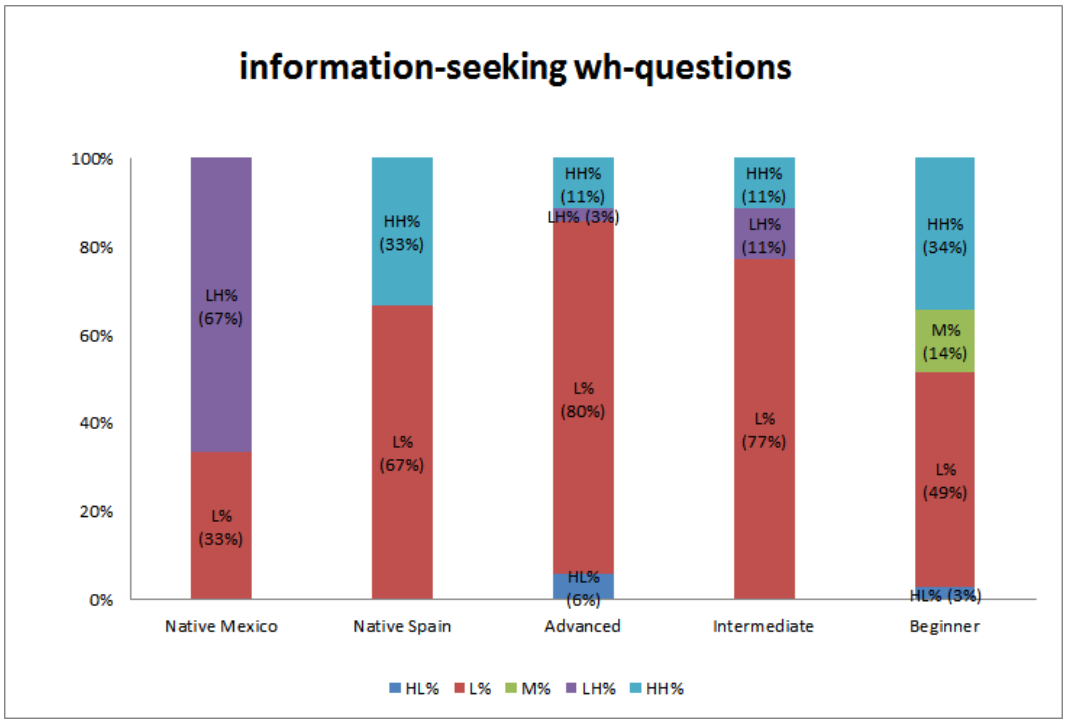

Figure 66. Boundary tone realization in information-seeking wh-questions

	Native Mexico (n = 3)	**Native Spain** (n = 3)	**Advanced** (n = 7)	**Intermediate** (n = 7)	**Beginner** (n = 7)
HH%	0%	33.3% (n = 5)	11.43% (n = 4)	11.43% (n = 4)	34.29% (n = 12)
LH%	66.7% (n = 10)	0%	2.86% (n = 1)	11.43% (n = 4)	0%
M%	0%	0%	0%	0%	14.28% (n = 5)
L%	33.3% (n = 5)	66.7% (n = 10)	80% (n = 28)	77.14% (n = 27)	48.57% (n = 17)
HL%	0%	0%	5.71% (n = 2)	0%	2.86% (n = 1)
TOTAL (n = 135)	100% (n = 15)	100% (n = 15)	100% (n = 35)	100% (n = 35)	100% (n = 35)

Table 20. Boundary tone realization in information-seeking wh-questions

7.4.3 Invitation Yes-No Questions

The results showed that all native Spanish speakers produced HH%, except Native2MF (LH%), a "*fresa*" speaker. Compared to the advanced group and intermediate group, beginners show a higher error rate, with 65.72% producing the L% boundary tone. I assume that even though they were instructed in the slides to produce the sentence in questions, in an inviting situation, it may not have been as easy for them to convey the meaning via intonation.

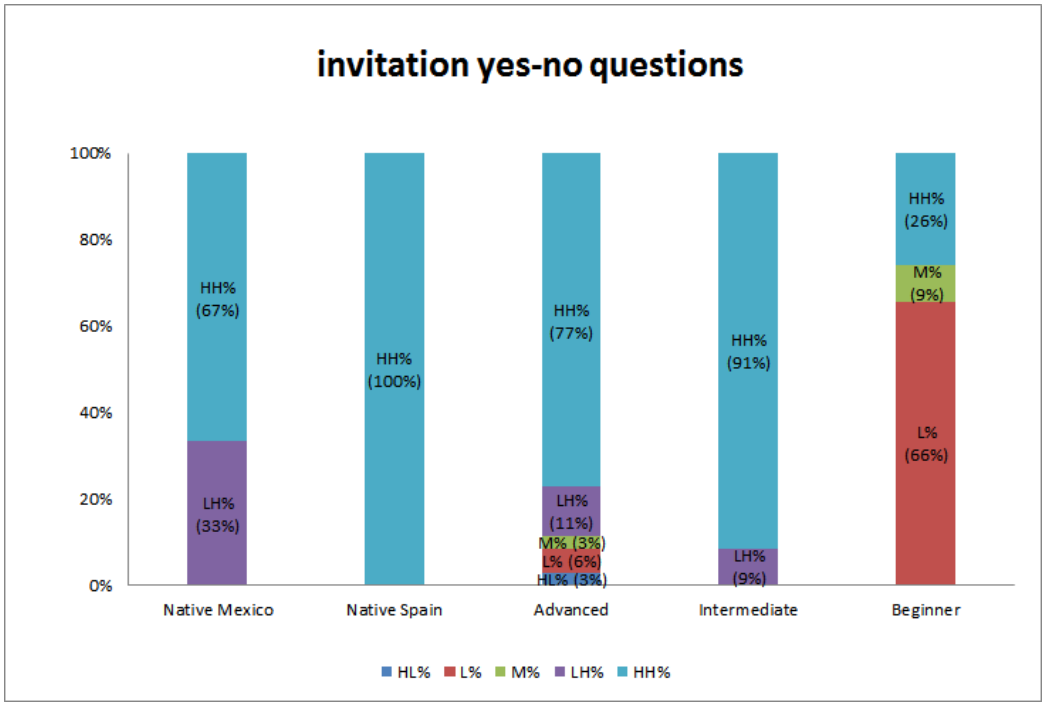

Figure 67. Boundary tone realization in invitation yes-no questions

	Native Mexico (n = 3)	**Native Spain** (n = 3)	**Advanced** (n = 7)	**Intermediate** (n = 7)	**Beginner** (n = 7)
HH%	66.7% (n = 10)	100% (n = 15)	77.14% (n = 27)	91.43% (n = 32)	25.71% (n = 9)
LH%	33.3% (n = 5)	0%	11.43% (n = 4)	8.57% (n = 3)	0%
M%	0%	0%	2.86% (n = 1)	0%	8.57% (n = 3)
L%	0%	0%	5.71% (n = 2)	0%	65.72% (n = 23)
HL%	0%	0%	2.86% (n = 1)	0%	0%
TOTAL (n = 135)	100% (n = 15)	100% (n = 15)	100% (n = 35)	100% (n = 35)	100% (n = 35)

Table 21. Boundary tone realization in invitation yes-no questions

7.4.4 Invitation Wh-Questions

As discussed, my designed sentences will elicit different types of boundary tones, but not the L+¡H* M% configuration.

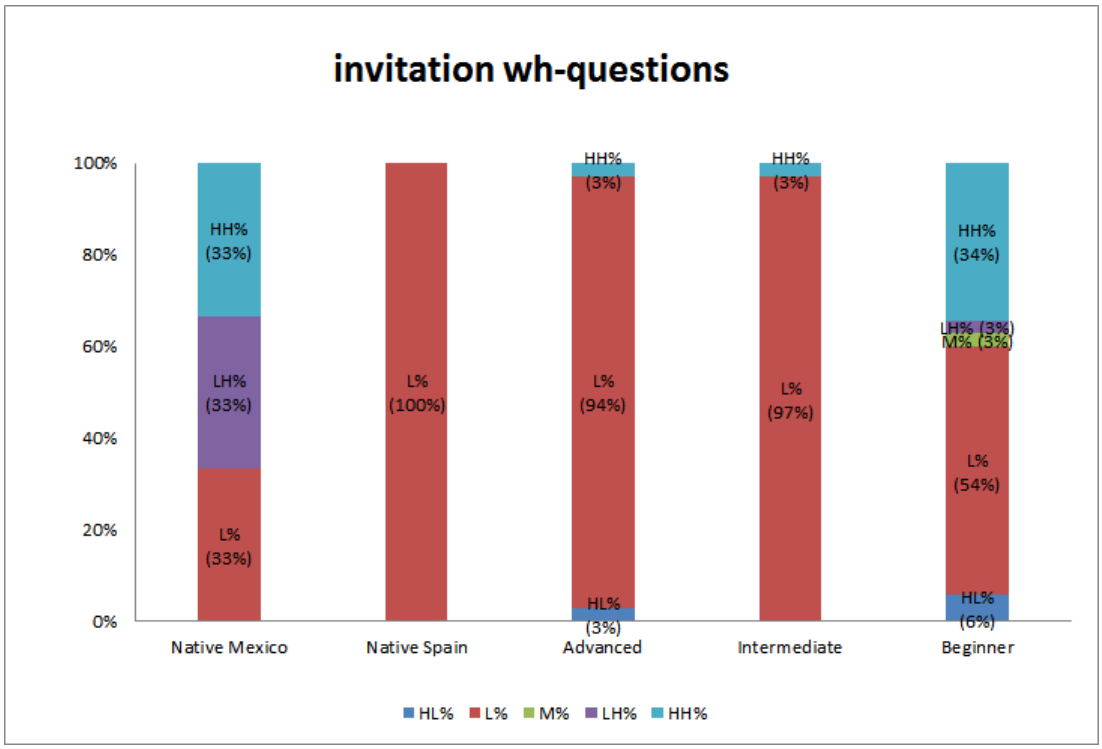

Figure 68. Boundary tone realization in invitation wh-questions

	Native Mexico (n = 3)	**Native Spain** (n = 3)	**Advanced** (n = 7)	**Intermediate** (n = 7)	**Beginner** (n = 7)
HH%	33.33% (n = 5)	0%	2.86% (n = 1)	2.86% (n = 1)	34.29% (n = 12)
LH%	33.33% (n = 5)	0%	0%	0%	2.86% (n = 1)
M%	0%	0%	0%	0%	2.86% (n = 1)
L%	33.34% (n = 5)	100% (n = 15)	94.28% (n = 33)	97.14% (n = 34)	54.28% (n = 19)
HL%	0%	0%	2.86% (n = 1)	0%	5.71% (n = 2)
TOTAL (n = 135)	100% (n = 15)	100% (n = 15)	100% (n = 35)	100% (n = 35)	100% (n = 35)

Table 22. Boundary tone realization in invitation wh-questions

In Table 22, I show that different results obtained for native speakers from Mexico. Overall, L% is dominant, except within the beginner group. Native Mexican speakers showed three different types of boundary tones according to the speaker. Native1MM, a male speaker, used HH%, Native2MF, a "*Fresa*" Spanish speaker, used LH%, and Native6MF, a female speaker, used HH%. Among three Mexican native speakers (all having been born and living in Mexico City for the majority of their lives), as mentioned earlier, Native2MF self-reported that her speech is natural but her Spanish is from the "*Fresa*" group.

7.5 Discussion

It is interesting that the majority of the intermediate and advanced Native Korean Speakers (NKS) produced L% in information-seeking wh-questions and in invitation wh-questions, which is not what I had predicted based on previous research. This may be due to the English intonation of information-seeking wh-questions and invitation wh-questions, which use a falling tone[30]. Future studies are needed to confirm these initial findings of the influence of English on L1 Koreans' production. Additionally, according to the results, beginners do tend to commit more errors, and I posit that this is because these types of sentences require conveying of meaning through intonation, beyond simple lexical items.

[30] See Hedberg et al. (2004)

CHAPTER 8 Discussion and Conclusion

8.1 Summary

In this dissertation, I have examined the acquisition of Spanish intonation by Korean learners of Spanish as a second language in four different areas.

Twenty-one participants representing three proficiency levels (seven beginners, seven intermediates, and seven advanced learners) recorded themselves reading words, phrases and sentences in Spanish as naturally as possible. Native Mexican and Peninsular Spanish speakers (three participants each) also participated as a control group.

Praat was used to analyze the intonation, and the pitch contour was labeled following the Spanish ToBI (Tones and Break Indices) (Beckman et al. 2002, Prieto & Roseano 2010) and Korean ToBI (Jun 2000, 2005) transcription conventions, which are based on the Autosegmental-Metrical model of intonational phonology (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Ladd 1996/2008) of each language.

In chapter 4, I examined the first research question about applying Korean Accentual Phrase (AP) initial tone-segment mapping to Spanish. High tone was used when the phrase-initial segment was aspirated (/p^h, t^h, k^h, $tʃ^h$/) or tense (/p*, t*, k*, s*, tʃ*/) or /h/ or /s/; otherwise, Low tone was applied (Jun 1993, 1998, 2000, 2005). The slopes between the high tone category and the low tone category of each participant were shown clearly. The results showed that the beginner and intermediate groups showed similar patterns to each other, while the advanced and native groups also patterned similarly to one another. The results demonstrate that the effect of Korean Accentual Phrase (AP) tone-segment mapping applied to Spanish is more salient in the

group of beginners and intermediates, while learners in the advanced group can overcome Korean L1 influence by acquiring the stress pattern of the words correctly.

In chapter 5, I showed that nuclear and pre-nuclear Pitch Accents in Spanish by L1 Koreans were realized differently from native Spanish speakers since Korean does not have this distinction. As compared to natives speakers' results, it was difficult for most of Native Korean Speakers (NKS) to acquire the delayed peak rising accent L+>H* in pre-nuclear position. L2 learners' selection of pitch accent type also differed from native speakers. In addition, Native Korean Speakers (NKS) tend to produce L+H* L% more often than L* L% in nuclear position in broad focus statements due to the AP-initial LH tone (Jun 2000, 2005).

The data suggest that L1 Korean speakers have a strong tendency to produce an "L H" (rising) tonal pattern over a word, i.e., the AP tone pattern, regardless of the location of stress. Thus, the word-final syllable was always mapped to a "High" tone in pre-nuclear position. I posit that edge is marked by rising H tone, due to the influence of L1 Korean. Also, a tendency of Korean speakers to align the high tone with the end of the word is confirmed as in Hualde & Kim (2015).

In chapter 6, I showed how Korean learners produce Spanish function words versus content words. The results showed that Korean learners of Spanish at the beginning level tend to produce each Spanish word as an AP-like tonal unit on almost every monosyllabic function word, while many of the intermediate and advanced learners produced one tone over two monosyllabic function words together. More advanced Korean learners also put pitch accent on a function word more often than native Spanish speakers, suggesting that Korean speakers equated Korean AP with pitch accent in Spanish. This supports the parallelism between AP and pitch

accent mentioned in Jun (1993, 1996) and Ladd (1996/2008). In addition, advanced L2 speakers were better at grouping monosyllabic function words into phrases, confirming findings from Jun & Oh (2000).

In chapter 7, I examined the boundary tones realized on four different types of questions: information-seeking yes-no questions and wh-questions, and invitation yes-no questions and wh-questions. The majority of the intermediate and advanced Native Korean Speakers (NKS) produced L% in information-seeking wh-questions and in invitation wh-questions, which is not what I had predicted based on previous research. This may be due to the English intonation of information-seeking wh-questions and invitation wh-questions, which use a falling. Future studies are needed to confirm these initial findings of the influence of English on L1 Koreans' production. Additionally, according to the results, beginners do tend to commit more errors, and I posit that this is because these types of sentences require conveying of meaning through intonation, beyond simple lexical items.

Overall, results have shown that beginner Korean learners of Spanish demonstrate more influence of their native language than intermediate and advanced groups. In general, L2 learners are not aware of the prosodic characteristics of their second language, and tend to apply their native language's prosodic features to their L2. As Jun & Oh (2000) concluded phonological properties of intonation were acquired earlier than phonetic properties of intonation. Also, the phonetic realization of pitch accents and boundary tones of L2 were not fully acquired even by the advanced L2 learners.

8.2 General Discussion

This dissertation is the first study analyzing the acquisition of Spanish intonation by native Koreans speakers using the ToBI systems of Spanish and Korean, based on the Autosegmental-Metrical model of intonational phonology. This AM model could well explain the prosodic differences of these two languages, and using the ToBI system enabled me to identify and demonstrate the different intonation inventories of each language.

In Spanish, at the postlexical level, the stressed syllable of a word can be realized with a pitch accent if the word receives prominence. The type of pitch accent differs depending on the location of the accent i.e., nuclear pitch accent is on the phrase-final word, while pre-nuclear pitch accents are before the nuclear pitch accented word). The inventory of the nuclear pitch configuration may also differ depending on the sentence type.

On the other hand, in Seoul Korean where there is no stress, word prominence is not marked by pitch accent but by locating the word at the beginning of an Accentual Phrase (AP). The tonal pattern of the AP is not distinctive and does not change due to the location or sentence type except when the AP is the last AP of an utterance. In this case, the AP-final tone is overridden by the sentence-final boundary tone. Typically, each content word in Spanish receives one Pitch Accent (PA) on the stressed syllable of a word, while each word forms one Accentual Phrase (AP) in Seoul Korean.

For this reason, Spanish is a ‘head’-prominence language while Korean is an ‘edge’-prominence language (Jun 2005a, 2014a). Though the means of marking prominence differ between Spanish and Korean, both languages have an Intonational Phrase (IP), the highest

prosodic unit marked by intonation. In both languages, the IP is defined by a boundary tone realized on the IP-final syllable, which is substantially lengthened, and followed by an optional pause. However, the types of IP-boundary tones allowed in each language are different.

Based on these prosodic differences between Spanish and Korean, in general, L1 Korean speakers had difficulties in marking prominence according to Spanish conventions and had a strong tendency to produce an "L H" (rising) tonal pattern over a word, i.e., the AP tone pattern, regardless of the location of stress. Thus, the word-final syllable was always mapped to a "High" tone in pre-nuclear position. Even in nuclear position (sentence final position), rising AP tone was commonly found, showing L+H* L% configuration in broad-focus statements. Also, in Seoul Korean, as each word forms one Accentual Phrase (AP), L2 learners produced AP-like tonal units especially on monosyllabic function words in Spanish.

The data also allow for some other general observations. The number of IPs in each sentence was one (1) for native Spanish speakers. Native Korean speakers tended to use more IP tones in the middle of a sentence, meaning substantial lengthening or sometimes hesitation was found in their production, especially when they were beginners. This showed a clear disfluency in the beginning group as well as in the intermediate group. In the advanced group, speakers tended to group the prosodic units better, so that the number of IPs was reduced, providing support for the finding in Jun and Oh (2000). Additionally, the duration of each utterance was shorter as the proficiency level increased. Moreover, L2 learners applied L1 boundary tones in Spanish, such as HLH% which does not exist in Spanish.

According to these results, the four dimensions of Mennen (2015)'s L2 Intonation Learning theory (LILt)) were supported.

From our study of pre-nuclear and nuclear pitch distinctions in Chapter 5, systemic dimensions of Mennen (2015) were supported. Native Korean speakers had difficulty when acquiring the systemic dimension, since the inventory of L1 Korean intonation is different from L2 Spanish intonation. For example, the schematic representations for Korean Accentual Phrase (AP) do not match exactly to Spanish Pitch Accents. Producing native-like pitch accents in pre-nuclear and nuclear position in Spanish was the hardest element to acquire for L1 Korean speakers across all proficiency levels. The Korean AP tone pattern was applied regardless of the position of pitch accents in a sentence. The inventory and distribution of categorical phonological elements of L1 was transferred to the L2. Finally, as shown in many examples throughout this dissertation, native Korean speakers' production of Spanish could be labeled with K-ToBI, and the most frequent cases were L Ha, L L+ Ha, which were initial-AP rising.

In the realizational dimension, even if we could label native Korean speakers' Spanish production according to Sp-ToBI, and even if the number and type of the pitch accents were the same as a native speaker's, the phonetic realizations were not identical. I posit that this made L2 learners' production sound different from native speakers'.

When L2 learners produced four different types of questions, especially beginners had problems with applying native-like boundary tones, causing difficulties in communicating semantic meaning. L2 learners find it difficult to use systemic elements to signal intonation function.

8.3 Limitations and Future Directions

It was difficult to control listing intonation and reading tone. However, this seems unavoidable when testing beginners. In order to control the number of syllables and the stress location in a word, I had to use some of the unfamiliar words. Since there are more dimensions and variables in the prosodic categories than in segmental categories, it was hard to label each prosodic unit using ToBI. Prosodic categories have not been fully established by researchers, making the labeling element challenging.

For future studies, spontaneous speech data by L1 Korean learners of Spanish could be analyzed, though it can be challenging to include beginners due to their limited proficiency. Additionally, Korean dialectal influence on L2 production could be tested. In this dissertation, I only analyzed Seoul Korean speakers, since other dialect such as South Kyungsang is lexical pitch accented (Kim & Jun, 2009). Moreoever, Korean boundary tones (HLHL%, HLH%, LHLH%, LHLHL%, Jun 2000) that does not exist in Spanish could be analyzed to see how they influence phonetic realization in Spanish.

APPENDIX

Language background information in Korean

<녹음 참가자 설문지>

- 연구주제: 한국어 모국어 화자가 스페인어를 구사할 때 나타나는 소리 현상
- 연구자: 손 지 은
- 연구자 소속: UCLA, Department of Spanish and Portuguese

본 연구는 한국어 모국어 화자가 스페인어를 구사할 때 나타나는 소리 현상에 대해 연구하기 위함이며,
아래 참가자의 정보는 연구 목적 이외의 용도로 사용되지 않음을 알려드립니다.
옆 칸에 해당 내용을 적어주시기 바랍니다.

1. 이름	
2. 학부 입학년도 / 학년	
3. 나이 (만)	
4. 이메일	
5. 스페인어 공부 기간 - 고등학교에서 배웠거나, 스페인어권 국가 체류경험이나 연수 경험이 있다면 명시	
6. 본인이 수강한 스페인어 관련 과목을 하이라이트나 붉은색으로 표시해 주세요. 그 외 국외수학 등으로 이수한 과목을 적어주세요.	초급스페인어 1, 초급스페인어 2, 중급스페인어 1, 중급스페인어 2, 스페인어 글쓰기, 스페인어 말하기, 시사 스페인어, 스페인어문법1, 스페인어문법 2, 중급스페인어작문, 중급스페인어회화, 스페인어학개론, 고급스페인어작문, 고급스페인어회화, 스페인어학연습 1, 스페인어학연습 2, (그 외:)
7. 본인이 생각하는 본인의 스페인어 구사 수준에 하이라이트나 붉은색으로 표시해 주세요.	• **초급**: 기초적인 어휘, 문법 등을 공부하는 중이며, 간단한 회화를 구사하려고 노력 중임 • **중급**: 기초적인 어휘, 문법 등을 공부했으며, 말하기 및 글쓰기 관련 과목을 수강한 적이 있음

	• **중급이상**: 본인이 소통하고자 하는 내용을 중급수준 이상으로 구사할 수 있음
8. 태어난 도시 및 서울/수도권에 거주한 기간	
9. 본인의 한국어 구사에 영향을 미친 지역방언에 대해서 *- 예시: 부산에서 태어나 고등학교까지 마쳤으며, 어머니는 충청남도 방언을 구사하심*	
10. 본인이 스페인어를 구사할 때, 가장 어려운 점 (답변은 선택사항임)	
11. 영어나 다른 외국어권 국가에서의 연수/교환학생/거주 경험 (기간 명시)	

Language background information translated in English

- Research topic: Sound phenomena when native Koreans speak Spanish
- Researcher: JyEun Son
- Affiliation of researcher: Department of Spanish and Portuguese at the University of California, Los Angeles

This research is designed to study the sounds that occur when Native Koreans speak Spanish, and the following personal information will be used only for research purposes and will not be released in public.

Required personal information is as follows; please fill out the boxes below.

1. Name or nickname	
2. Admission year	
3. Age, the year when you were born	
4. Email	
5. How long have you been studying Spanish? In case you learned Spanish from High School, please mention it. In case you have stayed or lived in Spanish speaking countries, please mention it.	
6. Please mark red or highlight the Spanish language courses that you have taken so far. Or list the Spanish language courses that you have taken so far.	Elementary Spanish 1, Elementary Spanish 2, Intermediate Spanish 1, Intermediate Spanish 2, Writing in Spanish, Speaking in Spanish, Current Spanish, Spanish Grammar 1, Spanish Grammar 2, Intermediate Spanish Writing, Intermediate Spanish Conversation, Introduction to Spanish Linguistics, Advanced

	Spanish Writing, Advanced Spanish Conversation, Spanish seminar 1, Spanish Seminar 2
7. Where were you born? How long have you lived in Seoul?	
8. Please list any Korean dialects that you have contact with, such as your parents' dialect. *For example: I was born in Busan and I lived there until my high school years, and my mom speaks Chungcheongnam-do dialect.*	
9. What is the most challenging part when you speak Spanish? (optional)	

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