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The perception of Spanish lexical stress in yes/no questions and exclamations by Japanese-speaking late learners: evidence for the effect of context of learning

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Abstract

Whereas the acquisition of Spanish lexical stress by English-speaking learners has received some attention (Face, 2003; Lord, 2001; 2004; Marasco, Steele, Sunara, & Colantoni, 2012), very little is known about the perception of Spanish lexical stress by Japanese-speaking learners (Atria, Kimura, Sensui, Takasawa & Toyomaru, 2012). Specifically, little is known about the perception of Spanish lexical stress in interrogative and exclamative sentences by Japanese-speaking learners. This language pairing is novel and lends itself well to the study of perception of stress because whereas Spanish is a stress-accent language, Japanese is a pitch-accent language, where stress is acoustically realized differently in each language.

This study has three goals. First, it seeks to make an empirical and a theoretical contribution to the field of second language phonology by examining the perception of Spanish lexical stress by advanced Japanese-speaking learners of Spanish. In particular, it aims to examine and compare the perception of paroxytone (*lim**i**te*; he limits) and proparotytone (*l**í**mite*; limit) words in sentence-final and non-final position of both yes/no questions and exclamations. Subsequently, it will determine, how the L1 (first language) Japanese prosodic system may interact with the variation in the realization of F0 peak displacement in the latter contexts in Spanish. The study also examines the effect of context of learning as well as type of words.

The participants consisted of 45 advanced Japanese-speaking late learners of Spanish (20 in Bogotá and 25 in Japan). Their ages varied between 22 and 50 years old. The control group consisted of 20 native Spanish speakers of Bogotá Spanish. The three groups were required to participate in a stress identification task. Nine sets of 3 syllable accentual minimal triplets with each having an oxytone (e.g., nabid**ó**), a paroxytone (e.g., nab**i**do) and a proparoxytone (e.g., n**á**bido) were used. The participants listened to the target words in five different contexts: isolation (e.g., med**i**co), final position of yes/no questions (e.g., ¿él dijo l**í**mite?), final position in exclamations (e.g., ¡él dijo v**á**lido!), non-final position of yes/no questions (e.g., ¿él dijo medic**ó** ayer?), and non-final position of exclamations (e.g., ¡él dijo med**i**co ayer!).

Results show that learners had difficulty perceiving the Spanish lexical stress, indicating that the interaction of the Japanese and Spanish prosodic systems may lead to the misperception of lexical stress. The recorded stimuli produced by a native speaker of Bogota Spanish are analyzed acoustically and the variation in F0 peak displacement in different prosodic contexts is discussed as a potential factor for miscuing the learners. Moreover, results show an advantage for the Bogota L2 (second language) group, who had been immersed in Colombia in comparison with the Japan L2 group, who had received classroom instruction in Japan. Furthermore, there was no effect of type of word (i.e., real vs, nonce word). The study has implications for models of L2 speech learning as well as pedagogical implications.

Keywords

second language acquisition, second language phonology, Japanese, Spanish, context of learning, lexical stress, stress perception, advanced learners, F0 peak,

For Joice,

my brave wife

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Chapter 1

Introduction

1.1 Objectives of this study

This study has three goals in regard to advanced Japanese-speaking learners of Spanish perceiving lexical stress in different structural contexts, and in different learning environments. First, it seeks to make an empirical and a theoretical contribution to the field of second language phonology by examining the perception of Spanish lexical stress by advanced Japanese-speaking late learners of Spanish. In particular, it aims to examine and compare the perception of paroxytone (*lim**i**te*; he limits) and proparotytone (*l**í**mite*; limit) words in sentence-final and non-final position of both yes/no questions and exclamations. Subsequently, it will determine, how the first language (L1) Japanese prosodic system (Morimoto, 1984; Labrune, 2012; Hirayama, 2009; Kubozono, 2011) may interact with the Spanish prosodic system and acoustic cues (Hualde, 2005; Llisterri, Marín & Mota, 1995), specifically the variation in the realization of F0 peak in the interrogative and exclamative sentences in Spanish. Whereas variation exists in the realization of F0 peak in different prosodic contexts in Spanish, this variation does not appear in Japanese. Moreover, F0 peak, duration and intensity are considered the acoustic correlates of stress (Hualde, 2012) in Spanish, F0 peak is the only acoustic correlate of lexical stress in Japanese. Therefore, an F0 peak displacement may miscue the learners and lead to a misperception of the Spanish lexical stress.

Second, this study aims to investigate the effect of the context of learning by examining the perception of paroxytone and proparoxytone words in interrogative and exclamative sentences in two groups of learners: (1) advanced Japanese-speaking learners who have received instruction in Japan, and (2) advanced Japanese-speaking learners who have been immersed in Bogota, Colombia. Whereas some studies provide evidence for a positive effect of immersion on second language (L2) speech learning (Díaz-Campos,

2006; Mora, 2008; Avello, Mora, and Pérez-Vidal, 2012), others do not (Díaz-Campos, 2004; Pérez-Vidal, Juan-Garau, and Mora, 2011; Avello and Lara, 2014). Moreover, most studies have focused on L2 production (e.g., Díaz-Campos, 2004; Avello and Lara, 2014) and there is a dearth of evidence on the effect of immersion on the acquisition of L2 perception (Hualde, 2005; Llisterri, Marín & Mota, 1995) and Japanese stress systems (Morimoto, 1984; Labrune, 2012; Hirayama, 2009; Kubozono, 2011).

Third, it will examine the effect of real versus nonce words in the perception of paroxytone and proparoxytone words in interrogative and exclamative sentences in the sentence-final and non-final positions. This is important because it will show whether Japanese speakers are using previously memorized lexical patterns (Altmann, 2006; Llisterri, Machuca, de la Mota, Riera & Ríos, 2002, Dupoux and peperkamp, 2002) or they are able to correctly perceive lexical stress in new words.

1.2 Research questions

The three main research questions in this study are as follows:

1. Will advanced Japanese-speaking late learners of Spanish experience difficulties perceiving Spanish lexical stress in interrogative and exclamative sentences? Specifically, will the perception of paroxytone and proparoxytone words in the sentence final position in interrogative (e.g., ¿Él dijo li**mi**te? ¿Él dijo **lí**mite?) and exclamative sentences (e.g., ¡Él dijo li**mi**te! ¡Él dijo **lí**mite!) be more difficult than in sentence non-final position (e.g., ¿Él dijo li**mi**te ayer? ¿Él dijo **lí**mite ayer? ¡Él dijo li**mi**te ayer! ¡Él dijo **lí**mite ayer!)?

2. Will there be an effect of context of learning? Specifically, will learners who have been immersed in Spanish in Bogota, Colombia outperform learners who have learned Spanish in a class-room setting in Japan?

3. Is there an effect of real vs. nonce words? In particular, will stress perception be easier in real words in comparison with nonce words?

1.3 Outline of the study

The research questions addressed above were examined through the present experiment examining the perception of Spanish lexical stress of paroxytone and proparoxytone words in interrogative and exclamative sentences by advanced Japanese-speaking late learners of Spanish. The study included 45 Japanese speakers and 20 Spanish native speakers as the control group. Participants were assigned to groups based on their location. Therefore, of the 45 participants that were recruited, 25 were enrolled in a fourth-year Spanish language course in Tokyo, Japan. All the students in Japan had spent less than six months in a Spanish speaking country and did not have an advanced proficiency level in any other language. The Bogota group consisted of 20 Japanese speakers who had been living in Bogota for at least five years. The participants in Bogota worked in the city of Bogota and had not studied Spanish before arriving in the city. Also, they did not attend a regular Spanish class, preferring to learn Spanish from a private teacher from Japan, who had taught Spanish to many people in the Japanese-speaking community living in the city. The participants in Bogota were recruited from various places, including universities, restaurants, and Japanese academies. All the participants were required to perform a stress identification task and a read-aloud task. Also, they had to complete a background questionnaire and a proficiency test. All these tasks took place in one session.

The perception of stress was tested through evaluating participants as they listened to nonce and real words in isolation and embedded within interrogative and exclamative sentences in final and non-final position. Participants were presented with 135 total tokens containing proparoxytone, paroxytone, and oxytone stress patterns. The stimuli consisted of five triplets of nonce words and four triplets of real words all with a syllable structure of CVCVCV (e.g., *t**í**pimo, tip**i**mo, tipim**ó***). The triplets comprised words that varied in the position of stress, but every member of each triplet of nonce and real words shared the same spelling. However, the location of the stress changed the meaning of the real words. For example, *l**í**mite* (limit (n.)), *lim**i**te* (he limits (v.)), *limit**é*** (I limited (v.)). The participants had to choose the correct word out of the three words presented on the screen of a computer to match what they heard. They listened to the target words in five

different structural contexts. As Figure 1 shows, in Context 1 the target words were presented in isolation (e.g., *val**i**do*), Context 2 and Context 3 presented the target words in final position of a yes/no question (e.g., *¿él dijo v**á**lido?*), and an exclamation (e.g., *¡él dijo val**i**do!*), respectively, and Context 4 and Context 5 presented the target words in non-final position of a yes/no question (e.g., *¿él dijo numer**ó** ayer?*), and in non-final position of an exclamation (e.g., *¡él dijo lim**i**te ayer!*), respectively.

Table 1: Structural contexts

	Final Position	**Non-final Position**
Isolated (context 1)		
Yes/no question	Context 2 ¿él dijo v**á**lido?	Context 4 ¿él dijo numer**ó** ayer?
Exclamation	Context 3 ¡él dijo val**i**do!	Context 5 ¡él dijo lim**i**te ayer!

The stress perception task was built using the software Psychopy 2 version 1.84.1 (Peirce, 2007, 2009) and its goal was to test the perception of F0 peak displacement in Spanish. Moreover, it was necessary to use the programme TeamViewer to allow participants to have access to the researcher's computer and do the perception task. The application Skype was also used as a backup to listen to the file sounds contained on Psychopy 2 version 1.84.1 (Peirce, 2007, 2009). An adult female speaker from Bogota recorded the word-tokens. A digital audio file containing all the sentences was recorded using the application EasyAudio Recorder Lite. After the recording, all the sound files were uploaded to the software Psychopy 2 version 1.84.1 (Peirce, 2007, 2009).

The overall results indicated that the perception of stress in paroxytone and proparoxytone words in interrogative and exclamative sentences posed difficulties for the Japanese-speaking advanced learners of Spanish. In particular, the perception of paroxytones and proparoxytones was more difficult in sentence-final position but the perception of these words was more difficult in sentence-non-final position in exclamative sentences. These results are attributed to the interaction of the learners' L1 prosodic system and variation in F0 peak realization in Spanish. The asymmetry between the exclamatives and interrogatives is also analyzed in light of the unexpected F0 peak realization patterns observed in the recorded stimuli produced by a native speaker of

Bogota Spanish. There was also an effect of context of learning. Specifically, there was an asymmetry between the perception of Spanish lexical stress by the learner group that had been immersed in Spanish in Bogota, Colombia and the group that had learned Spanish in a class-room setting in Japan. Interestingly, the former group patterned more with the native speakers of Colombian Spanish. There was no effect of type of word. This is attributed to the order of stimuli presentation, namely that the nonce words were presented before the real words, or due to the fact that Japanese speakers were not using memorised stressed patterns. Also, it could be possible the similarity of the stimuli in the triplets for the nonce and real word tasks might be the cause for not obtaining a difference between both groups of words.

1.4 Structure of the thesis

The structure of the remainder of the thesis is as follows: Chapter 2 addresses the concept of stress-accent and pitch-accent languages and their general properties. It also provides the different lines of research regarding Spanish stress and F0 peak displacement and typological differences related to stress in Spanish and Japanese. This leads to Chapter 3 and the presentation of relevant studies on the acquisition of L2 stress. More specifically, it presents studies on the perception of Spanish lexical stress by Japanese and English speakers. Chapter 4 presents the effect of the context of learning and the different studies that have compared immersion and formal instruction, as well as, the combined effects of the two. Chapter 5 defines the hypotheses and outlines the methodology followed to conduct the perceptual experiment. In this chapter, the stress perception task with real and nonce words, the questionnaire, the read aloud task, and the proficiency test are explained in detail. The participant criteria, the procedure, stimuli and testing protocol are explained as well. In Chapter 6, the behavioral results from each task as well as a spectrographic analysis of F0 peak realization of the recorded stimuli produced by a native speaker of Bogota Spanish are presented. Moreover, the results are analysed in light of variation in the realization of F0 peaks in the recorded stimuli. Lastly, Chapter 7 consists of the discussion of the results, the conclusions and suggestions for future work.

Chapter 2

2 Spanish stress-accent and Japanese pitch-accent

In the last chapter, the objectives, research questions, structures of the thesis, motivations for the study, and a summary of the methodology and results were presented. The purpose of this chapter is to discuss the acoustic and perceptual cues of Spanish lexical stress and Japanese pitch-accent. A review of the different lines of research on Spanish stress and the perception of lexical stress, and more specifically the perception of F0 peak displacement in Spanish will also be presented.

Regarding the organization of the rest of this chapter, first, definition of stress-accent and pitch-accent will be presented (§2.1). Then, Spanish stress typology (§2.2) and the Tokyo Japanese pitch-accent system are explained (§2.3). After that, the three lines of research about the the correlates of stress in Spanish are discussed (§2.4). In discussing the acoustic correlates of stress in Spanish, the phenomenon of F0 peak displacement is presented. This is particularly crucial given the possibility that the variation in F0 peak realization may lead to miscuing of Japanese-advanced learners.

2.1 What is stress-accent and pitch-accent?

When considering syllable prominence, there are two types of languages: stress-accent and pitch-accent languages. The term *stress* generally refers to syllable prominence, i.e., the syllable that receives a greater articulatory effort in its production and a greater salience in terms of perception. In stress-accent languages, such as Spanish, a stressed syllable contains a combination of the following properties to stand out over the rest of the syllables in a word: greater duration, greater amplitude, and higher fundamental frequency/pitch (Couper-Kuehlen, 1986; Ou, 2004; Hualde, 2012; Hyman, 2001, 2009). Also, these phonetic properties may have a strong or a weak presence in the stressed syllable (Hayes, 1995; Hualde, 2012, 2014; Hyman, 2014). Therefore, a stressed syllable

differs from an unstressed syllable in terms of the quality of phonetic properties it may have (e.g., duration, amplitude, pitch).

In pitch-accent languages, the articulatory and acoustic properties of this relative prominence mainly depend on a relatively higher pitch. Pitch refers to F0, that is to say the fundamental frequency or tone. On the first mora of the word momiji (Figure 1) a rise of the pitch can be observed, on the next mora mi . Hence, the word momiji has its accent on the first mora mo. Consequently, the pattern (H) and (L) is accomplished. Thus, the primary cue to perceiving and producing prominence is only the pitch. In other words, the other phonetic properties do not have the same degree of importance with respect to perceiving and producing lexical prominence. Tokyo Japanese is a good example of a language without stress, but with pitch-accent. Since stress entails more than the phonetic property of pitch. Bybee, Chakraborti, Jung and Scheibman (1998) define a pitch-accent language as follows: "A pitch-accent system is one in which pitch is the primary correlate of prominence and there are significant constraints on the pitch patterns for words. . ." (p. 277).

Although typologically different and not using the same acoustic cues to mark the lexical prominence, stress-accent and pitch-accent share some of Trubetzkoy's (1969) functions of accent. This means that the stress or pitch accent have a distinctive and a culminative function when marking prominence: the distinctive function serves to differentiate words. For instance, in Spanish the location of the lexical prominence serves to distinguish the meaning of words with the same spelling: *g**é**nero* (gender), *gen**e**ro* (I generate), *gener**ó*** (he generated); *s**á**bana* (bed sheet) and *sab**a**na* (savannah); *l**a**vo* (I wash) *lav**ó*** (he washed). Likewise, in Tokyo Japanese, accent distinguishes the meaning of words too, e.g., *hash**í*** (bridge) and *h**a**shi* (chopsticks); *h**a**na* (nose) *han**á*** (flower). The lack of minimal pairs following this pattern in Japanese, however, renders this functional load of accent fairly light. Beckman (1986) supports this view, arguing that in Japanese the distinctive function is not as important as the culminative function. Indeed, when accent gives information about one speech unit that stands out over the others, this property of accent is called culminativity. In other words, accent indicates that a word can only have one single prominence. In this respect, Spanish and Japanese share this characteristic;

words in both languages can only have one prominence. However, the way of marking this prominence is typologically different in both languages, as will be explained below.

2.2 Spanish stress typology

Spanish is considered a mixed system (with predictable and unpredictable stress). Stress is, on the one hand, phonemic and unpredictable. There are minimal triplets, such as, ***í**ntimo, int**i**mo*, and *intim**ó*** (i.e., intimate, I become close, he became close) that are contrastive because of the position of stress (Hualde 2005). Such triplets in Spanish are highly frequent and have to be learned. On the other hand, stress is predictable because Spanish, for the most part, has a three-syllable window; that is, stress must fall on only one of the three syllables of a word from right to left. There are three types of words: (1) oxytone words, where stress is in the last syllable of a word, as in *beb**é*** (baby); (2) paroxytone words, where stress falls in the penultimate syllable, as in *can**i**bal* (cannibal)*;* and (3) proparoxytone words, where stress is on the antepenultimate syllable, as in *matem**á**tica* (math). Stress cannot be placed in a fourth position beyond this three syllables window (*ma**té**matica**). According to Hualde (2005), the exceptions are the verbs that are formed when enclitic pronouns are added to them, for instance, *entreg**á**ndomelo* (giving it to me). Based on the explanation above, it can be stated that Spanish has a *free stress* system with certain restrictions.

2.3 Tokyo Japanese pitch-accent

Tokyo Japanese is a pitch-accent language in which each word has a tonal pattern that works as a marker of stress. It does not assign a specific tone to each syllable, as is the case in other languages such as Mandarin Chinese. Instead, in a pitch-accent language, accent position can be identified within a word without assigning a specific tone to each syllable in a word as is the case with tonal languages (Iwasaki, 2012). In general, the tone can be defined as the relative degree of peak of the consonants of vowel sounds, which measurement depends on the F0, or the number of vibrations produced by the vocal cords (Morimoto, 1984, p. 12).

In Tokyo Japanese pitch-accent, the minimum and basic unit that carries accent is the mora, a unit of measure that is thought to be constant in its temporal duration and that , it can be a syllable that consists of a single vowel (V), a consonant-vowel (CV), or a consonant-semivowel cluster with a vowel (CyV). That is, /a/, /ma/, and /mya/ would have the same temporal duration (psychologically perceived, at least) and each one constitutes one mora (Iwasaki, 2012, p. 37).

A syllable can consist of one or two morae and, in certain cases, even three. The following examples illustrate what has been explained above: (1): パン /pan/ (bread), has one syllable and two morae because the moraic ン /n/ consists of one mora by itself [1]; (2) a. 蛙 /kawazu/ (frog) has three syllables: /ka.wa.zu/ and three morae: ka.wa.zu; b. 簡単 /kantan/ (easy) has two syllables: /kan.tan/ and four morae: ka.n.ta.n; c. 伯母さん /obasan/ (aunt) has three syllables: /o.ba.san/ and four morae: o.ba.sa.n.

The mora is an element of great importance when distinguishing the accentual patterns of the Japanese varieties spoken in different regions of Japan. As mentioned before, this work will only focus on the standard variety of Japanese spoken in Tokyo because other Japanese varieties present different typologies. Although all varieties have lexical pitch accent, all the systems have tonal accent show variation. For example, the loan word from English *McDonald's* has distinct pronunciations: In Tokyo, ma.KU.DO.NA.ru.do, in Kyoto/Osaka, ma.ku.do.NA.ru.do, in Nagasaki, MA.KU.DO.NA.RU.DO, in Kagoshima, ma.ku.do.na.RU.do, in Miyakonojo, ma.ku.do.na.ru.DO, and MA.KU.DO.na.RU.do in Koshikijima. The syllables in capital letters indicate the high tone.[2]

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[1] In many varieties of Japanese, the mora is not the basic, rhythmic unit used to divide words in smaller parts, but rather the syllable. For example, in the variety spoken in Miyagi prefecture, called Takajócho, the syllable is the element that is important to divide words. Therefore, おばあさん /obáasan/ (grandmother), will have three syllables /o.báa. san/ and 5 moraes o.bá.a.sa.n (Tsujimura 1996).

[2] Example taken from Kubozono (2011, p. 2879)

For their part, tones are associated with morae, consequently, in Japanese the accent can be defined as a pitch that falls from a high mora (H) to a low mora (L)[3]. In the accentual system of Tokyo Japanese, the presence and location of high tones (H) and low tones (L) are distinctive from a phonological point of view. Phonetically, the accent is marked as follows: the high mora from which the tone starts its fall to the low mora, is considered the accented mora of the word, and hence, the place where the accent is located in Japanese (Labrune, 2012). In Tokyo Japanese's pitch-accent realization, neither intensity nor duration mark the pattern of the lexical pitch accent H L (i.e., high and low). Also, a word can be unaccented when there is not a pitch fall. The following examples will illustrate this point. Although the two words are identical, each pair has a distinct pitch pattern. However, it must be noted that the quantity of words differentiated by their pitch pattern is not considerably extensive (Kimura et al., 2012).

a. 紙**ka**mi	(H-L)	paper	vs	髪ka**mi**	horse	(L-H
b. 鼻**ha**na	(H-L)	nose	vs	花ha**na**	flower	(L-H)
c. 箸**ha**shi	(H-L)	chopstick	vs	橋ha**shi**	bridge	(L-H)

If, in a given context, a speaker wants to say "flower" and produces the word ***h**a**n**a*** with a high and low pitch pattern, his/her interlocutor from the city of Tokyo will understand this word as *nose* instead of *flower*. Therefore, Iwazaki (2012) comments that despite the fact that there are words sharing the same pitch pattern, and hence, pronunciation, they have different meanings and cannot be distinguished by their accented mora. Instead, a Chinese character is the only way to differentiate them[4]. Consider the following examples from Iwazaki (2012), where the same word with the same pronunciation can

[3] H stands for high-toned and L stands for low-toned.

[4] 鯉、恋、濃い、来い.

have different meanings and those meanings are only differentiated by their spelling. a. 鯉**ko**i (carp), b. 恋**ko**i (love), c. 濃い**ko**i (dark), d. 来い**ko**i (come!). The accented (bolded) mora in these four examples is always the same but the different meaning corresponds with a different orthographic representation.

It is worth pointing out that the pitch pattern of a word is totally predictable when the accented mora is known. Nonetheless, the location of the accent will not be predictable. For this reason, Japanese has a *free* or *unpredictable* accent system. That is, the accent is lexically indicated and must be learned for every word. For instance, a. 空sor**a**, (sky) (L-H); b. 川ka**wa**, (river) (L-H); c. 心ko**ko**ro, (heart) (L-H-L); d. 男oto**ko**, (man) (L-H-H)[5]. Referring to this phenomenon, Tsujira (1996) explains that in Japanese the accent goes with the word as part of its pronunciation and its meaning. The following oscillogram (Figure 1) shows the pitch of the accented mora falling from ***mo*** on the next mora *mi* in the word *momiji* (autumn colours):

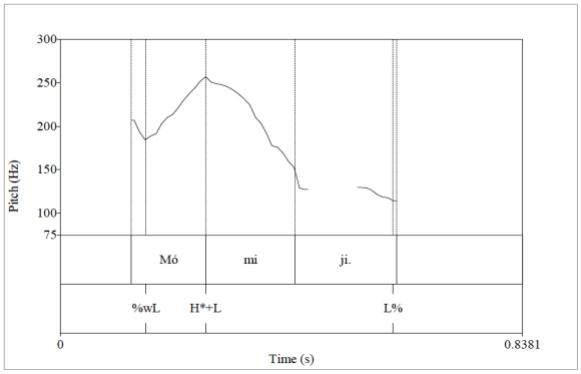

Figure 1: Oscillogram from Kimura et al. (2012). For the sequence *momiji*

The oscillogram in Figure 1 demonstrates how the accent marks the location of the pitch fall. That is, the accented mora receives a high pitch, and the morae following the accented one contains a low pitch. In Tokyo Japanese, words are divided into accented and unaccented. Approximately half of the lexicon of Tokyo Japanese vocabulary is

[5] Examples from Tsujimura (1996).

unaccented such as 鼻 (*hana*). However, words that are presented as unaccented are relatively short and, in a strict sense, Japanese, since this unaccented characteristic is not common in long, derivative words and loan words (Kubozono, 2011). On one hand, accented words have a sequence of (H-L), i.e., a pitch fall, as Figure 1 illustrated above. On the other hand, unaccented words do not have the pitch pattern H-L (Labrune, 2012). The following example illustrates this situation: the word 鮭 ***sa****ke* (salmon) is an accented word in which the location of stress is on the first mora and its pitch pattern is H-L. The marker of the accent is the pitch fall from the first mora *sa* to the second mora *ke*. However, in *sake*。[6]（alcohol) there is no marker of accent because it is an unaccented word. This means that each mora receives a high pitch because there is not marker of stress which indicates a pitch fall.

In Tokyo Japanese, the following rule is allowed: *n* +1 pitch pattern, where *n* stands for the number of morae that a word contains. Regardless of the number of morae that a word contains, only one accented mora is acceptable. In other words, one pitch fall, from the accented mora to the rightward mora is permissible in a legitimate a word. As a consequence, secondary accent does not exist in Japanese. Thus, for a three morae word having the following structure: CVCVCV, the following prosodic pitch patterns are possible for the nouns at the lexical level of the words containing three morae: **CV**CVCV 涙***na****mida* (HLL) tear, CV**CV**CV 心*ko****ko****ro* (LHL) heart, CVCV**CV** 鏡*kaga****mi*** (LHH) mirror, CVCVCV。(unaccented) 桜*sakura*。(LHH) cherry tree[7] (Labrune, 2012). In sum, these four prosodic patterns are possible for three-mora words having the vowel structure CVCVCV.

Nevertheless, the *n* + 1 accent possibilities rule works for nouns, but not for verbs and adjectives. As a consequence, it can be stated that the accentuation of nouns with two or three morae is unpredictable, since the accent can fall on the first, second, or third mora, as demonstrated in the previous examples. Nonetheless, in the case of longer accented

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[6] The symbol 。 means the word is unaccented.

[7] Examples from Labrune (2012).

nouns (i.e., more than three morae), which comprise compound and loanwords, the accentuation is considered predictable, because there is a tendency to assign the stress on the antepenultimate mora (Haraguchi, 1991). However, regarding verbs and -i (い)[8] adjectives in standard Tokyo Japanese, the location of the accent is not very unpredictable. Consequently, there are only two pitch patterns for verbs and adjectives (in present tense), irrespective of word length. Similarly to nouns, verbs and adjectives exhibit the accented and unaccented patterns. Although with verbs the two patterns are presented in an equitable way, this is not true for adjectives and the frequency of the accented pattern is higher for the latter.

Iwazaki (2012) suggests four rules that will automatically determine the pitch patterns of a word: (1) the initial mora will always have a low pitch (L). There will be, however, an exception when the initial mora is bearing the accent; (2) The pitch of the initial mora and the second mora, must be different, meaning that, if the first pitch is high, it must fall on the point where the second tone starts and vice versa; (3) it must be a fall of the pitch from the accented mora to the next mora on the right. The location will have to be specified through the lexicon; (4) all morae located after the accented mora will have a low pitch, that is to say, at the moment the pitch falls and becomes low it does not rise to become high again.

As a consequence of these Iwazaki (2012) rules, the following are the possible prosodic patterns that can occur in sequences that contain H-L patterns. The following examples have up to five morae:

a. Accented words (have a sequence H-L)

H-L	HL-L	HLL-L	HLLL-L	HLLLL-L
	LH-L	LHH-L	LHHH-L	LHHHH-L

[8] There are two types of adjectives in Japanese: -i (い) adjectives y -na (な). Each group is conjugated differently. For example, 可愛い – kawaii (nice, beatiful) and 静かな (な) – shizukana, quiet (sound).

LHL-L LHLL-L LHLLL-L

LHHL-L LHHLL-L

LHHHL-L

b. Unaccented words (do not have a sequence H-L)[9]

L-H LH-H LHH-H LHHH-H LHHHH-H

Due to the initial lowering rule suggested by Haraguchi (1997),[10] which establishes that the pitch of the initial mora in a given word will be low, except if the accent is located on that initial mora. From this, it follows that the pattern of unaccented words provided in (b) consists of words, which do not contain any displacement from high to low. Considering that there is not any pitch marker in the words presented in (b), it means each mora receives a high pitch because there is not any indication of a pitch fall to mark low. As a result, the rule or principle of initial dissimilation is applied to the first mora and words are pronounced following the patterns established in (b), as LHH and so on (Labrune, 2012; Tsujimura, 1996).

Tokyo Japanese accent, as the above example illustrates, has characteristics of a distinctive accent. Although the accent in Japanese is derived by the lexicon, it has certain restrictions that would determine the pitch pattern of many words. In this category are the loanwords that have their origins in western countries and compound substantives. With these types of words the pitch tends to fall on the antepenultimate mora.

In the two sections 2.2 and 2.3 that described Spanish lexical stress and Tokyo Japanese pitch-accent, it was important to show how the realization of F0 peaks in Japanese and the manner of marking the focal prominence in a word in both languages is different. This is critical for the present study since it is clear how these typological differences

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[9] Both tables from Labrune (2012) p. 181.

[10] Cited in Tsujimura (1996) p. 75.

could pose difficulties for Japanese-speaking advanced learners of Spanish in perceiving Spanish lexical stress. The following sections will explain the miscuing that the F0 peak displacement may cause and the difficulties it may produce to Japanese speakers.

2.4 Spanish Stress Correlates

Traditionally two lines of research have existed with respect to the phonetic nature of Spanish stress: one holds that Spanish stress depends on the fundamental frequency and the other claims that Spanish stress depends on intensity (see Urrutia, 2007 & Quilis, 1993 for an illustration of these two positions). Regarding the first line of research, the authors claim Spanish stress depends mainly on the fundamental frequency (F0). Among them, Andrés Bello (1984) considers the F0 an important acoustic correlate. Quilis (1993) states that Spanish stress depends on the fundamental frequency for its perception and production. The RAE[11] (1959, 2011) gives the F0 a special relevance too. For their part, Quilis (1993), Llisterri, Machuca, Ríos, de la Mota, and Riera, (2003) support the fundamental frequency (F0) as the main cue for lexical stress for perception and production. In this respect, Garrido, Llisterri, de la Mota, and Ríos (1995) point out that the association between the F0 peak and stress has an important role in the identification of the lexical stress in isolated words. Likewise, Bolinger and Hodapp (1961) and Navarro Tomás (2004) give the same importance to the F0.

All the above-mentioned authors have considered duration as the second most important acoustic correlate after the F0. Hence, Martínez and Fernández (2007) confirm what the other authors have explained and offer an argument in favour of the F0 as the main factor to detect stress in Spanish when they state that duration is the second most important acoustic correlate in Spanish and discard intensity as a determinant parameter to produce and perceive the Spanish lexical stress. Although all the cited authors have evidence to demonstrate F0 as the main cue to stress in Spanish, Ortega-Llebaria (2006) considers that the material used in their experiments was flawed, since they only included words in isolation and the carrier sentences were read with a declarative intonation. That is, all the

[11] Real academia de la lengua española.

stressed syllables were also accented and, therefore, had a rising pitch. Consequently, the cues for stress and accent were together on the same syllable. Following the same line of argumentation, Martínez and Fernández (2007) consider that pitch and duration are relevant depending on the circumstances. Ortega-Llebaria and Prieto (2007) share this latter position, arguing there are certainly grounds for scepticism to consider the F0 the main cue for stress in Spanish because the previous authors only studied words containing pitch accent. Instead, Ortega-Llebaria and Prieto in their experiment compared the acoustic correlates of Spanish in accented and deaccented words. Therefore, they consider:

> …the traditional goal of searching for the *main cue* to stress in Spanish makes no sense, as phonetic cues are not used the same way in accented and unaccented contexts. In accented contexts, it is clear that the pitch is a strong phonetic cue of stress. Yet in unaccented contexts, where pitch is flat and cannot be an indicator of the stress difference, the results of this study reveal that duration, intensity, and even vowel quality are good indicators of the stress difference. Thus, in the absence of an accent, cues like duration and spectral tilt are crucial in the production of Spanish stress (p.174).

The second position entails that stress in Spanish depends on intensity. According to Navarro Tomás (2004, 1974), intensity is essential to indicate the stress. Similarly, Cuervo (1981, 1954) and Llorach (1994) argue that intensity is the main acoustic correlate in Spanish stress realization. The two previous lines of research are the most traditional ones in the Spanish phonetics and phonology fields. Nevertheless, two more positions have recently taken place. The third line of research places an emphasis on duration as the essential acoustic factor to determine Spanish stress (Ríos, 1991; Prieto and Ortega-Llebaria, 2007; Ortega-Llebaria, 2006; Ortega-Llebaria, Gu, and Fan, 2013; Garrido et al., 1995).

There is also a different perspective on the order of importance of the acoustic correlates in Spanish. This last position suggests that all the three acoustic correlates are important. Although, Quilis (1993) supports this view, he believes fundamental frequency (F0) is

more important than duration and intensity. Apart from Quilis (1993), different authors such as Kholer (1990) and Silverman (1990) agree with this proposal. There has not always been consensus in the literature on the importance of the acoustic correlates of Spanish stress. Although there is a consensus about the significance of these three cues, (duration, intensity and F0 peak) each author confers more relevance to one factor over the others.

It is worth mentioning that the three acoustic correlates are not at all times present to the same degree in the acoustic signal of words. Therefore, there are contexts where the stressed syllable may possess a subtle or a strong presence of one or two of the acoustic correlates (Hualde, 2012). In other words, stress realization is sensitive to the contexts; moreover, intonation and language specific constraints also affect it (Cutler, 2005). In Spanish in particular not all the acoustic correlates of stress may always be present. Specifically, in Spanish, when the F0 peak is not aligned with the stressed syllable, it moves to the next syllable on the right of the syllable bearing the focal prominence (Xu, 1999; Garrido, Llisterri, de la Mota, & Ríos, 1993,1995; Llisterri, Machuca, de la Mota, & Ríos, 2002; Llisterri et al., 2003; Prieto, Van Santen & Hirschberg, 1995; Llisterri, Machuca, Ríos, de la Mota, Riera, 2003). Indeed, this phenomenon is very frequent in Spanish and is referred to as the F0 shift, F0 peak displacement, or F0 peak delay. According to Garrido et al. (1993), the F0 peak displacements occurs 70% of the time in Spanish pitch accents of declarative sentences, and aligns with the stressed syllable approximately 25% of the time. Navarro Tomás (1944) also claims that the F0 peak displacement is a common phenomenon in Spanish. Based on the previous information, it can be determined that depending on the context where the words are pronounced, every acoustic correlate will have a different degree of importance. The present study is concerned with this phenomenon, referring to it henceforth as F0 peak displacement.

Llisterri et al. (1995) studied this phenomenon and found congruent evidence to support what Garrido et al. (1993) claimed, namely that F0 peak displacement is more frequent in paroxytone words (*ma**ri**no*), where the F0 peak moves to the rightward syllable. The F0 peak displacement was less salient in proparoxytone words (***Dé**bora*), where it moves rightward two syllables. They also concluded that the F0 peak displacement tends to

occur across NP-VP (i.e., Noun phrase-Verb phrase) boundaries. Regarding oxytone words (*Mari**ví***), no F0 peak displacement takes place on this type of words with ultimate stress. These findings were supported in a later study (Llisterri, Machuca, de la Mota, Riera & Ríos, 2002) dedicated to perception, since previous studies had an acoustic perspective (Llisterri et al., 1995; Garrido et al., 1993, among others). For this reason, F0 becomes a less reliable cue for stress in certain contexts (e.g., phrase-final position in declaratives) (Hualde, 2012). When F0 is not aligned with the stressed syllable, then duration becomes a more important cue for perceiving stress because of the F0 peak displacement. These findings are congruent with previous literature (Ortega-Lleberia and Prieto, 2007, 2010; Ortega-Llebaria et al., 2013; Ortega-Llebaria, 2006, and Prieto, van Santen, and Hirschberg, 1995).

Llisterri, et al. (2002) provide more evidence in support of the view that duration is a more reliable and important cue for stress in Spanish when the F0 peak displacement takes place. The authors designed a perceptual experiment to evaluate the role of F0 peaks in the perception of Spanish lexical stress. Participants consisted of 20 students, native speakers of Castillian Spanish. A perception task consisting of three different tests was conducted. A corpus of isolated words and full sentences was recorded. The F0 contour was manipulated using Praat, but the other two cues duration and intensity were left intact. Listeners did not hear the original values of the F0 because they were modified to be able to obtain a new stress pattern different from the original one. The stimuli were words sharing the same segmental form, but varying their meaning because of the stress placement (e.g., *n**ú**mero*, 'the number'; *num**e**ro*, 'I number'; *numer**ó***, 'he/she numbered'). Also, nonce words were used to evaluate the role of lexical knowledge (e.g., *n**ú**libo, nul**i**bo, nulib**ó***). Thus, for proparoxytone words such as *n**ú**mero,* the F0 contour was replaced by the F0 values belonging to paroxytone words as *num**e**ro,* and the F0 contours of paroxytone words were changed by the values corresponding to oxytone words, such as *numer**ó***. However, oxytone words' pitch contours were not manipulated. As it was mentioned earlier, duration and intensity were not modified. Three tests were conducted as part of the perception task. The first test consisted of 30 isolated words. Participants were asked to identify the location of the stressed syllable (i.e., first, second, or third from the right of the word boundary). The second test comprised of 24 pairs of isolated words;

this time, the participants were asked to say whether the words had similar or different stress patterns. Regarding the third test, the target words were embedded in sentences. The stimuli for the last test consisted of 84 words. The participants had to identify the location of the stressed syllable (i.e., first, second, or third). The results yielded that most participants were able to identify the originally stressed syllable, despite the manipulation of the F0 values. In other words, they could perceive the stressed syllable, although the F0 peak was displaced to the rightward syllable. Regarding the perception of lexical stress on the second syllable (i.e., paroxytone words) and F0 contour with the peak on the final syllable of nonce words embedded into sentences, participants perceived the stress on the syllable carrying the F0 peak in 30.92% of cases. However, the perception of the originally stressed syllable was correct in 67.11% of cases. With respect to the nonce paroxytone words in isolation, 63.16% of cases were perceived on the originally stressed syllable and 36.84% of cases on the syllable bearing the F0 peak. For real words in isolation, participants exhibited a similar performance perceiving 60.53% of cases on the originally stressed syllable and 36.84% of cases on the syllable bearing the F0 peak. Likewise, in the perception of real paroxytone words embedded in sentences, 67.11% of responses indicated the syllable bearing the lexical stress before the manipulation was perceived, and 36.84% of responses to the syllable carrying the F0 peak.

The findings provide evidence that the F0 peak displacement is not a miscue for Spanish native speakers, since the displacement does not force participants to perceive the syllable with the higher F0 as the stressed syllable. These results are consistent with the accounts given by previous and more recent studies as Ortega-Llebaria (2007) and Ortega-Llebaria et al. (2013). As it was mentioned earlier, in the absence of pitch accents, duration becomes the most important cue to perceive stress in Spanish. Although traditionally the line of research supporting the F0 as critical in stress perception in Spanish was very extensive in empirical studies, recently experimental works have demonstrated that duration is a more reliable cue to perceive stress than the F0. This has been claimed after studying the F0 peak displacement in Spanish when questions about the effects of this displacement in the perception of Spanish lexical stress arose. These questions identified the issue of what would be left for listeners if the F0 (considered the main cue to stress in Spanish) shifts to the syllable on the right. What will listeners have

to rely on in deaccented stressed syllables? (Llisterri et al., 1995, 2002; Ortega-Llebaria & Prieto, 2007; Ortega-Llebaria, 2006; Ortega-Llebaria et al., 2013; Prieto, van Santen, & Hirschberg, 1995). The supporting evidence explained above suggests duration is the main cue for stress perception in Spanish because, in the absence of the F0 peak, listeners can continue to perceive the original stressed syllable.

With respect to Spanish as a second language, Ortega-Llebaria et al. (2013) investigated the F0 peak displacement. English speakers with a high proficiency level of Spanish were included in this study. The aim was to find out if the differences in the realization of stress in English and Spanish could pose any ease or difficulty to the English-speaking learners of Spanish. Indeed, the results reported English native speakers manifested difficulties in perceiving Spanish stress when the F0 peak was not aligned with the stressed syllable in the pre-nuclear position. For example, instead of perceiving a parxoxytone word, they perceived an oxytone one. The difficulty was created because the F0 aligns differently in English and Spanish. English speakers perceive stress only when the stress syllable coincides with pitch accent and they are not able to perceive Spanish pitch accent as L*+H (the asterisk indicates that the pitch H or L is aligned with the stressed syllable) because the realization in English is all the time H*. Consequently, English speakers do not perceive word stress of Spanish in deaccented contexts. Ortega-Llebaria (2006) accounts are in accordance with the Ortega-Llebaria et al. (2013) study which will be reviewed in detail in chapter 3.

2.5 The F0 peak displacement to the rightward syllable of a word miscuing the learners

Although Spanish and Japanese have some phonological features in common, lexical prominence is perceived differently in both languages. On the one hand, Japanese accent is defined by marking a decrease in tone after the more prominent mora (Tsujimura, 1996). However, in Spanish depending on the context (e.g., isolated word; declarative, exclamatory, or interrogative sentences) the presence of acoustic correlates (i.e., frequency F0, duration, and intensity) could be subtler for indicating stress (Hualde, 2014). Therefore, Spanish realization of stress exhibits a variation on the position of tone when the word is isolated or in interrogative and exclamatory contexts of full sentences.

The exception is when the target word (i.e., proparoxytone and paroxytone) is embedded into interrogative and exclamatory sentences and it is located in final position. In such contexts, the F0 peak tends not to be aligned with the stressed syllable anymore. Instead, the displacement of the F0 peak takes place and the high pitch moves to the next syllable (Xu, 1999; Garrido, Llisterri, de la Mota, & Ríos, 1993,1995; Llisterri, Machuca, de la Mota, & Ríos, 2002; Llisterri et al., 2003; Prieto, Van Santen & Hirschberg, 1995; Llisterri, Machuca, Ríos, de la Mota, Riera, 2003) as mentioned before. Hence, this displacement may interact with the learners' L1 and miscue for Japanese-speaking learners of Spanish because this displacement does not occur in Tokyo Japanese in any context. As an example, the following oscillograms of the sequence *ta**ma**go* (i.e., egg in Japanese), isolated and in full sentence demonstrate how the pitch maintains the same realization in different contexts in Japanese.

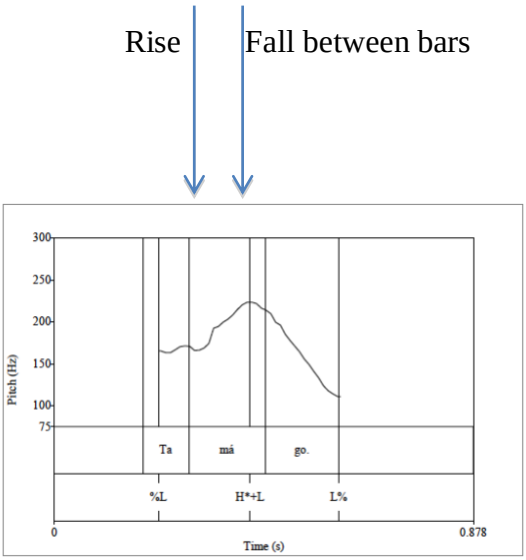

Figure 2: Oscillogram from Kimura et al. (2012). Sequence *ta**ma**go*

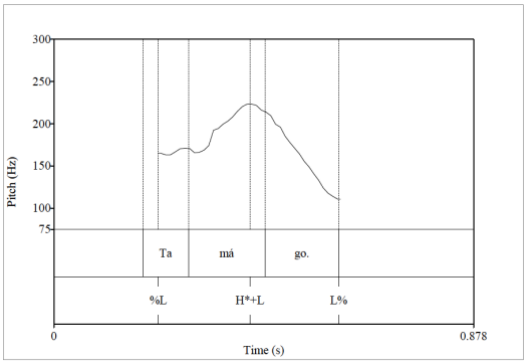

Figure 3: Oscillogram from Kimura et al. (2012). Sequence *ta**ma**go*

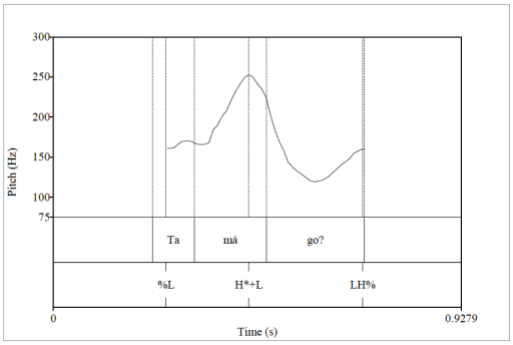

Figure 4: Oscillogram from Kimura et al. (2012). Sequence *ta**ma**go?*

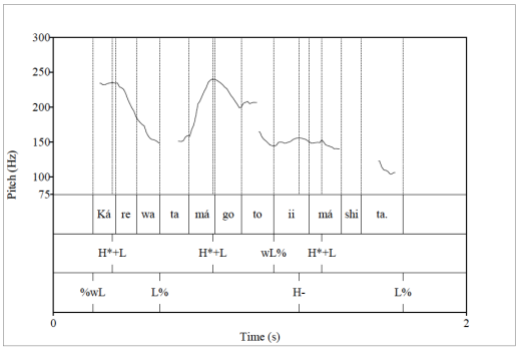

Figure 5: From Kimura et al. (2012). Sequence *kare wa tam**a**go to iimashita*

In the case that Japanese speakers could perceive the stress regardless of the displacement of the F0 peak, this displacement could cause a lexical confusion for the Japanese speakers, since instead of perceiving *li**mi**te* in a yes/no question, they would be perceiving *limi**té*** (I limited) because of the false cue produced by the displacement of the

F0 peak and transfer from L1. Consequently, incorrect perception of word stress in L2 Spanish may create a miscommunication problem that can "precipitate false recognition, often in defiance of segmental evidence" (Cutler 1984, p. 80).

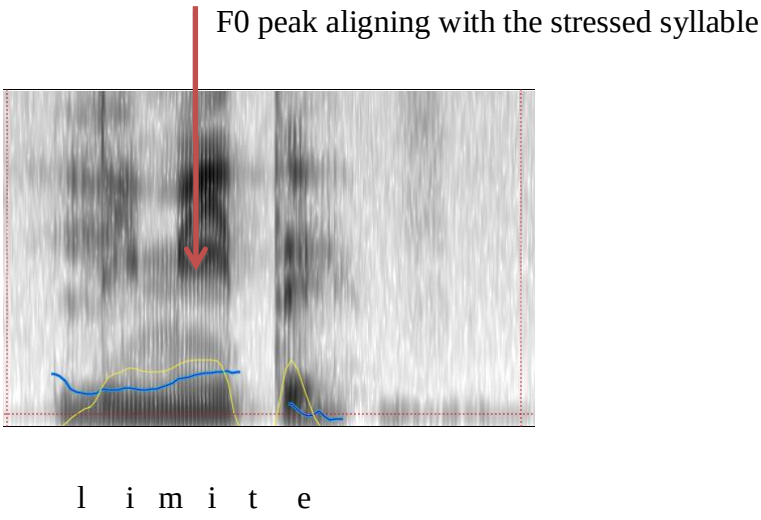

Figure 6: Spectrogram of sequence *li**mi**te*

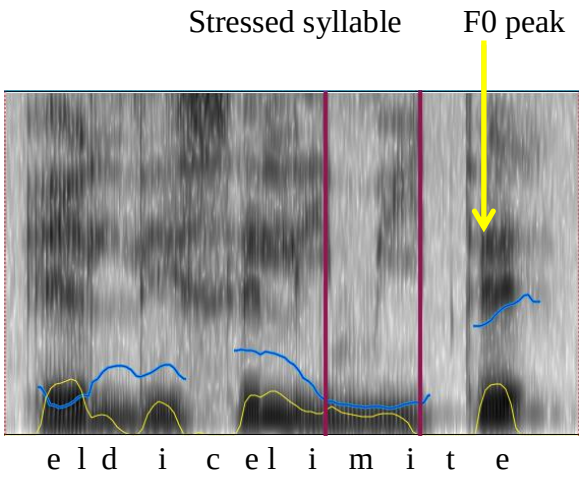

Figure 7: Spectrogram of sequence *¿él dice li**mi**te?*

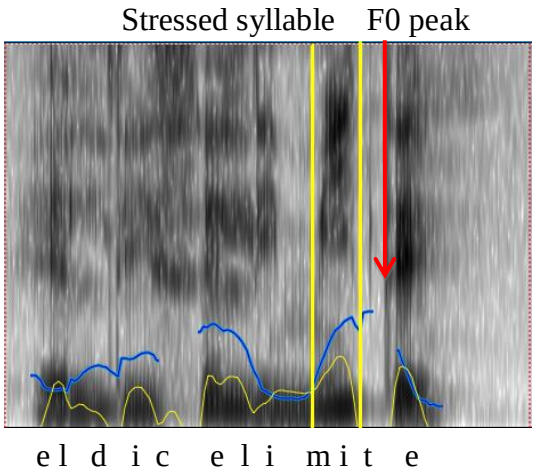

Figure 8: Spectrogram of sequence *¡él dice li**mi**te!*

The above spectrograms show how Spanish has a different realization of F0 peaks in comparison with Japanese. Therefore, it is thought that Japanese speakers will have a higher accuracy rate in identifying stress position when the F0 peak is aligned with the stressed syllable than when there is an F0 peak displacement.

2.6 Chapter summary

This chapter has presented in detail the relevant characteristics of the Spanish stress-accent and Japanese pitch-accent. Also, their differences were illustrated with respect to the realization of prominence in both prosodic systems, as well as the possible difficulties a Japanese speaker would face when learning a language with the stress patterns present in Spanish. More specifically, it has been proposed that the variation in the realization F0 peak, in particular an F0 peak displacement may miscue learners and lead to erroneous stress identification of paroxytone and proparoxytone words in final position of yes/no questions and exclamations, because of transfer from L1.

The chapter also illustrated the different lines of research regarding Spanish correlates. Therefore, a presentation of the authors who consider a) the F0 the most important cue for perceiving Spanish stress (Andrés Bello, 1984; Quilis, 1993; Enriquez et al., 1989; Llisterri at al., 2003; Bolinger and Hodapp, 1961); b) Spanish stress depends on the intensity (Navarro Tomás, 1918; Cuervo, 1981, 1954; Llorach, 1994); c) duration is the

essential acoustic factor to perceive stress in Spanish (Ríos, 1991; Prieto and Ortega-Llebaria, 2007; Ortega-Llebaria, 2006; Ortega-Llebaria et al., 2013) d) Spanish stress depends on the interaction of the three acoustic correlates (Kholer, 1990; Silverman, 1990). Based on the evidence provided by these studies, the position of duration as the main cue in absence of the F0 peak for native speakers to perceive the Spanish stress was chosen as an important factor in this study.

This chapter has reviewed literature that claims that F0 peak displacement is common in Spanish and it does not create any problems for native speakers of Spanish. It has also illustrated why it may create problems for Spanish L2 learners, in the case of this study: Japanese speakers. The next chapter will review studies about L2 stress acquisition by Japanese, English, and Korean speakers and how the differences in their typology may have consequences in their perception of the L2. Also, two stress perception models will be presented, namely: The Stress "Deafness" Model and the Stress Typology Model.

Chapter 3

3 Perception of L2 lexical stress and the effects of context of learning

Chapter 2 provided a description of the Spanish and Japanese lexical stress and their acoustic correlates, the concept of stress-accent and the pitch-accent, and explained how the miscuing created by F0 peak displacement in Spanish may lead to misperception in Japanese-speaking learners of Spanish. This chapter will explore the relevant studies related to the perception of Spanish stress by second language learners. Phonological acquisition models such as the Speech Learning Model (1995) and the Perceptual Assimilation Model (Best & Tyler, 2007) will be presented first (§3.1). Two models of speech perception, namely: Stress "Deafness" Model and Stress Typology Model will be examined as well (§3.2). Due to the lack of research on the perception of Spanish lexical stress by Japanese speakers, previous research on the perception of Spanish lexical stress perception by English speakers has also been included in this chapter (§3.3). Since English is a language with lexical stress similar to Spanish, therefore, some studies on the perception of English lexical stress by Japanese speakers are included as well.

3.1 L2 speech learning models

In this section, two of the most prominent L2 phonological models will be reviewed, namely the Speech Learning Model (Flege, 1995) and the Perception Assimilation Model (Best & Tyler, 2007). However, less research has been conducted on the perception of suprasegmentals. Therefore, most models of L2 speech learning are based on the perception of segments only.

The Speech Learning Model (SLM) is a phonetic model that focuses on how the underlying phonetic representations change with the learner's experience. According to this model, beginner L2 learners struggle to perceive the differences between the L1 and L2 sounds. However, experience with the language helps reduce the difficulty of L2

sound perception created by perceived similarities of L2 sounds to the L1 sounds. Flege (1995) claims that L2 learners in early stages of learning rely on their L1 categories to perceive the L2 sounds. Therefore, they do not discern the phonetic differences between neither minimal pair of L2 sounds, nor L1 and L2 sounds pairs that are not identical, which learners perceive as such. Thus, they are not able to establish a new phonetic category (i.e., phoneme) because L2 sound categorization may be blocked by what is called a process of equivalence classification (for identical and not very phonetically similar L2 sounds). In other words, learners perceive L2 sounds as allophones of their L1 due to a perceived phonetic similarity.

The Speech Learning Model predicts that the degree of the perceived phonetic similarity will determine the level of difficulty and the possibility of creating a new phonetic category. If the perceived acoustic/phonetic distance between the L1 and the L2 sound is small, the L2 sound will be mapped on to the L1 sound. In SLM terms, this would be a similar sound. On the other hand, if the perceived acoustic/phonetic distance between the L1 and the L2 sound is large, then the 'new' L2 sound will be easy to acquire. L2 sounds that are identical or phonetically close to L1 sounds are considered 'old'. These 'old' sounds are not problematic for the learner because the already exist in the L1.

The Perceptual Assimilation Model (PAM; Best & Tyler, 2007) is a phonological model that focuses on the perception of non-native phonetic contrasts. According to this model, the perceptual difficulties can be predicted when differentiating a non-native contrast, if it is considered the degree of perceptual similarity of the constellation of native articulatory gestures. The L2 learner will perceive non-native sounds with good or poor accuracy depending on the perceptual similarity these sounds share with the L1 sound system. The PAM proposes that the accuracy in the discrimination of non-native sounds depends on the way the sounds are assimilated to the L1 sounds. That is, naïve listeners will hear these sounds as good or bad examples of native phonological segments (*Categorized*). For example, the aspirated English /p/ produced by a French speaker whose native system has an unaspirated /p/. Alternatively, a naïve listener may judge a sound as different from any other native phonemes (*Uncategorized*). For example, Xhosa clicks sound differently from English consonants, or in a very rare case. Additionally, the sounds may be

perceived but not judged as linguistic speech sounds (*Non-Assimilated*) (Best & Tyler, 2007). That is, the level of discrimination from good to excellent is predicted for two category assimilations, where two L2 phones can be perceived as acceptable examples of two different L1 phones. Although this model with frequency is applied to the acquisition of the second language, the PAM really is a perception model of the non-native speech (Escudero, 2007).

All the models reviewed in this section focus on the segmental aspects of speech learning and do not make any predictions about the perception of suprasegmentals. Although the prominent models of L2 speech learning have focused on the acquisition of segments, there are specific models of stress perception in the literature that will be reviewed in the next section.

3.2 Stress perception models

The information relevant to the Stress "Deafness" Model (SDM) (Dupoux, Pallier, Sebastian and Mehler, 1997, and Dupoux and Peperkamp, 1999; 2002) will be presented in the following section. The stress perception models the Stress "Deafness" Model (Peperkamp and Dupoux, 2002) and the Stress Typology Model (Altman, 2006) will be explained.

3.2.1 What is the stress "deafness" effect?

According to Dupoux, Pallier, Sebastian and Mehler (1997) and Dupoux and Peperkamp (1999; 2002), the term stress "deafness" refers to problems that listeners or speakers of fixed stress languages would face, discriminating or processing phonological stress contrasts, not used in their L1. The researchers consider that L2 processing is related to the L1. Therefore, adult learners of a second language will have difficulty with all the structures not present in their L1 stress system.

According to Dupoux et al. (1997) speakers of different languages process natural languages in different ways. In other words, native speakers and proficient non-native speakers of a given language process that same language differently. This is due to the fact that prosody is a crucial factor when acquiring the L1 and adults do not have the

same opportunities to facilitate language acquisition, as children would have. Therefore, adults are not capable of extracting the rhythmical-periodical properties of an L2 to trigger the needed adjustments in perception and production routines that would facilitate the specific-language processing to take place. Conversely, these adjustments in adults are not as flexible as they used to be during childhood and consequently, late learners will experience an interruption in their L2 language-specific processing. Then the L1 routines would affect the perception of L2 stress since they determine the sensitivity to the stress system of the L1 and perhaps the L2. Also, these routines could be disruptive and not allow accurate perception of the L2 stress system. According to Dupoux et al. (1997), the way prosodic dimensions are represented in every language is not universal. Instead they are language-specific. For instance, if these dimensions have contrastive values, they will be totally specified. However, others with a fixed or predictable distribution will not be represented.

3.2.2 Stress "Deafness" Model

The Stress Deafness Model (SDM) is a psycholinguistic model, designed to study the behaviour of different languages with respect to stress. Peperkamp and Dupoux (2002) propose a typology of languages with non-contrastive stress or predictable stress (e.g., French, Polish (fixed penultimate stress), Hungarian (fixed initial stress). This typology of languages with predictable stress (e.g., non-contrastive) was proposed based on an important hypothesis: "before having acquired the entire lexicon, infants use stress patterns at utterance edges to infer whether stress is contrastive or not, hence, set the Stress Parameter" (Peperkamp and Dupoux, 2002, p. 210).

The typology is represented in Figure 9, showing the language-specific *pre-lexical representation*[12] proposed by the authors and the different stages (in increasing order of

[12] Infants acquire the *pre-lexical representation* in their first years of life. It is located between the universal phonetic representation and the lexicon. It encodes suprasegmental and segmental distinctions at the universal phonetic level. Once acquired, the *pre-lexical representation* does not change. As a consequence, adults face difficulties with non-native segmental and suprasegmental contrasts because "it remains stable even after extensive exposure to a second language. All these properties result in patterns of phonological 'deafness' for certain non-native contrasts, i.e. those contrasts involving sounds that are

complexity) of acquisition of stress rules depending on the L1 with predictable stress. It means Class I and II are low-level information and Class III and IV are high-level information stages.

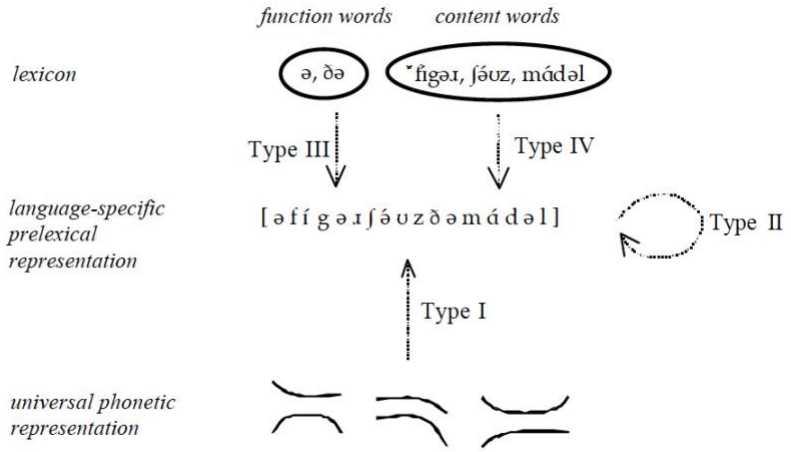

Figure 9: Compilation of pre-lexical representation in early language acquisition. Taken from Dupoux and Peperkamp (1999).

According to the typology, stress rules in languages assigned to Class I (e.g., French) are acquired first. Then, the order of the time course of stress rules acquisition (Stress Parameter getting set) is in the same order of the typology. In Class II (e.g., Fijian) the rules are acquired in a second place, then it follows Class III (e.g., Hungarian) and Class IV (e.g., Polish, Piro, Arawakan) stress rules will be the last ones to be acquired in the language development. On that account, in Class I the Stress Parameter is set at an early point in language development, but in Class IV it is set at a late point. According to the authors, once the language-specific stress system is acquired it will not change, even after specific training, or a considerable exposure to a second language. Therefore, learners will experience difficulties when are exposed to stress structures that differ from their L1.

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assimilated to a single sound pattern in the pre-lexical representation." Dupoux and Peperkamp (1999, p. 6)

A phonological “deafness” appears because the learners start manifesting difficulties to discriminate phonological contrasts not present in their first language. This phonological “deafness” increases, as it becomes resistant to second language learning and to a specific training.

Dupoux and Peperkamp (1999) establish a hierarchy of languages with non-contrastive stress, based on the assumptions explained above. According to the degree of regularity, or predictability, the authors classified these languages in a hierarchy of stress “deafness” in a descending degree of difficulty from Class I (exhibiting the greatest difficulties in perceiving stress contrasts) to Class IV (no difficulties in perceiving stress contrasts). On one hand, French, Finnish, and Pitta-Pitta (Australian language) are good examples of languages belonging to Class I regularity. As a result, these languages exhibit a high degree of stress “deafness” to non-native contrasts. On the other hand, Polish speakers will have less difficulty in distinguishing non-native stress contrasts. The following table resumes all the hierarchical stress “deafness” proposed by Dupoux and Peperkamp (1999) and later replicated in Peperkamp and Dupoux (2002).

Table 2: Hierarchy of Stress “Deafness” taken from Peperkamp and Dupoux (2002) and Altmann (2006)

Regularity	**Language**	**Stress Rule**
Class I		Predictable stress.
	French,	Stress falls on word-final syllables.
	Finnish, Pitta-Pitta	Stress falls on word-initial syllables.
Class II		Predictable stress.

	Fijian	Stress on the heavy final syllable; otherwise, on the penultimate syllable.
Class III	Hungarian	Predictable stress. Stress falls on word-initial syllables.
Class IV	Polish	Predictable stress. Stress falls on the penultimate syllable, but on monosyllabic words on the final syllable.

The authors (Dupoux & Peperkamp, 1999; Peperkamp & Dupoux, 2002; Dupoux, Sebastián-Gallés, Navarrete & Peperkapm, 2007; Peperkamp, Vendelin & Dupoux, 2010) developed two hypotheses to test the typology of languages with non-contrastive stress based on the stress "deafness" hierarchy. They also wanted to test their predictions about the degree of "deafness" according to the stages of stress rules' acquisitions, or the setting of the Stress Parameter. The first hypothesis, the Lexical Parameter Setting hypothesis, "predicts stress 'deafness' should be attested in speakers of languages belonging to any of the four classes since in none of these classes is stress used contrastively" (Peperkamp & Dupoux, 2002, p._6). It means speakers of these languages do not store stress in their mental representation of words (i.e., lexicon). The second hypothesis, The Non-Lexical Parameter Setting hypothesis, "predicts the existence of languages with non-contrastive stress whose speakers nonetheless encode stress in the phonological representation" (Peperkamp & Dupoux, 2002, p. _6). This englobes the three last hypotheses explained in Figure 8 and means the degree of the stress "deafness" will vary "depending on the moment during language development at which the Stress Parameter gets set" (Peperkamp & Dupoux, 2002, p. _6) .

According to the Lexical Parameter hypothesis, all languages belonging to the typology from Class I to Class IV will yield stress "deafness." However, depending when the Stress Parameter is set, speakers of languages belonging to Class I, II, III, or IV will experience stress "deafness" at different times. For example, if the Stress Parameter is set after the phonological properties, function words, and the entire lexicon are acquired, then all languages belonging to Class I-III will experience stress "deafness." But if the parameter is set after the acquisition of the phonology of the language and the function words, then only speakers of Class I and II languages will experience stress "deafness." If the parameter is set based on only the phonetic information, then speakers of languages belonging to Class I are the only one to be stress "deaf."

The Stress "Deafness" Model predicts that the more regular (i.e., predictable) is the stress in a language, the more difficulties its native speakers will face in distinguishing stress contrasts. Therefore, the authors consider the stress "deafness," or the difficulties perceiving contrasts, cannot be overcome by training or experience, in the case of languages with predictable stress. As a result, a question arises: what would experienced speakers of other languages with non-contrastive stress?

Peperkamp and Dupoux (2007) applied the Stress "Deafness" Model to the L2 perception of stress. However, L2 stress perception is a different process than L1 stress perception. During L2 acquisition, the processes are controlled, and more importantly, adults studying in a formal instruction classroom setting learned the stress of words while they were learning their vocabulary. Another factor that might differentiate the L2 stress perception is the orthography. Following hypotheses from Pepperkamp and Dupoux (2007) and Dupoux and Peperkamp (2002), speakers learning a stress pattern that is completely different from their L1 could be incapable of learning the L2 stress patterns. This assumption raises a question related to the current study: will Japanese-speaking learners of Spanish have difficulties identifying/perceiving the variations in the realization of pitch in the Spanish lexical stress in yes/no questions and exclamations (e.g. *¿él dijo **<u>ná</u>**bido?* Does he say **<u>ná</u>**bido ?) and exclamations (e.g. *¡él dijo na**<u>bi</u>**do!* He said na**<u>bi</u>**do!) with the paroxytone and proparoxytone words in final and non-final position?

Although the Stress "Deafness" Model does not consider languages without stress, such as Japanese, Dupoux and Peperkamp (2002) predict that "when processing a foreign language with pitch as phonetic correlate of stress, speakers of tone languages might map stressed vowels onto high tone vowels and unstressed vowels onto low tone vowels. In other words, they can assimilate stress to tone, and… stress 'deafness' will not be observed" (p. 182-183). That is, speakers of a language with no stress, as is the case of Japanese, will not have difficulties perceiving stress because their language does not involve any of the parameters of stress that could interfere with its perception. For this reason, it is necessary to review and consider the Stress Typology Model in the following section.

3.2.3 Stress Typology Model

Vogel (2000) proposes the Stress Typology Model (STM), which brings into focus the stress perception of phonological property differences in several metrical systems. Altman and Vogel (2002) modify the original model and Altman (2006) provides support for the STM. In this way, the STM expands the SDM, on account of all the languages included in a new stress typology, based on a typology of stress phenomena that consists of a branched hierarchy that explains the use of stress and other prosodic phenomena, as for example the tone (Altman, 2006). Although the STM differs in some ways from the SDM, according to Altman (2006), the two models are compatible; that is, both employ the same notion of stress parameters, are based on observable surface patterns, and focus on primary stress and classify languages according to their regularity (e.g., predictable and unpredictable stress). The STM, however, provides more possibilities category of languages. Figure 10 shows the two major groups languages are classified in the Typology of Stress Parameter proposed by Vogel (2000).

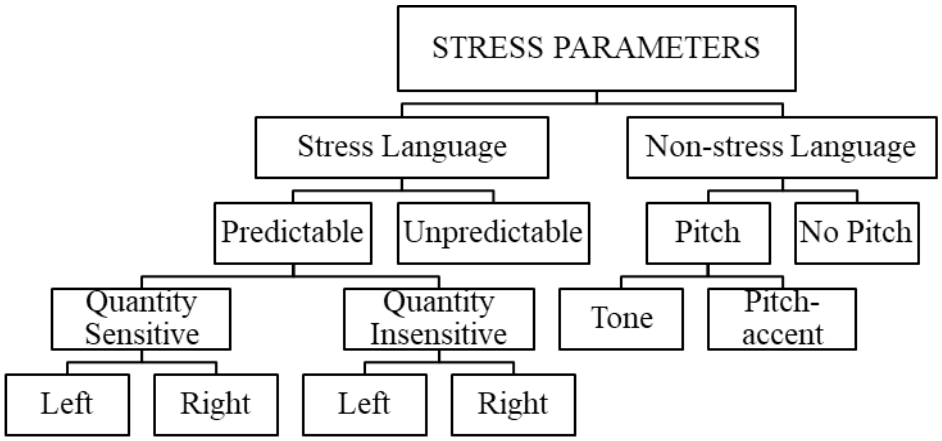

Figure 10: Typology of stress parameters (A&V, following Vogel 2000 Taken from Altman, 2006)

According to the STM's stress typology, systems with predictable stress must have stress lexically specified, while in systems with unpredictable stress, this is not required. According to the STM a parameter setting[13] is necessary as information about whether the edge of the word is important for stress assignment or not and, if so, which edge will determine whether the language is classified as quantity sensitive or not (i.e., sensible to syllable weight or not). Furthermore, the STM considers languages with no stress, which make use of different information (e.g., pitch accent or tone) or do not use this sort of information as contrastive or demarcative at the word level (e.g., Korean, Japanese).

The hierarchy proposed in this model[14], illustrated in Figure 10, predicts several degrees of difficulty for speakers of different L1s in their L2 acquisition. More specifically, the acquisition of primary stress at the word level in the L2 can be especially difficult. In Figure 10, every link in the binary branching represents a parameter. If the property

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[13] Altman (2006) uses the notion of parameter in a very broad sense, meaning " some property concerning word stress that can be either present or absent in a given language" (p. 26).

[14] This hierarchy is structured with a binary branching that represents the parameters, which indicate the different properties in a metrical system.

specified in the parameter is present in the metrical system of a certain language, then there is a positive parameter setting, but if the property is not present in the language, there is a negative parameter setting. A negative parameter settings value, however, will not be considered to have a negative influence on the acquisition of L2 primary stress at all. For example, Japanese has a lot of negative values because it does not have stress and is situated very high in the hierarchy. Therefore, the negative values offer Japanese speakers advantages in perceiving L2 stress.

In both the SDM and the STM, the fewer positive parameter settings a language has, the better the L2 performance of its speakers is predicted to be. The default parameter setting value in the STM is negative. Consequently, positive setting value produce a negative effect on the success of L2 acquisition of stress and negative parameter setting values are a reliable predictor of success in L2 stress perception; that is, speakers of languages located higher in the hierarchy are likely to have the best perceptual performance. Thus, based on what has been highlighted here, speakers of a language with non-word-level stress (e.g., Chinese, Korean, Japanese) will yield the best performance, or will experience few difficulties with L2 stress perception. This advantage is a consequence of not having stress at the word level which does not allow for the possibility of having a positive parameter setting from the L1 to interfere during L2 acquisition of stress. Moreover, in a language without word-level stress, all parameter setting values will be negative. Therefore, presenting negative settings will not influence the acquisition of stress, but rather produce a substantial positive effect in native speakers of non-stress languages. Consequently, the more positive parameter settings a language has, the more difficulties speakers will manifest when perceiving L2 stress. Figure 11 indicates how languages with fewer positive values are in a higher position in the hierarchy, and as languages increase their positive parameter setting values, they will be located in a lower position in the hierarchy. As Kijak (2009) has pointed out, performance in L2 perception depends on the position in the hierarchy a language is located; the higher it is located, fewer positive settings are activated and interference with L2 perception will be reduced too. As a result of this, languages with predictable stress are placed at the bottom of the hierarchy. On the contrary, speakers of languages with unpredictable stress are expected to demonstrate high performance, are speakers whose L1 has non-word-level stress.

Following this line of argumentation, the two languages involved in the current study, namely Spanish and Japanese, will be classified in the hierarchy as anunpredictable stress language and pitch-accent non-stress language, respectively (see Figure 11).

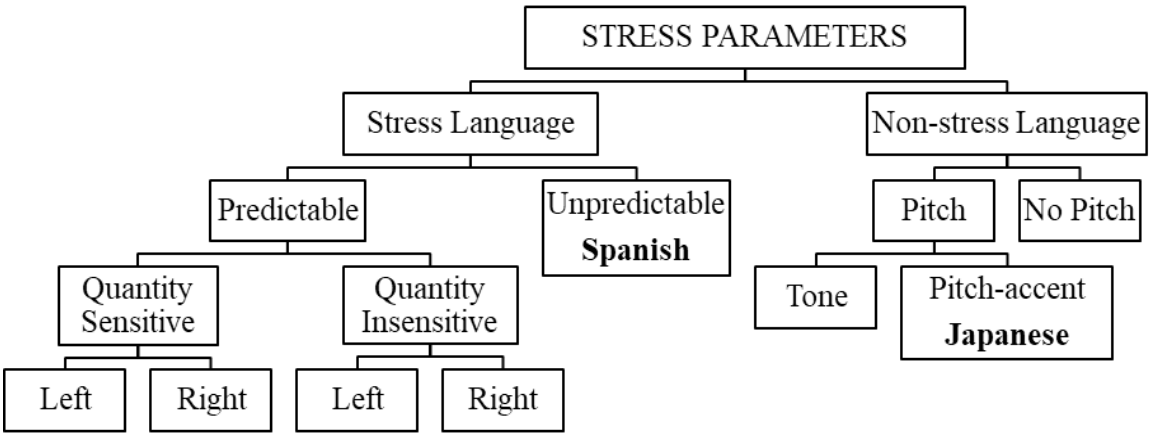

Figure 11: Classification of Spanish and Japanese, the two languages involved in this study following the STM

The classification described above and the predictions espoused by the STM can be taken to mean that Japanese native speakers should not experience any difficulties with the perception of Spanish lexical stress at all. The next section will explain in detail empirical L2 perception studies, involving Japanese speakers.

3.3 L2 acquisition of stress

Several studies have been conducted comparing studies on the acquisition of Spanish stress by early and late English-speaking L2-Spanish learners (González, 2001; Lord, 2001, 2004, 2010; Face, 2003; Castro 2006; Ortega-Llebaria, 2007; Ortega-Llebaria, Gu, & Fan 2013; Romanelli & Menegotto, 2014, and Kim, 2015, among others), and Japanese-speaking L2-English learners (Beckman, 1986; Archibald, 1997; Tokuma, 2003, 2007, 2009; Kawagoe, 2003; Kawagoe & Arai, 2007). Nevertheless, relatively few studies (e.g., Atria, Kimura, Sensui, Takasawa & Toyomaru, 2012) have been conducted, comparing the prosodic acquisition of Spanish lexical stress by early and late Japanese learners. This section will present studies on the acquisition of Spanish and English lexical stress by Japanese speakers and due to the lack of studies on the acquisition of

Spanish lexical stress by Japanese speakers, studies about the acquisition of English lexical stress by Japanese speakers are considered. This subsection varies from other sections above because it presents the different challenges Japanese speakers have had when perceiving L2 English and Spanish lexical stress. The results of the different studies reviewed here inform the reader about the positive or negative effects of learning an L2 that is typologically different form Japanese.

Although prosody is very important in L2 acquisition, investigators have studied segments more extensively than suprasegmental aspects, regarding the acquisition of L2 English by Japanese speakers. As a consequence, the acquisition of English phonemes by Japanese speakers has been more broadly studied than the acquisition of the English lexical stress. However, some studies have focused on the topic such as Bekman (1986) studied which of the three acoustic correlates of English was more salient and how Japanese speakers' perception of Lexical stress would be affected. Recently, the number of studies on the acquisition of suprasegmental aspects of English by Japanese speakers has increased. Kawagoe (2003) and Sugiura (2004) were interested in how Japanese speakers can perceive English lexical stress as native speakers regardless of the context where the L2 is learned. Tokuma (2007, 2009) saw the effect of F0 peak-delay on the L1 Japanese and the L2 English in the perception of English lexical stress by Japanese speakers. Additionally, Suhagara (2011) studied the perception of primary and secondary English lexical stress manipulating the F0. These studies will be review below.

Many studies have been conducted on the perception of segments during acquisition (Hertel, 1995; Lord, 2001), but research on L2 stress perception is relatively new and presently limited. This research has been based on languages that are typologically different in their stress realization. However, languages with typological similarities have not been extensively studied.

This section will cover studies related to the research questions that are guiding the present study. First, it will begin by examining the differences between the acoustic correlates of L1 Japanese and L2 English and Spanish before examining how these differences affect learners' perception of English lexical stress. After this, the way in

which the position of the stressed syllable in the L2 affects Japanese speakers' perception of L2 stress will be reviewed. Finally, the positive effects of the differences between the stress correlates of English and Japanese in Japanese learners of English will be reported. It is important to discuss these topics because they show how Japanese speakers are affected when learning an L2 that has a different stress typology from Japanese and how this difference may be beneficial or not. Also, it shows variation in the realization of pitch in English and Spanish and Japanese learners' behaviour when perceiving English and Spanish lexical stress.

3.3.1 Effect of differences between the acoustic correlates of stress in L1 and L2

As explained previously, in Spanish, it is common to associate stress with post-tonic F0 peak alignments (Ortega-Llebaria et al, 2013). Additionally, stressed syllables receive a low pitch with more frequency in Spanish than in English. When the stressed syllable receives a flat pitch and F0 peak aligns with the post-tonic, then duration becomes an important cue for Spanish speakers to identify the stressed syllable (Ortega-Llebaria et al., 2013). As a result of this different realization of stress, Ortega-Llebaria et al. 2013 argues that English speakers experience difficulties perceiving the stress of Spanish words embedded in declarative sentences and reported clauses. Ortega-Llebaria et al. (2013) state that Spanish native speakers identify stress based on duration when the F0 peak, or pitch accent, is not aligned with the stressed syllable. Meanwhile, English speakers do not experience difficulties perceiving the Spanish lexical stress when stressed syllable coincides with the F0 pea, at the phrasal level. This study is important for this dissertation because its main topic is variation in the realization of pitch accents in Spanish and how English speakers who are learners of Spanish can be affected by these variations.

Ortega-Llebaria et al. (2013) examined cross-language differences in the realization of Spanish and English stress within two intonational contexts: declarative sentences and reported clauses. They manipulated target words and created a declarative sentence from a reported clause; for example, 'saluda, mama contenta' (mum greets happily). The main cues to perceive stress in every type of sentence were manipulated, i.e., F0 and duration

alignment in declarative sentences, duration and intensity in reported clauses. For example, in one token, only F0 was manipulated and duration and intensity remained the same. In this fashion, listeners heard [`mama] with duration and intensity that belong to the word, but with the F0 trend for the word [ma`ma]. The participants of the study consisted of 11 native English speakers and a control group of six Spanish native speakers. Results show that due to the differences in the phonetic realization of stress in English and Spanish, English native speakers had difficulties in perceiving Spanish stress. They were using their native language pitch accent frequencies and duration patterns as the main cues to perceive Spanish stress. Therefore, the common realizations of stress in Spanish posed difficulties to English native speakers because F0 peaks mark the stressed syllable, however, depending on the context, the pitch is aligned differently with the stressed syllable in the two languages. As a result of this different realization of stress, English speakers experience difficulties perceiving the stress of the target words embedded in declarative sentences and reported clauses. These findings show that the context-sensitive perspective examined in this study creates "stress deafness" in English speakers.

Beckman (1986) conducted a study on the perceptual cues of accent in English and Japanese. The goal of the experiment was to discover which of the three acoustic correlates of English had the most perceptual salience. Two sets of synthetic stimuli were used. In total, 31 individuals participated in the experiment. They were divided into three groups: 15 native speakers of Tokyo Japanese, 8 native speakers of American English, who had a little knowledge of Japanese, and 11 native speakers of American English, who did not have any knowledge of Japanese. During the procedure, each participant heard the two sets of stimuli in English individually in two different sessions with a 30 minute break. Participants had to judge each stimulus on a five-point scale, where 1 was a clear example of hearing the word with first syllable accent and 5 was a second syllable accent. Participants scored the stimulus choosing the number in one of the three columns on an answer sheet. The columns were labelled as follows: 1 'clearly PERmit' and 5 'clearly perMIT'. A third column was labelled as 'can't tell'. However, in English duration, intensity, F0, and vowel quality were correlated with stress. The results from this study demonstrated that in the perception of English lexical stress, F0 and duration

were the most important cues for perceiving stress, while intensity and vowel quality offered little suprasegmental information. Japanese speakers, however, relied much more on F0 than duration for perceiving English lexical stress and ignored duration.

In relatively recent findings, Tokuma (2007, 2009) investigated the perceptual effects of duration and F0 peak location in Japanese L1 and L2 perception of English stress. These studies confirmed what Beckman (1986) concluded previously: Japanese native speakers are hardly affected by duration, since they did not show sensitivity to duration, but only to the F0. Tokuma (2007) included five native speakers of British English (four lecturers in Japan and one graduate student in London, England) and 15 Japanese native speakers (undergraduate students in Tokyo). The participants were asked to listen to the stimulus nonce word '*-nurnur-*' embedded in the sentence '*Will you put .....down in the yard*?' and they had to judge which was the stressed syllable in the stimulus they heard. It is important to note that the sentences were synthesized and the F0 peaks manipulated. The results of the discrimination experiment revealed that Japanese speakers perceived F0 peak delay as a cue to identify English lexical stress on the target word '*-nurnur-*'. Thus, they were influenced by the location of the false cue given by F0 peaks to identify stressed syllables. The available evidence certainly corroborates Beckman's (1986) findings: duration is not a cue for accented syllables in Japanese the three cues are correlated with accented syllables in English: duration, F0, and amplitude. Differences in the phonetic realization of the accented syllables in both languages, affected the perception of Japanese speakers. As a consequence, they perceived F0 peaks and relied on them as a cue to identify the second syllable after the stressed syllable as the accented one. Meanwhile, English speakers perceived F0 peaks as one of the three cues to accentual prominence. Although the author does not mention the English level of the Japanese participants, she claims Japanese speakers with "poor English command" are not able to perceive duration as a cue to identify stressed syllables in English lexical stress.

Tokuma (2009) studied the effect of F0 peak delay on the L1/L2 perception of English lexical stress by Japanese speakers. It must be pointed out that she followed a similar design as Tokuma (2007). This study examined 22 native speakers of South-East British

English between the ages of 17 and 35 and a total of 43 native Japanese speakers, who were first-year or second-year undergraduate students, between the ages of 18 and 20. The nonce word changed this time from *'-nurnur-' to* '*-nini-'* /nɪnɪ/ and it was embedded in a different sentence too: 'Lee may *nini* my niece'. A female speaker recorded the stimulus sentence and she was asked to place lexical stress on the first syllable (i.e., /'**nɪ**nɪ/). The syllables in the word '*-nin-i'* were modified to have the same syllable duration and vowel quality. The F0 contour was manipulated too. As in Tokuma (2007) the participants' task was to listen to the stimulus word andjudge which was the stressed syllable.

In this study too, it was found that F0 peak delay affected the perception of both groups, but Japanese speakers were more sensitive to F0 peak delay. This difference is attributed to the importance F0 has as the main and only perceptual cue to perceive the accented syllable in Japanese. According to Beckman (1986), Tokuma (2003, 2007) and Ortega-Llebaria (2007), duration is a more salient perceptual cue than the other two correlates in English lexical stress, i.e., amplitude and intensity. For this reason, in the absence of duration as a perceptual cue to stress, since both syllables in the stimulus word '*-nini-*' had the same duration, English speakers had to rely only on F0 as their perceptual cue. Because of this, Japanese speakers outperformed English speakers, in the perception of the word '*-nini-*'. The reason was they rely solely on F0 as their perceptual cue to perceive pitch-accent. Therefore, it can be stated that Japanese learners do not use durational differences in English when F0 is not aligned with the accented syllable, as Tokuma (2003) and Beckman (1986) pointed out. Consequently, when peaks are not aligned with the accented syllable, F0 peak delay poses perceptual problems for Japanese speakers.

Apart from the research mentioned in the previous subsection, to the best of my knowledge, there is just one study dealing specifically with the acquisition of Spanish lexical stress by Japanese speakers. Kimura et al. (2012) investigated the perception of Spanish lexical stress by Japanese speakers. This study gives an account of the influence of intonation in the perception of Spanish stress by Japanese-speaking learners of Spanish. The authors' goal was to determine the factors that pose difficulties for Japanese

learners to perceive Spanish stress position correctly. A perception experiment was conducted. All the participants were second, third, and fourth-year students majoring in Spanish. They were asked to listen to a list of sentences containing target trisyllabic words with a syllable structure of CVCVCV. The list consisted of real words (i.e., *límite, limite, limité*) and nonce words (i.e., *lúguido, luguido, luguidó*) in six different contexts: isolated, affirmative final, affirmative non-final, negative non-final, interrogative-final, and interrogative non-final. When the target words were in final position, they were embedded into the sentence "Dijo la palabra X" *He/she said the word X*, whereas, when the target word was in final position, the sentence was "Dijo la palabra X la semana pasada" *He/she said the word X last week*. In total, 54 sentences were used. A native Spanish speaker from Cuenca, Spain read the list of sentences five times and a total of 250 sentences were recorded. All the participants were given a sheet of paper where they had to mark their choice of the word they thought was the correct answer based on each recording. Moreover, a comparison of 51 Japanese learners' performance with 43 native Peninsular Spanish speakers indicated a significant difference in their perception of nonce and real words. That is, the control group perceived 262.51 cases out of 270, whereas the Japanese-speaking learners perceived 218.57 out of 270. These results reveal that Japanese speakers had a worse performance than the control group ($p < 0.001$). Although perception/identification errors were observed in the perception of Spanish lexical stress in all the contexts, error rates differed between the contexts significantly. Performance differences among the contexts were significant; that is, with isolation, question non-final, and affirmative final their performance was native like ($F[2,177] = 0.84$; $p = 0.43$), but with affirmative non-final, negative non-final, their performance was lower ($t[1] = 0.84$; $p = 0.41$) and the negative non-final context was the most difficult and exhibited the greatest difference from the control group ($F[2,267] = 270.78$; $p < 0.001$). According to Kimura et al. (2012), in the isolation and affirmative final contexts the target paroxytone word offers Japanese-speaking participants an advantage in the perception of the stressed syllable in comparison with paroxytone words embedded into sentences in final position of questions. Due to a descending intonational pattern, the stressed syllable is pronounced with a higher pitch than the following syllable on the right. Unlike the two contexts of isolation and affirmative final, the question with the

target word in final position posed more perceptual difficulties because the stressed syllable is not aligned with the F0 peak. Therefore, the stressed syllable is perceived with a lower pitch. Hence, F0 peak displacement makes the perception of Spanish lexical stress difficult. In conclusion, Kimura et al. (2012) found that Spanish lexical stress is difficult for Japanese speakers, due to the different phonetic realization of stress in both languages. In Spanish, F0 realization varies according to the intonational context where the stress is located. Meanwhile, in Japanese, F0 realization always follows the same H L pattern. Consequently, Japanese learners perceived correctly the position of Spanish stress when the target word was in declarative sentences; that is, when the pitch descends.

Given the fact that the participants in this study were from different regions of Japan, it is clear that Japanese speakers of other varieties different from Tokyo-type Japanese can have difficulties perceiving the position of Spanish lexical stress. It is also not clear which group of the Japanese-speaking learners (e.g., intermediate, advanced) exhibited more difficulties. The authors analysed all the groups together and did not specify the performance of every level. Therefore, it is possible that advanced learners may have outperformed intermediate learners. Hence the current study will examine the perception of F0 peak displacement in advanced Japanese learners of Spanish.

Another valuable piece of information on the acquisition of Spanish lexical stress is the methodological procedure from Hualde and Kim (2015). The study examined the perception and production of Spanish lexical stress by two groups of Korean learners of Spanish. The authors hypothesized that due to the typological differences between Spanish and Korean, acquiring Spanish lexical stress could be challenging for Korean students. Since standard Korean is a language lacking lexical stress and lexical tone, Korean learners interpreted Spanish stress following the cues in their L1 Korean such as phrasal prosody. Regarding their perception experiment, Hualde and Kim (2015) wanted to investigate whether the identification of Spanish lexical stress was easier or more difficult to perceive by Korean participants depending on the intonational context. In total, 22 Korean-speaking learners of Spanish and 13 native Spanish speakers were the participants in this perceptual experiment. The stimuli consisted of 40 Spanish verbal forms, which were presented as minimal pairs (e.g., *l**a**vo/lav**ó***). The only difference

between the pairs was the location of lexical stress. The target words were embedded in sentences and presented in four different contexts: isolation (e.g., *an**u**do*), pre-nuclear position in a statement (e.g., *an**u**do la corbata*), final position in yes/no questions (e.g., *¿los an**u**do?*), pre-nuclear position in yes/no question (e.g., *¿an**u**do la corbata?*). These four contexts were necessary because the F0 peak of the target words was expected to have a different realization in every context. The participants were asked to do a forced-choice-identification task. The results suggest that the perception of the Korean learners differed significantly from that of the native Spanish speakers. The results show a 90% accuracy in the perception for the native speakers and 54% for the L2 Spanish learners. More specifically, paroxytone words were easier to identify than oxytone words. Also, when the F0 peak was aligned with the stressed syllable, the participants performed better than when the F0 peak displacement took place. The authors found a significant difference between the two types of words; and the Korean participants performed better with paroxytone words in present tense. This behaviour was the same with two-syllable and three-syllable target words, since Korean participants perceived stress on the penultimate syllable all the time. The results also indicate a better performance with words in isolation in declarative contexts, which supports the authors' hypothesis; however, it was only confirmed with paroxytone words.

Suhagara (2011) also studied Japanese speakers' perception of English lexical stress. In this study, the perception ability of Japanese speakers was examined employing trochaic (e.g., *TRANSplant*) and iambic (e.g., *transPLANT*) words that were distinguished by cues other than F0. As it has been said before, Japanese speakers rely heavily on F0 as their main cue to identify the stress in L2 English. Because of this, the author tested their perception of English primary stress in a context where F0 patterns caused ambiguous interpretations using stimuli with different stress patterns (i.e., trochaic and iambic words) to avoid the strong influence of F0 patterns on Japanese speakers' perception. The aim of this study was to find out whether Japanese learners of English would prefer strong initial syllables in the absence of a strong cue such as F0 if the bias toward strong initial syllables would be a preference belonging solely to English native speakers. Suhagara (2011) conducted a forced choice identification experiment with 38 Japanese speakers with a high proficiency level in English and 12 native speakers of American

English. Six pairs of nouns-verbs alternating primary and secondary stress were used as stimuli in the task (e.g., trochaic noun *IM*pact vs. iambic verb im*PACT*). Three different pitch patterns were created: natural, which was not manipulated; flat, manipulated with a value of 175 Hz on all syllables; and declining, with a manipulation of F0 declining from the beginning of the initial syllable (i.e., 186 Hz) to the end of the final syllable (i.e., 161 Hz). The rest of the acoustic cues (i.e., duration, intensity, and vowel quality) were not manipulated. A female native speaker of American English read the stimuli. Listeners had to judge the primary stress location of the words presented to them twice. The results suggest that in the declining condition, both groups' percentages were 80% for nouns, and just 30% for verbs, marking a significant difference between nouns and verbs. The data suggests that Japanese listeners preferred final primary stress over initial stress when F0 had a flat pattern. The available evidence certainly corroborates that English native speakers are influenced by the most frequent stress pattern in their L1: initial strong syllables. Suhagara (2011) states that Japanese speakers' preference for word-final primary stress may be due to the fact that they perceived the final syllables in the stimuli with flat F0 as the ones with more prominence; whilst the same stimuli in initial position were rejected.

The aim of this subsection was to show the different realizations of pitch accents in Japanese, English and Spanish and how these differences affect L2 learners. However, there is still a gap in the literature since there is not sufficient research on the identification/perception of variations in the realization of pitch accent in Spanish by Japanese speakers. Some questions that remain unanswered are: whether the differences in the phonetic realization of pitch accents in accented syllables in Spanish and Japanese affect the perception of Spanish lexical stress by Japanese speakers? Can Japanese speakers overcome the difficulty of the miscues created by the variations on the realization of the pitch accent in Spanish, after a long period of immersion?

3.3.2 Other views on L2 stress perception by Japanese speakers

This subsection will cover how position of the stressed syllable in the sentence and how the patterns of F0 realization affect the perception of English stress. This topic is

important for the purpose of the present study because based on previous work, it is predicted that the position of the target word will influence whether or not Japanese speakers correctly perceive Spanish stress.

Archibald (1997) investigated the ability of Japanese learners of English to perceive L2 stress. Archibald claims that Japanese learners of English, due to the fact that Japanese is a non-stress language, store the stress characteristics of each lexical item they memorize and do not make use of any stress rules, or suprasegmental information they perceive. In this study, one Japanese participant read aloud a list of isolated real words. The same words the participant produced were recorded by an English native speaker and played to the Japanese participant. Participants carried out a production and a perception tasks of stress assignment. Before performing the two tasks, participants read a list of words out loud. Then, after a training session, participants heard the same words they had read before, this time pronounced by an English native speaker, and marked what they perceived as the stressed syllable. Japanese participants' performance on the perception task was highly accurate. The author explains that, in Japanese, there is a sensitivity to durational cues since it is a mora-counting language, and that bimoraic words have a longer duration than monomoraic ones, supporting Mochizuki-Sudo and Kiritani's (1991) findings. Despite these results, Archibald concludes the Japanese speakers treat English lexical stress as a lexical phenomenon and do not compute metrical representations.

Nonetheless, there are certainly grounds for scepticism on this position, since Japanese speakers have been found to have a native-like performance when acquiring English stress. Kawagoe (2003) supports this view and strives to explain how Japanese learners can modify their native system to adopt differences in syllable structure. She claims that Japanese speakers are able to acquire stress especially in English, even though their language does not possess stress at all. This indicates that Japanese speakers who are learners of English can redistribute or reset the features present in their L1 and acquire new structures Japanese does not have.

Based on the overview of the studies presented above, it can be seen that Japanese speakers perform differently in every task. Also, it was demonstrated that the success in

the perception of L2 stress depends on many variables. Thus, some studies support and contradict what the SDM and the STM have predicted. These types of results bring up the following questions: Can phonetic differences between Spanish and Japanese positively influence the cross-linguistic perception of L2 stress? Would a prolonged L2 exposure exert significant effects on the perceptual skills of Japanese speakers? Will longer exposure be the best way to navigate variations in the realizations of the pitch accents in Spanish?

3.3.3 Positive effects of the differences between stress correlates in the L1 and the L2

This subsection will cover a study that demonstrates how Japanese speakers can perform like English native speakers when perceiving the English lexical stress even though their L1 does not have stress. This study is important because it shows that Japanese speakers can benefit from the lack of stress in their L1 when perceiving L2 stress, following what Altman (2006) has predicted. Therefore, the purpose of adding this study in this literature review is to explain how typological differences can have a positive effect on Japanese speakers, who are learners of an L2 with lexical stress.

Sugiura (2004) also argues that Japanese learners of English, can performe like English native speakers when perceiving English lexical stress. In this study, the author created nonce words with a syllable structure of CVCV to perform three tasks: stress contrast, a phoneme contrast, and a schwa. The experiment included seven English native speakers ages 10 to 40, thirteen Japanese native speakers ages 18 to 50, who at the time of the experiment were at a beginner English level, and nine Japanese advanced learners of English ages 20 to 50. All native speakers and L2 English learners were in Japan at the time they participated in the experiment. The results showed that both groups of L2 learners (i.e., beginners and advanced) patterned with native speakers of English when perceiving stress contrasts influenced by F0, duration and intensity. The same results were obtained with the schwa distinction, which showed no differences in the performances of the three groups (i.e., native speakers, beginner learners, and advanced learners). The findings of this study are supportive evidence consistent with the results offered by Altman (2006); in other words, these types of learners are able to redistribute

or reset the features present in their L1 and acquire new structures their L1 does not have.

The main points of the discussion above may be summed up as follows: research conducted on the acquisition of English lexical stress by Japanese speakers of different levels has shown that Japanese learners of English can be affected by different acoustic correlates in the L2. In other cases, however, Japanese speakers of different proficiency levels have performed similarly to English native speakers; that is, the typological differences between English or Spanish and Japanese do not have negative effects on the L2 stress perception of Japanese speakers. Nevertheless, English speakers rely on more cues than Japanese subjects. However, it is confirmed from this review that typological differences and a different quantity of correlates in the L2 cannot affect the perceptual skills of Japanese speakers L2 negatively when perceiving L2 lexical stress. It is clear, then, that the results of the different studies are inconsistent, and there is not a clear answer to the question whether typological differences or variations in the pitch accent realizations can affect the performance of Japanese speakers perceiving suprasegmental information in L2 English or Spanish. Therefore one might ask:does the performance of Japanese speakers depend on the type of suprasegmental phenomenon studied or is the perception of lexical stress difficult for Japanese speakers in general?

3.4 Summary of the chapter

The studies reviewed in this chapter have demonstrated that stress is a complex phonological phenomenon and that the typological differences between the two studied languages (i.e., English and Spanish, or Japanese and Spanish) are crucial to learners' performance. Specifically, L2 lexical stress perception by Japanese speakers may be affected by variation in the phonetic realization of stress in the L2 and modulated by the position of the target words (i.e., final vs. non-final), the context where the target words are presented (i.e., isolation vs. sentences), the type of sentence (i.e., declarative, question, exclamation) and the type of word (i.e., real vs. nonce).

The review of previous studies on L2 stress perception included the presentation of two perception models, namely, The Stress Deafness Model of Peperkamp & Dupoux (2002) and the Stress Typology Model of Altmann & Vogel (2002). According to the two

models' proposals, the L1 is the system that configures the perceptual sensitivity and this perceptual sensitivity is not affected by L2 exposure or training.Therefore, if a speaker did not have good perceptual skills in a given L2, this difficulty would not be overcome through exposure to the L2 or perceptual training of the L2 prosodic system. However, the studies reviewed have demonstrated that the perceptual abilities of Japanese speakers depend on the type of language they are learning and the type of phenomenan tested.

This chapter reviewed a series of phonological studies showing that speakers with irregular stress systems in their L1 also had difficulties or were stress "deaf" to the perception of L2 stress, contradicting predictions of the two models presented (Ortega-Llebaria, 2007; Ortega-Llebaria, Gu, & Fan 2013; Beckman, 1986; Archibald, 1997; Tokuma, 2003, 2007, 2009; Kawagoe, 2003; Kawagoe & Arai, 2007; Atria, Kimura, Sensui, Takasawa & Toyomaru, 2012). In this review, speakers of languages with irregular stress (i.e., English) and no stress (i.e., Japanese) displayed difficulties perceiving the Spanish lexical stress, which should not occur according to the Stress Typology Model (STM). On the other hand, the predictions of the two models have been confirmed in other studies (Mochizuki-Sudo and Kiritani, 1991; Kawagoe, 2003; Sugiura, 2004). Based on the literature that contradicts or supports the two models, it can be argued that the perception of L2 stress is a complex phenomenon.

Chapter 4

4 Context of learning: Natural Immersion versus Formal Instruction in a classroom setting

Studies focusing on the acuisition of suprasegmental features (e.g., lexical stress) are very scarce (Romanelli & Menegoto, 2014; Romanelli, Menegoto, & Smyth, 2015 a & b). In general, few studies have been carried out on the acquisition of specific phonological features and phonological acquisition in immersion versus formal instruction. Moreover, the findings are inconclusive about the hypothesis that immersion enhances L2 speech production and perception. Since the second objective of this study is to look into the under-investigated effect of classroom instruction at home compared to a natural immersion setting, in what follows, the discussion will focus on the possible positive effects of a natural immersion on the L2 speech learning of both segmental and suprasegmental features in a classroom setting.

Immersion is a type of naturalistic context where learners interact with the target language community. Thanks to the opportunities that the immersion offers to the learners to interact with native speakers and have access to meaningful input, it is believed that the learner who spends a certain time immersed in a target language community expected to become more native-like in their L2 than those who acquire and L2 in a regular classroom in an at home institutional setting in their home country (Pérez-Vidal et al., 2011). However, research on L2 phonological acquisition is somewhat limited and the evidence regarding the effect of immersion on L2 speech learning in not consistent.

The remainder of this chapter is structured as follows. First, the positive and negative effects of immersion are provided through empirical studies that discuss its potential benefits as compared to formal instruction (§4.1). Then, a review of the most recent L2 phonology studies including the two contexts is presented (§4.2).

4.1 Positive and null effects of the immersion context

Generally, studies based on immersion have contrasted natural immersion contexts and formal instruction. For example, Díaz-Campos (2004) found that immersion (i.e., one four-month term) did not help to enhance students' L2 phonological acquisition. In this study, 20 students received formal instruction at the University of Colorado, while 26 were immersed in a target language community in Alicante, Spain, while participating a 10-week study abroad program. A read-aloud task was used to analyse both groups' production of word-initial stops, intervocalic fricatives, word-final laterals, and palatal nasals. The results show that being immersed was not helpful at all since the performance of learners in immersion was not superior to their counterpart group who stayed at home. Improvement in the production of Spanish word-initial voiced plosives and word-final laterals was similar in both groups. Moreover, the group who received classroom instruction, surprisingly, behaved more similarly to Spanish native speakers than the learners in the study abroad program.

In a second study, Díaz-Campos (2006) found the opposite effect of context of learning, namely, that learners studying abroad outperformed the at-home group. With a similar design to Díaz-Campos (2004), he examined the effect of conversational style on the pronunciation of segments such as word-initial voiced plosives, voiced intervocalic fricatives, and word-final laterals. Two groups participated in this study: one group of 26 students whowere studying Spanish in Alicante, Spain and 20 who were taking Spanish through formal instruction in the United States. The two groups were required to take part in a read-aloud task and an interview. The stimuli consisted of 60 words including word-initial voiceless stops (i.e., [p, t, k]), voiced intervocalic fricatives (i.e., [β, ð, ɤ]), syllable-final laterals (i.e., [ɬ]), and the palatal nasal (i.e., [ɲ]). A comparison of the pre- and post-test results showed that the study-abroad learners exhibited a tendency to produce more target-like segments in conversational style than their formal learner counterparts in a

regular classroom. It was concluded that combining immersion and instruction would be more beneficial for L2 phonological acquisition.

More evidence on the effects of study abroad and its comparison with formal instruction was provided by Mora (2008), who examined the production and perception of English voiceless plosives in adult Catalan/Spanish bilingual advanced learners of English, who were in Barcelona and went to study abroad for three months in an English-speaking country. The participants did a production task (a read-aloud task of voiceless oral stops) and a perception task (i.e., a categorical AX auditory discrimination test[15]). The stimuli for the perception task consisted of 135 English word pairs expressing 9 phonemic contrasts through minimal pairs (i.e., /æ/-/ʌ/, /ɑː/-/æ/, /ɪ/-/e/, /ɪ/-/iː/, /e/-/ə/, /t/-/d/, /s/-/z/, /tʃ/-/dʒ/, /d/-/ð/). The voiced onset time (VOT) of voiceless oral stops (i.e., /p, t, k/) produced in the production task was analysed as well. Context of learning had a different effect on perceptual and production abilities of the learners. Whereas formal instruction had a positive effect on perceptual learning, where segmental perceptual ability was observed to improve over time and significant gains were maintained after a period of formal instruction, formal instruction did not have a positive effect on VOT acquisition. Instead, study abroad had a positive effect on the participants' VOT production skills, albeit the gains were not maintained over time.

Pérez-Vidal, Juan-Garau, and Mora (2011), also explored the effect of formal instruction and immersion with a similar design to Mora (2008), but with contrasting outcomes. This latter study differs from Mora (2008) because it found a positive effect in a different population in formal instruction on the perception and production of English phonemic contrasts. The study abroad experience, however, was not beneficial for the perception and production of English phonemic contrasts. This was a longitudinal study that followed the students for three years and collected data in four different cycles. The participants consisted of twenty-five multilingual Spanish/Catalan speakers learning

[15] Participants hears two sounds (A and X) and have to decide whether these sounds match or not.

English as their third language (L3) and another foreign language as their fourth language (L4). There were also ten native speakers of English in the control group. The perception task was an AXB discrimination task[16]. The stimuli comprised three front English vowels contrasts /ɪ/-/iː/, /e/-/æ/, /æ/-/ʌ/, which were embedded into nonce words beginning with onset clusters allowed in Spanish/Catalan as follows: /kl_s/, /fl_s/, /bl_s/. The production of the learners was assessed through a read-aloud task of 114 written English words, which included the vowels used in the AXB task. The gains of the learners' accuracy in the perception of the English vowel contrasts were greater after formal instruction, where they obtained high scores (90%-96%). The discrimination scores showed an increasing rend during formal instruction. These outcomes are in line with previous research on perception (Díaz-Campos, 2004; Mora, 2008), where improvement was found to be greater during formal instruction than the study abroad experience. Regarding the production analysis, it was found that the participants produced most of the vowel contrasts differently from the native speakers of English. Moreover, the authors reported that when significant improvements occurred, they occurred during formal instruction exclusively. These findings suggest that formal instruction had more robust positive effects on vowel accuracy production and perception than the study abroad experience. Pérez-Vidal et al. (2011) explained the results by proposing that some domains, such as phonological perception and production, demand longer stays in natural immersion setting to be more beneficial for learners. They also point out that the initial level of competence and the nature of academic practice can modulate the effect of immersion on L2 speech learning.

Avello and Lara (2014) carried out a comparative study on the possible differential effects of length of stay on the L2 phonological development of two groups of Spanish/Catalan learners of English, following three and six months of study abroad, respectively. Their aim was to test the production of segmental accuracy in the two

[16] In the AXB task, participants hear three stimuli in sequence, and must say whether the second (X) is more similar to the first (A) or to the second (B).

groups. The participants had an English B2 level, equivalent to upper-intermediate/advanced, according to the Common European Framework of Reference. The investigation compared a pre-test prior to departure and a post-test done immediately after their return. The short-stay group experienced a period of formal instruction prior to the study abroad experience, but the long-stay group did not. In total, 25 participants belonged to the short-stay (three months) group and eight to the long-stay group (six months). Also, 21 native English speakers participated as the control group. The task consisted of a read-aloud of the text "The North Wind and the Sun." Vowel quality and duration, and VOT in plosives (/t, k/) were measured. The stimuli included the following English vowel contrasts: /i: - ɪ/ and /æ - ʌ/. There was no significant difference between the two groups; that is, neither experimental group was unable to produce a robust distinction between the two L2 vowel contrasts /i: - ɪ/ and /æ - ʌ/. Regarding the VOT, the participants' production of plosives did not benefit from the experienced abroad and there was not a significant difference in the post-test. In all, this study suggests that a study abroad experience does not improve segmental production in L2 learners.

Avello, Mora, and Pérez-Vidal (2012) obtained an opposite pattern with respect to the benefits of immersion. They used a different method from that of Avello and Lara (2014) to measure pronunciation accuracy, they considered pronunciation error counts and accentedness ratings. In an effort to determine whether a three-month study abroad experience affected the pronunciation of 23 Catalan/Spanish learners of English, a read-aloud task was conducted for phonetic measures, which consisted of pronunciation accuracy scores computed by pronunciation error counting (i.e., phonemic deletions, insertions and substitutions, and stress misplacement). With respect to perceived foreign accent measures, these consisted of two experiments. In one experiment, the group of judges randomly heard the sentences produced by the native group and the experimental group of non-native speakers of English at pre-test and post-test and they had to rate them on a Likert scale from 1 to 7, where 1 stands for native and 7 for heavy foreign accent. The second experiment consisted of comparing paired pre-test and post-test sentences produced by the non-native speakers, where the judges had to decide which sentence sounded more native-like. The participants performed the read-aloud task as a pre-test, before travelling and as a post-test, immediately after returning. A group of six native

speakers of English were the control group and another group of 37 Catalan/Spanish bilinguals trained in English phonetics assessed the degree of foreign accent in the English pronunciation of the Catalan/Spanish group. Avello, Mora, and Pérez- Vidal (2012) found that the non-native speakers' error production decreased after the study abroad experience with short-term immersion. The results of the post-test showed fewer pronunciation errors (*M* = 3.95, *SD* = 2.75) than in the pre-test (*M* = 3.30, *SD* = 2.65). Also, foreign accent was positively affected by immersion time, since the perceived degree of accentedness decreased from pre-test (*M* = 4.88, *SD* =1.28) to post-test (*M* = 4.68, *SD* = 1.20). These findings diverge from the previous research reviewed (Díaz-Campos, 2004; Pérez-Vidal et al., 2011; Avello and Lara 2014), which showed no L2 phonological gain from an immersion experience.

Other experimental results have demonstrated that the relationship between immersion and phonological gains is not as straightorward as researchers hypothesized. For example, Mora (2014) examined 198 participants (Bilingual Spanish/Catalan speaking learners of English) in a longitudinal study over three years. In this time, there were several testing stages, where an AXB auditory discrimination task was conducted with a different number of participants for each stage. Of all the four testing stages, only 27 participants completed the four perception tasks in the four data collection stages while 67 did so in the first three stages. However, only the outcomes of the 27 participants were considered in a delayed post-test. The author compared the gains participants obtained during the formal instruction context at the first and the second testing stages to the gains obtained during the study abroad time at the second and third stages. A group of 66 participants were assessed to observe the possible effects of formal instruction and immersion on perceptual phonological development. A pre-test and a post-test were necessary to evaluate this effect. For the control group, nine native speakers of English provided the data. The stimuli consisted of contrastive British English vowel pairs (i.e., /iː/, /ɪ/, /e/, /æ/, /ʌ/) embedded into /k_l/, /fl_s/, and /bl_s/ contexts and word-final consonant pairs contrasting in voicing (i.e., /p/, /b/, /s/, /z/, /tʃ/, /dʒ/) embedded into /gliː/, /fliː/, and /giː/ contexts. Results showed that in general participants performed almost perfectly for some of the tested contrasts (/e/-/æ/, /p/-/b/), but much lower for other(/æ/-/ʌ/, /tʃ/-/dʒ/) contrasts. Participants obtained high scores, but not as high as those of

native speakers. Concerning the longitudinal effect of the context of learning, it was found that gains obtained during formal instruction were greater than those in study abroad contexts (9.91% vs. 4.88%, respectively). That is, learners' discrimination skills were more influenced during formal instruction than during the three-month immersion of the study abroad program. However, the author explains that this unexpected result might be due to the short-term immersion experience participants had because changes in L2 perceptual abilities need more than three months to develop positively. This is in line with previous research that has considered the same explanation (Pérez-Vidal et al, 2011; Højen, 2003). Mora (2014) suggests the participants would have obtained a different outcome during an immersion period if they had received a specific perceptual training focusing on the sound contrasts of English through formal instruction during their study abroad period.

The findings of the above studies are inconclusive with respect to the effect of immersion and instruction in a formal setting on L2 phonological learning. The differences may be due to differences in experimental design.

4.2 The combined effects of formal instruction and immersion

Mora (2014) suggested that combining contexts, i.e., explicit instruction and immersion, ends up being more beneficial for the L2 phonological acquisition process. Similarly, Lord (2010) states, "In this respect, immersion appears to be beneficial, but it seems that those with instruction in addition to immersion may reap even more benefits" (p. 497). Lord's (2010) argument is in line with proposals by Pérez-Vidal et al. (2011) and Díaz-Campos (2006). Díaz-Campos (2006) suggests that an authentic immersion experience requires an active engagement by the learner in social interactions with native speakers in the L2 language community. Besides the practice with native speakers, these social interactions will help learners use language meaningfully. Unfortunately, learners do not always have the opportunity to interact with the target language community on a regular basis. The research about L2 acquisition abroad does not take the frequency or quality of these interactions into account to verify the authenticity of the immersion experience.

A study that examined the effect of conducting training during immersion is Lord (2010), which analysed the fricative-occlusive distinction in Spanish by a group of English native speakers who were immersed in Mexico (for two months) after taking a course on phonetics. The results of the group that received formal instruction before going abroad were compared with a group who did not receive formal instruction on phonetics but were in the same summer programme in Mexico. The participants were eight intermediate English-speaking learners of Spanish, divided into two groups based on their previous experience with Spanish phonetics and pronunciation courses. The data collection consisted of a read-aloud task before the study abroad programme and immediately after returning from Mexico. All participants read out loud a list of 60 words and phrases containing the following Spanish phones: [b, d, g, β, ð, ɣ]. The results showed that participants produced the occlusive sounds with the highest accuracy (100%). This might be due to L1 transfer and not due to instruction since the Non-Instruction group's performance was similar to the Instruction group's performance. The accuracy scores were different for fricative allophones in the pre-immersion and post-immersion accuracy scores of both groups. The Instruction group obtained higher accuracy percentages prior to the study abroad programme, hence, the effects of instruction prior to immersion are positive because the Instruction group outperformed the Non-Instruction group. However, according to the author, instruction alone is not enough to accurately produce the fricative allophones. Immersion increased the accuracy rates, since the Non-Instruction group improved from 3.5% to 5.8%, and the Instruction group improved from 8.6% to 28.7%, which demonstrates that immersion was beneficial for both groups. However, the Instruction group obtained overall superior gains in their production of fricative allophones. The above results demonstrate that instruction combined with immersion may lead to more gains than a single context of learning.

4.3 Effects of context of learning on the perception and production of Spanish lexical stress

More recently, a few studies have focused on the acquisition of Spanish lexical stress by learners who are in natural immersion settings. These studies (Romanelli & Menegoto, 2014; Romanelli, Menegoto, & Smyth, 2015a, 2015b) have analysed the effects of the

study abroad in isolation, without comparing the study-abroad learners with their counterpart learners in an at-home institution as a control group. Despite the lack of a control group, these studies have provided consistent and easily interpretable evidence for L2 learners' improvement of their perception of lexical stress as a result of being immersed in a L2 language community. Furthermore, these studies emphasize the importance of a perceptual training, while in immersion and the impact of pre-departure proficiency level impact on the learners' progress (Pérez-Vidal et al., 2011).

Romanelli, Menegoto, and Smyth (2015b) conducted a study involving a perceptual training with English native spekers, who were attending an intensive three-week immersion Spanish course in Mar del Plata, Argentina. Thirty-two students participated in this study, and were divided into two groups: one group of 16 students as the non-native control group (e.g., no training), and another group of 16 students with training. The training group received perceptual training consisting of eight sessions of ten minutes each. The training focused on vowel contrasts and stress. Although the non-native control group did not receive any perceptual training, they carried out communicative tasks centred on the perception of consonants as part of the regular Spanish lessons. The perception and production of stress were measured through a pre-test and a post-test. A group of 14 Spanish native speakers was used as the native control group. The authors examined the perception and production of ultimate and penultimate lexical stress (i.e., /a, e, o/ preceded by /p, t, k/) in paroxytone and oxytone words. During the pre-test, students took part in two identification tasks, one with real words and the other with nonce words. Also, a read-aloud task was conducted (i.e., a fable and a list of words). The post-test tasks were the same as the ones carried out during the pre-test. The results suggest that there was an improvement in the perception of ultimate and penultimate lexical stress in both groups. However, while the trained group performed similarly to the non-native control group, this was not the case for the untrained group. The results for the production task show that the 32 participants did not have difficulties when producing the stress of paroxytone words during the pre-test and the post-test. There were differences among the three groups with the perception of oxytone words in the pre-test and the post-test in that time the trained group improved much more than the non-native control group from pre-test (25% vs. 49%) to post-test (85% vs. 65%).

Second language phonological acquisition and its relationship to the context of learning (i.e., lexical stress) has not been studied thoroughly. The only studies related to the topic under research are Romanelli et al. (2014) and Romanelli et al. (2015a, 2015b), to the best of my knowledge. However, these studies did not compare their results of Spanish learners' performance during their stay in a natural immersion setting with an at-home control group. In order to assess the impact of both settings on the learners' linguistic gains, this comparison between immersed and formally trained learners is still necessary. As such, the present study investigates the perception of Spanish lexical stress in advanced-speaking Japanese learners of Spanish immersed in an L2 language community (i.e., Bogota) and compares them to learners who stayed at an at-home institution (i.e., Japan). Also, it controls for the amount of time spent in the community combined with the instruction received while at home or in the natural immersion setting.

4.4 Chapter summary

This chapter, covered previous studies addressing the effects of formal instruction and immersion on the perception and production of specific phonological features. Overall, the findings are inconclusive. This chapter also showed that the combination of formal instruction and immersion can lead to better results than each context separately (Lord, 2010). Also, previous research has shown that even short term immersion in the target language community, along with perceptual training, has positive effects on the perceptual abilities of learners (Romanelli & Menegoto, 2014; Romanelli, Menegoto, & Smyth, 2015a, 2015b). The studies reviewed showed that groups who received training while in immersion reported broader improvements than those whose learning was limited to formal language classroom tasks. Despite the lack of a control group at an at-home institution, these studies have provided consistent and easily interpretable evidence for L2 learners' improvement of their perception of lexical stress as a result of being immersed in a L2 language community.

In order to shed further light on the body of literature reviewed in this chapter and in previous chapters, the remainder of this thesis looks at effects of context of learning on the L2 perception of Spanish lexical by Japanese-speaking learners will be tested by comparing the performance of learners in Bogota, Colombia with those in Japan.

Chapter 5

5 Hypotheses and methodology

In the previous chapters, a literature review was provided through relevant studies related to stress perception and context of learning. Based on some of the evidence reviewed in these chapters, three hypotheses were established and a method was designed. This chapter will provide three hypotheses and the methodology used to look into the research questions.

In the rest of this chapter, the hypotheses will be presented (§5.1). Then, the design of the experiment is provided (§5.2) in terms of different aspects of the methodology, such as participants (§5.2.1), data collection (§5.2.2) and stress identification tasks (§5.2.3). Also, a description of the stimuli used in the tasks will be provided (§5.2.4), as will an analysis of the proficiency level of the participants (§5.2.5).

5.1 Hypotheses

Hypothesis 1. Because the Japanese stress system (Labrune, 2012; Tsujimura, 1996; Iwasaki 2012) is different from the Spanish stress system (Hualde, 2014), advanced Japanese-speaking late learners of Spanish will have difficulties perceiving Spanish lexical stress. Specifically, paroxytone and proparoxytone words in interrogative and exclamation sentences in sentence-final position will be more difficult than in sentence non-final position for both groups of Japanese speaking late learners both in immersion and formal instruction contexts. This is due to the interaction between variation in the realization of the F0 peaks (e.g., alignment with the stressed syllable or displacement) and the learners' L1 prosodic system (Ortega-Llebaria et al., 2013). Because of the acoustic differences between Spanish and Japanese (Kimura et al., 2012; Ortega-Llebaria, 2006; Ortega-Llebaria and Prieto, 2007; Ortega-Llebaria et al., 2013; and Hualde, 2014), F0 peak displacement may miscue the learners and result in misperception.

Hypothesis 2. There will be an effect of context of learning. In particular, advanced Japanese-speaking late learners who were immersed in Spanish in Bogota, Colombia will outperform the Japan group in the correct identification of stress in paroxytone and proparoxytone words in interrogative and exclamation sentences in sentence-final position. (Pérez-Vidal et al, 2011; Romanelli et al, 2015a & b; Romanelli et al, 2014).

Hypothesis 3. There will be an effect of type of words (Guion, 2005; Peperkamp and Dupoux, 2002). Real words will be easier than nonce words because participants will have access to their stress patterns in their lexicon they have learned in the classroom or in natural immersion settings; however, this is not the case with nonce words (Altmann, 2006; Hymes, 1997; and Romanelli et al., 2015b).

5.2 Methodology

All participants were required to participate in a stress identification task and a read-aloud task in Spanish. Participants were tested individually. In line with the hypotheses stated above, the first objective of these tests was to determine whether the Japanese-speaking learners had difficulty perceiving paroxytone and proparoxytones in prosodic contexts in which there might be an F0 peak misalignment with the stressed syllable, leading to a miscuing of the stress pattern. The second objective was to determine the effect of context of learning and the third objective was to examine the effect of type of words. Both learner groups completed a language background questionnaire that asked questions about their language background and use (see Appendix H). In order to test the participants' level of proficiency, they were also asked to complete an oral and a written language proficiency tests (see Appendix I-J).

5.2.1 Participants

In total, 64 participants ranging between 22 and 50 years old were tested in this study. The participants were divided into three groups: (1) the Japan L2 group; (2) the Bogota L2 group and (3) native speakers of Bogota Colombian Spanish.

5.2.1.1 Japan group

This group consisted of 24 Japanese-speaking learners of Spanish living in Tokyo, Japan. The learner group living in Japan was required to have been students of Spanish for three and a half years (i.e., in their final year of Spanish in Japan). The participants in this group were enrolled at Seisen University or Sophia University in Tokyo. Moreover, they had been born in Japan, their ages ranged between 22 to 25 years, and reported not having an advanced proficiency in any other foreign languages. The participants had not lived in a Spanish-speaking country for more than six months before testing, and spoke Tokyo variety of Japanese.

5.2.1.2 Bogota group

The second group comprised 20 Japanese speakers living in Bogota, Colombia. The Japanese-speaking participants in this the second group had lived in Bogota for at least five years and some had studied Spanish in Japan before they went to live in Colombia. They were born in Japan, and moved to Bogota, during adulthood, where they were working. Their ages ranged between 20-50 years. They all reported not having an advanced proficiency level in any language other than Japanese and Spanish and spoke a variety of Tokyo Japanese.

5.2.1.3 Control group

The control group consisted of 20 native speakers of Bogota Spanish, who were born and raised in Bogota, Colombia. Their ages ranged between 30-40 years.

5.2.2 Recruitment, Procedures & Data collection

5.2.2.1 Procedure

Participants were tested in a quiet room. Each session took approximately one and a half hours; one hour for the stress perception tasks and thirty minutes for the rest of the tests (i.e., background questionnaire and proficiency test). All the procedures were explained to the participants, who then provided and reported their written consent regarding their participation in this study (see Appendix G). After the consent forms were collected from

them, all participants were informed about the objectives of the research. Also, they were told their answers were confidential and for academic purposes and that they were free to withdraw from this study at any moment and for any reason. After this protocol session, participants were presented with the stress perception task with nonce words. First, they sat in front of a notebook computer in a quiet room and they were given a pair of headphones. Second, they read the instructions in Spanish displayed on the screen. Third, they listened to two examples. Finally, they started doing the stress perception task with nonce words. The stress perception task with nonce words took approximately thirty minutes. After completing the first task, participants took a ten minutes' break. After the break, all participants were provided with the second stress perception task, this time with real words. Upon the completion of the two stress identification tasks, all participants were asked to do the oral production part of the proficiency task.

Regarding the participants in Japan, a researcher in Canada stopped communication when all the participants had completed the two tasks and the oral production part of the proficiency task. Then a professor in Japan was responsible for continuing with the session and administering the written part of the proficiency test as well as the background questionnaire. Also, a data collector in Japan compensated the participants with ¥2000 Japanese yen (approximately $22 Canadian dollars). Concerning the participants in Bogota, the same procedure was followed; that is, a data collector in Colombia continued with the written part of the proficiency test and the background questionnaire, when the researcher in Canada finished supervising the perception tasks and the oral production part of the proficiency test. Then, at the end of each session a data collector compensated every participant with $ 20.000 Colombian pesos (approximately $10 Canadian dollars).

5.2.2.2 Japan group

This section will detail the recruitment process in Japan. The primary researcher remained in London, Ontario during participant recruitment and data collection. A professor in Japan assisted the researcher with recruitment and data collection. This data collector in Japan was working at Seisen University in Tokyo and facilitated participant recruitment in Japan in two ways. First, he asked his colleagues who taught fourth year

Spanish courses at Seisen University to distribute a poster (Appendix A) in their respective classes and asked interested students to contact him. Second, the professor contacted four other professors in Japan at other Japanese universities (Sophia University in Tokyo, Kanagawa University in Kanagawa, Kanda University of International Studies in Chiba, and Tokyo University of Foreign Studies, Tokyo) with the poster for the study. These professors asked their colleagues who taught fourth year Spanish courses at their respective universities to distribute the posters (Appendix B, C, D, E) in their respective classes. These populations were asked to contact the professors mentioned above at their corresponding university. Once contacted by students who were interested in being participants, each professor wrote to the researcher and a potential participant to set up an appointment for testing and asked him/her to open a Skype account and install TeamViewer software (TeamViewer 2010, Version 12.0.71483). During the appointments/sessions, the researcher met with the students virtually on an individual basis and the data collector from Seisen University was present at the session via Skype. During each session, the researcher conducted the stress identification task and then the oral portion of the proficiency test. Prior to the testing session, the researcher in Canada explained the procedures to the participants and gave them instructions for downloading the free TeamViewer software (also referred to in the letter of information), which was necessary for sharing computers with the researcher and conducting the stress identification task. Upon completion of the stress identification task and the oral part of the proficiency task, the professor in Japan was responsible for continuing with the session and administering the written part of the proficiency test as well as the background questionnaire.

The recordings took place during ten sessions, each involved two participants, who were in a quiet place at their respective university. After administering, the proficiency test, and the background questionnaire, each professor sent hard copies of the completed questionnaires, tests, and consent forms to the coordinating data collector at Seisen University, who sent all of these documents via regular mail to the researcher in Canada. It is important to point out that of the five universities who received invitations to participate, only students from Seisen University and Sophia University participated.

5.2.2.3 Bogota group

In Bogota, Colombia, a local data collector was charged with connecting participants and the researcher, and assisting with technical preparation for the stress identification task and the oral part of the proficiency test (i.e., downloading necessary software). All participants used the data collector's laptop in their homes, and therefore, the participants in Bogota were not asked to open a Skype account, to download TeamViewer software. After the stress identification task and the oral part of the proficiency test were completed, the Colombian data collector administered the background questionnaire and the written part of the proficiency test during the same (one single visit) session.

The steps taken by the data collectors in Japan and Colombia were necessary to accomplish desktop sharing. Sharing the desktop screen allowed participants to have access to the software Psychopy 2 version 1.84.1 (Peirce, 2007, 2009) and allowed them to do the experiment while listening to the sound file contained on Psychopy 2 version 1.84.1 (Peirce, 2007, 2009), the program needed to run the stress identification task.

5.2.2.4 Control group

Regarding the native speaker participants, the procedure for both participant recruitment and data collection was the same as what has been described above for the Bogota Japanese-speaking group living in Bogota. Control group participants were contacted through the snowball method, by gathering potential participants through the identification of colleagues.

5.2.3 Materials & Apparatus

Participation in this study did not affect the students' final grades and their instructors were not notified of their performance or final results on the tests or questionnaire.

5.2.3.1 Background questionnaire

All participants were required to fill out a background questionnaire (see Appendix H) after they completed the stress identification task. The background questionnaire's purpose was to collect demographic information from the participants as well as

information on their language knowledge and use. Hence, it included questions about the number of years they have been studying Spanish, level of another language studied or acquired, and how participants practice their Spanish, among other questions. These sessions took place in Tokyo and Bogota in person with the data collectors.

5.2.3.2 Task 1: Stress identification task with nonce words

As it was stated above, the test phase of this study consisted of a stress identification task performed by the three groups of participants (i.e., the Japan L2 group, the Bogota L2 group, and the control group). This task aimed to test the perceptual skills of Japanese speakers. To this end, the testing procedures used in the present experiment were adopted from the ones used by Llisterri et al. (2014), Kimura et al. (2012), and Kim and Hualde (2014). The stress identification task involved the following stimuli: nine sets of three syllable triplets, with each having an oxytone (e.g., nabid**ó)**, a paroxytone (e.g., nab**i**do) and a proparoxytone (e.g., n**á**bido) variant. The syllable structure of the stimuli was CVCVCV. Participants listened to the target words in the five different contexts outlined in Table 3.

Table 3: Structural contexts

Sentence type	Final Position	Non-final Position
Isolation	Context 1 **ná**bido	
Yes/no question	Context 2 ¿él dijo n**á**bido?	Context 4 ¿él dijo **na**bido ayer?
Exclamation	Context 3 ¡él dijo **tí**pimo!	Context 5 ¡él dijo **tí**pimo ayer!

In the first part of this perception task, participants listened to a word in isolation or embedded in a sentence (e.g., ***á****brigo* or *¿él dijo* ***á****brigo ayer?*) and had to indicate as quickly as possible the word they heard by clicking on one of the three options (e.g., ***á****brigo- a**bri**go* – ***a****brigo*) they were presented with on the computer screen as outlined in Figure 12.

Figure 12: Three options on the screen the participants were presented with.

Each word was presented in the five contexts specified above (Table 3). The randomization of the stimuli was different for every fifth participant. There were four sets of randomized blocks, each block consisted of nonce words blocks of triplets. Every nonce word block contained 75 nonce words: 5 triplet sets x 3 syllables accentual minimal triplets members x 5 different sentence types.

The test lasted 30 minutes and in this phase, no feedback was provided and no sequence was repeated. The experiment was built and run using an open-source graphic experiment builder called Psychopy 2 version 1.84.1 (Peirce, 2007, 2009). A second program called TeamViewer was also used. As mentioned earlier, this program was necessary to share desktops with the participants in Japan and Colombia, so learners could participate online. It is important to emphasise that the researcher did not have access to the participants' desktops; rather, the investigator gave permission to all the participants to have access to his desktop through TeamViewer.

5.2.3.3 Task 2 Stress identification task with real words

The three groups of participants also performed the stress identification task with real words. The procedure used in this task was also adopted from the ones used by Llisterri et al. (2014), Kimura et al. (2012), and Kim and Hualde (2014). The stress identification task consisted of four sets of three syllable triplets with each having an oxytone (e.g., limi**té)**, a paroxytone (e.g., li**mi**te) and a proparoxytone (e.g., **lí**mite) word. The syllable structure of the stimuli was CVCVCV. Participants listened to the target words in the five different contexts summarized in Table 4:

Table 4: Structural contexts for real words

Sentence Type	**Final Position**	**Non-final Position**
Isolation	Context 1 medico	
Yes/no question	Context 2 ¿él dijo válido?	Context 4 ¿él dijo **nú**mero ayer?
Exclamation	Context 3 ¡él dijo **vá**lido!	Context 5 ¡él dijo **li**mite ayer!

Participants listened to a word in isolation or embedded in a sentence (e.g., ***lí****mite* or *¿Él dijo* ***lí****mite ayer?*) and indicated as quickly as possible word they heard by clicking on one of the three options (e.g., ***lí****mite* - *li****mi****te* – *limi****té***) they were presented with on the computer screen. Each word was presented in the five contexts specified above.

The randomization of the stimuli was different for every fifth participant. There were four sets of randomized blocks, each block consisted of nonce words blocks of triplets. Every real word block contained 60 real words: 4 triplet sets x 3 syllables accentual minimal triplet members x 5 different sentence types. The test lasted 30 minutes and in this phase, no feedback was provided and no sequence was repeated. The experiment was built and run using an open-source graphic experiment builder software called Psychopy 2 version 1.84.1 (Peirce, 2007, 2009). A second program called TeamViewer was also used.

5.2.3.4 Proficiency Test

Concerning the proficiency test, two main research instruments were applied in this study to measure the Spanish proficiency of the advanced Japanese-speaking late learner participants. Both learner groups (i.e., the Bogota L2 group and the Japan L2 group) carried out the same test. The first component was the reading aloud of a short text (*El viento y el sol* "The North Wind and the Sun", (see Appendix K), which was rated by native speaker judges. In this first part of the proficiency test, the investigator recorded the participants' voices while they read the short text via Skype using the Easy Audio Recorder Lite application.

This application only recorded a sound file, not a video file. After the data collection took place, the recordings were edited and put together in Audacity (Audacity 2016, Version

2.0.3) as one audio file. Once the data collection was completed, three native Spanish speakers who were asked to act as judges, listen to the recordings and rate the oral proficiency of the Japanese speaker participants. This oral proficiency judgment was carried out in London, Ontario (see Appendix L). A graduate student at Western, a professor of Modern Languages and Literatures Department at Western, and a native speaker community member acted as the judges. The three judges were speakers of Bogota Spanish. The second component of the proficiency test consisted of 30 multiple-choice questions on morphology and 20 questions on vocabulary and context in a cloze test (see Appendices I and J).

The excerpt produced by the Japanese-speaking learners of Spanish was evaluated by the three native speaker judges was for this proficiency judgement, a 1 to 5 scale was used, where 1 was not at all advanced, and 5 very advanced (adapted from Dörnyei & Csizér, 2012). The judges were asked to rate the Japanese speakers' production based on the overall clarity of the speech in terms of pronunciation accuracy and fluidity. The three judges received an explanation about the meaning of each number and two practice judgments were given before doing the real judgement task. The judges heard the Japan group first and the Bogota group second. The judges could listen to the recording a second time to confirm their judgments.

5.2.3.4.1 Results of proficiency judgment test

The three judges rated the proficiency level of the participants in the Bogota group and the Japan group based on their oral production reading of *El viento y el sol*. Figure 13 shows the average ratings of the level of the Japanese-speaking learners of Spanish. The results of the overall oral production were as follows: the Bogota group was rated as advanced by Judges 1 and 2, and advanced by Judge 3. For the Japan group, Judges 1 and 3 rated them all as advanced, and Judge 2 rated them as less advanced.

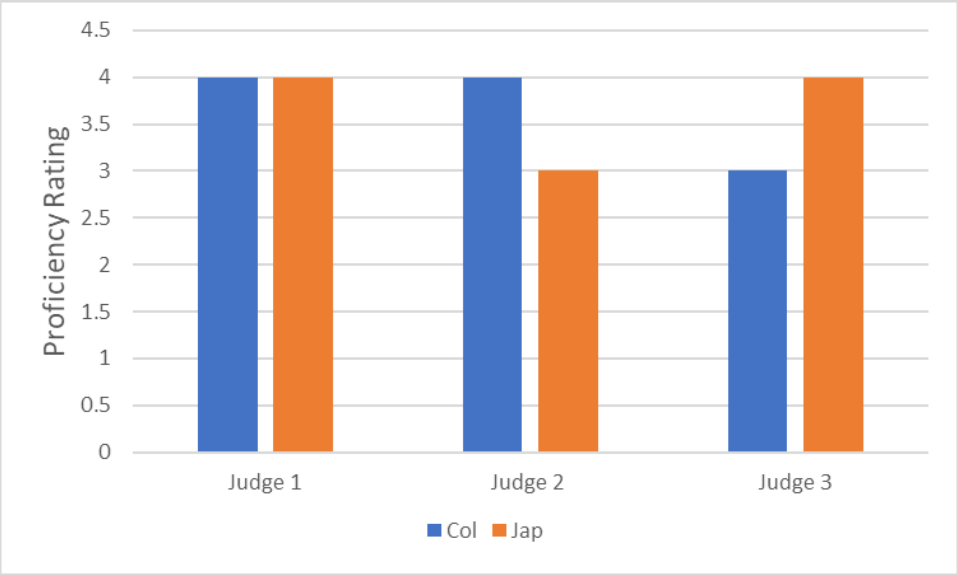

Figure 13: Average rating of oral production in the proficiency judgement test

5.2.4 Stimuli

The stimuli consisted of five triplets – 15 words in total – of trisyllabic Spanish nonce words, which differed only in the location of their primary stress (see target words in Table 5) and four triplets of – 12 words – of trisyllabic Spanish real words (See Table 6). In total, 135 words per participant were analysed for this study (see Table 5). The words in the isolated context served as the fillers. The phoneme /r/ was not used in the stimuli for both the real and nonce words given that this sound has been reported to create difficulty for Japanese learners (Aoyama & Flege, 2004, 2011; Yamada and Tohkura, 1992; Hattori & Iverson, 2009). An adult female speaker from Bogota, Colombia pronounced and recorded the audio stimuli. She was instructed to say the words in a natural way and at a normal rate of speech.

Table 5: Nonce target words stimuli

Context 1: Target word in isolation	Context 2: Target word in final position of yes/no question	Context 3: Target word in final position of exclamation	Context 4: Target word in non-final position of yes/no question	Context 5: Target word in non-final position of exclamation
<u>ná</u>bido	¿él dijo **ná**bido?	¡él dijo **ná**bido!	¿él dijo **ná**bido ayer?	¡él dijo **ná**bido ayer!

	did he say **ná**bido?	he said **ná**bido!	did he say **ná**bido yesterday?	he said **ná**bido yesterday!
na**bi**do	¿él dijo na**bi**do? did he say na**bi**do?	¡él dijo na**bi**do! he said na**bi**do!	¿él dijo na**bi**do ayer? did he say na**bi**do yesterady?	¡él dijo na**bi**do ayer! he said na**bi**do yesterday!
nabi**dó**	¿él dijo nabi**dó**? did he say nabi**dó**?	¡él dijo nabi**dó**! he said nabi**dó**!	¿él dijo nabi**dó** ayer? did he say nabi**dó** yesterday?	¡él dijo nabi**dó** ayer! he said nabi**dó** yesterday!
típimo	¿él dijo t**í**pimo? did he say t**í**pimo?	¡él dijo t**í**pimo! he said t**í**pimo!	¿él dijo t**í**pimo ayer? did he say t**í**pimo yesterday?	¡él dijo t**í**pimo ayer! he said t**í**pimo yesterday!
ti**pi**mo	¿él dijo ti**pi**mo? did he say ti**pi**mo?	¡él dijo ti**pi**mo! he said ti**pi**mo!	¿él dijo ti**pi**mo ayer? did he say ti**pi**mo yesterday?	¡él dijo ti**pi**mo ayer! he said ti**pi**mo yesterday!
tipi**mó**	¿él dijo tipi**mó**? did he say tipi**mó**?	¡él dijo tipi**mó**! he said tipi**mó**!	¿él dijo tipi**mó** ayer? did he say tipi**mó** yesterday?	¡él dijo tipi**mó** ayer! he said tipi**mó** yesterday!
nético	¿él dijo **né**tico? did he say **né**tico?	¡él dijo **né**tico! he said **né**tico	¿él dijo **né**tico ayer? did he say **né**tico yesterday?	¡él dijo **né**tico ayer! he said **né**tico yesterday!
ne**ti**co	¿él dijo ne**ti**co? did he say ne**ti**co?	¡él dijo neti**c**o! he said neti**c**o!	¿él dijo ne**ti**co ayer? did he say ne**ti**co yesterday?	¡él dijo neti**c**o ayer! he said neti**c**o yesterday!
neti**có**		¡él dijo neti**có**!	¿él dijo neti**có** ayer?	¡él dijo neti**có** ayer!

	¿él dijo neti**có**? did he say neti**có**?	he said neti**có!**	did he say neti**có** yesterday?	did he say neti**có** yesterday?
mádino	¿él dijo m**á**dino? did he say m**á**dino?	¡él dijo m**á**dino! he said m**á**dino!	¿él dijo m**á**dino ayer? Did he say m**á**dino yesterday?	¡él dijo m**á**dino ayer! he said m**á**dino yesterday!
ma**di**no	¿él dijo ma**di**no? did he say ma**di**no?	¡él dijo ma**di**no! he said ma**di**no!	¿él dijo ma**di**no ayer? did he say ma**di**no yesterday?	¡él dijo ma**di**no ayer! he said ma**di**no yesterday!
madi**nó**	¿él dijo madi**nó**? did he say madi**nó**?	¡él dijo madi**nó**! he said madi**nó**!	¿él dijo madi**nó** ayer? did he say madi**nó** yesterday?	¡él dijo madi**nó** ayer! he said madi**nó** yesterday!
tánimo	¿él dijo **tá**nimo? did he say **tá**nimo?	¡él dijo **tá**nimo! he said **tá**nimo	¿él dijo **tá**nimo ayer? did he say **tá**nimo yesterday?	¡él dijo **tá**nimo ayer! he said **tá**nimo yesterday!
ta**ni**mo	¿él dijo ta**ni**mo? did he say ta**ni**mo?	¡él dijo ta**ni**mo! he said ta**ni**mo!	¿él dijo ta**ni**mo ayer? did he say ta**ni**mo yesterday?	¡ él dijo ta**ni**mo ayer! he said ta**ni**mo yesterday!
tani**mó**	¿él dijo tani**mó**? did he say tani**mó**?	¡el dijo tani**mó**! he said tani**mó**!	¿él dijo tani**mó** ayer? did he say tani**mó** yesterday?	¡el dijo tani**mó**! he said tani**mó** yesterday!

Table 6: Real target words stimuli

Context 1: Target word in isolation	Context 2: Target word in final position of yes/no question	Context 3: Target word in final position of exclamation	Context 4: Target word in non-final position of yes/no question	Context 5: Target word in non-final position of exclamation
n**ú**mero	¿él dijo n**ú**mero? did he say number?	¡él dijo n**ú**mero! he said number!	¿él dijo n**ú**mero ayer? did he say number yesterday?	¡él dijo n**ú**mero ayer! he said number yesterday!
num**e**ro	¿él dijo num**e**ro? did he say I number?	¡él dijo num**e**ro! he said I number!	¿él dijo num**e**ro ayer? did he say I number yesterday?	¡él dijo num**e**ro ayer! he said I number yesterday!
numer**ó**	¿él dijo numer**ó**? did he say he/she numbered?	¡él dijo numer**ó**! he said he/she numbered!	¿él dijo numer**ó** ayer? did he say he/she numbered yesterday?	¡él dijo numer**ó** ayer! he said he/she numbered yesterday!
m**é**dico	¿él dijo m**é**dico? Did he say doctor?	¡él dijo m**é**dico! he said doctor!	¿él dijo m**é**dico ayer? Did he say doctor yesterday?	¡él dijo m**é**dico ayer! he said doctor yesterday!
med**i**co	¿él dijo med**i**co? Did he say I medicate?	¡él dijo med**i**co! he said I medicate!	¿él dijo med**i**co ayer? Did he say I medicate yesterday?	¡él dijo med**i**co ayer! he said I medicate yesterday!
medic**ó**	¿él dijo medic**ó**? Did he say he/she medicated?	¡él dijo medic**ó**! he said he/she medicated!	¿él dijo medic**ó** ayer? Did he say he/she medicated?	¡él dijo medic**ó** ayer! he said he/she medicated yesterday!

l**í**mite	¿él dijo l**í**mite? Did he say limit?	¡él dijo l**í**mite! he said limit!	¿él dijo l**í**mite ayer? Did he say limit?	¡él dijo l**í**mite ayer! he said limit yesterday!
lim**i**te	¿él dijo lim**i**te? Did he say I/he/she limit?	¡él dijo lim**i**te! he said I/he/she limit!	¿él dijo lim**i**te ayer? Did he say I/he/she limit?	¡él dijo lim**i**te ayer! he said I/he/she limit yesterday!
limit**é**	¿él dijo limité? Did he say he/she limited?	¡él dijo limit**é**! he said he/she limited!	¿él dijo limité ayer? Did he say he/she limited?	¡él dijo limité ayer! he said he/she limited yesterday!
v**á**lido	¿él dijo v**á**lido? Did he say valid?	¡él dijo v**á**lido! he said valid!	¿él dijo v**á**lido ayer? Did he say valid yesterday?	¡él dijo v**á**lido ayer! he said valid yesterday!
val**i**do	¿él dijo val**i**do? Did he say I respect/ steem/ appreciate?	¡él dijo val**i**do! he said I respect/ steem/ appreciate!	¿él dijo val**i**do ayer? Did he say I respect/ steem/ appreciate yesterday?	¡él dijo val**i**do ayer! he said I respect/ steem/ appreciate yesterday!
valid**ó**	¿él dijo valid**ó**? Did he say he/she respected/ steemed/ appreciated?	¡él dijo valid**ó**! he said he/she respected/ steemed/ appreciated!	¿él dijo valid**ó** ayer? Did he say he/she respected/ steemed/ appreciated yesterday?	¡él dijo valid**ó** ayer! he said he/she respected/ steemed/ appreciated yesterday!

5.2.5 Summary of the chapter

In this chapter, the hypotheses were presented. It was hypothesized that the Bogota group would outperform the Japan group in the perception of the Spanish lexical stress. Also, the context of learning would be beneficial for the Bogota group and the nonce words will be more difficult to perceive than the nonce ones. In terms of the methodology, the two stress perception tasks and their procedure were explained in detail. In the next chapter, the results of the collected data will be presented.

Chapter 6

6 Data analysis and results

6.1 Introduction

In this chapter, first, the statistical analysis of the results obtained in the perception task will be presented. The analyses included in this chapter consist of mixed-model ANOVAs that compared the perception abilities of the two groups of Japanese-speaking late learners who are highly advanced in Spanish (i.e., 25 living in Japan and 20 in Bogota, Colombia) with the performance of a control group of 20 native Spanish speakers. The statistical analysis was conducted in SPSS. The data were analysed using ANOVA with the within-participant independent variables being stress patterns, sentence type, position of words within the sentence (final vs. non-final), and type of word (real vs. nonce), and the between-participant independent variable being context of learning. The participants' accuracy was determined by correct stress selection/identification. This was followed by an analysis of a subset of the recorded stimuli produced by a native speaker of Bogota Spanish that the participants were presented with during the stress identification task. Given that both sentence-final and non-final positions were difficult for participants, F0 peak displacement and maximum pitch were analysed in all the contexts in the recorded stimuli in order to first see whether or not the patterns of F0 peak displacement in the stimuli patterns with what has been reported in the literature. In addition, the analysis of the recorded stimuli helps explain some of the unexpected results. Confusion matrices that show error types produced by the participants are also reported and analysed in light of the analysis of the recorded stimuli.

In this chapter, the results are organized with respect to the three research questions and their respective hypotheses about the perception of the paroxytones and proparoxytones in sentence-final vs. sentence-non-final positions in interrogative and exclamative sentences in both real and nonce word contexts. The themes of the research questions are

(i) yes/no questions vs. exclamations, (ii) real vs. nonce words, and (iii) the effect of immersion vs. formal instruction. Recall that hypothesis 1 predicted that Japanese-speaking learners would have difficulty perceiving Spanish lexical stress. Specifically, the perception of Spanish paroxytone and proparoxytone words would be more difficult in the sentence-final vs. the sentence-non-final position of both interrogative and exclamative Spanish sentences for both groups of Japanese-speaking late learners. Hypothesis 2 concerned the effects of immersion vs. formal instruction in the perceptual skills of the Japanese speakers. Based on the longer exposure to the target language in an immersion learning environment, it was predicted that this group would outperform the group in formal instruction in the correct identification of stress in paroxytone and proparoxytone words in interrogative and exclamations sentences. Hypothesis 3 focused on the perception of real and nonce words. Specifically, it was predicted that nonce words would create more perceptual difficulties due to the fact that they are not stored in the participants' lexicon. The sections are divided according to these research questions and related linguistic and cognitive factors. To address the first question, the interactions of the linguistic variables such as stress patterns (i.e., paroxytone vs. proparoxytone), position of the words (i.e., final vs. non-final), and sentence type (i.e., yes/no questions vs. exclamations) will be analysed in (§6.2.1). The next subsection endeavours to answer the second research question, which is related to the effect of immersion. The results will inform us as to whether there is a positive effect of immersion on the Bogota, Colombia group that leads them to outperform the Japan group in correct stress identification (§6.2.2). The examination of the perception of nonce and real words in yes/no questions and exclamations with the target words in final and non-final position follows next (§6.2.3). Interactions between the three factors are provided in section §6.2.4. An acoustic analysis of a subset of the recorded stimuli produced by a native speaker of Bogota Colombian Spanish is provided in section §6.2.5. Section §6.2.6 analyses the confusion matrices/errors of the participants in light of the acoustic analysis of the recorded stimuli.

6.2 Results

6.2.1 Interactions of linguistic variables

6.2.1.1 Stress Position x Sentence Position x Sentence Type.

There was a significant 3-way interaction between stress position, sentence position, and sentence type ($F_{(2)}$ = 11.53, $p < 0.001$, $\eta_p^2 = 0.16$, $OP > 0.99$). Based on Figures 14 and 18, the two non-oxytone conditions showed opposite patterns in questions and exclamations: final position in interrogatives was harder while final position in exclamatives was easier. Figures 14 and 15 demonstrate that proparoxytone words in final position (M = 0.48) were more difficult to perceive than in non-final position (M = 0.50) in interrogatives. Also, paroxytone words were more difficult to perceive in the final position (M = 0.32) than in non-final position (M = 0.50) in interrogatives. Oxytone words showed a different pattern for questions and exclamations; that is, final position was easier in both types of sentences. The results for the yes/no questions confirmed our hypothesis that paroxytone words in sentence-final position of yes/no questions are more difficult to perceive than in sentence non-final position. However, participants demonstrated a different behaviour in exclamations than in yes/no questions; they obtained higher accuracy rates with proparoxytone and paroxytone words in final position. Figures 14 and 15 demonstrate that proparoxytone words in non-final position (M = 0.65) were more difficult to perceive than in final position (M = 0.80) in exclamatives. Also, paroxytone words were more difficult to perceive in the non-final position (M = 0.37) than in final position (M = 0.51) in interrogatives. This was an unexpected result since it was predicted that final position would be more difficult in both types of sentences.

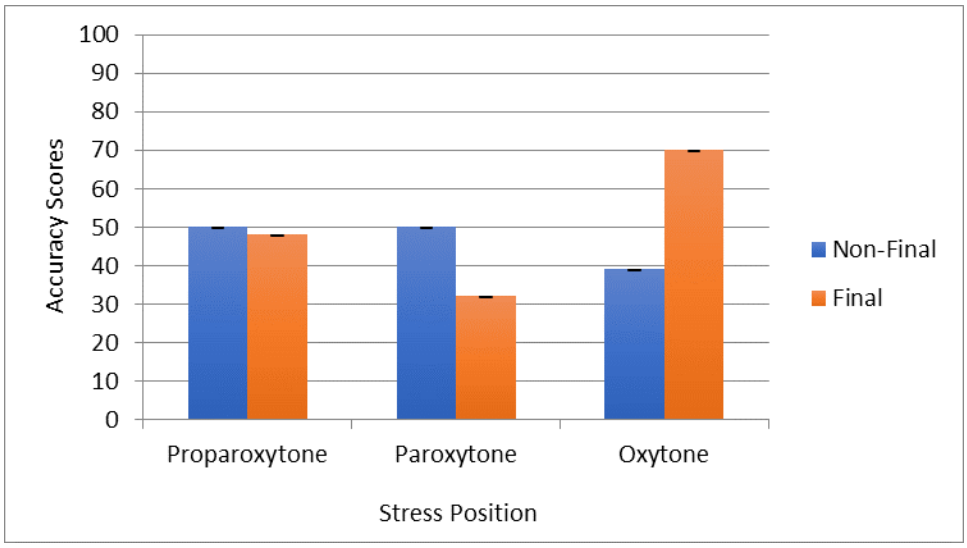

Figure 14: Estimated marginal means of accuracy for the interaction between stress position, word position, and sentence type in yes/no questions

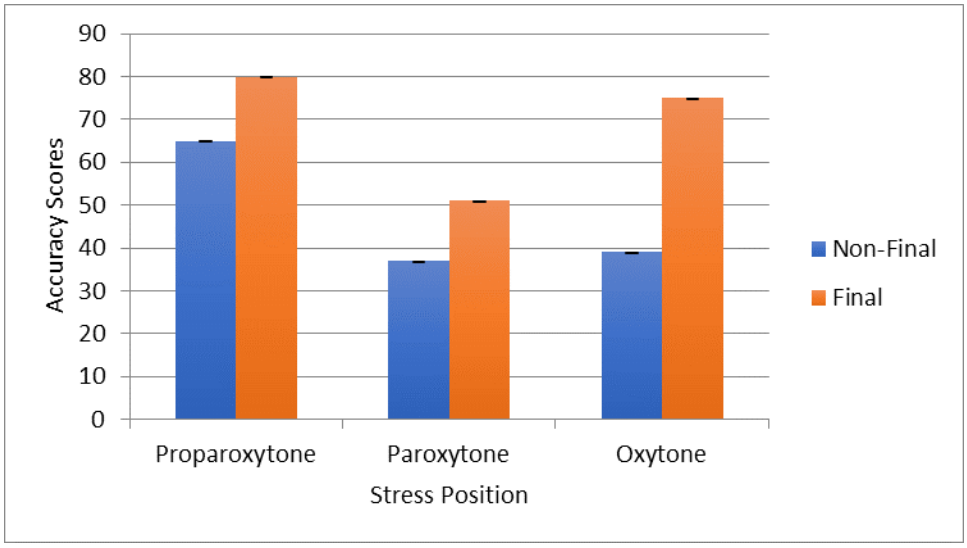

Figure 15: Estimated marginal means of accuracy for the interaction between stress position, word position, and sentence type in exclamations

As a follow-up to the omnibus ANOVA, a mixed-model ANOVA was conducted including only questions. It was found that the differences in stress position in questions (Figure 16) were significant. Proparoxytone (M = .48, SE = 0.02), paroxytone (M = 0.44, SD = 0.02), oxytone (M = 0.54, SD = 0.02), ($F_{(1.77,109.65)}$ = 4.82, p = 0.01, η_p^2 = 0.07). Proparoxytone was not different from paroxytone (p = 0.86), oxytone was different from

paroxytone (p = 0.003), and there was no difference between proparoxytone and oxytone (p > 0.14). When compared with the exclamations, yes/no questions' accuracy rates were lower as shown in Figure 16.

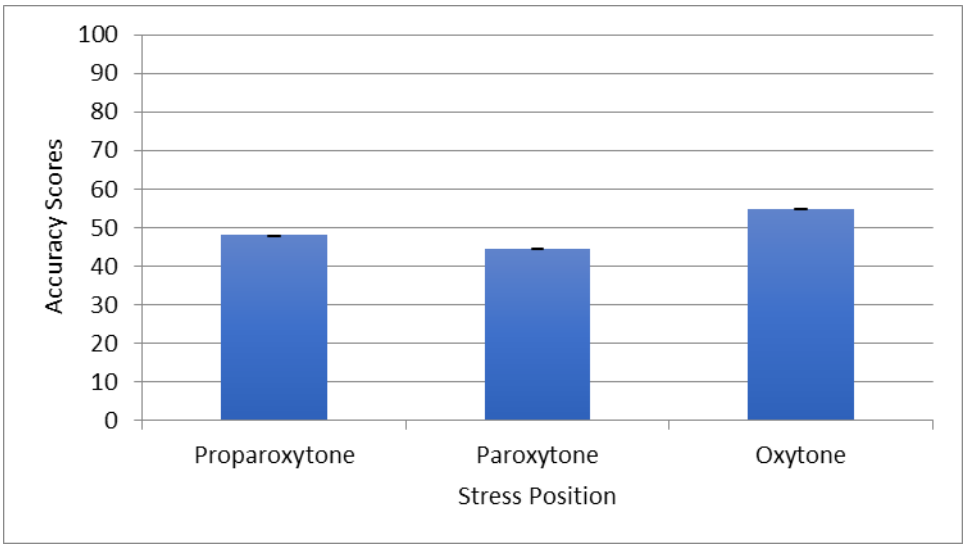

Figure 16: Estimated marginal means of accuracy for the condition stress position in yes/no questions

With regards to stress position in exclamations, as a follow-up to the omnibus ANOVA, a mixed-model ANOVA was conducted including only Exclamations. A significant difference in stress position in exclamations (Figure 17) was found. The groups differed in the perception of exclamations with proparoxytone (M = 0.72, SE = 0.02), paroxytone (M = 0.45, SD = 0.02), oxytone (M = 0.56, SD = 0.02), ($F_{(1.93,119.91)}$ = 41.46, p < 0.001, η_p^2 = 0.40). As predicted, proparoxytone was more accurate than paroxytone (p < 0.001), while oxytone was less accurate than paroxytone (p < 0.001), and proparoxytone was more accurate than oxytone (p < 0.001).

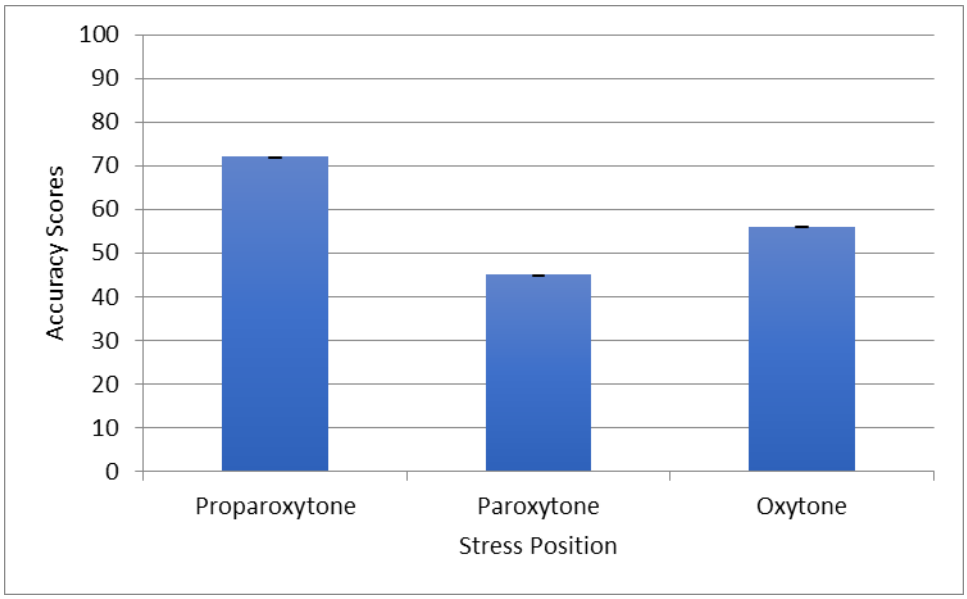

Figure 17: Estimated marginal means of accuracy for stress position in exclamations across the three groups

6.2.2 Effect of context of learning

This section tackles the second research question, concerning the differences between the two contexts of learning: will context of learning modulate stress identification in paroxytone and proparoxytone words in sentence-final position in interrogative and exclamation sentences? In other words, will the performance of the learners who learned Spanish through direct exposure to the language in a Spanish-speaking country (Colombia) differ from that of the learners in a formal instructional setting in an at-home institution in Japan? It was predicted that the Bogota group in immersion would be more accurate than the Japan group in formal instruction. A mixed-model ANOVA was used to verify this prediction.

Figure 18 shows that the groups differed and there was a significant main effect of learning environment; that is, Bogota L2 vs. Japan L2 vs. Bogota L1 ($F_{(2)} = 267.39$, $p < 0.001$, $\eta_p^2 = 0.90$, $OP > 0.99$). Post hoc Bonferroni-corrected pairwise tests showed that the Bogota L1 group scored the best among the three groups (Mean = 0.74, SE = 0.01), followed by the Bogota L2 group ($M = 0.48$, $SE = 0.01$), and then the Japan L2 group (M

= 0.38, *SE* = 0.01). All pairwise differences were significant at the $p < 0.001$ level. As a whole, results indicated immersion aided stress identification.

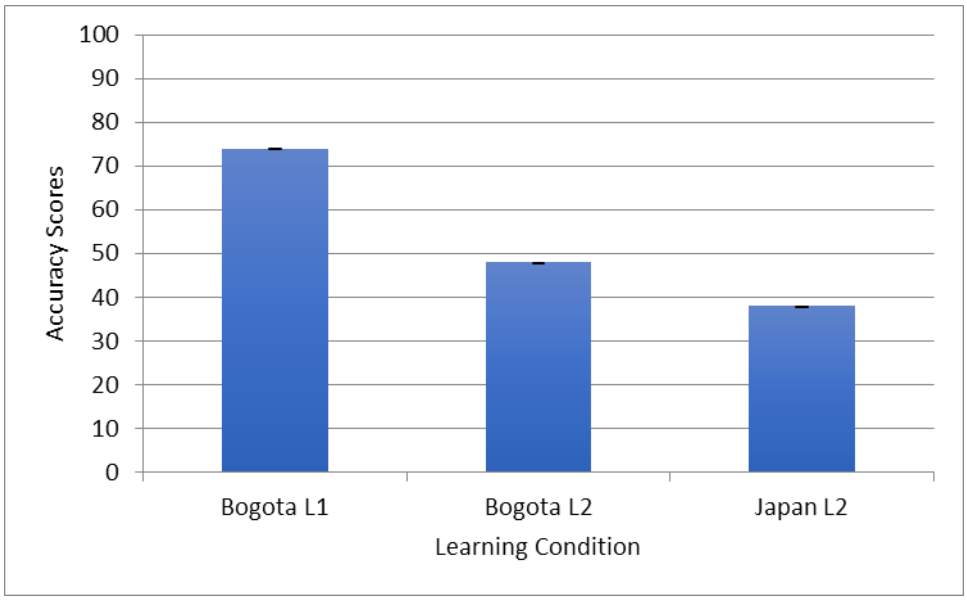

Figure 18: Estimated marginal means of accuracy for learning environment

6.2.3 Effect of real and nonce words on perception

This section addresses the third research question in this study: is there an effect of real words vs. nonce words? A mixed-model ANOVA was run to answer this question. The results are shown in the rest of this section. Note that we predicted that nonce words would more difficult to perceive than real words.

Figure 19 provides the means of accuracy and shows that there was no significant main effect on the perception of real vs. nonce words ($F_{(1)} = 1.67$, $p = 0.20$, $\eta_p^2 = 0.03$, *OP* = 0.25). Thus, the means for the real condition (*M* = 0.54, *SE* = 0.01) and the nonce condition (*M* = 0.53, *SE* = 0.01) were similar. This result was not as predicted since it was expected stress identification would be more difficult in nonce words than real words because participants would not have pre-existing lexical representations of these nonce words in their lexicon.

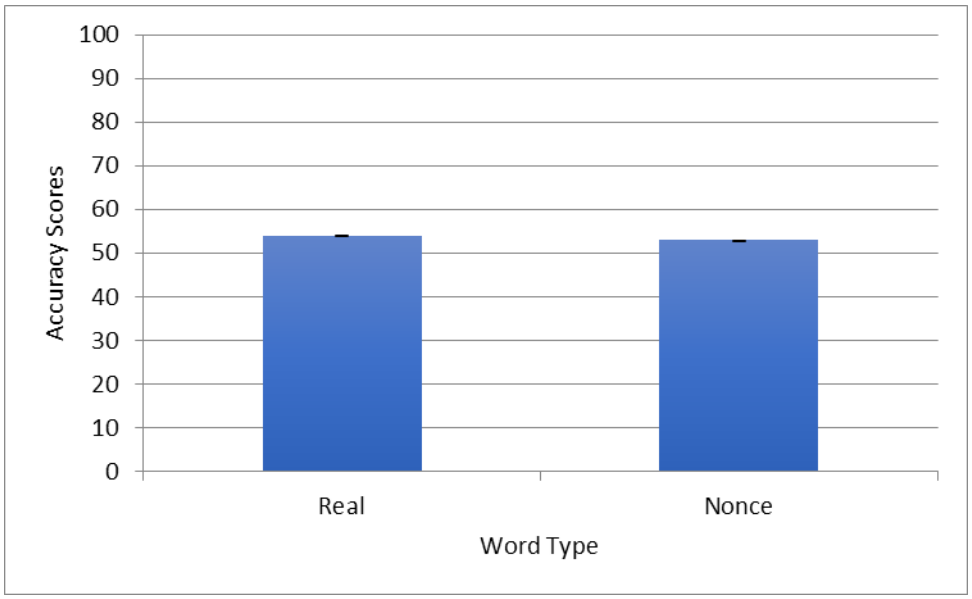

Figure 19: Estimated marginal means of accuracy for the perception of real and nonce words collapsed across the three groups

6.2.4 Interactions

In order to assess the impact of the two contexts of learning on the stress identification of paroxytone and proparoxytone words in sentence-final position in interrogative and exclamation questions, interactions were explored regarding Learning Condition x Stress Position x Sentence Position x Sentence Type x Word type, and Learning Condition x Sentence Position x Stress Position.

6.2.4.1 Learning Condition x Stress Position x Sentence Position x Sentence Type x Word type

There was not a 5-way interaction between these variables ($F_{(4,121.53)} = 0.84$, $p = 0.50$, $\eta_p^2 = 0.03$, $OP = 0.26$). Given this lack of significance, the impacts of learning condition were plotted for on the 4 within-subject variables independently. Essentially, the 3 learning conditions are always ordered in the same way according to the three groups, performance, namely: Bog L1 > Bog L2 > Jap L2.

6.2.4.2 Learning Condition x Stress Position

Figure 20 provides the estimated marginal means for the effect of learning condition and stress position condition ($F_{(3.60,111.48)} = 7.50$, $p < 0.001$ $\eta_p^2 = 0.20$, $OP > 0.99$). Paroxytone words were harder to perceive than proparoxytones for all three groups. The native speakers had the highest accuracy rates and the Bogota group obtained higher accuracy rates than the Japan group.

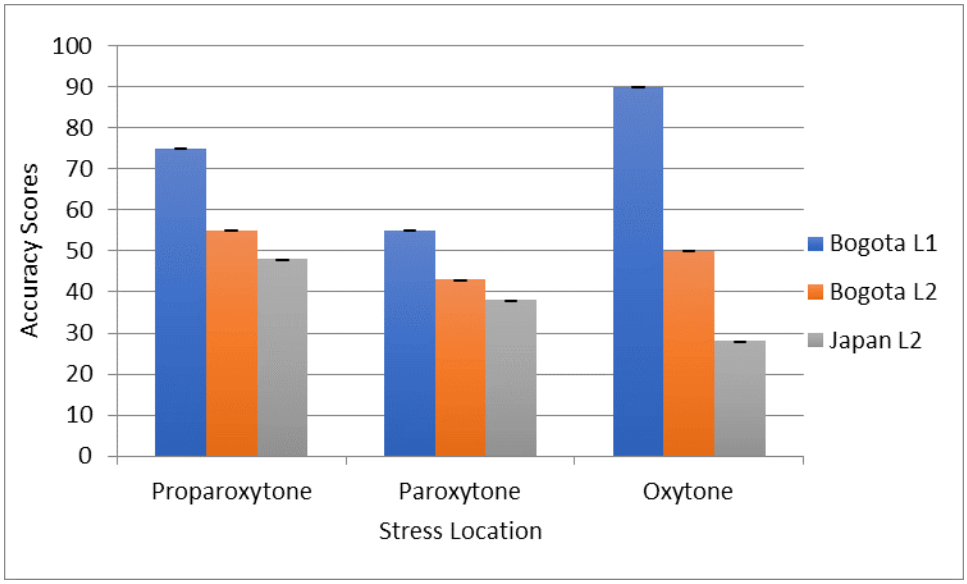

Figure 20: Estimated marginal means of accuracy for the interaction between learning condition and stress position

6.2.4.3 Learning Condition x Sentence Position

Figure 21 shows that there was an interaction between learning condition and word position ($F_{(2,62)} = 9.71$, $p < 0.001$, $\eta_p^2 = 0.24$ $OP = 0.98$); however, words in final position were easier to perceive than the non-final position. This result was not expected, since it was predicted that sentence-final position would be more difficult than sentence non-final. These results might have been obtained due to the fact that the results were collapsed across both conditions of learning.

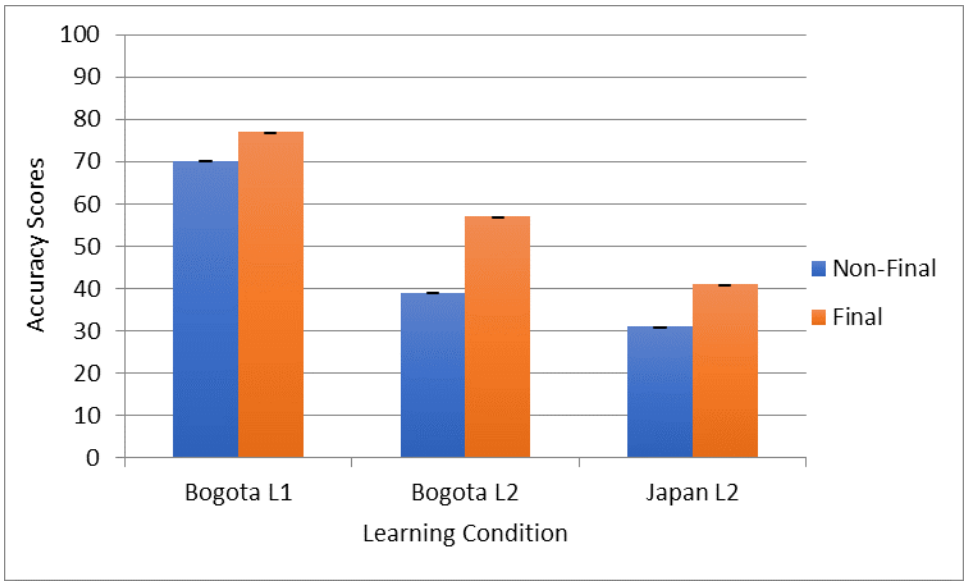

Figure 21: Estimated marginal means of accuracy for the interaction between learning condition and word position

6.2.4.4 Learning Condition x Sentence Type

Figure 22 presents the accuracy scores showing a significant interaction between learning condition and sentence type ($F_{(2,62)}$ = 5.18, p = 0.008, η_p^2 = 0.14, OP = 0.81). Participants exhibited lower means of accuracy with yes/no questions than exclamations. Moreover, the L1 group (M_Q= 0.72 vs. M_E 0.75) was generally more accurate than the Bogota L2 group (M_Q= 0.44 vs. M_E = 0.52) and the Japan L2 group (M_Q = 0.32 vs. M_E = 0.43). In addition, the Japan L2 group exhibited more difficulty perceiving lexical stress across the board in yes/no questions than the Bogota L2 group, as predicted.

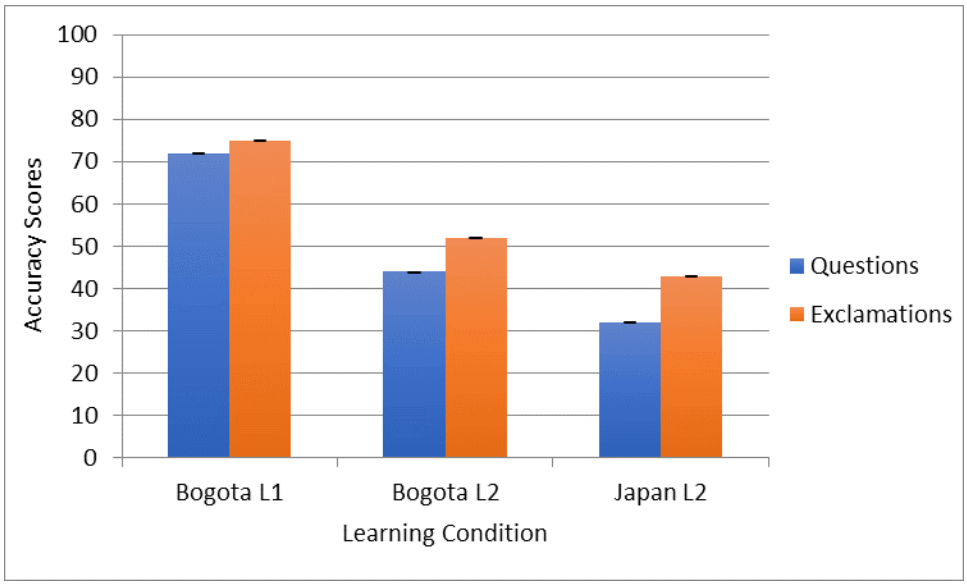

Figure 22: Estimated marginal means of accuracy for the interaction between learning condition and sentence type

6.2.4.5 Learning Condition x Sentence Position x Stress Position.

Figures 23, 24, and 25 show that there was a significant 3-way interaction among learning condition, sentence position, and stress position ($F_{(3.45,\ 106.81)} = 9.12$, $p < 0.001$, $\eta_p^2 = 0.23$, $OP > 0.99$). In the Bogota L1 group, the following hierarchy was established in terms of the means of accuracy, from the easiest stress pattern to the hardest one: oxytone> proparoxytone > paroxytone, regardless of sentence position. For both the Bogota L1 and Bogota L2 groups, paroxytone and proparoxytone words in final position were easier to perceive than in non-final position. In the Bogota L2 group, this pattern was the same for proparoxytone and paroxytones. In the Japan L2 groups, however, proparoxytone and paroxytone were easier in the non-final position. We had predicted that the Bogota L2 group would outperform the Japan L2 group, but we had not predicted that the two groups would exhibit different patterns of stress identification.

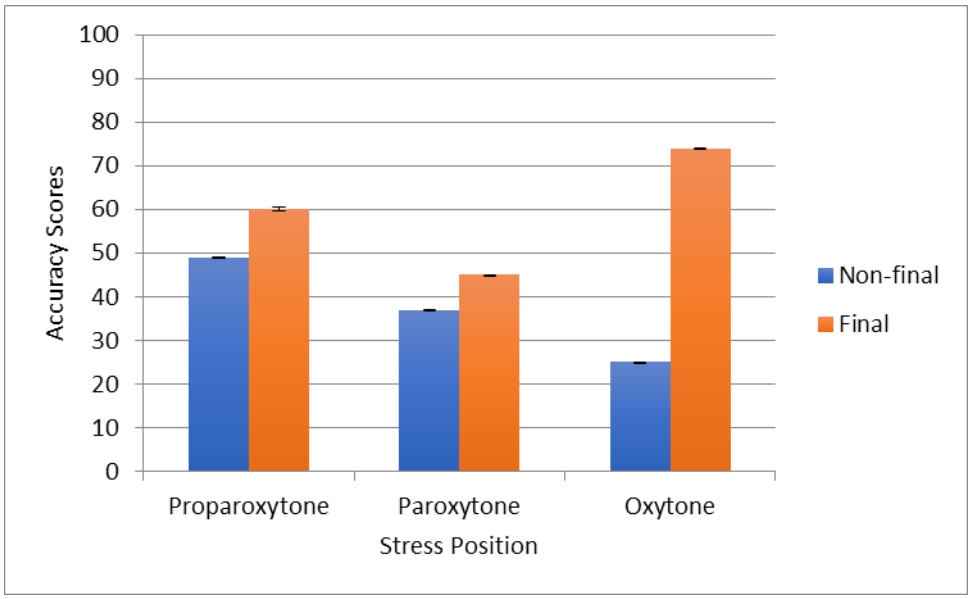

Figure 23: Estimated marginal means of accuracy for the interaction between Bogota L2 group, sentence position, and stress position.

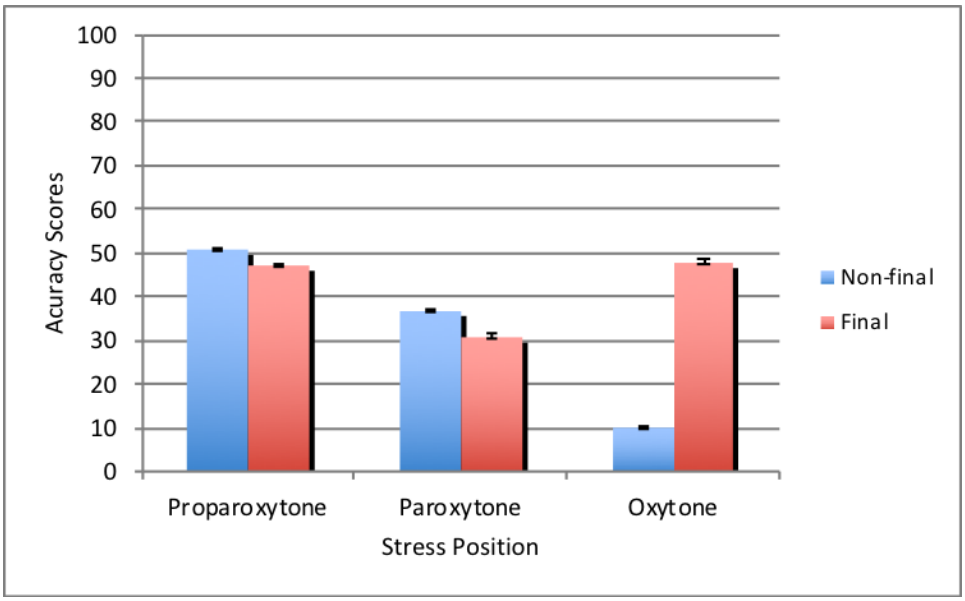

Figure 24: Estimated marginal means of accuracy for the interaction between Japan L2 group, sentence position, and stress position.

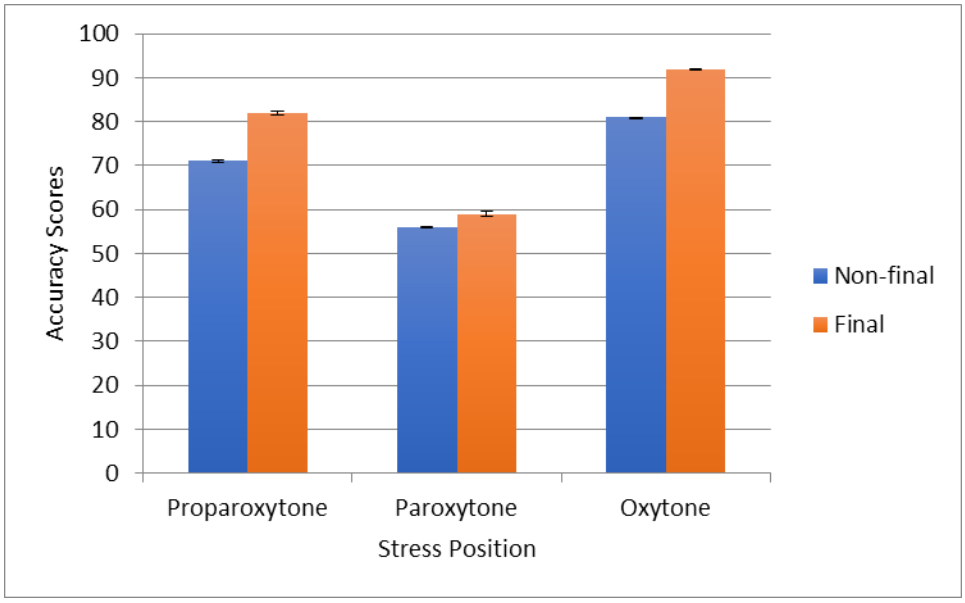

Figure 25: Estimated marginal means of accuracy for the interaction between Bogota L1 group, sentence position, and stress position.

6.2.4.6 Learning Condition x Word type

Figure 26 illustrates a significant interaction between learning condition and type of word ($F_{(2,62)}$ = 9.68, p < 0.001, η_p^2 = 0.24, OP = 0.98). Depicting how the means of accuracy for the Bogota L1 group are lower for nonce words (M = 0.70) than for real words (M = 0.78). For the Bogota L2 group, real and nonce words resulted in similar rates of accuracy (M_R = 0.48 versus M_N = 0.49). However, the Japan L2 group obtained a lower mean of accuracy for real words than for nonce words (M_R = 0.35 vs. M_N = 0.39). The results of the perception of real and nonce words were not as expected. The Japan L2 group did not show differences in their rates of accuracy between the two types of words either.

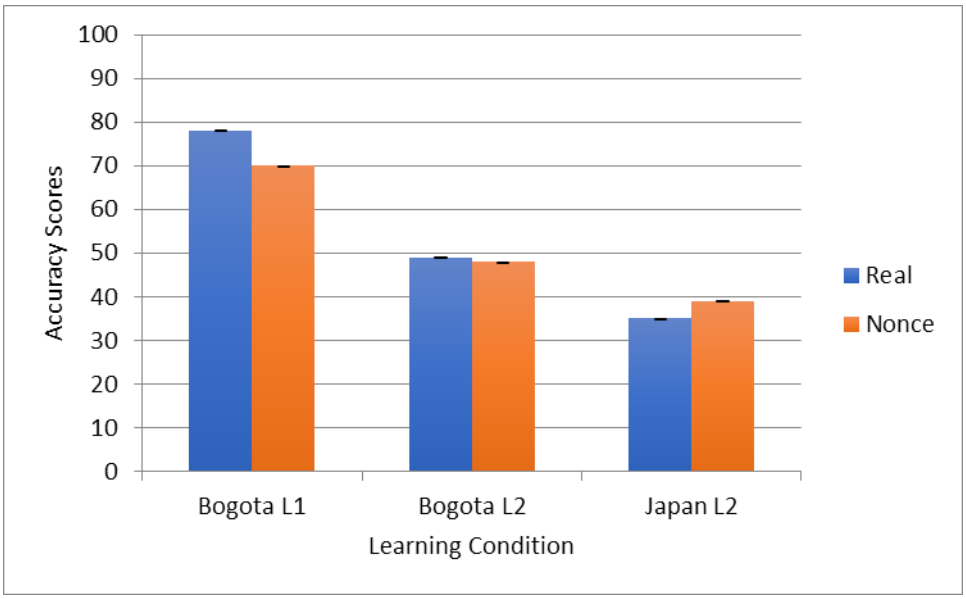

Figure 26: Estimated marginal means of accuracy for the interaction between learning condition and sentence type.

This section has provided an overview of the results with respect to accuracy rates. The next section will verify whether the F0 peak displacement patterns observed in the recorded stimuli were consistent with what has been reported for Spanish in general. We will also provide the maximum pitch values of the peaks in each sentence.

6.2.5 Analysis of the stimuli

A subset of the recorded stimuli (56 out of 135 words) were acoustically analysed to see whether F0 peaks were aligned with stressed syllables or displaced in sentence final position in interrogative and exclamative sentences, as has been reported in the literature for Spanish, especially in the non-final position (e.g., Ortega-Llebaria et al, 2013). Specifically, seven target words in each of the following contexts were analysed: proparoxytone words in sentence-final and sentence-non-final position of yes/no questions, proparoxytone words in sentence-final and sentence-non-final position of exclamations, paroxytone words in sentence-final and in sentence-non-final position of yes/no questions, and paroxytone words in sentence-final and in sentence-non-final position of exclamations (see Tables 7 and 8).

Table 7: The subset of stimuli analyzed acoustically for variation in F0 peak alignment: real words.

Target words	Context 1: Target word in final position of yes/no question	Context 2: Target word in final position of exclamation	Context 3: Target word in non-final position of yes/no question	Context 4: Target word in non-final position of exclamation
N**ú**mero	¿él dijo n**ú**mero? did he say n**ú**mero?	¡él dijo n**ú**mero! he said n**ú**mero!	¿él dijo n**ú**mero ayer? did he say n**ú**mero yesterday?	¡él dijo n**ú**mero ayer! he said n**ú**mero yesterday!
Num**e**ro	¿él dijo num**e**ro? did he say num**e**ro?	¡él dijo num**e**ro! he said num**e**ro!	¿él dijo num**e**ro ayer? did he say num**e**ro yesterday?	¡él dijo num**e**ro ayer! he said num**e**ro yesterday!
L**í**mite	¿él dijo l**í**mite? Did he say l**í**mite?	¡él dijo l**í**mite! he said l**í**mite!	¿él dijo l**í**mite ayer? Did he say l**í**mite?	¡él dijo l**í**mite ayer! he said l**í**mite yesterday!
Lim**i**te	¿él dijo lim**i**te? Did he say lim**i**te?	¡él dijo lim**i**te! he said lim**i**te!	¿él dijo lim**i**te ayer? Did he say lim**i**te?	¡él dijo lim**i**te ayer! he said lim**i**te yesterday
V**á**lido	¿él dijo v**á**lido? Did he say v**á**lido?	¡él dijo v**á**lido! he said v**á**lido!	¿él dijo v**á**lido ayer? Did he say v**á**lido yesterday?	¡él dijo v**á**lido ayer! he said v**á**lido yesterday!
Val**i**do	¿él dijo val**i**do? Did he say val**i**do?	¡él dijo val**i**do! he said val**i**do!	¿él dijo val**i**do ayer? Did he say val**i**do yesterday?	¡él dijo val**i**do ayer! he said val**i**do yesterday!
M**é**dico			¿él dijo m**é**dico ayer? Did he say m**é**dico yesterday?	¡él dijo m**é**dico ayer! he said m**é**dico yesterday!
Med**i**co			¿él dijo med**i**co ayer? Did he say med**i**co yesterday?	¡él dijo med**i**co ayer! he said me**di**co yesterday!

Table 8: The subset of stimuli analyzed acoustically for variation in F0 peak alignment: nonce words

Target words	Context 1: Target word in final position of yes/no question	Context 2: Target word in final position of exclamation	Context 3: Target word in non-final position of yes/no question	Context 4: Target word in non-final position of exclamation
Nábido	¿él dijo **ná**bido? did he say **ná**bido?	¡él dijo **ná**bido! he said **ná**bido!	¿él dijo **ná**bido ayer? did he say **ná**bido yesterday?	¡él dijo **ná**bido ayer! he said **ná**bido yesterday!
Na**bi**do	¿él dijo na**bi**do? did he say	¡él dijo na**bi**do! he said na**bi**do!	¿él dijo na**bi**do ayer? did he say na**bi**do yesterady?	¡él dijo na**bi**do ayer! he said na**bi**do yesterday!
Nético	¿él dijo **né**tico? did he say **né**tico?	¡él dijo **né**tico! he said **né**tico	¿él dijo **né**tico ayer? did he say **né**tico yesterday?	¡él dijo **né**tico ayer! he said **né**tico yesterday!
Ne**ti**co	¿él dijo ne**ti**co? did he say ne**ti**co?	¡él dijo neti**c**o! he said neti**c**o!	¿él dijo ne**ti**co ayer? did he say ne**ti**co yesterday?	¡él dijo neti**c**o ayer! he said neti**c**o yesterday!
Mádino	¿él dijo m**á**dino? did he say m**á**dino?	¡él dijo m**á**dino! he said m**á**dino!	¿él dijo m**á**dino ayer? Did he say m**á**dino yesterday?	¡él dijo m**á**dino ayer! he said m**á**dino yesterday!
Ma**di**no	¿él dijo ma**di**no? did he say ma**di**no?	¡él dijo ma**di**no! he said ma**di**no!	¿él dijo ma**di**no ayer? did he say ma**di**no yesterday?	¡él dijo ma**di**no ayer! he said ma**di**no yesterday!
típimo	¿él dijo t**í**pimo? did he say t**í**pimo?	¡él dijo t**í**pimo! he said t**í**pimo!		
ti**pi**mo	¿él dijo ti**pi**mo? did he say ti**pi**mo?	¡él dijo ti**pi**mo! he said ti**pi**mo!		

The acoustic analysis of F0 peak maximums and the F0 patterns (i.e., rise and falls) in paroxytone and proparoxytone words in final and non-final position of yes/no questions and exclamations, revealed 3 patterns (see Table 9). A checkmark indicates that the pattern was always observed (i.e., at a 100% rate) in the subset of the stimuli that were analysed and an 'X' indicated that the pattern was not observed in that context.

Table 9: The relationship between stress and pitch (F0) in exclamations and yes/no questions with proparoxytone and paroxytone words in sentence-final and sentence non-final position.

			Type of Pitch (F0) realization					
Stress Pattern	**Sentence type**	**Sentence position**	**Antepenultimate syllable**	**Penultimate syllable**	**Final syllable**	**Peak Within the antepenultimate and the penultimate syllable**	**Rise in the antepenultimate syllable**	**Expected**
Proparoxytone	Yes/no questions	Final			✓			X
		Non-final			✓			X
	Exclamations	Final		✓				✓
		Non-final			✓			X
Paroxytone	Yes/no questions	Final			✓			✓
		Non-final				✓		X
	Exclamations	Final				✓		X
		Non-final					✓	X

In regard to proparoxytones in sentence-final and non-final position of yes/no questions, F0 peaks tended to move to the final syllable. First, it is important to note that F0 peak displacement in sentence-final position was not expected; instead it was expected that displacement would be present one syllable after the stressed syllable. Second, an F0 peak in sentence non-final position was not expected, but the analysis demonstrated the opposite. (See Figures 27, 28, 29 and 30).

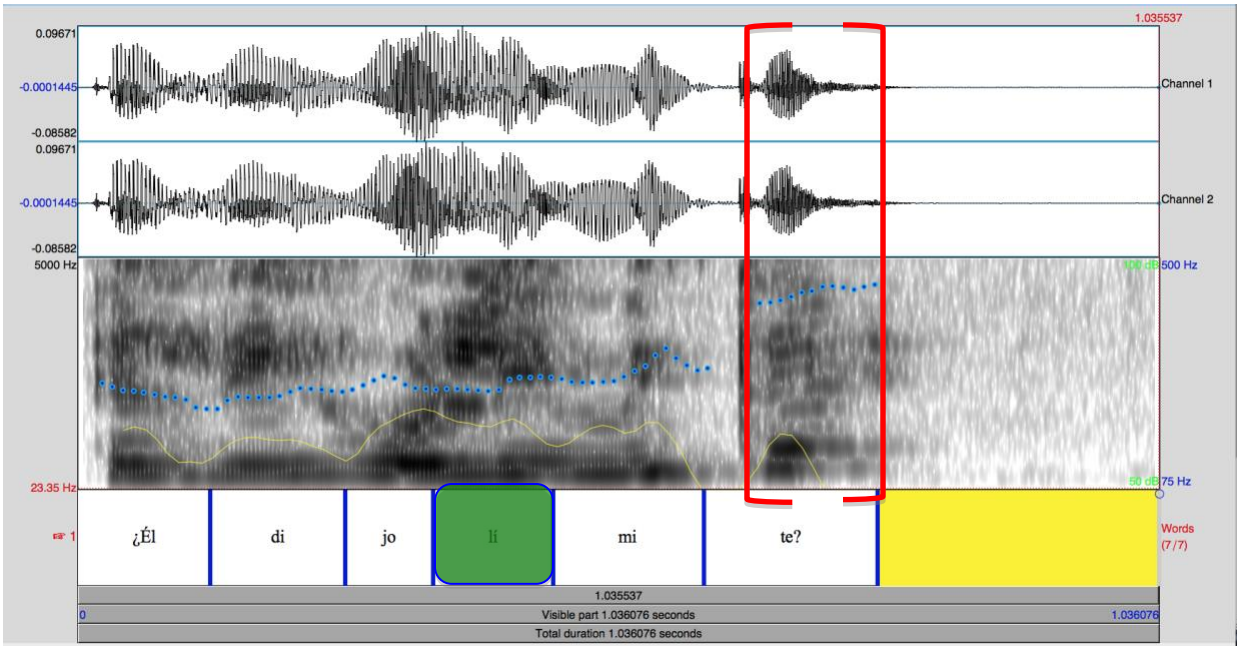

Figure 27: Spectrogram of the yes/no question sentence *¿Él dijo* ***lí****mite?* containing a proparoxytone word in sentence-final position showing the F0 peak displaced from the antepenultimate syllable ***lí*** to the final syllable ***te*** in the word ***lí****mite*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

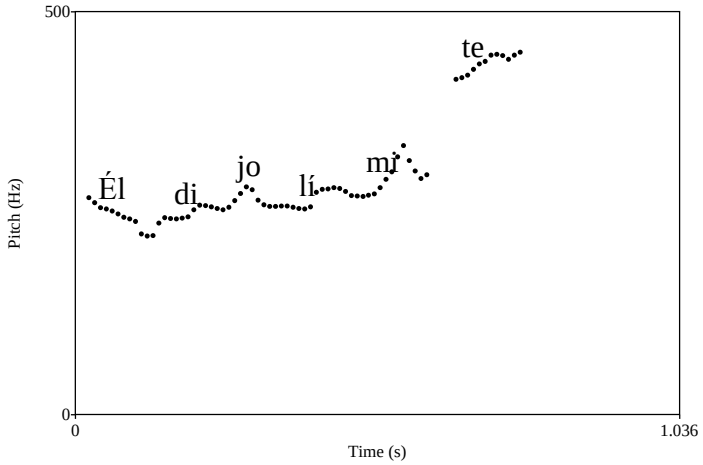

Figure 28: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the yes/no question sentence *¿Él dijo* ***lí****mite?* containing a proparoxytone word showing displacement from the antepenultimate syllable ***lí*** to the post-tonic final syllable ***te*** in the word ***lí****mite*.

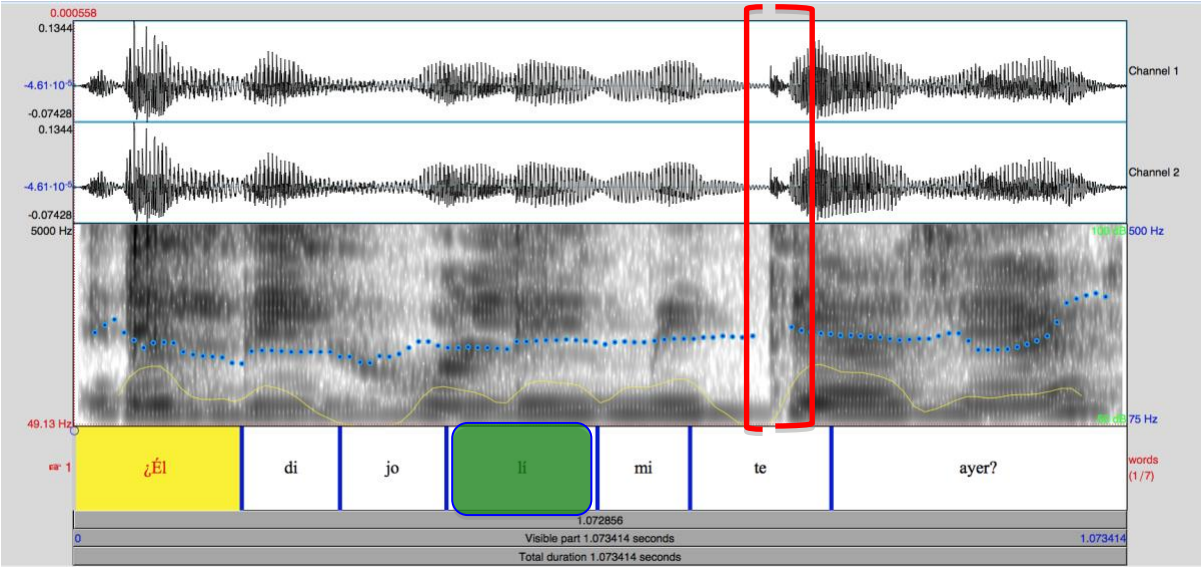

Figure 29: Spectrogram of the yes/no question sentence *¿Él dijo* ***lí****mite ayer?* containing a proparoxytone word in the sentence non-final position showing the F0 peak displaced from the antepenultimate syllable ***lí*** to the final syllable ***te*** in the word ***lí****mite*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

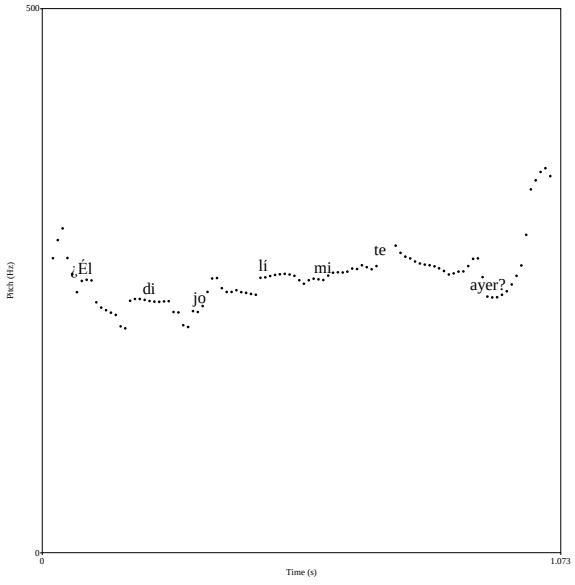

Figure 30: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the yes/no question sentence *¿Él dijo* ***lí****mite ayer?* containing a proparoxytone word showing displacement from the antepenultimate syllable ***lí*** to the post-tonic final syllable ***te*** in the word ***lí****mite*.

Paroxytones in sentence-final position of yes/no questions also exhibited F0 peak displacement to the final syllable, as expected (See Figures 31 and 32).

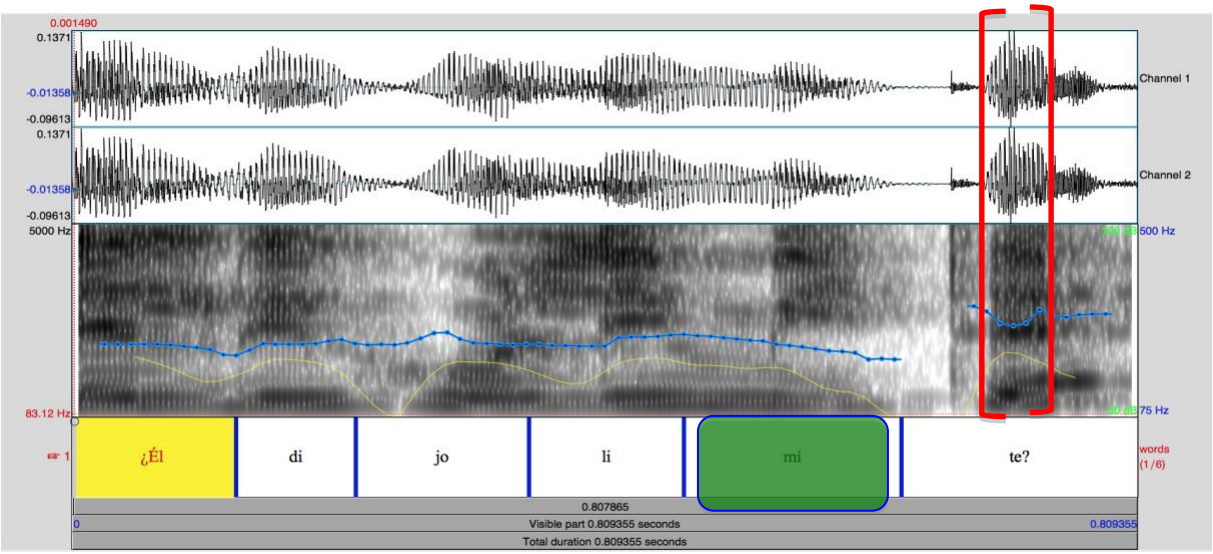

Figure 31: Spectrogram of the yes/no question sentence *¿Él dijo li**mi**te?* containing a paroxytone word in sentence-final position showing the F0 peak displaced from the penultimate syllable ***mí*** to the final syllable ***te*** in the word *li**mi**te*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

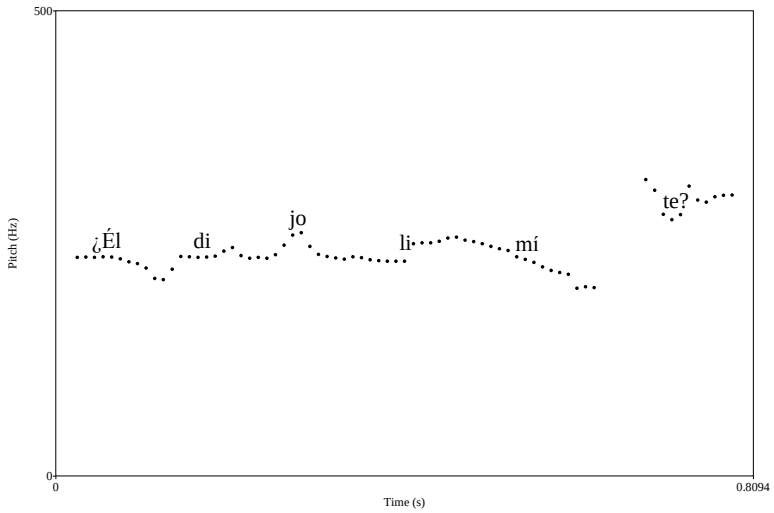

Figure 32: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the yes/no question sentence *¿Él dijo li**mi**te?* containing a proparoxytone word showing displacement from the antepenultimate syllable ***mí*** to the post-tonic final syllable ***te*** in the word *li**mi**te*.

With respect to paroxytones in non-final position of yes/no questions, the F0 peak spaned across/was within the antepenultimate and the penultimate syllable, exhibiting an unexpected pattern (See Figures 33 and 34). In this context, the F0 peak was expected to be aligned with the stressed syllable.

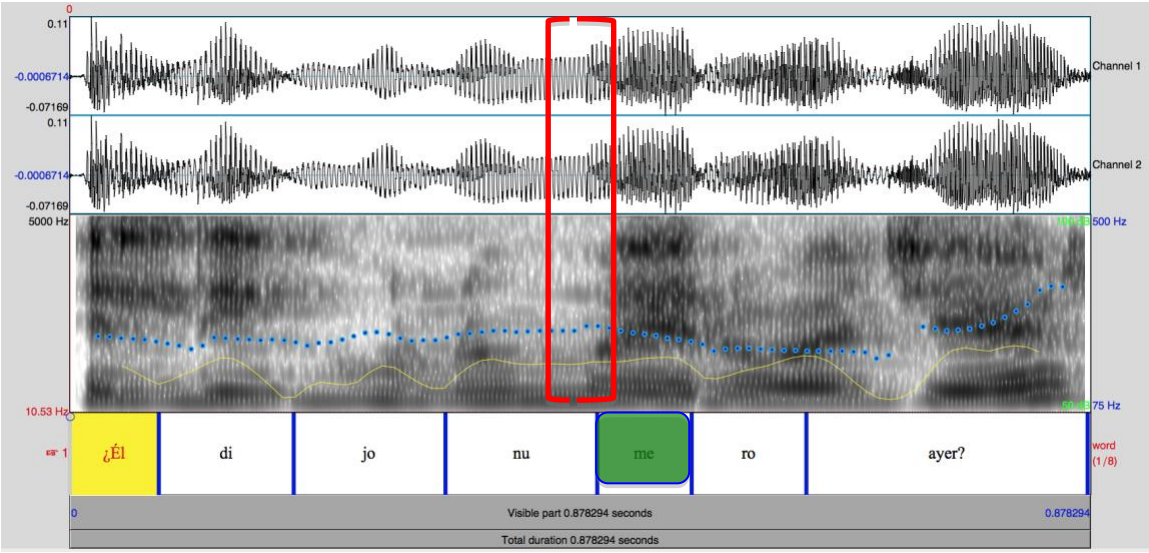

Figure 33: Spectrogram of the yes/no question sentence *¿Él dijo nu**me**ro ayer?* containing a paroxytone word in sentence non-final position showing the F0 peak within the boundaries of the pre-tonic syllable ***nu*** and the stressed syllable ***me*** in the word *nu**me**ro*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

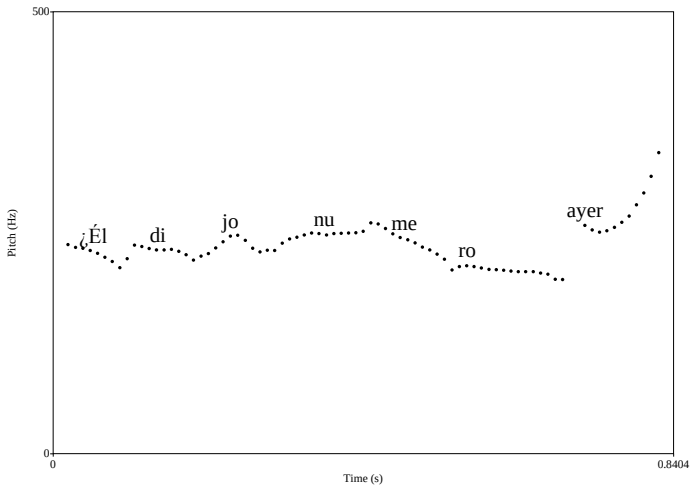

Figure 34: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the yes/no question sentence *¿Él dijo nu**me**ro ayer?* containing a paroxytone word showing the F0 peak within the boundaries of the pre-tonic syllable ***nu*** and the stressed syllable ***me*** in the word *nu**me**ro*.

Exclamations exhibited different F0 peak patterns in comparison with interrogatives. Namely, proparoxytones in sentence-final position of exclamations showed F0 peak displacement to the penultimate syllable, as expected (See Figures 35 and 36).

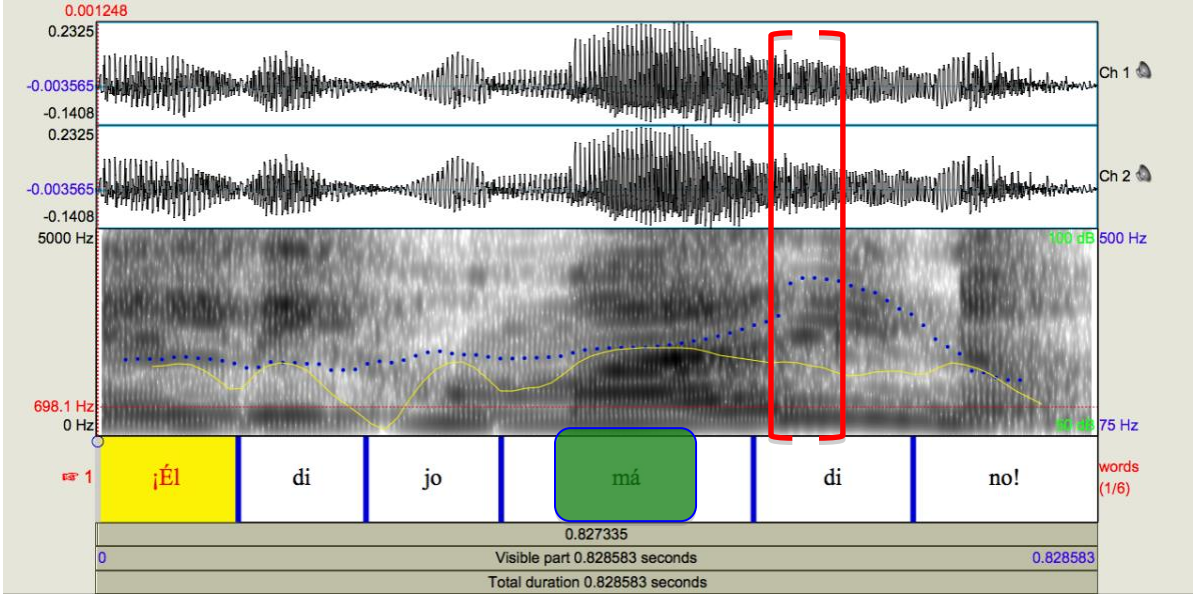

Figure 35. Spectrogram of the exclamation ¡Él dijo mádino! Containing a proparoxytone word in sentence-final position showing the F0 peak displaced from the antepenultimate syllable ***má*** to the penultimate syllable ***di*** in the word ***má****dino*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

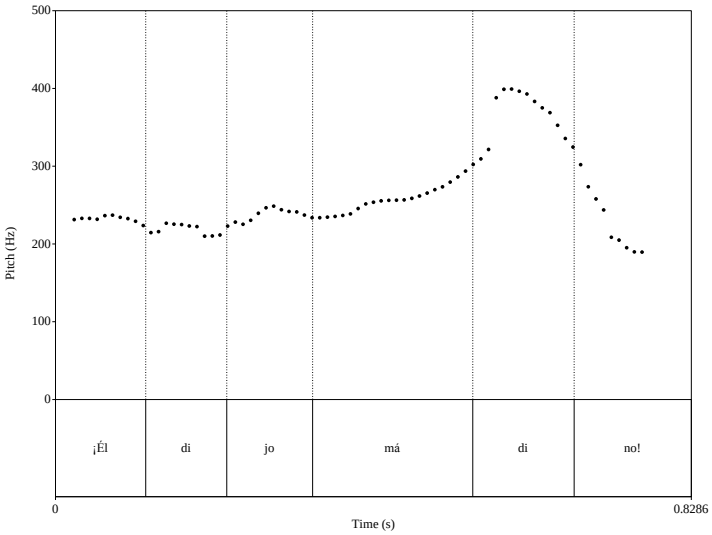

Figure 36: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the exclamation ¡*Él dijo* ***má****dino!* containing a proparoxytone word showing displacement from the antepenultimate syllable ***má*** to the penultimate syllable ***di*** in the word ***má****dino*.

Proparoxytones in sentence-non-final position of exclamations exhibited an F0 peak displaced to the final syllable (See Figures 37 and 38). This movement of the F0 peak was not expected since it was predicted that in the sentence-non-final position, F0 peaks would align with stressed syllables.

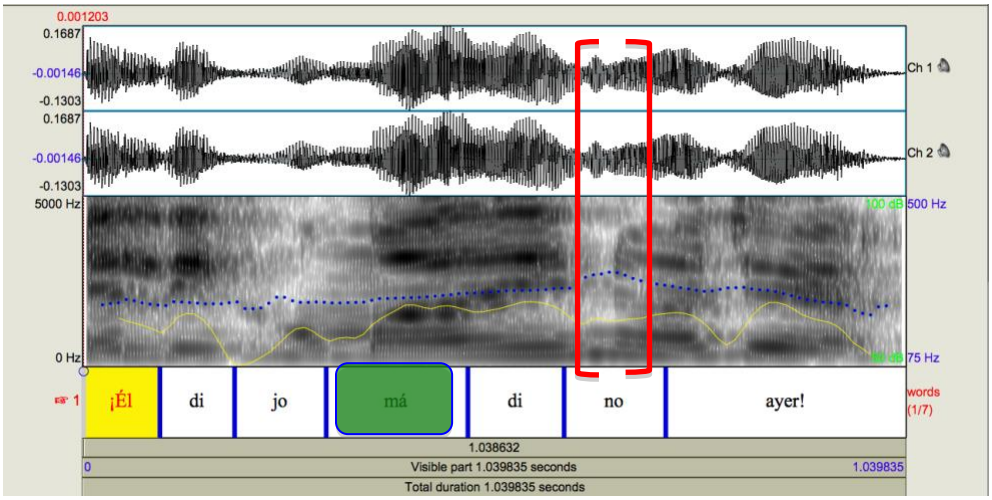

Figure 37: Spectrogram of the exclamation ¡*Él dijo* ***má****dino ayer!* containing a proparoxytone word in the sentence non-final position showing the displacement from the antepenultimate syllable ***má*** to the final syllable ***no*** in the word ***má****dino*. The red brackets indicate the F0 peak location and the green box the stressed syllable.

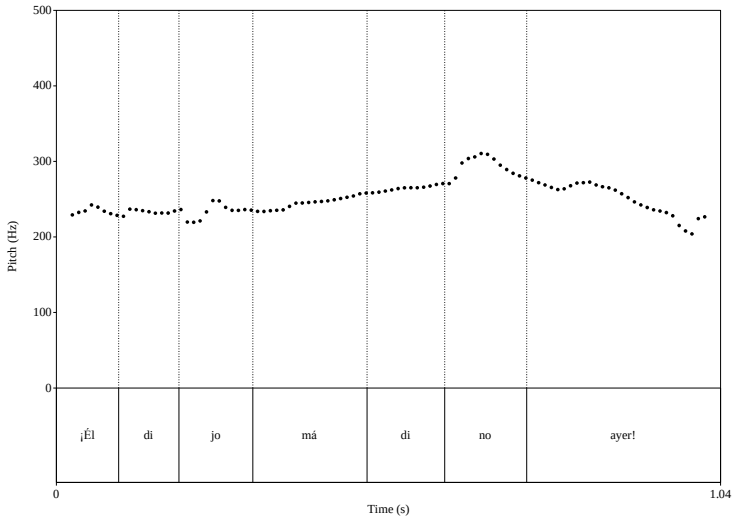

Figure 38: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the exclamation *¡Él dijo* ***<u>má</u>****dino ayer!* containing a proparoxytone word showing displacement from the antepenultimate syllable ***<u>má</u>*** to the final syllable ***no*** in the word ***<u>má</u>****dino*.

Paroxytones in sentence-final position in exclamations exhibited F0 peaks that were located within both the antepenultimate and the penultimate syllable, showing an unexpected pattern (See Figures 39 and 40). This pattern was unexpected since it was expected that F0 peaks would be displaced to the final syllable.

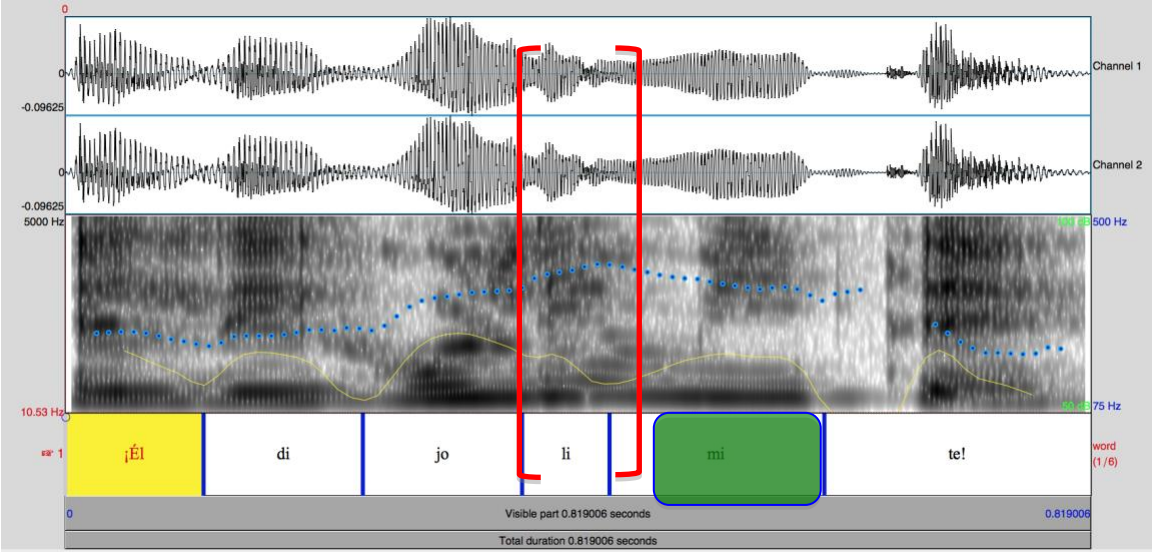

Figure 39: Spectrogram of the exclamation ¡*Él dijo li**mi**te!* containing a paroxytone word in the sentence-final position showing the F0 peak within the boundaries of the offset of the antepenultimate syllable ***li*** and onset of the stressed penultimate syllable ***mi*** in the word *li**mi**te***.** The red brackets indicate the F0 peak location and the green box the stressed syllable.

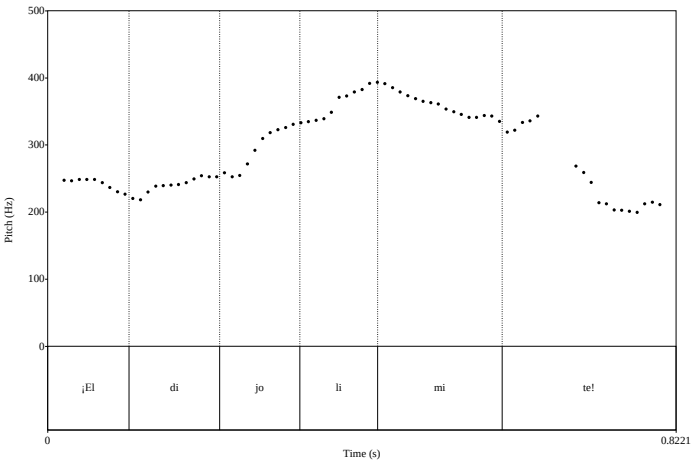

Figure 40: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the exclamation ¡*Él dijo_li**mi**te!* containing a paroxytone word showing the F0 peak within the boundaries of the offset of the antepenultimate syllable ***li*** and onset of the stressed penultimate syllable ***mi*** in the word *li**mi**te*.

Finally, for paroxytone words in exclamations in the sentence-non-final position, F0 rises to peaks were retracted to the antepenultimate syllable, where they continued on to the following (penultimate) syllable (see Figures 41 and 42). This pattern was not expected, as peaks were expected to stay aligned with stressed syllables.

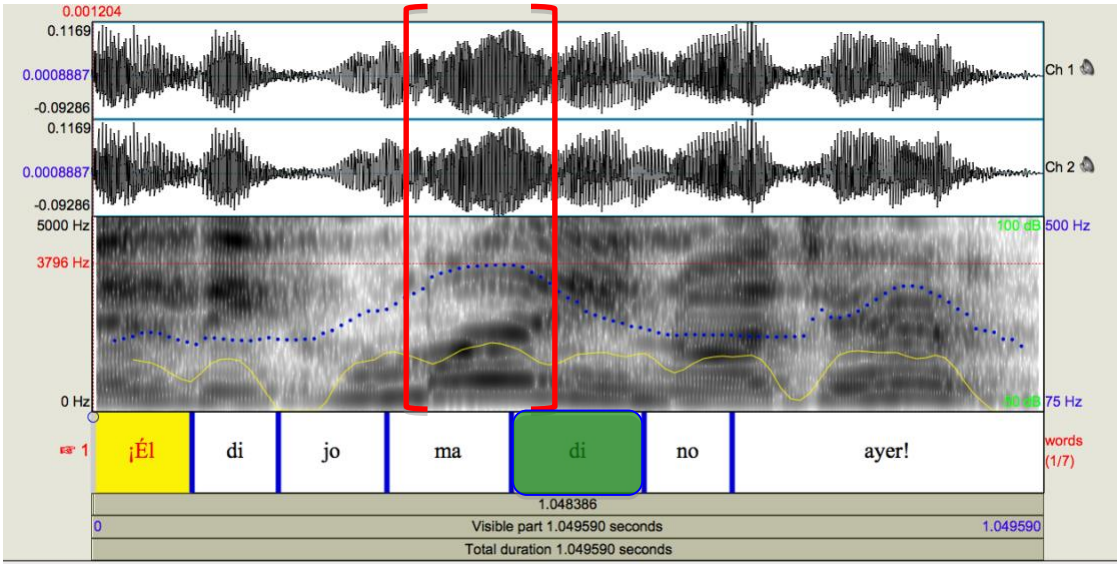

Figure 41: Spectrogram of the exclamation ¡*Él dijo ma**di**no ayer!* containing a paroxytone word showing the F0 peak retracted to the antepenultimate unstressed syllable ***ma*** its rise continuing within the stressed penultimate syllable ***di*** in the word *ma**di**no***.** The red brackets indicate the F0 peak location and the green box the stressed syllable.

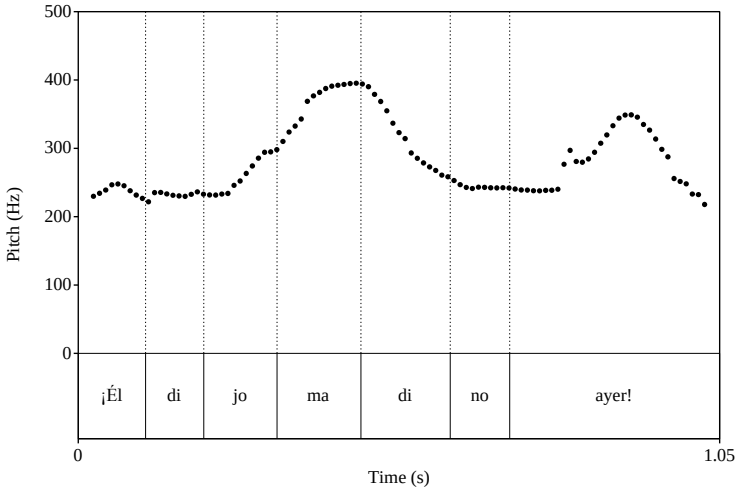

Figure 42: Extracted pitch contour showing the relationship between the syllables and the pitch contour of the exclamation ¡*Él dijo ma**di**no ayer!* containing a paroxytone word showing retraction to the antepenultimate unstressed syllable ***ma*** with its rise penultimate syllable **di** in the word *ma**di**no***.**

Finally, F0 peak values were always higher for both proparoxytones and paroxytones in sentence-final position than in sentence non-final position in both interrogative and exclamative sentences. The largest difference in mean pitch values appeared to be between sentence-final and sentence non-final positions of proparoxytone words.

Table 10: The relationship between maximum F0 peak values and sentence position for proparoxytone and paroxytone words in interrogative and exclamative sentences.

Stress Pattern	Sentence type	Sentence position	Media of pitch (Hz)
Proparoxytone	Yes/no questions	Final	406.8
		Non-final	268
	Exclamations	Final	413.3
		Non-final	338.8
Paroxytone	Yes/no questions	Final	384.2
		Non-final	271.8
	Exclamations	Final	365.4
		Non-final	329.8

In sum, in this section we have seen both expected and unexpected patterns of F0 peak displacement. As expected, they were displaced to the final syllable in paroxytone words in the sentence-final position of interrogatives. The first unexpected pattern was that F0 peak displacement was observed in non-final position for both proparoxytone and paroxytone words in both interrogative and exclamative sentences. Second, the location/displacement of F0 peaks was not always as predicted; that is, instead of in the post-tonic syllable, peaks were found within the antepenultimate and penultimate syllables (i.e., for paroxytone words in interrogative sentences in non-final position and exclamative sentences in final position) or were retracted to the ante-penultimate syllable with its rise continuing to the penultimate syllable (i.e., for paroxytone words non-final position of exclamative sentences). Finally, mean F0 peak values were higher in sentence-final position in comparison with non-final position.

This section provided an acoustic analysis of the F0 peak displacement, highlighting unexpected patterns. In the next section, error types and patterns will be analysed in light of the patterns reported in the current section.

6.2.6 Confusion matrices (between groups) of F0 peak displacement

Confusion matrices (Tables 11 to 26) report the error types and rates of paroxytone and proparoxytones in interrogative and exclamative sentences in sentence-final and non-final positions for both real and nonce words contexts. The results show that, in all cases, there were three types of choices in response to both paroxytones and proparoxytones by the participants in the identification task: oxytones, paroxytones and proparoxytones. It was expected that Japanese-speaking learners would (mis)-assign stress to the syllable that contains an F0 peak.

Tables 11 and 12 show that the Bogota group was more accurate than the Japan group in their responses to both proparoxytone and paroxytone words in sentence-final position in real words. Moreover, the Japan group chose oxytones as a response to both proparoxytone (70%) and proparoxytone (63%) real words at a higher rate than the Bogota group (32% and 37% for proparoxytone and paroxytones, respectively). This is a

position where, in the recorded stimuli, F0 peak displacement was observed in the final syllable. It is possible that the Japan group might have been more affected by F0 peak displacement in the final position in the recorded stimuli that they heard.

Table 11: Confusion matrix of yes/no questions with real words in final position for the Japan group

Japan n= 25		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	17 **(17%)**	13 **(13%)**	70 **(70%)**
	Paroxytone	22 **(22%)**	15 **(15%)**	63 **(63%)**

Table 12: Confusion matrix of yes/no questions with real words in final position for the Bogota group

Bogota n= 20		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	34 **(42.5%)**	14 **(17.5%)**	32 **(40%)**
	Paroxytone	17 **(21.2%)**	26 **(32.5%)**	37 **(46.2%)**

Moreover, with respect to both the proparoxytone and paroxytone words, the rate of correct identification for both in sentence-non-final position was higher than in sentence-final position for both the Japan and the Bogota group (see Tables 13 and 14). Whereas the rate of correct identification for proparoxytones and paroxytones in the Japan group in the interrogative sentence-non-final position was 46% and 44%, respectively, it was 17% and 15% in their sentence-final counter-parts. For the Bogota group, whereas rate of correct identification for proparoxytones and paroxytones in the interrogative sentence-non-final position was 46% and 45%, respectively, it was 34% and 26% in their sentence-final position counter-parts. The higher rate of accuracy in this position might be because the maximum pitch value was lower, making it less likely for F0 peak displacement to

lead to a miscue. Furthermore, unlike in sentence-final position, oxytones were chosen less frequently than proparoxytones or paroxytones. This may also have to do with the maximum pitch being lower in sentence-non-final position in comparison with sentence-final position.

It is also worth noting that there was a higher rate of proparoxytone words chosen in response to paroxytone words by both the Japan and the Bogota group (43% and 46.25%, respectively) than oxytone words (13% and 8.75%, in the Japan and Bogota groups, respectively) in non-final position. As indicated in Table 10, in the recorded stimuli, F0 peaks in paroxytone words in the non-final position in interrogatives were found in both ante-penultimate and penultimate syllables. This might have triggered the mis-assignment of stress to proparoxytone words by learners.

Table 13: Confusion matrix of yes/no questions with real words in non-final position for the Japan group.

Japan n= 25		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	46 **(46%)**	39 **(39%)**	15 **(15%)**
	Paroxytone	43 **(43%)**	44 **(44%)**	13 **(13%)**

Table 14: Confusion matrix of yes/no questions with real words in non-final position for the Bogota group

Bogota n= 20		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	37 **(46.25%)**	23 **(28.75%)**	20 **(25%)**
	Paroxytone	37 **(46.25%)**	36 **(45%)**	7 **(8.75%)**

The patterns observed with respect to nonce words were similar to those for real words. The pattern observed in Tables 11 and 12 with respect to sentence-final position inducing a higher rate of oxytone choice in the real word context is also observed with respect to nonce words in the same position (see Tables 15 and 16). Moreover, the Japan group again exhibited a higher rate of oxytone choice in comparison with the Bogota group.

Table 15: Confusion matrix of yes/no questions with nonce words in final position for the Japan group

Japan n= 25		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	31 **(24.8%)**	26 **(20.8%)**	68 **(54.4%)**
	Paroxytone	31 **(24.8%)**	29 **(23.2%)**	65 **(52%)**

Table 16: Confusion matrix of yes/no questions with nonce words in final position for the Bogota group

Bogota n= 20		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	36 **(36%)**	21 **(21%)**	43**(43%)**
	Paroxytone	27 **(27%)**	30 **(30%)**	43 **(43%)**

Similar to real words, the rate of accuracy was higher in non-final position than in final position in interrogative sentences for nonce words. Again, with respect to both the proparoxytone and paroxytone words, both groups were more accurate in non-final position in interrogatives (see Tables 17 and 18) than in final position. Whereas the rate of correct identification for proparoxytones and paroxytones in the Japan group in interrogative non-final position was 44.8% and 44%, respectively, it was 24.8% and 23.2% in their sentence-final counter parts. For the Bogota group, whereas the rate of correct identification for proparoxytones and paroxytones in the interrogative non-final

position was 42% and 49%, respectively, it was 36% and 30% in their sentence-final counter parts.

Furthermore, unlike sentence-final position of interrogatives with real words oxytones were chosen less frequently than proparoxytones or paroxytones in the nonce word condition. Oxytones were chosen as a response to proparoxytones and paroxytones at a rate of 10.4% and 9.6%, respectively, by the Japan group (see Table 17) and at a rate of 17% and 23% by the Bogota group in the sentence-non-final position (see Table 18). However, oxytones were chosen as a response to proparoxytones and paroxytones at a rate of 54.4% and 52%, respectively, by the Japan group (see Table 15) and at a rate of 43% as a response to both proparoxytones and paroxytones by the Bogota group in sentence-final position (see Table 16).

Table 17: Confusion matrix of yes/no questions with nonce words in non-final position for the Japan group

Japan n= 25		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	56 **(44.8%)**	56 **(44.8%)**	13 **10.4%)**
	Paroxytone	58 **(46.4%)**	55 **(44%)**	12 **(9.6%)**

Table 18: Confusion matrix of Yes/no questions with nonce words in non-final position for the Bogota group

Bogota n= 20		Identified stress		
		Proparoxytone	Paroxytone	Oxytone
Actual stress	Proparoxytone	42 **(42%)**	41 **(41%)**	17 **(17%)**
	Paroxytone	28 **(28%)**	49 **(49%)**	23 **(23%)**

The results of the real and nonce words with exclamations are demonstrated in Tables 19 through 26. Both proparoxytone and paroxytone words in exclamative sentences for real words (see Tables 19 and 20) and nonce words (see Tables 23 and 24) resulted in more accurate identification rates in sentence-final position than in their interrogative counterparts. In other words, proparoxytones and paroxytones were easier to perceive in sentence-final exclamatives than in their interrogative counterparts. It is worth noting that there was F0 peak displacement for both proparoxytone and paroxytone words in both the interrogative and exclamative sentences, as indicated in Table 9. However, the location of F0 peaks differed between interrogatives and exclamatives; that is, whereas for interrogatives there was an F0 peak displacement on the final syllable, for exclamatives, with regards to proparoxytones, peaks were on the penultimate syllable and for paroxytones, they shared between the ante-penultimate and penultimate syllables in the sentence-final position. It is possible that a shift closer to the stressed syllable or an F0 peak that is shared between the stressed syllable and its preceding syllable may lead to a higher rate of accuracy in stress identification than an F0 peak displacement to the final syllable. The maximum pitch for proparoxytones and paroxytones in sentence-final position in both interrogatives and exclamatives were also compared. However, maximum pitch in exclamative sentence-final position was only lower (365.4) in paroxytones in exclamatives in comparison with interrogatives (365.4 and 384.2, respectively) and pitch was actually higher for propoaryxtones in exclamatives in comparison with interrogatives (413.3 and 406.8, respectively). Therefore, pitch, in this case, cannot explain why proparoxytones and paroxytones were easier in the sentence-final position of exclamatives in comparison with interrogatives.

It is also worth noting that the Bogota group was more accurate than the Japan group with respect to both proparoxytones and paroxytones in exclamations in the sentence-final position (see Tables 19 and 20). Whereas the Bogota group correctly identified proparoxytone words at at rate of 75% and paroxytone words at a rate of 43.75% (see Table 20), the Japan group correctly identified proparoxytones at a 69% rate and paroxytones at a 31% rate (see Table 19). Also, the Japan group differed from the Bogota

group because it had a higher rate of identification of paroxytone words as proparoxytone words (51 vs. 26, respectively). In other words, the rise on the antepenultimate syllable in the recorded stimuli might have had a more robust effect on the Japan group than the Bogota group.

Table 19: Confusion matrix of exclamations with real words in final position for the Japan group

Japan n= 25		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	69 **(69%)**	22 **(22%)**	9 **(9%)**	%100
	Paroxytone	51 **(51%)**	31 **(31%)**	18 **(18%)**	%100

Table 20: Confusion matrix of exclamations with real words in final position for the Bogota group

Bogota n= 20		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	60 **(75%)**	17 **(21.25%)**	3 **(3.75%)**	%80
	Paroxytone	26 **(32.5%)**	35 **(43.75%)**	19 **(23.75%)**	%80

Also, unlike interrogatives, the accuracy identification rate for both proparoxytone and paroxytone real words in sentence-final position of exclamations was higher than in non-final position (see Tables 19-22). Whereas proparoxytones in exclamation sentences in final position had an accuracy rate of 69%, they had an accuracy rate of 54% in non-final

position in the Japan group. Paroxytones also had a higher accuracy rate in sentence-final position (31%) in the Japan group than in non-final position (22%). For the Bogota group, proparoxytones had an accuracy rate of 75% in sentence final position but an accuracy rate of 52.5% in non-final position. For the paroxytone words, they had an accuracy rate of 43.75% in final position but an accuracy rate of 23.75% in non-final position. Both F0 peak displacement and maximum pitch values were considered to see whether F0 peak displacement was observed in both sentence-final and non-final positions (see Table 9); however the patterns were different in each position. For proparoxytone words, whereas F0 peak displacement to the penultimate syllable was observed in final position, in non-final position, displacement to the final syllable was observed. It might be that F0 peak displacement to the final syllable in this context is more confusing than one that is closer to the actual stressed syllable. Maximum pitch values cannot explain the higher accuracy rates in sentence-final position in this case because the maximum pitch was higher in sentence-final position (413.3Hz) than in non-final position (338.8Hz) for proparoxytone words. In the case of paroxytone words in final position, F0 peaks were shared almost equally between the antepenultimate and the penultimate syllables but in sentence-non-final position, most were found in the antepenultimate syllable, even though the rise continued into the penultimate syllable. The maximum pitch values were again higher in sentence-final position (365.4Hz) than in non-final position (329.8hz). One would expect a higher pitch to make the effect of F0 peak displacement even more salient; therefore, in this case, it is likely that pitch values were not the modulating factor in accuracy rates. Instead, it is proposed that the location and/or type of F0 peak displacement may have modulated the degree of difficulty of the perception of proparoxytone and paroxytones in sentence-final non-final positions in exclamatives.

Interestingly, paroxytone words were identified as proparoxytones at a higher rate by the Japan group (70%) than the Bogota group, suggesting that an F0 peak that is shared between two syllables may be identified differently by different kinds of learners. In other words, the rise of the syllable on the ante-penultimate syllable had a more robust effect on the Japan group than the Bogota group.

When an F0 peak was shared between two syllables or its rise continued on to the following syllable, it led to slightly different rates in choices of responses. With respect to proparoxytones, as indicated in Tables 21 and 22, the Japan group had a 54% accuracy rate, a 30% paroxytone response rate and a 16% oxytone response rate but the Bogota group had 52.5% accuracy rate, a 23.75% paroxytone response rate and a 19% oxytone response rate, suggesting that a shared F0 peak might have had a slightly different effect on the two groups. With respect to paroxytones, the rates of responses were even more similar, where the Japan group had a 70% proparoxytone response rate, 22% paroxytone response rate and 8% oxytone response rate, and the Bogota group had a 67.5% proparoxytone response rate, 23.75% paroxytone response rate and 8.75% oxytone response rate. Overall, the two groups appeared to behave in a similar fashion.

Table 21: Confusion matrix of exclamations with real words in non-final position for the Japan group

Japan n= 25		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	54 **(54%)**	30 **(30%)**	16 **(16%)**	%100
	Paroxytone	70 **(70%)**	22 **(22%)**	8 **(8%)**	%100

Table 22: Confusion matrix of exclamations with real words in non-final position for the Bogota group

Bogota n= 20		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	42 **(52.5%)**	19 **(23%)**	19 **(23%)**	%80
	Paroxytone	54 **(67.5%)**	19 **(23%)**	7 **(8.%)**	%80

A comparison of Tables 19-26 also shows that the same patterns reported for stress identification for both proparoxytone and paroxytones in both the sentence-final and non-final exclamatives in the real word context were also found in the nonce word contexts, albeit the rates of identification were not identical. For example, for proparoxytones in sentence-final-position in exclamatives in the real word context, the highest response rate in the Japan group was 69% proparoxytones, followed by 22% paroxytones and 9% oxytones (see Table 19). In the nonce word context, proparoxytones in sentence-final position in exclamatives also most frequently lead to a proparoxytone response (71.2%), followed by a paroxytone response (19.2%) and an oxytone response (9.6%).

Table 23: Confusion matrix of exclamations with nonce words in final position for the Japan group

Japan n= 25		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	89 **(71.2%)**	24 **(19.2%)**	12 **(9.6%)**	%125
	Paroxytone	39 **(31.2%)**	66 **(52.8%)**	20 **(16%)**	%125

Table 24: Confusion matrix of exclamations with nonce words in final position for the Bogota group

Bogota n= 20		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	71 **(71%)**	21 **(21%)**	8 **(8%)**	%100
	Paroxytone	16 **(16%)**	64 **(64%)**	20 **(20%)**	%100

Table 25: Confusion matrix of exclamations with nonce words in non-final position for the Japan group

Japan n= 25	Identified stress	Error

					rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	72 **(57.6%)**	38 **(30.4%)**	15 **(12%)**	%125
	Paroxytone	71 **(56.8%)**	41 **(32.8%)**	13 **(10.4%)**	%125

Table 26: Confusion matrix of exclamations with nonce words in non-final position for the Bogota group

Bogota n= 20		Identified stress			Error rate
		Proparoxytone	Paroxytone	Oxytone	%
Actual stress	Proparoxytone	52 **(52%)**	33 **(33%)**	15 **(15%)**	%100
	Paroxytone	49 **(49%)**	30 **(30%)**	21 **(21%)**	%100

In summary, in this section, participant the responses were analysed in light of the identification patterns that had emerged with respect to F0 peak displacement and maximum pitch values in the recorded stimuli analysis. First, the analysis in this section points out that both proparoxytone and paroxytone words in the various contexts analysed always lead to three types of responses: proparoxytones, paroxytones and oxtytones. Moreover, it was found that the location of F0 peak displacement may modulate response types/rates. For example, an F0 peak that is shared between the actual stressed syllable and the following syllable in paroxytones in sentence-non-final position in interrogatives may lead to a higher choice of proparoxytone words, and in paroxytones in sentence-final position in exclamatives, it would lead to a higher rate of correct identification, as might a shift that is closer to the stressed syllable (in proparoxytones in exclamatives in sentence-final position). Also, higher pitch may also result in a lower accuracy rates in some cases. For example, the higher rate of accuracy in non-final position in

interrogatives may have been due to a lower pitch. Second, the Japan and Bogota group sometimes exhibited different error patterns in identifying stress in interrogatives and exclamatives. Based on the stimuli analysis, this might have been triggered when an F0 peak was shared by two syllables. For the most part, the error patterns were the same in both the real and nonce word contexts.

6.3 Summary of the chapter

This chapter provided an analysis of the results both in terms of accuracy rates and type of errors, where the errors were analysed in light of an analysis of the recorded stimuli. The overall hypothesis that Japanese-speaking participants would have difficulty perceiving Spanish lexical stress was confirmed. However, the hypothesis that final position would be more difficult than non-final position was verified for interrogatives but not for exclamatives. The second hypothesis was also confirmed because there was a main effect of context of learning the immersion group, for the most part, outperformed the Japan group. Moreover, some asymmetries were also observed between the accuracy and error patterns of the Japan and Bogota group. Hypothesis 3 was not confirmed, as there was not a main effect of type of word.

Chapter 7

7 Discussion, conclusions & future work

7.1 Discussion

In Chapter 6, the results of this study demonstrated that Japanese-speaking learners have difficulties perceiving Spanish lexical stress. Specifically, the perception of proparoxytone and paroxytones were analysed with regards to factors hypothesized to modulate the rate of misperception. These factors were position in the sentence (sentence-final vs. sentence-non-final), context of learning (immersion vs. instruction) and type of word (real vs. nonce words). Both accuracy rates and error types were analysed while considering F0 peak displacement exhibited in the recorded stimuli that was produced by a native speaker of Bogota Spanish. This chapter will discuss the findings in light of previous research, highlighting some of the contributions and implications of this study in addition to suggesting future research avenues.

The first section of this chapter (§7.2) concentrates on the perception of Spanish lexical stress and the effect of position in the sentence. Then, section 7.3 addresses the interaction between the learners' L1 prosodic system and variation in F0 peak realization as the source of errors. Section 7.4 discusses the effects of the context of learning on the perception of Spanish lexical stress. The following section is concerned with the effect of real vs. nonce words (§7.5). Sections 7.6 and 7.7 outline implications for phonological models of acquisition and pedagogical implications. In section 7.8, the thesis will conclude with discussing the contributions of the findings of this study. Finally, future directions are discussed in 7.9.

7.2 The perception of Spanish lexical stress and the effect of position in the sentence

The first research question in this study was whether highly advanced Japanese-speaking late learners would have difficulty perceiving Spanish lexical stress. Specifically, the study examined whether proparoxytones and paroxytones would be more difficult to

perceive in the sentence-final position than in the sentence-non-final position. Because the Japanese stress system (Morimoto, 1984; Tsujimura, 1996; Iwasaky, 2012 & Lebrune, 2012) is different from the Spanish stress system (Ríos, 1991; Garrido et al., 1995; Prieto and Ortega-Llebaria, 2007; Ortega-Llebaria, 2006; Hualde, 2012; Ortega-Llebaria et al, 2013), it was predicted that advanced Japanese-speaking late learners of Spanish would have difficulties perceiving Spanish lexical stress. Specifically, this study highlighted the importance of the interaction of phonetic/acoustic cues in the L2 with the learners' L1 prosodic system and hypothesized that because of the variation in the realization of F0 peak (Ortega-Llebaria, 2006; Ortega-Llebaria et al., 2012), paroxytone and proparoxytone words in interrogative and exclamative sentences in sentence-final position would be more difficult than in non-final position for both groups of Japanese speaking late learners.

The results showed that Japanese-speaking learners indeed had difficulty perceiving Spanish lexical stress. Importantly, sentence position modulated the degree of difficulty. However, whereas sentence-final position resulted in lower accuracy rates of identification in interrogative sentences, non-final position yielded a higher accuracy rate of identification in exclamative sentences. The results with respect to interrogative sentences are consistent with findings in previous literature (e.g., Kimura et al., 2012). However, the findings with respect to non-final position creating more difficulties than final position was novel. Despite the differences between F0 peak realization in the recorded stimuli produced by a native speaker of Bogota Spanish in the current study and what has been reported in the literature for F0 peak realization in Spanish in general (Ortega-Llebaria et al, 2013; Ortega-Lleberia & Prieto, 2007, 2010), there was some evidence suggesting that the interaction of the learners' L1 prosodic system and the variation in the realization of F0 peaks in Bogota Spanish may have been the reason for positional effects.

7.3 The interaction between the learners' L1 and F0 peak realization in Spanish interrogative and exclamative sentences

The findings in this study suggest that Japanese-speaking learners may (mis)assign stress

based on F0 peak realization in the input; that is, F0 peak displacement may miscue the learners and lead to misidentification of Spanish lexical stress (Kimura et al., 2012). For example, the results showed that F0 peak displacement to the final syllable in proparoxytones in final position in interrogatives led to a higher rate of oxytone responses than proparoxytone or proparoxytone responses. In other words, stress was mis-assigned more frequently when an F0 peak was dislocated to another position in the stimuli (e.g., the final syllable, in this case). Moreover, pitch appeared to modulate the effect of F0 peak displacement in sentence-non-final and final positions of interrogatives; that is, non-final position had a higher accuracy rate of identification than final position in interrogatives, possibly because a higher pitch might have made F0 peak displacement more salient and the chances of learners being miscued more probable. Another pattern that was established that provides some evidence for the role of F0 peak displacement in miscuing the learners was that a higher rate of proparoxytones was chosen in response to paroxytone words by both the Japan and the Bogota group in non-final position. As previously explained, in the recorded stimuli, an F0 peak in paroxytone words in sentence-non-final position in interrogatives was found in both antepenultimate and penultimate syllables. This might have triggered the mis-assignment of stress to proparoxytone words by the learners. Also, the data suggested that a shift closer to the stressed syllable, an F0 peak that is shared between the stressed syllable and its preceding syllable (e.g., the case of proparoxytones in sentence-final position) or an F0 peak shared between two syllables may have led to a higher rate of accuracy in stress identification than an F0 peak displacement to the final syllable (e.g., proparoxytone sentence-final position in interrogatives).

The interaction between the learners, L1 and F0 peak displacement resulting in misperception of lexical stress is consistent with the findings of Japanese-speaking learners of Spanish (Kimura et al., 2012), English speakers, learners of Spanish (Ortega-Llebaria et al., 2013) and Japanese speakers, who are learners of English (Tokuma, 2007). What is novel about the current study is that (a) it focuses on highly advanced late learners and (b) the unexpected patterns of F0 peak displacement in the current study are different and more complex than those reported in previous studies resulting in new findings.

Although there is some evidence in the current study to suggest that variation in F0 peak realization appears to modulate Spanish lexical stress misperception by Japanese-speaking learners, this claim has to be further investigated. It must be noted that the current study was designed based on the assumption that there would only be F0 peak displacement in non-final position, and not in final position, however, this was not the case. F0 peak displacement was present in both positions and variation in F0 peak displacement was rather complex, making it more difficult to analyse the effect of variation in the realization of F0 peaks in Spanish. It would have been much easier to pinpoint the potential effect of the interaction of the learners' L1 prosodic system with variation in the realization of F0 peak displacement in Spanish, if F0 peak displacement was present in sentence-final position and not in sentence-non-final position, as reported in the literature for Spanish in general. Second, the misidentification of stress in interrogatives and exclamatives needs to be further compared with the isolated contexts, where presumably, F0 peak aligns with the stressed syllable. This will highlight the degree to which the perception errors reported in the current study were a result of F0 peaks creating miscues, as opposed to other reasons that might have led to errors, such as phonological differences between the Spanish and Japanese lexical stress. Future studies could compare the current results with isolated words or statement sentences where, presumably, there is no F0 peak displacement.

7.4 The effect of context of learning

The second research question in this study concerned the effect of context of learning (e.g., Romanelli et al., 2015b) on the perception of lexical stress by highly advanced Japanese-speaking late learners of Spanish. It was predicted that there would be an effect of context of learning. In particular, it was predicted that advanced Japanese-speaking late learners who were immersed in Spanish in Bogota, Colombia would outperform the Japan group in the correct identification of stress in paroxytone and proparoxytone words in interrogative and exclamation sentences in sentence-final position (Pérez-Vidal et al., 2011; Romanelli et al., 2015a & b; Romanelli et al., 2014). This hypothesis was confirmed, as there was a significant main effect of context of learning, and overall, the Bogota L2 learners outperformed the Japan L2 learners in stress identification. Moreover,

asymmetries, both with respect to accuracy rates and error types, were noted. For example, whereas the Bogota L2 group patterned with the native speakers of Spanish, exhibiting a higher accuracy rate in final position, when the results were collapsed for both the exclamative and interrogative sentences, the Japan L2 group had a higher accuracy rate in non-final position. Moreover, an F0 peak that was shared between two syllables affected the two learners' groups differently at times. The finding that immersion can positively affect L2 phonological acquisition is consistent with the findings of DeKeyser (1991), Pellegrino (1998), Wilkinson (1998), Collentine (2004), Díaz-Campos (2004) and Pérez-Vidal et al. (2011). What is different about the findings of the current study is that they highlight the positive effect of immersion with respect to (a) perception, and (b) a suprasegmental aspect of phonology, namely, stress. Previously, most studies have been concerned with the effect of immersion on the acquisition of production of a segmental aspect (e.g., Díaz-Campos, 2006; Lord, 2010). Moreover, previous studies for the most part have looked at study abroad experiences but this study has compared a context of learning, where people have moved to live in a different country, namely Colombia, with those in the country of origin studying in a formal setting.

7.5 The effect of real vs. nonce words

The third research question in this study focused on the effect of real vs. nonce words on the perception of Spanish lexical stress. It had been predicted that there would be an effect of type of words (Altman, 2006). In theory, real words should be easier than nonce words because the learners would have access to the stress patterns in their lexicon they have learned in the classroom or in natural immersion settings (Altmann, 2006; Hymes, 1997; and Romanelli et al., 2015b). However, there was no main effect of type of words and the difference between real and nonce words was not significant. Moreover, the Japan group appeared to perform slightly better in the nonce word context, although the differences between the two contexts were not significant. These findings are inconsistent with the previous literature. Dupoux, Sebastián-Gallés, Navarrete, Peperkamp (2007) found that stress was more difficult to perceive in nonce words than real words in French speaking late learners of Spanish, who demonstrated higher error rates than a Spanish

control group. Carpenter (2015) found the same effect for untrained French speakers, who were less accurate when perceiving nonce words than trained French speakers and English speakers. This was also true for Romanelli & Menegoto (2014) in the perception of Spanish nonce words by English speakers, who were more accurate in perceiving real words than nonce words. It is possible that the lack of a significant effect of type of word in the current study might be because learners were not using previously memorized lexical patterns. Instead, they were using their own strategies to perceive Spanish lexical stress. Also, in this study, nonce words were presented to the participants before real words. The participants might not have performed as well as they would normally do on the real words if the stimuli had been randomized and/or if the experiment had taken place on two separate occasions. Future studies should take order effects into consideration.

7.6 Implications for models of stress acquisition

The results of the current study show that although immersion improved Spanish lexical stress perception by Japanese-speaking learners, it did not lead to native-like abilities. These results are not consistent with the findings of Altman (2006), who tested Japanese speakers who exhibited native-like perception scores in their perception of English unpredictable stress. Altman (2006) attributed her findings to the lack of stress parameter settings in the Japanese system. Regarding the acquisition of Spanish lexical stress in the present study, the Stress Typology Model would also predict the following: native speakers of Tokyo Japanese would be successful in their perception of Spanish lexical stress. Acquisition should be possible because Japanese is a pitch accent language and its speakers do not have any parameter settings established for their L1 stress. However, given the results of the current study, it may also be possible that the acquisition of stress is a more complex phenomenon that previously thought, as stated by Correira (2015) and/or the differences between the findings of the current study and Altman (2006) are due to methodological and/or language pairing differences between the two. Although the body of literature on studies that investigate the acquisition of stress from an acoustic/phonetic point of view (e.g., Colantoni, Marasco, Steele, & Sunara, 2015) are growing, the current models of stress acquisition are mostly phonological. The findings

of the current study suggest that there is a need for a more fine-grained model that considers the acoustic/phonetic correlates of stress in addition to phonological stress.

7.7 Pedagogical implications

This study also has pedagogical implications. Spanish lexical stress is often taught in the classroom in isolated words; that is, there is no emphasis on teaching stress perception in sentences, where the acoustic correlates of stress may vary depending on the type and position of stress, as it has been observed in previous studies (Garrido et al., 1993; Listerri et al., 1993,1995; Prieto et al., 1995; Xu, 1999; Ortega-Llebaria, 2006; Ortega-Lleberia and Prieto, 2007, 2010, and Ortega-Llebaria et al., 2013) and this study. Moreover, although the effect of perceptual training was not the focus of this study, the results suggest that difficulties in the acquisition of Spanish lexical stress partly lie in perception, at least with respect to lexical stress in interrogative and exclamative sentences. However, classroom instruction is mostly focused on production. Therefore, it is suggested that more time be dedicated to perceptual training in the classroom. The combination of these two approaches could lead to better performances as shown by Lord (2010). Moreover, given the positive effects of immersion, it is recommended that language programs incorporate an exchange or study abroad program where students can have the opportunity to be immersed in the L2.

7.8 Conclusion

This study has added to the sparse empirical data on the perception of Spanish lexical stress by Japanese-speaking learners. The results of the stress identification task in this study have contributed to our understanding of the perception of Spanish lexical stress by Japanese-speaking late learners. First, it has shown that the perception of Spanish lexical stress, in particular with respect to proparoxytones and paroxytones in interrogative and exclamations, is difficult for highly advanced Japanese-speaking learners. Second, it showed that, whereas proparoxytones and paroxytones are more difficult in interrogatives in sentence-final position, exclamatives are more difficult in non-final position. The analysis of some of the trends in the results was explained in light of analysis of the recorded stimuli that were presented to the participants. The study contributes to the field

of L2 phonological acquisition by attributing the results to the interaction of the learners' L1 prosodic system with L2 acoustic/phonetic cues (e.g., variation in F0 peak realization) in L2 perception and highlighting the importance of the role of acoustic cues in addition to L1 and L2 phonological differences in L2 perception of stress. Moreover, the study showed that immersion has a more positive effect on Spanish lexical stress perception than instructed learning. Specifically, learners who had been living in Colombia patterned more with native speakers of Bogota Spanish and outperformed learners who had studied Spanish in Japan at the time of testing. The study also showed that there was no significant difference between real and nonce words; however, this might be due to the order of presentation and learning effects. That is, learners might be using their own strategies to perceive Spanish lexical stress.

Previously, it has been proposed that speakers of languages with regular stress such as French could have difficulties in perciving lexical stress in an L2 context (Peperkamp & Dupoux, 2002; Dupoux et al., 2007). Unlike the findings of Altman (2006), the results of the current study show that speakers of Japanese (a pitch-accent language) can also have difficulties perceiving stress, although prolonged exposure to the language (i.e., immersion) may improve perceptual abilities. It has been proposed here that future models of L2 stress acquisition should consider stress realization and perception both from a phonetic/acoustic and phonological point of view.

7.9 Future work

This study leaves several questions open for further work. First, in future studies, F0 peaks can be manipulated to further investigate the effect of its interaction with learners' L1 system. Second, the perception of real vs. nonce words can be investigated, where the stimuli are better randomized. Third, future studies can examine the effect of perceptual training on the perception of F0 peak displacement of Japanese speakers. For example, future work could examine the potential effects of training on an immersion vs. a formal instruction group. Also, the effect of teaching F0 peak displacement in the classroom can be explored. Moreover, there is still very little known about whether formal instruction boosts the perception of Spanish stress in immersion. Future studies could compare a group who receives both formal instruction and is in immersion with an immersion only

group. It is predicted that the combination of instruction and immersion will be more beneficial for the Japanese speakers as previously shown (Lord, 2010; Romanelli & Menegoto, 2014).

Finally, the acquisition of Spanish stress by Japanese speakers is a linguistic process that needs to be examined further. Given there are only a few studies on this topic, this thesis can be considered as a contribution in this area of phonological research that will help to start new discussions about this topic.

References

Akinaga, Kazue (2002). Tokyo no hatsuon to yure [Variation in the pronunciation of Tokyo Japanese]. In Hida Y. and Sato T. (eds.), *Gendai Nihongo Koza 3*, Tokyo: Meiji Shoin, 40-58.

Alfano, I., Savy, R., & Llisterri, J. (2008). Las características acústicas y perceptivas del acento léxico en español y en italiano: Los patrones acentuales paroxítonos. En *Language Design. Journal of Theoretical and Experimental Linguistics. Special Issue 2: Experimental Prosody*, *2*, 23-30.

Altmann, H. (2006). The perception and production of second language stress: A cross-linguistic experimental study. PhD Thesis. Delaware University.

Altmann, H. & Vogel, I. (2002) L2 Acquisition of Stress: The role of L1. Paper presented in *DGfS Annual Meeting "Multilingualism Today".* Mannheim, Germany.

Aoyama, K., & Flege, J. E. (2011). Effects of L2 experience on perception of English /r/ and /l/ by native Japanese speakers. The Journal of the Phonetic Society of Japan, 15, 5-13.

Aoyama, K., Flege, J. E., Guion, S. G., Akahane-Yamada, R., and Yamada, T. _2004_. "Perceived phonetic distance and L2 learning: The case of Japanese /r/ and English /l/ and /r/," J. Phonetics 32, 233–250.

Archibald, J. (1997). The acquisition of English stress of nonaccentual languages: Lexical storage versus computation of stress. Linguistics 35, pp. 167-181.

Arnott W, Goli T, Bradley A, Smith A, Wilson W. (2014). The filtered words test and the influence of lexicality. Journal of Speech, Language, and Hearing Research. 57(5), 1722-1730.

Avello, P. and Lara, A.R. 2014. “Phonological Development in L2 Speech Production during Study Abroad Programmes Differing in Length of Stay”. In Pérez-Vidal, C. (Ed.) *Language Acquisition in Study Abroad and Formal Instruction Contexts.* Amsterdam: John Benjamins, 137-165.

Avello, P., Mora, J. C., & Pérez-Vidal, C. (2012). Perception of FA by Non-Native Listeners in a Study Abroad Context. *Research in Language*. 10(01), 63-78.

Beckman, M., (1986) *Stress and Non-Stress Accent*. Dordrecht: Foris Publications.

Bello, Andrés, Gramática de la lengua castellana destinada al uso de los americanos. Con las Notas de Rufino José Cuervo. Estudio y edición de Ramón Trujillo, Madrid, Arco/Libros, 1988, pág. 173.

Best Catherine and Tyler, Michael. (2007). Nonnative and second-language speech perception: commonalities and complementarities. In Bohn, O., & Munro, M. J. (Eds.)., *Language experience in second language speech learning: In honor of James Emil Flege*. Amsterdam. Philadelphia: John Benjamins Pub. Co.

Bolinger, Dwight L. y Hodapp, Marion, “Acento melódico. Acento de intensidad”, *BFUCh*, 13, 1961, pág. 47.

Bybee, Joan L., Chakraborti, Paromita, Jung, Dagmar, and Scheibman, Joanne. 1998. Prosody and segmental effect: some paths of evolution for word stress. Studies in Language 22.267-314.

Castro, O. (2006). *Issues in spanish morphophonology :Implications for language acquisition*. Lanham, Md: University Press of America.

Colantoni, L., Marasco, O., Steele, J. & Sunara, S. (2015) Phonological and phonetic aspects of the L2 acquisition of French and Spanish stress. *Selected Proceeding on the 6th conference on Laboratory Approaches to Romance Phonology*, E. Willis, P. Martín Butragueño, & E. Herrera Zandejas (Eds). Somerville, MA: Cascadilla Proceedings Project, pp. 129-144.

Contreras, Heles (1963). “Sobre el acento en español”. Boletín de Filología, Universidad de Chile, 15, 223-237.

Contreras, Heles (1964). “¿Tiene el español un acento de intensidad?”. Boletín de Filología, Universidad de Chile, 16, 237-239.

Couper-Kuhlen, E. (1986). *An Introduction to English Prosody* . London and Tuebingen: Edward Arnold and Niemeyer.

Cruttenden, Alan. (1986) *Intonation*. Cambridge: Cambridge University Press.

Cuervo, Rufino 1955: *Apuntaciones críticas sobre el lenguaje bogotano con frecuente referencia al de los países de Hispano-América*, Bogotá: Instituto Caro y Cuervo.

Cuervo, Rufino José, Notas a la Gramática de la lengua castellana de don Andrés Bello. Edición, variantes y estudio preliminar por Ignacio Ahumada Lara, Bogotá, Instituto Caro y Cuervo, 1981, pág. 44.

Cutler, A. (1984). Stress and accent in language production and understanding. In D. Gibbon, & H. Richter (Eds.), Intonation, accent and rhythm: Studies in discourse phonology (pp. 77-90). Berlin: de Gruyter.

Cutler, A. (2005). Lexical stress. In D. B. Pisoni, & R. E. Remez (Eds.), The handbook of speech perception (pp. 264-289). Oxford: Blackwell.

Díaz-Campos, Manuel. 2004. Context of learning in the acquisition of Spanish second language phonology. *Studies in Second Language Acquisition* 26. 249-74.

Díaz Campos, M. 2006. “The effect of style in second language phonology: An analysis of segmental acquisition in study abroad and regular-classroom students”. *Selected Proceedings of the 7th Conference on the Acquisition of Spanish and*

Portuguese as First and Second Languages. Somerville, MA: Cascadilla Proceedings Project. [Documento de Internet disponible en www.lingref.com, documento #1271].

Dupoux, E., Pallier, C., Sebastián-Gallés, N., & Mehler, J. (1997). A Destressing 'Deafness' in French? *Journal of Memory and Language, 36,* 406-421.

Dupoux, E. & Peperkamp, S. (2002). Fossil markers of language development:

Phonological 'deafnesses' in adult speech processing. In: J. Durand & B. Laks (Eds.), *Phonetics, Phonology, and Cognition,* (pp. 168–190). Oxford: Oxford University Press.

Dupoux, E., Peperkamp, S., & Sebastián- Gallés, N. (2001). A robust method to study

stress 'deafness'. *Journal of the Acoustical Society of America, 100,* 1606–1618.

Dupoux, Emmanuel; Nuria Sebastián-Gallés; Eduardo Navarrete y Sharon

Peperkamp (2007). "Persistent stress "deafness": The case of French learners of Spanish", *Cognition*, 106(2), p. 682-706.

Dupoux, E. & C. Pallier (1997). A Destressing 'Deafness' in French? Journal of Memory

and Language 36, 406-421.

Dupoux, E. & Peperkamp, S. (2002). Fossil markers of language development:

Phonological 'deafnesses' in adult speech processing. In: J. Durand & B. Laks (Eds.), Phonetics, Phonology, and Cognition, (pp. 168–190). Oxford: Oxford University Press.

Dupoux, E., Peperkamp, S., & Sebastián- Gallés, N. (2001). A robust method to study

stress 'deafness'. Journal of the Acoustical Society of America, 100 , 1606–1618.

Dupoux, Emmanuel; Nuria Sebastián-Gallés; Eduardo Navarrete y Sharon

Peperkamp (2007). “Persistent stress “deafness”: The case of French learners of Spanish”, *Cognition*, 106(2), p. 682-706.

Enríquez, Emilia V., Casado, Celia y Santos, Andrés. (1989). La percepción del acento en español. *Lingüística Española Actual, 11*, 241-269.

Escudero, Paola. (2007). Second language phonology: the role of perception. In Pennington, M. C. (Ed.). (2007). *Phonology in context* (pp. 109-134). Houndmills, Basingstoke, Hampshire; New York: Palgrave Macmillan.

Estebas-Vilaplana, E. & Prieto, P. 2010. Castilian Spanish intonation. In: Prieto, P. & Roseano, P. (eds.), Transcription of Intonation of the Spanish Language.

Face, Timothy L. (2005) Syllable weight and the perception of Spanish stress placement by second language learners. *Hispanic Linguistics at the Turn of the Millennium*, ed. By

Garrido, Juan, M.Llisterri, Joaquim, de la Mota, Carmen y Ríos, Antonio (1995). Estudio comparado de las características prosódicas de la oración simple en español en dos modalidades de lectura, *Phonetica*, 174-194, Bilbao, Universidad de Deusto.

Garrido, J.M., Llisterri, J., de la Mota, C., y Ríos, A. (1995). Estudio comparado de las características prosódicas de la oración simple en español en dos modalidades de lectura. En Elejabeitia, A., e Iribar, A. (Eds.) *Phonetica. Trabajos de fonética experimental* (pp. 173-194). Bilbao: Universidad de Deusto (Serie Lingüística, 6).

González, Jorge Enrique. (2001) *La acentuación en las interlenguas del español y del inglés*. Tesis de PhD, University of Massachusetts.

Haraguchi, S. (1991). *A theory of stress and accent*. Dordrecht: Foris.

Hattori, K., & Iverson, P. (2009). English /r/-/l/ category assimilation by Japanese adults: Individual differences and the link to identification accuracy. *Journal Of The Acoustical Society Of America, 125*(1), 469-479. doi:10.1121/1.3021295

Bruce Hayes (1995). *Metrical Stress Theory: Principles and Case Studies*. Chicago: The University of Chicago Press. Pp. 455.

Hertel, T. J. (1995) The influence of the first language stress system on the acquisition of second language stress. Cited in Lord, Gillian E (2001) *The second language acquisition of Spanish stress: Derivational, analogical or lexical?* PhD Dissertation. The Pennsylvania State University.

Héctor Campos, Elena Herburger, Alfonso Morales-Front, and Thomas J. Walsh, 1-13. Sommerville, MA: Cascadilla.

Hualde, José Ignacio. (2005). *The sounds of Spanish*. Cambridge. UK.

Hualde, José Ignacio (2012). Stress and Rhythm. En Hualde, J. I., Olarrea, A., & O'Rourke, E. (Eds.), *The handbook of hispanic linguistics* (pp. 153-167). Malden, MA: John Wiley & Sons Inc.

Hualde, J. I. & Kim, J-Y. (2015). "The acquisition of Spanish lexical stress by Korean learners". International Congress of Phonetic Sciences. Glasgow.

Hulst, H.G. van der (2010.). Representing Accent. In *Phonological Studies*,13, 117-128.

Jamieson, J., Morosan, D. 1986. Training non-native speech contrasts in adults: Acquisition of the English /T/ and /D/ contrast by francophones. *Perception and Psychophysics* 40, 205-215. (*Available at* http://link.springer.com/article/10.3758%2FBF03211500)

Hyman, L.M., 2001. Tone systems. In: Haspelmath, M. et al. (Eds.), Language Typology and Language Universals: An International Handbook, vol. 2. Walter de Gruyter, Berlin & New York, pp. 1367–1380.

Hyman, Larry M. 2009. How (not) to do phonological typology: the case of pitch-accent. *Language Sciences* 31.213-238.

Hyman, L.M. (2014) 'Do all languages have word accent?', in van der Hulst, H. (ed.) *Word Stress: Theoretical and Typological Issues*. Cambridge University Press,.

Iwasaki, Shoichi. (2012). *Japanese*. London Oriental and African Language Library. Amsterdam: John Benjamins

Juan-Garau, M. 2014. "Oral Accuracy Growth after Formal Instruction and Study Abroad: Onset Level, Contact Factors and Long-Term Effects". In C. Pérez-Vidal (Ed.) Language Acquisition in Study Abroad and Formal Instruction Contexts. Amsterdam: John Benjamins, 87-110.

Kawagoe, Itsue. (2003). Acquisition of English Word Stress by Japanese Learners. In Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002), ed. Juana M. Liceras et al., 161-167. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #1040.

Kohler, K. 1990. "Macro and micro F_0 in the synthesis of intonation", *Papers in Laboratory Phonology I*, pp. 115-138, Cambridge University Press.

Kijak, Anna M.(2009). "How stressful is L2 stress? A cross-linguistic study of L2 stress perception and production of metrical systems". Disertación doctoral, Utrecht University. Disponible: http://www.lotpublications.nl/publish/articles/003409/bookpart.pdf

Kim, Ji-Young (2015). Selected Proceedings of the 6th Conference on Laboratory Approaches to Romance Phonology, ed. Erik W. Willis et al., 106-128. Somerville, MA: Cascadilla Proceedings Project.

Kimura, Takuya, Sensui, Hirotaka, Takasawa, Miyuki, Toyomaru, Atsuko & Atria, José J. (2010, september). A pilot study on perception of Spanish stress by Japanese learners of Spanish. Papers presented at the Interspeech 2010 satellite workshop on "Second language studies: Acquisition, learning, education and technology",

Tokyo, Japan. Paper retrieved from http://www.gavo.t.utokyo.ac.jp/L2WS2010/papers/L2WS2010_O1-04.pdf

Kubozono, Haruo (1999). Mora and syllable. In Tsujimura, Natsuko (ed.) (1999). *The handbook of Japanese linguistics*, pp. 31–61 Malden, Mass. & Oxford: Blackwell.

Kubozono, Haruo. (2011). Japanese Pitch Accent. En van Oostendorp, M. (Ed.). *The blackwell companion to phonology*. Chichester, U.K.; Malden, MA: Wiley-Blackwell.

Kubozono, Haruo (1999). Mora and syllable. In Tsujimura, Natsuko (ed.) (1999). *The handbook of Japanese linguistics*, pp. 31–61 Malden, Mass. & Oxford: Blackwell.

Lázaro Carreter, Fernando. (1968). *Diccionario de terminos filológicos.* Madrid: Gredos.

Labrune, Laurence. (2012) *The Phonology of Japanese*. Oxford: Oxford University Press.

Labrune, Laurence. (2012). Questioning the universality of the syllable: evidence from Japanese. *Phonology*, Cambridge University Press (CUP), 2012, 29 (1), pp.113-152.

Llisterri, J., Machuca, M. J., de la Mota, C., Riera, M., & Ríos, A. (2005). La percepción del acento léxico en español. In *Filología y lingüística. Estudios ofrecidos a Antonio Quilis*. (pp. 271-97). Madrid: Consejo Superior de Investigaciones Científicas - Universidad Nacional de Educación a Distancia - Universidad de Valladolid.

Llisterri, J.- Machuca, M.J.- Ríos, A.- de la Mota, C.- Riera, M. (2003) Algunas cuestiones en torno al desplazamiento acentual en español. En Herrera Z., E.- Martín Butragueño, P. (Eds.). *La tonía: dimensiones fonéticas y fonológicas* (pp. 163-185). México: El Colegio de México, Centro de Estudios Lingüísticos y Literarios (Cátedra Jaime Torres Bodet, Estudios de Lingüística, 4).

Llisterri, J., Marín, R., de la Mota, C., Ríos, A. (1995) Factors affecting F0 peak displacement in Spanish. In *Eurospeech'95. Proceedings of the 4th European*

Conference on Speech Communication and Technology. Madrid, 18 -21 de septiembre de 1995. Vol. 3, pp. 2061-2064. ISSN: 1018-4074.

Llisterri, J., & Schwab Sandra. (2013). Does Training Make French Speakers More Able to Identify Lexical Stress? In *Proceedings of the International Symposium on the Acquisition of Second Language Speech* Concordia Working Papers in Applied Linguistics, 5, 2014 © 2014 COPAL. (*available at*

http://doe.concordia.ca/copal/documents/40_Schwab_Llisterri_Vol5.pdf)

Llisterri, J., Marin, R., da la Mota, C. & Ríos, A. 1995, Factors affecting F0 displacement in Spanish. ESCA, Eurospeech'95. 4h Conference on Speech Communication and Technology , 2061-2064. Lincom Europa: München, 17-48.

Llisterri, J. Machuca, M. J. Ríos, A. de la Mota, C. Riera, M. (2003). Algunas cuestiones en torno al desplazamiento acentual en español, in Herrera Z., E. Martín Butraguño, P. (Eds.) *La tonía: dimensiones fonéticas y fonológicas*. México: El Colegio de México, Centro de Estudios Lingüísticos y Literarios (Cátedra Jaime Torres Bodet, Estudios de Lingüística, 4). pp. 163-185.

LLISTERRI, J.- MACHUCA, M. J.- de la MOTA, C.- RIERA, M.- RÍOS, A. (2002) "The role of F0 peaks in the identification of lexical stress in Spanish", in BRAUN, A.- MASTHOFF, H.R. (Eds.) Phonetics and its Applications. Festschrift for JensPeter Köster on the Occasion of his 60th Birthday. Stuttgart: Franz Steiner Verlag (Zeitschrrift für Dialektologie und Linguistik, Beiheft 121). pp. 350-361. ISBN: 3-515-08094-5

Alarcos Llorach, Emilio, *Gramática de la lengua española*, Madrid, Real Academia Española, Colección Nebrija y Bello, Espasa, 1994, pág. 45.

Logan, J., Lively, S., Pisoni, D. (1993). Training Japanese listeners to identify English /r/ and /l/: *J. Acoust. Soc. Am*. 94 (3 Pt 1): 1242–1255.

(*Available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3509365/)

Lord, Gillian, E. (2001). *The second language acquisition of Spanish stress: Derivational, analogical or lexical?* Ph.D Dissertation. The Pennsylvania State University.

Lord, G. (2010), The Combined Effects of Immersion and Instruction on Second Language Pronunciation. In *Foreign Language Annals*, 43: 488–503.

Marasco, O., Steele, J., Sunara, S. & Colantoni, L. (2012) *Phonological and phonetic aspects of the L2 acquisition of French and Spanish stress*. Paper presented at Laboratory Approaches to Romance Phonology, Colegio de México, October 3-5.

Martínez Celdrán, Eugenio y Fernández Planas, Ana M.ª. (2007). Manual de fonética española. Articulaciones y sonidos del español, 2.ª ed., Barcelona, Ariel, págs. 199-200.

McCawley, James. (1968). *The Phonological Componenet of a Grammar of Japanese.* Paris: The Hague.

Mathôt, S., Schreij, D., & Theeuwes, J. (2012). OpenSesame: An open-source, graphical experiment builder for the social sciences. *Behavior Research Methods*, *44* (2), 314-324.

Mochizuki-Sudo, M. and Kiritani, S. (1991) 'Production and perception of stress-related durational patterns in Japanese learners of English.' J. of Phonetics. 19, 231-248.

Montrul, S. (2011). Morphological error in Spanish second language learners and heritage speakers. *Studies in Second Language Acquisition, 33*(2), 163-192.

Mora, J.C. and Valls-Ferrer, M. 2012. "Oral fluency, accuracy and complexity in formal instruction and study abroad learning contexts". *TESOL Quarterly*, 46 (4), 610-641.

Navarro Tomás, Tomás, . (2004). Manualde pronunciación española, 28.ª ed., Madrid, CSIC, , pág. 183.

Navarro Tomás, Tomás. (1974). Manual de entonación española, 4.ª ed., Madrid, Guadarrama, , pág. 21

Navarro Tomás, Tomás. (1944). Manual de entonación española, Madrid, Guadarrama, edición de 1974.

Morimoto, Yoshiharu. (1984) El acento español y el acento japonés en contraste. En *Sophia Lingüística*, *16*, 1984, pp. 10-17.

Ortega-Llebaria, Marta; Hong Gu y Jieyu Fan (2013). "English speakers‟ perception of Spanish lexical stress: context-driven L2 perception", *Journal of Phonetics, 41*, p. 186-197.

Ortega-Llebaria, Marta & Pilar, Prieto. (2007). Disentangling stress from accent in Spanish: Production patterns of the stress contrast in de-accented syllables. In P. Prieto, J. Mascaró & M-J. Solé (Eds.) Segmental and prosodic issues in Romance Phonology. CILT Collection (Current Issues in Linguistic Theory), John Benjamins.

Ortega-Llebaria, Marta & Prieto, Prieto. (2009). Perception of word stress in Castilian Spanish: The effects of sentence intonation and vowel type. In M. Vigário, F. Sónia, & M.J. Freitas (Eds.) Phonetics and phonology: Interactions and interrelations, (pp. 35-50). Amsterdam: John Benjamins.

Ortega-Llebaria, Marta (2007). "Perception of stress in Spanish by L1 and L2 speakers", *6th International Symposium on Bilingualism*, University of Hamburg.

Ortega-Llebaria, Marta; Hong GU y Jieyu FAN (2013). "English speakers‟ perception of Spanish lexical stress: context-driven L2 perception", *Journal of Phonetics, 41*, p. 186-197.

Ortega-Llebaria, Marta. (2006). Phonetic Cues to Stress and Accent in Spanish.

Selected Proceedings of the 2nd Conference on Laboratory Approaches to Spanish Phonetics and Phonology, ed. Manuel Díaz-Campos, 104-118. Somerville, MA:

Cascadilla Proceedings Project. Available from: https://www.researchgate.net/publication/241458874_Phonetic_Cues_to_Stress_and_Accent_in_Spanish [accessed Dec 2, 2016].

Ortega-Llebaria, M., & Prieto, P. (2007). Disentangling stress from accent in spanish: Production patterns of the stress contrast in deaccented syllables. *SEGMENTAL AND PROSODIC ISSUES IN ROMANCE PHONOLOGY, prieto, pilar, mascaro, joan & sole, maria-josep eds], amsterdam, NE: John benjamins, 2007, pp 155-176*

Ortega-Llebaria, Marta & Prieto, Prieto. (2010). Acoustic correlates of stress in Central Catalan and Castilian Spanish. Language and Speech.54(1), 73-97.

Ortega-Llebaria, M., & Prieto, P. (2011). Acoustic correlates of stress in central Catalan and Castilian Spanish. *Language and Speech, 54*, 73-97.

Ou, S-C. (2004). An optimality-theoretic approach to word stress: evidence from Mandarin-English interlanguage. *Proceedings of 15th ICPhS at Barcelona*.

Peperkamp, S. & E. Dupoux (2002). A typological study of stress 'deafness'. In: C. Gussenhoven & N. Warner (eds.) Papers in Laboratory Phonology 7. Berlin: Mouton de Gruyter, 203-240.

Peirce, JW (2007) PsychoPy - Psychophysics software in Python. Journal of Neuroscience Methods, Volume 162, Issues 1–2, 15 May 2007, Pages 8-13,

Peirce JW (2009) Generating stimuli for neuroscience using PsychoPy. Frontiers in Neuroinformatics. Volume 2 10

Pérez-Vidal, Carmen; Juan-Garau, M.; Mora Bonilla, J.C. (2011). The effects of formal instruction and study abroad contexts on foreign language development: the SALA project. Dins: Sanz, C.; Polanyi, L. (1995) Langugae learning and living

abroad: stories from the field. In B. Freed (ed.) *Second Language Acquisition in a Study Abroad context* (pp. 271-293). Amsterdam/Philadelphia: Benjamins.

Prieto, Pilar., Van Santen, Jan., Hirschberg, Julia 1994: 'Patterns of F0 Peak Placement in Mexican Spanish'. Pilar Prieto, ed. *Proceedings*

_____(1995). Tonal Alignment Patterns in Spanish. In: *Journal of Phonetics* 23, 429-451.

Quilis, Antonio. (1993). *Tratado de fonología y fonética españolas*. Gredos. Madrid.

Quilis, Antonio, *Fonética acústica de la lengua española*, Madrid, Gredos, 1981, pág. 332

Quilis, Antonio (1971). "Caracterización fonética del acento español". Travaux de Linguistique et de Littérature, 9, 53-72.

Real Academia Española /Asociación de Academias de la Lengua Española (2011): *Nueva gramática de la lengua española: fonética y fonología*, Madrid: Espasa Libros.

Ríos, A. (1991): *Caracterización acústica del ritmo castellano*, trabajo de investigación de tercer ciclo, Departamento de Filología Española, Universidad Autónoma de Barcelona.

Romanelli, Sofía y Andrea Menegotto. "¿Sordos al acento? La percepción de acento contrastivo de estudiantes angloparlantes de español", *SIGNOS ELE*, 8, julio 2014, URL http://p3.usal.edu.ar/index.php/ele/article/view/2317, ISSN 1851-4863

Romanelli, Sofía, Andrea Menegotto & Ron Smyth (2015). Percepción y producción de acento en alumnos angloparlantes de ELSE en la Argentina: Efectos del entrenamiento y de la inmersión. *Signo y Seña*, 27, 47-88

Romanelli, Sofía, Andrea Menegotto & Ron Smyth (2015) "Stress perception: effects of training and a study abroad program for L1 English late learners of Spanish". *Journal of Second Language Pronunciation* 1.2: 181-210.

Ruiz Mella, Magaly y Pereira Reyes Yasna (2010). Acento léxico: tendencias de los correlatos acústicos. En *Onomázein* 22 (2): 43-58.

Saalfeld, Anita K. (2009). Stress in the beginning Spanish classroom: an instructional study (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3363080).

Silverman, K. 1990. "The separation of prosodies", *Papers in Laboratory Phonologie I*, pp. 139-151, Cambridge University Press.

Solé, M.J. 1984. Experimentos sobre la percepción del acento. *Estudios de Fonética Experimental*, 1, pp. 131-242.

Schwab, S., & Llisterri, J. (2011). Are French speakers able to learn to perceive lexical stress contrasts? In ICPhS 2011. *Proceedings of the 17th International Congress of*

Phonetic Sciences (pp. 1774-7). City University of Hong Kong, China. 17-21 August, 2011.

Segalowitz, N. & Freed, B. F. (2004). Context, contact, and cognition in oral fluency

acquisition: learning Spanish in at home and study abroad contexts. *SSLA*. 26, 173-199. Simões, A. (1996). Phonetics in second language acquisition: An acoustic study of fluency in adult learners of Spanish. *Hispania, 79, 87-95.*

Strange, Winifred and L. Shafer, Valerie. (2008). Speech perception in second language learners: the re-education of selective perception. In Edwards, J. G. H., & Zampini, M. L. (Eds.). (2008). *Phonology and second language acquisition* (pp. 153-192). Amsterdam; Philadelphia: J. Benjamins Pub. Co.

Tsujimura, Natsuko. (1996). *An introduction to Japanese Linguistics*. Blackwell Publishers. Malden, Massachusetts, USA.

Tsujimura, Natsuko (ed.) (1999). *The handbook of Japanese linguistics*. Malden, Mass. & Oxford: Blackwell.

Tokuma, S., (2007) “Perception of English lexical stress: effect of F0 peak location on English and Japanese speakers.” Proc. Of ICPhS, Saarbruecken, pp. 1685-1688.

Tokuma, Shinichi (2003) "Perception of English lexical stress by English and Japanese speakers: effect of duration and "realistic" intensity change", In *EUROSPEECH-2003*, 2121-2124.

Perception of English F0 peak-delay by English and Japanese speakers: we hear what they do not hear Won Tokuma Proceedings of Phonetics Teaching & Learning Conference 2009 1-4 Aug 2009

Tokuma, S. & Xu, Yu. (2009) “The effect of F0 peak-delay on L1/L2 perception of English lexical stress.” In *Proc. of Interspeech*, Brighton, 2009.

Trubetzkoy, N.S. (1969). Principles of Phonology. Berkley & Los Angeles: University of California Press. Translated by Ch.A.M. Baltaxe from Grundzüge der Phonologie. (1939). Göttingen: Vandenhoeck & Ruprecht.

Ueyama, M. (2000), Prosodic transfer: an acoustic study of L2 English vs.

L2 Japanese, PhD diss, University of California.

Urrutia Cárdenas, Hernán. (2007). La naturaleza del acento en español: nuevos datos y perspectivas. *RLA. Revista de lingüística teórica y aplicada*, *45* (2), 135-142.

Van der Hulst, H., Goedemans, R., & van Zanten, E. (2010). *A survey of word accentual patterns in the languages of the world*. Berlin; New York: De Gruyter Mouton.

Vance, Timothy J. (1987). An introduction to Japanese phonology. Albany: State

University of New York Press.

Vogel, I. (2000). The Acquisition of Prosodic Phonology: Challenges for the L2 Learner.

Paper presented in *Structure, Acquisition, and Change of Grammars: Phonological and Syntactic Aspects*. Hamburg, Germany.

Xu, Y. (1999). Effects of tone and focus on the formation and alignment of F0 contours. *Journal of Phonetics* 27: 55-105.

Yamada, R., and Tohkura, Y. _1992_. "The effects of experimental variables on the perception of American English /r/ and /l/ by Japanese listeners," Percept. Psychophys. 52, 376–392.

Appendices

Western Arts&Humanities

Modern Languages & Literatures

Appendix:

A) Poster Bogota

Bogota, Colombia

Dear friend,

As part of my research (PhD thesis) at the Department of Modern Languages and Literatures at Western University, I need to test native speakers of Japanese to participate in a linguistics experiment. The main objective is to investigate how Japanese speakers perceive Spanish lexical stress. The experiment will be conducted at your university or at your place (home).

We are looking for participants with the following profile:

- Be a native speaker of Japanese (Tokyo accent type Japanese)
- To have an advanced level of Spanish
- To have lived in Bogotá for at least five years
- To have been born in Japan
- To have come to Colombia as adults
- To have learned Spanish as adults
- At the time of the experiement they should be between 22 to 50 years of age
- Should not have any hearing problems

Participants will be asked to complete three tasks: a sociolinguistic questionnaire, a proficiency test, and a stress identification task.

The experiment will last 60 minutes and the other two tasks: the questionnaire and the proficiency test will last 60 minutes. Participants will not receive any compensation when they complete the study. If you have all the above listed characteristics and are interested in participating in this study, or know about a friend who might be interested in this study, please contact Mr. Elkin Sierra via the following email: or send this information to anyone you think might be interested in participating in this study. You will be provided with more information about the study (a letter of information), prior to the beginning of all the tasks included in the study.

Thank you very much for your interest.

Appendix:

B) Poster Seisen University

Japan: Seisen University, Tokyo.

Participants needed

Native speakers of Japanese are needed to participate in a linguistics experiment, led by researchers at the Department of Modern Languages and Literatures at Western University. The main objective is to investigate how Japanese speakers perceive lexical Spanish stress. The experiment will be conducted at your university.

We are looking for participants who have the following profile:

- To be a native speaker of Japanese
- To have been born in Japan
- To be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, or Shizuoka
- To have studied Spanish for three years and a half at a Japanese university
- To be 22 years old or older
- Should not have lived in a Spanish speaking country for more than six moths
- Should not have and advanced proficiency level in other languages different from Japanese, and Spanish.
- Should not have any hearing or speech problems

Participants will be asked to complete three tasks: a background questionnaire, a placement test, and a stress identification task. Participation in this proficiency test will not affect the student's final grades and their instructors will not know the final results. The experiment will last about 60 minutes. Answering the questionnaire and the

proficiency test will last another 60 minutes. Participants will receive ¥ 2000 as a compensation when they complete the study.

If you have all the above listed characteristics and are interested in participating in this study, please contact Professor Kimura Takuya via the following email: You will be provided with more information about the study (a letter of information), prior to the study.

Thank you very much for your interest.

Appendix:

C) Poster Sophia University, Tokyo

Participants needed

Native speakers of Japanese are needed to participate in a linguistics experiment, led by researchers at the Department of Modern Languages and Literatures at Western University. The main objective is to investigate how Japanese speakers perceive lexical Spanish stress. The experiment will be conducted at your university.

We are looking for participants who have the following profile:

- Be a native speaker of Japanese
- To have been born in Japan
- To be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, or Shizuoka
- To have studied Spanish for three years and a half at a Japanese university
- To be 22 years old or older
- Should not have lived in a Spanish speaking country for more than six moths
- Should not have and advanced proficiency level in other languages different from Japanese, and Spanish.
- Should not have any hearing or speech problems

Participants will be asked to complete three tasks: a background questionnaire, a placement test, and a stress identification task. Participation in this proficiency test will not affect the student's final grades and their instructors will not know the final results. The experiment will last about another 60 minutes. Answering the questionnaire and the proficiency test will last 60 minutes. Participants will receive ¥ 2000 as a compensation when they complete the study.

If you have all the above listed characteristics and are interested in participating in this study, please contact Professor Kimiyo Nishimura via the following email:

. You will be provided with more information about the study (a letter of information), prior to the study.

Thank you very much for your interest.

Appendix:

D) Poster Kanagawa University, Kanagawa

Participants needed

Native speakers of Japanese are needed to participate in a linguistics experiment, led by researchers at the Department of Modern Languages and Literatures at Western University. The main objective is to investigate how Japanese speakers perceive lexical Spanish stress. The experiment will be conducted at your university.

We are looking for participants who have the following profile:

- Be a native speaker of Japanese
- To have been born in Japan
- To be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, or Shizuoka
- To have studied Spanish for three years and a half at a Japanese university
- To be 22 years old or older
- Should not have lived in a Spanish speaking country for more than six moths
- Should not have and advanced proficiency level in other languages different from Japanese, and Spanish.
- Should not have any hearing or speech problems

Participants will be asked to complete three tasks: a background questionnaire, a placement test, and a stress identification task. Participation in this proficiency test will not affect the student's final grades and their instructors will not know the final results. The experiment will last about another 60 minutes. Answering the questionnaire and the proficiency test will last 60 minutes. Participants will receive ¥ 2000 as a compensation when they complete the study.

If you have all the above listed characteristics and are interested in participating in this study, please contact Professor Wakako Kikuda via the following email: . You will be provided with more information about the study (a letter of information), prior to the study.

Thank you very much for your interest.

Appendix:

E) Poster Kanda University of International Studies, Chiba.

Participants needed

Native speakers of Japanese are needed to participate in a linguistics experiment, led by researchers at the Department of Modern Languages and Literatures at Western University. The main objective is to investigate how Japanese speakers perceive lexical Spanish stress. The experiment will be conducted at your university.

We are looking for participants who have the following profile:

- Be a native speaker of Japanese
- To have been born in Japan
- To be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, or Shizuoka
- To have studied Spanish for three years and a half at a Japanese university
- To be 22 years old or older
- Should not have lived in a Spanish speaking country for more than six moths
- Should not have and advanced proficiency level in other languages different from Japanese, and Spanish.
- Should not have any hearing or speech problems

Participants will be asked to complete three tasks: a sociolinguistic questionnaire, a placement test, and a stress identification task. Participation in this proficiency test will not affect the student's final grades and their instructors will not know the final results. The experiment will last about another 60 minutes. Answering the questionnaire and the

proficiency test will last 60 minutes. Participants will receive ¥ 2000 as a compensation when they complete the study.

If you have all the above listed characteristics and are interested in participating in this study, please contact Professor Kengo Matsui via the following email: . You will be provided with more information about the study (a letter of information), prior to the study.

Thank you very much for your interest.

Appendix:

F) **Poster Tokyo University of Foreign Studies, Tokyo**.

Participants needed

Native speakers of Japanese are needed to participate in a linguistics experiment, led by researchers at the Department of Modern Languages and Literatures at Western University. The main objective is to investigate how Japanese speakers perceive lexical Spanish stress. The experiment will be conducted at your university.

We are looking for participants who have the following profile:

- Be a native speaker of Japanese
- To have been born in Japan
- To be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, or Shizuoka
- To have studied Spanish for three years and a half at a Japanese university
- To be 22 years old or older
- Should not have lived in a Spanish speaking country for more than six moths
- Should not have and advanced proficiency level in other languages different from Japanese, and Spanish.
- Should not have any hearing or speech problems

Participants will be asked to complete three tasks: a background questionnaire, a placement test, and a stress identification task. Participation in this proficiency test will not affect the student's final grades and their instructors will not know the final results. The experiment will last about another 60 minutes. Answering the questionnaire and the proficiency test will last 60 minutes. Participants will receive ¥ 2000 as a compensation when they complete the study.

If you have all the above listed characteristics and are interested in participating in this study, please contact Professor Shigenobu Kawakami via the following email: You will be provided with more information about the study (a letter of information), prior to the study.

Thank you very much for your interest.

Appendix:

G) Letter of invitation and consent form

Project Title: The perception of Spanish lexical stress by Japanese-speaking late learners: the case of exclamations and yes/no questions

Main Researcher:

Yasaman Rafat, Assistant Professor,

Department of Modern Languages and Literatures, Western University

Elkin Sierra-Ríos, Hispanic Studies PhD Student,

Department of Modern Languages and Literatures, Western University

Letter of information

1. **Invitation to participate**

You are being invited to participate in a research study that aims to investigate the perception of the Spanish lexical stress patterns by Japanese speaking-learners of Spanish who learned or are learning Spanish in adulthood.

2. **Purpose of this letter**

The purpose of this letter is to provide you with all the information about the study, in order for you to make an informed decision regarding participation in this research study.

3. **Purpose of this study**

The purpose of this study is to determine whether advanced Spanish learners (Japanese speakers) can ultimately perceive the Spanish lexical stress in a native-like manner, and whether the context of learning affects this.

4. Inclusion Criteria

The potential participants of this study should be adults who have been born in Japan and are between 22-50 years old. Besides, they should speak a Tokyo accent type variety of Japanese. Also, it is required to be from one of these provinces: Tokio, Chiba, Saitama, Kanagawa, o Shizuoka, to have studied Spanish for three years and a half and have not lived in a Spanish speaking country previously for more than six months. Further, they should not have an advanced proficiency level in other languages different from Spanish and Japanese. Participants should not have hearing or speech problems.

5. Exclusion Criteria

Individuals will not be eligible to participate in this study if they are not Japanese, minors or older than 50 years of age. They will also not be eligible to participate in the study if they have hearing or speech issues or if they have an advanced proficiency level in other languages different from Spanish and Japanese. Also, people who speak a different variety of Tokyo accent type Japanese will not participate. Moreover, potential participants should not have lived in a Spanish-speaking country for more than six months.

6. Study Procedures

If you decide to participate in this study, you must complete a questionnaire and do a placement test. After completing the questionnaire, the placement test and the oral judgment test, you will start the task in which you must listen and identify the stressed syllable of trisyllabic (three syllables) words in different contexts. Participation in this proficiency test will not affect the student's final grades and their instructors will not be informed of the final results.

In order to be able to do the stress identification task, the participants will be asked to download the free software TeamViewer to share computers with the investigator Mr. Elkin Sierra, who will be in London, Canada, at the time of doing the experiment. Also, Participants will be asked to download the program Skype and open an account to be able to talk with the investigator Elkin Sierra, who will record an audio file of the participants reading a short text. This short reading will be part of the proficiency test.

7. Potential risks and harms

There are no known risks that are associated with the participation in this study.

8. Potential Benefits

People participating in this study will not receive any benefit for their participation. However, the results may provide valuable information about the acquisition, specifically, perception of the Spanish lexical stress by Japanese learners.

9. Compensation

At your request, you can have access to a summary of the results of this study. If you are interested in receiving this information, you can show your interest and provide

the researchers with your contact information in the letter of consent. There will be a compensation of **¥** 2000 for your participation in this study.

10. Voluntary participation

Participation in this research is completely voluntary and can be terminated at any time. In addition, the participant may also withdraw at any time, if desired. You do not waive any legal rights by participating in this study.

11. Confidentiality

All data collected will remain confidential and accessible only to the investigators (Mr. Sierra and Dr. Rafat). You will be identified with a number as a participant, so your name will never be given to the researchers. Therefore, it will not be revealed to anyone. Demographic information such as age, gender, and level of education will be collected separate from the data and used to present the results of this study in academic presentations at conferences and in articles we would publish. The information collected

will be stored, encrypted, and destroyed after five years. If you choose to withdraw from this study, your data will be removed and destroyed from our database.

12. Contacts for Further Information

If you have questions that are not answered during the different task you will do, you can contact us via email: Yasaman Rafat, Elkin Sierra. If you have any concerns about your participation in this study, we invite you to contact the office of ethical procedures to Phone 011-519-6613036 (Canada) or email

13. Publication

The results of this study will provide information towards the Graduate Student's (Elkin Dario Sierra's) PhD thesis. In the case this study is published, your name and other information will not be disclosed in the publication. If you are interested in receiving a summary of the results obtained in this study, you should contact us and a copy of the results will be given to you.

Researchers appreciate your participation in this study. To start your participation, complete and sign the form. After you have signed, you will receive a copy of it.

CONSENT FORM

Project Title: The perception of Spanish lexical stress by Japanese-speaking late learners: the case of exclamations and yes/no questions

Researchers' Names:

Yasaman Rafat, Assistant Professor,

Department of Modern Languages and Literatures, Western University

Elkin Sierra-Ríos, Hispanic Studies PhD Student,

Department of Modern Languages and Literatures, Western University

I have read the letter of information and everything is clear about the test procedure that I will perform. I have no concerns regarding the development of this study, since everything has been clearly explained to me.

If you wish to receive a summary of the results obtained in this study, please check the box ☐

Name:

_____

Participant's signature:

_____

Date:

_____

Person obtaining the consent:

_____

Western
Arts&Humanities

Modern Languages & Literatures

Signature:

_____

CONSENT FORM

Project Title: The perception of Spanish lexical stress by Japanese-speaking late learners: the case of exclamations and yes/no questions

Researchers' Names:

Yasaman Rafat, Assistant Professor,

Department of Modern Languages and Literatures, Western University

Elkin Sierra-Ríos, Hispanic Studies PhD Student,

Department of Modern Languages and Literatures, Western University

I have read the letter of information and everything is clear about the test procedure that I will perform. I have no concerns regarding the development of this study, since everything has been clearly explained to me. Therefore, I give my consent to be audio-recorded.

Name:

_____

Participant's signature:

_____

Date:

_____

Person obtaining the consent:

_____

Signature:

_____

Appendix:

H) Questionnaire

Cuestionario para hablantes de español/japonés

Background questionnaire for Spanish/Japanese speakers

(Esta información se mantendrá como confidencial)

(This information will be kept confidential)

Numero de identificación del participante:

Participant research ID number: _____

Iniciales: Edad:

Initials: _____ Age: _____

Sexo:

Sex:_____

Número de teléfono o correo electrónico:

Telephone number or e-mail:_____

Datos personales

I. Personal Data

1. ¿Cuál es el nivel más alto de educación que ha completado? (circule, por favor)

What is your highest level of education completed? (please circle):

Un tanto de secundaria secundaria un tanto de universidad Graduado de universidad

some high school high school some college college graduate

Maestría doctorado

Masters PhD

2. País de origen:

Country of origin: _____

3. País donde reside actualmente:

Country of current residence:_____

4. Ciudad donde vive actualmente:

City/town where you live:_____

5. ¿Ha vivido en un país hispano-hablante?

Have you lived in a Spanish speaking country?_____

Si la respuesta es positiva:

If yes:

6. ¿Qué país?:

What country:_____

7. ¿Qué ciudad?:

What city:_____

II. Su historia lingüística/ Your Linguistic background

8. ¿A qué edad empezó a aprender español?

At what age did you first begin to learn Spanish?

_____

9. ¿Habla más de un idioma?

Do you speak more than one language?

Sí

Yes_____

No_____

Idiomas:	Nivel:
Languages:	Proficiency level:
_____	_____
_____	_____
_____	_____
_____	_____

10. ¿Qué idiomas habla en la casa?

What languages do you speak at home?

11. ¿Usted ve televisión o escucha radio en español?

Do you watch TV in Spanish?

Sí No

Yes No

Si la respuesta es positiva, ¿cuántas horas a la semana?

If yes, specify how many hours a week.

12. ¿Usted lee en español?

Do you read in Spanish?

Sí No

Yes No

Si la respuesta es positiva, ¿cuántas horas a la semana?

If yes, speficy how many hours a week.

13. ¿Por cuántos años ha estado estudiando español?

How many years have you been studying Spanish for?

_____

14. ¿Ha estudiado un pre-grado en lengua española o literature?

Have you completed a degree in Spanish language or literature?

Sí No

Yes No

15. ¿Cuántos cursos de español ha tomado?

How many Spanish language courses have you taken?

_____

16. ¿Ha estudiado un pre-grado, maestria o doctorado en una material diferente, pero orientado en español?

Have you completed a degree in different subject but oriented in Spanish?

Sí No

Yes No

17. Si la respuesta es positive para 14 y 16, por favor provea los porcentajes para lo siguiente:

If you have answered yes to question 14 or 16, please provide a percentage for the following:

Los instructores de español que le enseñaban español u otra material en español en la universidad eran nativo-hablantes:_____%

Spanish instructors that taught you Spanish or another subject in Spanish at the university, who were native speakers of Spanish_____%

Los instructors de español que le enseñaban español u otra material en español en la Universidad que no eran native-hablantes:_____%

Spanish instructors that taught you Spanish or another subject in Spanish at the university, who were not native speakers of Spanish_____%

18. ¿Cuántas horas studio/estudia español a la semana en sus cursos de español?

How many hours a week of Spanish did/do you have in your Spanish courses?

2 horas	5 horas	10 horas	más de diez horas
2 hours	5 hours	10 hours	more than 10

IV. Uso del idioma / Language use

19. ¿Cuál idioma usa más frecuentemente?

What language do you frequently use?

Español	Japonés
Spanish	Japanese
	Horas:
Trabajo:_____	Hours:_____
work	
Estudio:_____	Horas:_____
Study	
Casa:_____	Horas:_____
House:_____	Hours:_____

20. En promedio, excluyendo cualquier curso de español, ¿cuánto tiempo pasa usted hablando en español?

On average, excluding any Spanish courses, how much time do you spend speaking in Spanish?

21. Tipicamente, ¿Cuántas horas por semana?

Typically, how many days per week?

a. 0 b. 1 c. 2 d. 3 e. 4 f. 5 g. 6 h. 7

22. ¿Cuántas horas por día?

How many hours per day?

a. 0-1 b. 1-2 c. 2-3 d. 3-4 e. 4-5 f. más de 5 / more than 5

23. En general, ¿tiene más amigos que hablen japonés o español?

In general, do you have more friends who speak Japanese or Spanish?

a. sólo japonés b. más japonés c. igual d. más español e. sólo español

only Japanese more Japanese the same more Spanish only Spanish

V. Historia familiar /Family History

24. ¿De dónde son sus padres?

Where are your parents from?

Madre Padre

Mother: _____ Father: _____

25. ¿Qué idiomas hablan sus padres?

What languages do your parents speak?

Madre Padre

Mother: _____ Father: _____

VI. Grupo Bogotá. No responda estas preguntas si no está viviendo en Bogotá.

Group Bogotá. Please, do not answer these questions if you are not living in Bogotá.

26. Si actualmente está viviendo en Bogotá, ¿Por cuánto tiempo ha vivido en Bogotá

If you are currently living in Bogotá, how long have you been living in Bogotá?

---

27. ¿A qué edad llegó a Bogotá?

At what age did you arrive in Bogotá?

_____

28. ¿Cuál de las opciones de abajo describe major sus arreglos de vivienda en Bogotá?

Which of the options below best describes your living arrangements in Bogotá?

Inicialmente.

Initially.

Vivía en una casa con una familia local, quienes en su mayoría hablaban español.

a. I lived in the home of a local family, who mostly spoke to each other Spanish.

Vivía en una residencia de estudiantes.

b. I lived in a student residence

Vivía en una habitación o apartamento con amigos de la ciudad.

c. I lived in a room or apartment with local friends

Vivía en una habitación o apartamento con otros extranjeros.

d. I lived in a room or apartment with other foreigners

Tiempo después.

Later on

Vivía en una casa con una familia local, quienes en su mayoría hablaban español.

a. I lived in the home of a local family, who mostly spoke to each other Spanish.

Vivía en una residencia de estudiantes.

b. I lived in a student residence

Vivía en una habitación o apartamento con amigos de la ciudad.

c. I lived in a room or apartment with local friends

Vivía en una habitación o apartamento con otros extranjeros.

d. I lived in a room or apartment with other foreigners

29. ¿Asistió a la escuela o Universidad en Colombia?

Did you attend school or University in Colombia?

Sí No

Yes No

Si la respuesta es positiva, ¿cuántos años?

If yes, speficy how many years.

_____

30. ¿Está usted trabajando actualmente en Bogotá?

Are you currently working in Bogotá?

Sí la respuesta es afirmativas, ¿por cuánto tiempo?

If the answer is affirmative, how long have you been living in Bogotá?

_____

31. Después de vivir en Bogotá su español ha:

After being living in Bogotá your Spanish had

a. Ha progresado poco o no ha progresado

made little or no progress

b. He aprendido algunas palabras

learnt some useful words

c. He alcanzado un nivel básico

achieved a good basic level

d. Me he vuelto bastante fluido

become pretty fluent

Ha llegado al final de este cuestionario. Si desea realizar algún comentario (observaciones relacionadas con la lengua o con el propio cuestionario), puede hacerlo en las líneas que siguen. Muchas gracias por colaborar.

You have reached the end of this questionnaire. If you want to write any comments (observations related to the language or the questionnaire), you can do it in these following lines. Thank you very much for your participation.

Appendix:

H). Placement test

Research ID Number _____

Name _____

Examen de elección múltiple

Multiple Choice Test

Cada una de las siguientes oraciones tiene un espacio en blanco que indica una palabra o frase que ha sido omitida. Selccione la palabra que complete major la oración.

Each of the following sentences contains a blank indicating that a word or phrase has been omitted. Select the choice that best completes the sentence.

1. Al oír del accidente de su buen amigo, Paco se puso _____.

a. alegre b. fatigado c. hambriento d. desconsolado

2. No puedo comprarlo porque me_____dinero.

a. falta b. dan c. presta d. regalan

3. Tuvo que guardar cama por estar _____.

a. enfermo b. vestido c. ocupado d. parado

4. Aquí está tu café, Juanito. No te quemes, que está muy _____.

a. dulce b. amargo c. agrio d. caliente

5. Al romper los anteojos, Juan se asustó porque no podía _____ sin ellos.

a. discurtir b. oír c. ver d. entender

6. ¡Pobrecita! Está resfriada y no puede _____.

a. salir de casa b. recibir cartas c. respirar con pena d. leer las noticias

7. Era una noche oscura sin _____.

a. estrellas b. camas c. lágrimas d. nubes

8. Cuando don Carlos salió de su casa, saludó a un amigo suyo: -Buenos días,___.

a. ¿Qué va? b. ¿Cómo es? c. ¿Quién es? d. ¿Qué tal?

9. ¡Qué ruido había con los gritos de los niños y el _____ de los perros!

a. olor b. sueño c. hambre d. ladrar

10. Para saber la hora, don Juan miró el _____.

a. calendario b. bolsillo c. estante d. despertador

11. Yo, que comprendo poco de mecánica, sé que el auto no puede funcionar sin _.

a. permiso b. comer c. aceite d. bocina

12. Nos dijo mamá que era hora de comer y por eso _____.

a. fuimos a nadar b. tomamos asiento c. comenzamos a fumar

d. nos acostamos pronto

13. ¡Cuidado con ese cuchillo o vas a _____ el dedo!

a. cortarte b. torcerte c. comerte d. quemarte

14. Tuvo tanto miedo de caerse que se negó a _____ con nosotros.

a. almorzar b. charlar c. cantar d. patinar

15. Abrió la ventana y miró: en efecto, grandes lenguas de _____ salían llameando de las casas.

a. zorros b. serpientes c. cuero d. fuego

16. Compró ejemplares de todos los diarios, pero en vano. No halló _____.

a. los diez centavos b. el periódico perdido c. la noticia que deseaba

d. los ejemplos

17. Por varias semanas acudieron colegas del difunto profesor a _____ el dolor de la viuda.

a. aliviar b. dulcificar c. embromar d. estorbar

18. Sus amigos pudieron haberlo salvado pero lo dejaron _____.

a. ganar b. parecer c. perecer d. acabar

19. Al salir de la misa me sentía tan caritativo que no pude menos que _____ a un pobre mendigo que había allí sentado.

a. pegarle b. darle una limosna c. echar una mirada d. maldecir

20. Al lado de la Plaza de Armas había dos limosneros pidiendo _____.

a. pedazos b. paz c. monedas d. escopetas

21. Siempre maltratado por los niños, el perro no podía acostumbrarse a _____ de sus nuevos amos.

a. las caricias b. los engaños c. las locuras d. los golpes

22. ¿Dónde estará mi cartera? La dejé aquí mismo hace poco y parece que el necio de mi hermano ha vuelto a _____.

a. dejármela b. deshacérmela c. escondérmela d. acabármela

23. Permaneció un gran rato abstraído, los ojos clavados en el fogón y el pensamiento ___ _____.

a. en el bolsillo b. en el fuego c. lleno de alboroto d. Dios sabe dónde

24. En vez de dirigir el tráfico estabas charlando, así que tú mismo _____ del choque.

a. sabes la gravedad b. eres testigo c. tuviste la culpa

d. conociste a las víctimas

25. Posee esta tierra un clima tan propio para la agricultura como para _____.

a. la construcción de trampas b. el fomento de motines c. el costo de vida

d. la cría de reses

26. Aficionado leal de obras teatrales, Juan se entristeció al saber _____ del gran actor.

a. del fallecimiento b. del éxito c. de la buena suerte d. de la alabanza

27. Se reunieron a menudo para efectuar un tratado pero no pudieron _____.

a. desavenirse b. echarlo a un lado c. rechazarlo d. llevarlo a cabo

28. Se negaron a embarcarse porque tenían miedo de _____.

a. los peces b. los naufragios c. los faros d. las playas

29. La mujer no aprobó el cambio de domicilio pues no le gustaba _____.

a. el callejeo b. el puente c. esa estación d. aquel barrio

30. Era el único que tenía algo que comer pero se negó a _____.

a. hojearlo b. ponérselo c. conservarlo d. repartirlo

Appendix:

I) Cloze Test

Cloze Test

En el siguiente texto se han reemplazado algunas de las palabras con espacios en blanco, los cuales se enumeran del 1 al 20. Primero, lea el texto completamente para entenderlo. Después, relea el texto y elija la palabra correcta para llenar el espacio en blanco en la hoja de respuestas. Marque su respuesta con un círculo en la hoja de respuestas, no llene los espacios en blanco del texto.

In the following text, some of the words have been replaced by blanks numbered 1 through 20. First, read the complete text in order to understand it. Then reread it and choose the correct word to fill each blank from the answer sheet. Mark your answers by circling your choice on the answer sheet, not by filling in the blanks in the text.

1.1 El sueño de Joan Miró

Hoy se inaugura en Palma de Mallorca la Fundación y Joan Miró, en el mismo lugar en donde el artista vivió sus últimos treinta y cinco años. El sueño de Joan Miró se ha _____ (1). Los fondos donados a la ciudad por el pintor y su esposa en 1981 permitieron que el sueño se _____(2); más tarde, en 1986, el

Ayuntamiento de Palma de Mallorca decidió _____(3) al arquitecto Rafael Moneo un edificio que _____(4) a la vez como sede de la entidad y como museo moderno. El proyecto ha tenido que _____(5) múltiples obstáculos de carácter administrativo. Miró, coincidiendo _____(6) los deseos de toda su familia, quiso que su obra no quedara expuesta en ampulosos panteones de arte o en _____(7) de coleccionistas acaudalados; por ello, en 1981, creó la fundación mallorquina. Y cuando estaba _____(8) punto de morir, donó terrenos y edificios, así como las obras de arte que en ellos _____(9).

El edificio que ha construido Rafael Moneo se enmarca en _____(10) se denomina "Territorio Miró", espacio en el que se han _____(11) de situar los distintos edificios que constituyen la herencia del pintor.

El acceso a los mismos quedará _____ (12) para evitar el deterioro de las obras. Por otra parte, se _____(13), en los talleres de grabado y litografía, cursos _____(14) las distintas técnicas de estampación. Estos talleres también se cederán periódicamente a distintos artistas contemporáneos,

_____(15) se busca que el "Territorio Miró" _____(16) un centro vivo de creación y difusión del arte a todos los _____(17).

La entrada costará 500 pesetas y las previsiones dadas a conocer ayer aspiran

_____(18) que el centro acoja a unos 150.000 visitantes al año. Los responsables esperan que la institución funcione a _____(19) rendimiento a principios de la _____ (20) semana, si bien el catálogo completo de las obras de la Fundación Pilar y Joan Miró no estará listo hasta dentro de dos años.

Hoja de respuestas Cloze Test

Cloze Test Answer Sheet

1.	a. cumplido	b. completado	c. terminado
2.	a. inició	b. iniciara	c. iniciaba
3.	a. encargar	b. pedir	c. mandar
4.	a. hubiera servido	b. haya servido	c. sirviera
5.	a. superar	b. enfrentarse	c. acabar
6.	a. por	b. en	c. con
7.	a. voluntad	b. poder	c. favor
8.	a. al	b. en	c. a

9. a. habría b. había c. hubo

10. a. que b. el que c. lo que

11. a. pretendido b. tratado c. intentado

12. a. disminuido b. escaso c. restringido

13. a. tomarán b. enseñarán c. dirán

14. a. sobre b. en c. para

15. a. ya b. así c. para

16. a. será b. sea c. es

17. a. casos b. aspectos c. niveles

18. a. a b. de c. para

19. a. total b. pleno c. entero

20. a. siguiente b. próxima c. pasada

J) Answer Sheet for Cloze Test and Multiple Choice Test

Answer Key: Multiple Choice Test

1. d	11. c	21. a
2. a	12. b	22. c
3. a	13. a	23. d
4. d	14. d	24. c
5. c	15. d	25. d
6. a	16. c	26. a
7. a	17. a	27. d
8. d	18. c	28. b
9. d	19. b	29. d
10. d	20. c	30. d

Answer Key: Cloze Test

1. a	8. c	15. b
2. b	9. b	16. b
3. a	10. c	17. c
4. c	11. b	18. a
5. a	12. c	19. b
6. c	13. b	20. b
7. b	14. a	

Total points possible : 50

Advanced	40 to 50
Intermediate	30 to 49
Low	0 to 29

Appendix:

K) Spanish Proficiency judgement

Reading aloud test

Por favor, lea el siguiente texto en voz alta.

Please read the following short text aloud.

Charlaban un día el Viento y el Sol cuando vieron pasar un hombre envuelto en una capa. El Viento se echó a reír.

—Se abraza a su capa como si fuera a perderla. No sabe que con solo soplar un poco se la arrancaría.

El Sol, entonces, le propuso ver quién de los dos podía quitarle la capa. El Viento comenzó a soplar. Pero, cuanto más fuerte lo hacía, más se envolvía el hombre con la capa. Fue inútil la furia con que soplara, no consiguió que la capa volara. Al fin dejó su turno al Sol. Este se abrió paso entre las nubes y comenzó a entibiar la tierra. El viajero soltó un poco la capa. El Sol comenzó a acariciarlo con sus rayos, el hombre anduvo un poco y luego se sacó la capa y la colgó en su brazo.

ESOPO

Appendix:

L)Spanish Proficiency judgement

We would like to ask you to help us by judging the following audios concerning the proficiency level of Spanish of two groups of Japanese speakers. This is not a test so there is no "right" or "wrong" answer and you do not even have to write your name on it. We are interested in your judgement about the Spanish proficiency level of 40 Japanese speakers. Please give your answers sincerely as only this will guarantee the success of the following investigation. Thank you very much for your help!

1. In the following section please judge the proficiency level of the Japanese speakers based on the recordings you will listen to by simply giving marks from 1 to 5.

5= very 4= quite a lot 3= so-so 2 = not really 1= not at all

For example, if you consider Japanese speakers on audios 1, 2, and 3 do not sound very advanced, not really advanced, and not at all advanced in their Spanish production; please encircle the following numbers:

Audio 1	5	4	3	2	1
Audio 2	5	4	3	2	1
Audio 3	5	4	3	2	1

Please listen to the audios and encircle one (and only one) number for each item, and please do not leave out any of them. Thank you for your help.

Japan group Tokyo

Audio 1	5	4	3	2	1
Audio 2	5	4	3	2	1
Audio 3	5	4	3	2	1
Audio 4	5	4	3	2	1
Audio 5	5	4	3	2	1
Audio 6	5	4	3	2	1
Audio 7	5	4	3	2	1
Audio 8	5	4	3	2	1
Audio 9	5	4	3	2	1
Audio 10	5	4	3	2	1
Audio 11	5	4	3	2	1
Audio 12	5	4	3	2	1

Audio 13	5	4	3	2	1

Audio 14	5	4	3	2	1
Audio 15	5	4	3	2	1
Audio 16	5	4	3	2	1
Audio 17	5	4	3	2	1
Audio 18	5	4	3	2	1
Audio 19	5	4	3	2	1
Audio 20	5	4	3	2	1

Please listen to the audios and encircle one (and only one) number for each item, and please do not leave out any of them. Thank you for your help.

Japan group Bogota

Audio 1	5	4	3	2	1
Audio 2	5	4	3	2	1
Audio 3	5	4	3	2	1
Audio 4	5	4	3	2	1

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

Appendix:

M)Tables for Stress Identification Task with nonce words

Table 15. Stress identification task: target stimuli for participants (nonce words words)

1. Context 1: Target word in isolation

nábido

a. nábido b. nabido c. nabidó

1. Context 2: Target word in final position of yes/no question

¿él dijo nábido?

a. nábido b. nabido c. nabidó

1. Context 3: Target word in final position of exclamation

¡él dijo nábido!

a. nábido b. nabido c. nabidó

1. Context 4: Target word in non-final position of yes/no question.

¿él dijo nábido ayer?

b. nábido b. nabido c. nabidó

1. Context 5: Target word in non-final position of exclamation

¡él dijo nábido ayer!

c. nábido b. nabido c. nabidó

2. Context 1: Target word in isolation

típimo

a. típimo b. tipimo c. tipimó

2. Context 2: Target word in final position of yes/no question

¿él dijo típimo?

a. típimo b. tipimo c. tipimó

2. Context 3: Target word in final position of exclamation

¡él dijo típimo!

a. típimo b. tipimo c. tipimó

2. Context 4: Target word in non-final position of yes/no question

¿él dijo típimo ayer?

a. típimo b. tipimo c. tipimó

2. Context 5: Target word in non-final position of exclamation

¡él dijo típimo ayer!

a. típimo b. tipimo c. tipimó

3. Context 1: Target word in isolation

nabido

a. nábido b. nabido c. nabidó

3. Context 2: Target word in final position of yes/no question

¿él dijo nabido?

a. nábido b. nabido c. nabidó

3. Context 3: Target word in final position of exclamation

¡él dijo nabido!

d. nábido b. nabido c. nabidó

3. Context 4: Target word in non-final position of yes/no question.

¿él dijo nabido ayer?

a. nábido b. nabido c. nabidó

3. Context 5: Target word in non-final position of exclamation

¡él dijo nabido ayer!

a. nábido b. nabido c. nabidó

4. Context 1: Target word in isolation

neticó

a. nético b. netico c. neticó

4. Context 2: Target word in final position of yes/no question

¿él dijo neticó?

a. nético b. netico c. neticó

4. Context 3: Target word in final position of exclamation

¡él dijo neticó!

a. nético b. netico c. neticó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo neticó ayer?

a. nético b. netico c. neticó

4. Context 5: Target word in non-final position of exclamation

¡él dijo neticó ayer!

a. nético b. netico c. neticó

5. Context 1: Target word in isolation

tanimó

a. tánimo b tanimo c. tanimó

5. Context 2: Target word in final position of yes/no question

¿él dijo tanimó?

a. tánimo b tanimo c. tanimó

5. Context 3: Target word in final position of exclamation

¡él dijo tanimó!

a. tánimo b tanimo c. tanimó

5. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimó ayer?

a. tánimo b tanimo c. tanimó

5. Context 5: Target word in non-final position of exclamation

¡él dijo tanimó ayer!

a. tánimo b tanimo c. tanimó

6. Context 1: Target word in isolation

tipimo

a. típimo b. tipimo c. tipimó

6.Context 2: Target word in final position of yes/no question

¿él dijo tipimo?

a.típimo b. tipimo c. tipimó

6.Context 3: Target word in final position of exclamation

¡él dijo tipimo!

a. típimo b. tipimo c. tipimó

6.Context 4: Target word in non-final position of yes/no question

¿él dijo tipimo ayer?

a.típimo b. tipimo c. tipimó

6.Context 5: Target word in non-final position of exclamation

¡él dijo tipimo ayer!

a. típimo b. tipimo c. tipimó

7. Context 1: Target word in isolation

madino

a. mádino b. madino c. madinó

7. Context 2: Target word in final position of yes/no question

¿él dijo madino?

a. mádino b. madino c. madinó

7. Context 3: Target word in final position of exclamation

¡él dijo madino!

a. mádino b. madino c. madinó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo madino ayer?

a. mádino b. medino c. madinó

7. Context 5: Target word in non-final position of exclamation

¡él dijo madino ayer!

a. mádino b. madino c. madinó

8. Context 1: Target word in isolation

nabidó

a. nábido b. nabido c. nabidó

8. Context 2: Target word in final position of yes/no question

¿él dijo nabidó?

a. nábido b. nabido c. nabidó

8. Context 3: Target word in final position of exclamation

¡él dijo nabidó!

a. nábido b. nabido c. nabidó

8. Context 4: Target word in non-final position of yes/no question

¿él dijo nabidó ayer?

a. nábido b. nabido c. nabidó

8. Context 5: Target word in non-final position of exclamation

¡él dijo nabidó ayer!

a. nábido b. nabido c. nabidó

9. Context 1: Target word in isolation

tipimó

a. típimo b. tipimo c. tipimó

9. Context 2: Target word in final position of yes/no question

¿él dijo tipimó?

a. típimo b. tipimo c. tipimó

9. Context 3: Target word in final position of exclamation

¡él dijo tipimó!

a. típimo b. tipimo c. tipimó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo tipimó ayer?

a. típimo b. tipimo c. tipimó

9. Context 5: Target word in non-final position of exclamation

¡él dijo tipimó ayer!

a. típimo b. tipimo c. tipimó

10. Context 1: Target word in isolation

netico

a. nético b. netico c. neticó

10. Context 2: Target word in final position of yes/no question

¿él dijo netico?

a. nético b. netico c. neticó

10. Context 3: Target word in final position of exclamation

¡él dijo netico!

a. nético b. netico c. neticó

10. Context 4: Target word in non-final position of yes/no question

¿él dijo netico ayer?

a. nético b. netico c. neticó

10. Context 5: Target word in non-final position of exclamation

¡él dijo netico ayer!

a. nético b. netico c. neticó

11. Context 1: Target word in isolation

madinó

a. mádino b. medino c. madinó

11. Context 2: Target word in final position of yes/no question

¿él dijo madinó?

a. mádino b. medino c. madinó

11. Context 3: Target word in final position of exclamation

¡él dijo madinó!

a. mádino b. medino c. madinó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo madinó ayer?

a. mádino b. medino c. madinó

11. Context 5: Target word in non-final position of exclamation

¡él dijo madinó ayer!

a. mádino b. medino c. madinó

12. Context 1: Target word in isolation

tanimo

a. tánimo b tanimo c. tanimó

12. Context 2: Target word in final position of yes/no question

¿él dijo tanimo?

a. tánimo b tanimo c. tanimó

12. Context 3: Target word in final position of exclamation

¡él dijo tanimo!

a. tánimo b tanimo c. tanimó

12. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimo ayer?

a. tánimo b tanimo c. tanimó

12. Context 5: Target word in non-final position of exclamation

¡él dijo tanimo ayer!

a. tánimo b tanimo c. tanimó

13. Context 1: Target word in isolation

nético

a. nético b. netico c. neticó

13. Context 2: Target word in final position of yes/no question

¿él dijo nético?

a. nético b. netico c. neticó

13. Context 3: Target word in final position of exclamation

¡él dijo nético!

a. nético b. netico c. neticó

13. Context 4: Target word in non-final position of yes/no question

¿él dijo nético ayer?

a. nético b. netico c. neticó

13. Context 5: Target word in non-final position of exclamation

¡él dijo nético ayer?

a. nético b. netico c. neticó

14. Context 1: Target word in isolation

mádino

a. mádino b. madino c. madinó

14. Context 2: Target word in final position of yes/no question

¿él dijo mádino?

a. mádino b. madino c. madinó

14. Context 3: Target word in final position of exclamation

¡él dijo mádino!

a. mádino b. madino c. madinó

14. Context 4: Target word in non-final position of yes/no question

¿él dijo mádino ayer?

a. mádino b. madino c. madinó

14. Context 5: Target word in non-final position of exclamation

¡él dijo mádinobayer!

a. mádino b. madino c. madinó

15. Context 1: Target word in isolation

tánimo

a. tánimo b tanimo c. tanimó

15. Context 2: Target word in final position of yes/no question

¿él dijo tánimo?

a. tánimo b tanimo c. tanimó

15. Context 3: Target word in final position of exclamation

¡él dijo tánimo!

a. tánimo b tanimo c. tanimó

15. Context 4: Target word in non-final position of yes/no question

¿él dijo tánimo ayer?

a. tánimo b tanimo c. tanimó

15. Context 5: Target word in non-final position of exclamation

¡él dijo tánimo ayer!

a. tánimo b tanimo c. tanimó

Table 16. Stress identification task: target stimuli for participants (nonce words)

1. Context 1: Target word in isolation

tanimó

a. tánimo b tanimo c. tanimó

1. Context 2: Target word in final position of yes/no question

¿él dijo tanimó?

a. tánimo b tanimo c. tanimó

1. Context 3: Target word in final position of exclamation

¡él dijo tanimó!

a. tánimo b tanimo c. tanimó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimó ayer?

a. tánimo b tanimo c. tanimó

1. Context 5: Target word in non-final position of exclamation

¡él dijo tanimó ayer!

a. tánimo b tanimo c. tanimó

2. Context 1: Target word in isolation

neticó

a. nético b. netico c. neticó

2. Context 2: Target word in final position of yes/no question

¿él dijo neticó?

a. nético b. netico c. neticó

2. Context 3: Target word in final position of exclamation

¡él dijo neticó!

a. nético b. netico c. neticó

2. Context 4: Target word in non-final position of yes/no question

¿él dijo neticó ayer?

a. nético b. netico c. neticó

2. Context 5: Target word in non-final position of exclamation

¡él dijo neticó ayer!

a. nético b. netico c. neticó

3. Context 1: Target word in isolation

nabido

a. nábido b. nabido c. nabidó

3. Context 2: Target word in final position of yes/no question

¿él dijo nabido?

a. nábido b. nabido c. nabidó

3. Context 3: Target word in final position of exclamation

¡él dijo nabido!

e. nábido b. nabido c. nabidó

3. Context 4: Target word in non-final position of yes/no question.

¿él dijo nabido ayer?

b. nábido b. nabido c. nabidó

3. Context 5: Target word in non-final position of exclamation

¡él dijo nabido ayer!

b. nábido b. nabido c. nabidó

4. Context 1: Target word in isolation

típimo

a. típimo b. tipimo c. tipimó

4. Context 2: Target word in final position of yes/no question

¿él dijo típimo?

b. típimo b. tipimo c. tipimó

4. Context 3: Target word in final position of exclamation

¡él dijo típimo!

a. típimo b. tipimo c. tipimó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo típimo ayer?

a. típimo b. tipimo c. tipimó

4. Context 5: Target word in non-final position of exclamation

¡él dijo típimo ayer!

a. típimo b. tipimo c. tipimó

5. Context 1: Target word in isolation

nábido

a. nábido b. nabido c. nabidó

5. Context 2: Target word in final position of yes/no question

¿él dijo nábido?

a. nábido b. nabido c. nabidó

5. Context 3: Target word in final position of exclamation

¡él dijo nábido!

a. nábido b. nabido c. nabidó

5. Context 4: Target word in non-final position of yes/no question.

¿él dijo nábido ayer?

b. nábido b. nabido c. nabidó

5. Context 5: Target word in non-final position of exclamation

¡él dijo nábido ayer!

nábido b. nabido c. nabidó

6. Context 1: Target word in isolation

tipimo

a. típimo b. tipimo c. tipimó

6.Context 2: Target word in final position of yes/no question

¿él dijo tipimo?

a.típimo b. tipimo c. tipimó

6.Context 3: Target word in final position of exclamation

¡él dijo tipimo!

a. típimo b. tipimo c. tipimó

6.Context 4: Target word in non-final position of yes/no question

¿él dijo tipimo ayer?

a.típimo b. tipimo c. tipimó

6.Context 5: Target word in non-final position of exclamation

¡él dijo tipimo ayer!

a. típimo b. tipimo c. tipimó

7. Context 1: Target word in isolation

tipimó

a. típimo b. tipimo c. tipimó

7. Context 2: Target word in final position of yes/no question

¿él dijo tipimó?

a. típimo b. tipimo c. tipimó

7. Context 3: Target word in final position of exclamation

¡él dijo tipimó!

a. típimo b. tipimo c. tipimó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo tipimó ayer?

a. típimo b. tipimo c. tipimó

7. Context 5: Target word in non-final position of exclamation

¡él dijo tipimó ayer!

a. típimo b. tipimo c. tipimó

8. Context 1: Target word in isolation

nabidó

a. nábido b. nabido c. nabidó

8. Context 2: Target word in final position of yes/no question

¿él dijo nabidó?

a. nábido b. nabido c. nabidó

8. Context 3: Target word in final position of exclamation

¡él dijo nabidó!

a. nábido b. nabido c. nabidó

8. Context 4: Target word in non-final position of yes/no question

¿él dijo nabidó ayer?

a. nábido b. nabido c. nabidó

8. Context 5: Target word in non-final position of exclamation

¡él dijo nabidó ayer!

a. nábido b. nabido c. nabidó

9. Context 1: Target word in isolation

madino

a. mádino b. madino c. madinó

9. Context 2: Target word in final position of yes/no question

¿él dijo madino?

a. mádino b. madino c. madinó

9. Context 3: Target word in final position of exclamation

¡él dijo madino!

a. mádino b. madino c. madinó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo madino ayer?

a. mádino b. medino c. madinó

9. Context 5: Target word in non-final position of exclamation

¡él dijo madino ayer!

a. mádino b. madino c. madinó

10. Context 1: Target word in isolation

netico

a. nético b. netico c. neticó

10. Context 2: Target word in final position of yes/no question

¿él dijo netico?

a. nético b. netico c. neticó

10. Context 3: Target word in final position of exclamation

¡él dijo netico!

a. nético b. netico c. neticó

10. Context 4: Target word in non-final position of yes/no question

¿él dijo netico ayer?

a. nético b. netico c. neticó

10. Context 5: Target word in non-final position of exclamation

¡él dijo netico ayer!

a. nético b. netico c. neticó

11. Context 1: Target word in isolation

tánimo

a. tánimo b tanimo c. tanimó

11. Context 2: Target word in final position of yes/no question

¿él dijo tánimo?

a. tánimo b tanimo c. tanimó

11. Context 3: Target word in final position of exclamation

¡él dijo tánimo!

a. tánimo b tanimo c. tanimó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo tánimo ayer?

a. tánimo b tanimo c. tanimó

11. Context 5: Target word in non-final position of exclamation

¡él dijo tánimo ayer!

a. tánimo b tanimo c. tanimó

12. Context 1: Target word in isolation

nético

a. nético b. netico c. neticó

12. Context 2: Target word in final position of yes/no question

¿él dijo nético?

a. nético b. netico c. neticó

12. Context 3: Target word in final position of exclamation

¡él dijo nético!

a. nético b. netico c. neticó

12. Context 4: Target word in non-final position of yes/no question

¿él dijo nético ayer?

a. nético b. netico c. neticó

12. Context 5: Target word in non-final position of exclamation

¡él dijo nético ayer?

a. nético b. netico c. neticó

13. Context 1: Target word in isolation

mádino

a. mádino b. madino c. madinó

13. Context 2: Target word in final position of yes/no question

¿él dijo mádino?

a. mádino b. madino c. madinó

13. Context 3: Target word in final position of exclamation

¡él dijo mádino!

a. mádino b. madino c. madinó

13. Context 4: Target word in non-final position of yes/no question

¿él dijo mádino ayer?

a. mádino b. madino c. madinó

13. Context 5: Target word in non-final position of exclamation

¡él dijo mádinobayer!

a. mádino b. madino c. madinó

a. tánimo b tanimo c. tanimó

14. Context 1: Target word in isolation

tanimo

a. tánimo b tanimo c. tanimó

14. Context 2: Target word in final position of yes/no question

¿él dijo tanimo?

a. tánimo b tanimo c. tanimó

14. Context 3: Target word in final position of exclamation

¡él dijo tanimo!

a. tánimo b tanimo c. tanimó

14. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimo ayer?

a. tánimo b tanimo c. tanimó

14. Context 5: Target word in non-final position of exclamation

¡él dijo tanimo ayer!

15. Context 1: Target word in isolation

madinó

a. mádino b. medino c. madinó

15. Context 2: Target word in final position of yes/no question

¿él dijo madinó?

a. mádino b. madino c. madinó

15. Context 3: Target word in final position of exclamation

¡él dijo madinó!

a. mádino b. madino c. madinó

15. Context 4: Target word in non-final position of yes/no question

¿él dijo madinó ayer?

a. mádino b. madino c. madinó

15. Context 5: Target word in non-final position of exclamation

¡él dijo madinó ayer!

a. mádino b. madino c. madinó

Table 17: Stress identification task: target stimuli for participants (nonce words)

1. Context 1: Target word in isolation

madinó

a. mádino b. medino c. madinó

1. Context 2: Target word in final position of yes/no question

¿él dijo madinó?

a. mádino b. madino c. madinó

1. Context 3: Target word in final position of exclamation

¡él dijo madinó!

a. mádino b. madino c. madinó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo madinó ayer?

a. mádino b. madino c. madinó

1. Context 5: Target word in non-final position of exclamation

¡él dijo madinó ayer!

a. mádino b. madino c. madinó
2. Context 1: Target word in isolation tipimó a. típimo b. tipimo c. tipimó 2. Context 2: Target word in final position of yes/no question ¿él dijo tipimó? a. típimo b. tipimo c. tipimó 2. Context 3: Target word in final position of exclamation ¡él dijo tipimó! a. típimo b. tipimo c. tipimó 2. Context 4: Target word in non-final position of yes/no question ¿él dijo tipimó ayer? a. típimo b. tipimo c. tipimó 2. Context 5: Target word in non-final position of exclamation ¡él dijo tipimó ayer! a. típimo b. tipimo c. tipimó

3. Context 1: Target word in isolation

nabido

a. nábido b. nabido c. nabidó

3. Context 2: Target word in final position of yes/no question

¿él dijo nabido?

a. nábido b. nabido c. nabidó

3. Context 3: Target word in final position of exclamation

¡él dijo nabido!

f. nábido b. nabido c. nabidó

3. Context 4: Target word in non-final position of yes/no question.

¿él dijo nabido ayer?

c. nábido b. nabido c. nabidó

3. Context 5: Target word in non-final position of exclamation

¡él dijo nabido ayer!

c. nábido b. nabido c. nabidó

4. Context 1: Target word in isolation

típimo

a. típimo b. tipimo c. tipimó

4. Context 2: Target word in final position of yes/no question

¿él dijo típimo?

c. típimo b. tipimo c. tipimó

4. Context 3: Target word in final position of exclamation

¡él dijo típimo!

a. típimo b. tipimo c. tipimó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo típimo ayer?

a. típimo b. tipimo c. tipimó

4. Context 5: Target word in non-final position of exclamation

¡él dijo típimo ayer!

a. típimo b. tipimo c. tipimó

5. Context 1: Target word in isolation

nábido

a. nábido b. nabido c. nabidó

5. Context 2: Target word in final position of yes/no question

¿él dijo nábido?

a. nábido b. nabido c. nabidó

5. Context 3: Target word in final position of exclamation

¡él dijo nábido!

c. nábido b. nabido c. nabidó

5. Context 4: Target word in non-final position of yes/no question.

¿él dijo nábido ayer?

d. nábido b. nabido c. nabidó

5. Context 5: Target word in non-final position of exclamation

¡él dijo nábido ayer!

nábido b. nabido c. nabidó

6. Context 1: Target word in isolation

madino

a. mádino b. madino c. madinó

6. Context 2: Target word in final position of yes/no question

¿él dijo madino?

a. mádino b. madino c. madinó

6. Context 3: Target word in final position of exclamation

¡él dijo madino!

a. mádino b. madino c. madinó

6. Context 4: Target word in non-final position of yes/no question

¿él dijo madino ayer?

a. mádino b. medino c. madinó

6. Context 5: Target word in non-final position of exclamation

¡él dijo madino ayer!

a. mádino b. madino c. madinó

7. Context 1: Target word in isolation

neticó

a. nético b. netico c. neticó

7. Context 2: Target word in final position of yes/no question

¿él dijo neticó?

a. nético b. netico c. neticó

7. Context 3: Target word in final position of exclamation

¡él dijo neticó!

a. nético b. netico c. neticó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo neticó ayer?

a. nético b. netico c. neticó

7. Context 5: Target word in non-final position of exclamation

¡él dijo neticó ayer!

a. nético b. netico c. neticó

8. Context 1: Target word in isolation

nabidó

a. nábido b. nabido c. nabidó

8. Context 2: Target word in final position of yes/no question

¿él dijo nabidó?

a. nábido b. nabido c. nabidó

8. Context 3: Target word in final position of exclamation

¡él dijo nabidó!

a. nábido b. nabido c. nabidó

8. Context 4: Target word in non-final position of yes/no question

¿él dijo nabidó ayer?

a. nábido b. nabido c. nabidó

8. Context 5: Target word in non-final position of exclamation

¡él dijo nabidó ayer!

a. nábido b. nabido c. nabidó

9. Context 1: Target word in isolation

tanimo

a. tánimo b tanimo c. tanimó

9. Context 2: Target word in final position of yes/no question

¿él dijo tanimo?

a. tánimo b tanimo c. tanimó

9. Context 3: Target word in final position of exclamation

¡él dijo tanimo!

a. tánimo b tanimo c. tanimó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimo ayer?

a. tánimo b tanimo c. tanimó

9. Context 5: Target word in non-final position of exclamation

¡él dijo tanimo ayer!

10. Context 1: Target word in isolation

netico

a. nético b. netico c. neticó

10. Context 2: Target word in final position of yes/no question

¿él dijo netico?

a. nético b. netico c. neticó

10. Context 3: Target word in final position of exclamation

¡él dijo netico!

a. nético b. netico c. neticó

10. Context 4: Target word in non-final position of yes/no question

¿él dijo netico ayer?

a. nético b. netico c. neticó

10. Context 5: Target word in non-final position of exclamation

¡él dijo netico ayer!

a. nético b. netico c. neticó

11. Context 1: Target word in isolation

tánimo

a. tánimo b tanimo c. tanimó

11. Context 2: Target word in final position of yes/no question

¿él dijo tánimo?

a. tánimo b tanimo c. tanimó

11. Context 3: Target word in final position of exclamation

¡él dijo tánimo!

a. tánimo b tanimo c. tanimó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo tánimo ayer?

a. tánimo b tanimo c. tanimó

11. Context 5: Target word in non-final position of exclamation

¡él dijo tánimo ayer!

a. tánimo b tanimo c. tanimó

12. Context 1: Target word in isolation

tipimo

a. típimo b. tipimo c. tipimó

12.Context 2: Target word in final position of yes/no question

¿él dijo tipimo?

a.típimo b. tipimo c. tipimó

12.Context 3: Target word in final position of exclamation

¡él dijo tipimo!

a. típimo b. tipimo c. tipimó

12.Context 4: Target word in non-final position of yes/no question

¿él dijo tipimo ayer?

a.típimo b. tipimo c. tipimó

12.Context 5: Target word in non-final position of exclamation

¡él dijo tipimo ayer!

a. típimo b. tipimo c. tipimó

13. Context 1: Target word in isolation

mádino

a. mádino b. madino c. madinó

13. Context 2: Target word in final position of yes/no question

¿él dijo mádino?

a. mádino b. madino c. madinó

13. Context 3: Target word in final position of exclamation

¡él dijo mádino!

a. mádino b. madino c. madinó

13. Context 4: Target word in non-final position of yes/no question

¿él dijo mádino ayer?

a. mádino b. madino c. madinó

13. Context 5: Target word in non-final position of exclamation

¡él dijo mádinobayer!

a. mádino b. madino c. madinó

a. tánimo b tanimo c. tanimó

14. Context 1: Target word in isolation

nético

a. nético b. netico c. neticó

14. Context 2: Target word in final position of yes/no question

¿él dijo nético?

a. nético b. netico c. neticó

14. Context 3: Target word in final position of exclamation

¡él dijo nético!

a. nético b. netico c. neticó

14. Context 4: Target word in non-final position of yes/no question

¿él dijo nético ayer?

a. nético b. netico c. neticó

14. Context 5: Target word in non-final position of exclamation

¡él dijo nético ayer?

a. nético b. netico c. neticó

15. Context 1: Target word in isolation

tanimó

a. tánimo b tanimo c. tanimó

15. Context 2: Target word in final position of yes/no question

¿él dijo tanimó?

a. tánimo b tanimo c. tanimó

15. Context 3: Target word in final position of exclamation

¡él dijo tanimó!

a. tánimo b tanimo c. tanimó

15. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimó ayer?

a. tánimo b tanimo c. tanimó

15. Context 5: Target word in non-final position of exclamation

¡él dijo tanimó ayer!

a. tánimo b tanimo c. tanimó

Table 18: Stress identification task: target stimuli for participants (nonce words)

1. Context 1: Target word in isolation

típimo

a. típimo b. tipimo c. tipimó

1. Context 2: Target word in final position of yes/no question

¿él dijo típimo?

d. típimo b. tipimo c. tipimó

1. Context 3: Target word in final position of exclamation

¡él dijo típimo!

a. típimo b. tipimo c. tipimó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo típimo ayer?

a. típimo b. tipimo c. tipimó

1. Context 5: Target word in non-final position of exclamation

¡él dijo típimo ayer!

a. típimo b. tipimo c. tipimó

2. Context 1: Target word in isolation tanimo a. tánimo b tanimo c. tanimó 2. Context 2: Target word in final position of yes/no question ¿él dijo tanimo? a. tánimo b tanimo c. tanimó 2. Context 3: Target word in final position of exclamation ¡él dijo tanimo! a. tánimo b tanimo c. tanimó 2. Context 4: Target word in non-final position of yes/no question ¿él dijo tanimo ayer? a. tánimo b tanimo c. tanimó 2. Context 5: Target word in non-final position of exclamation ¡él dijo tanimo ayer!
3. Context 1: Target word in isolation netico a. nético b. netico c. neticó 3. Context 2: Target word in final position of yes/no question ¿él dijo netico?

a. nético b. netico c. neticó

3. Context 3: Target word in final position of exclamation

¡él dijo netico!

a. nético b. netico c. neticó

3. Context 4: Target word in non-final position of yes/no question

¿él dijo netico ayer?

a. nético b. netico c. neticó

3. Context 5: Target word in non-final position of exclamation

¡él dijo netico ayer!

a. nético b. netico c. neticó

4. Context 1: Target word in isolation

madinó

a. mádino b. medino c. madinó

4. Context 2: Target word in final position of yes/no question

¿él dijo madinó?

a. mádino b. madino c. madinó

4. Context 3: Target word in final position of exclamation

¡él dijo madinó!

a. mádino b. madino c. madinó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo madinó ayer?

a. mádino b. madino c. madinó

4. Context 5: Target word in non-final position of exclamation

¡él dijo madinó ayer!

a. mádino b. madino c. madinó

5. Context 1: Target word in isolation

nábido

a. nábido b. nabido c. nabidó

5. Context 2: Target word in final position of yes/no question

¿él dijo nábido?

a. nábido b. nabido c. nabidó

5. Context 3: Target word in final position of exclamation

¡él dijo nábido!

e. nábido b. nabido c. nabidó

5. Context 4: Target word in non-final position of yes/no question.

¿él dijo nábido ayer?

a. nábido b. nabido c. nabidó

5. Context 5: Target word in non-final position of exclamation

¡él dijo nábido ayer!

nábido b. nabido c. nabidó

6. Context 1: Target word in isolation

tanimó

a. tánimo b tanimo c. tanimó

6. Context 2: Target word in final position of yes/no question

¿él dijo tanimó?

a. tánimo b tanimo c. tanimó

6. Context 3: Target word in final position of exclamation

¡él dijo tanimó!

a. tánimo b tanimo c. tanimó

6. Context 4: Target word in non-final position of yes/no question

¿él dijo tanimó ayer?

a. tánimo b tanimo c. tanimó

6. Context 5: Target word in non-final position of exclamation

¡él dijo tanimó ayer!

a. tánimo b tanimo c. tanimó

7. Context 1: Target word in isolation neticó a. nético b. netico c. neticó 7. Context 2: Target word in final position of yes/no question ¿él dijo neticó? a. nético b. netico c. neticó 7. Context 3: Target word in final position of exclamation ¡él dijo neticó! a. nético b. netico c. neticó 7. Context 4: Target word in non-final position of yes/no question ¿él dijo neticó ayer? a. nético b. netico c. neticó 7. Context 5: Target word in non-final position of exclamation ¡él dijo neticó ayer! a. nético b. netico c. neticó
8. Context 1: Target word in isolation nabidó a. nábido b. nabido c. nabidó 8. Context 2: Target word in final position of yes/no question

¿él dijo nabidó?

a. nábido b. nabido c. nabidó

8. Context 3: Target word in final position of exclamation

¡él dijo nabidó!

a. nábido b. nabido c. nabidó

8. Context 4: Target word in non-final position of yes/no question

¿él dijo nabidó ayer?

a. nábido b. nabido c. nabidó

8. Context 5: Target word in non-final position of exclamation

¡él dijo nabidó ayer!

a. nábido b. nabido c. nabidó

9. Context 1: Target word in isolation

tipimó

a. típimo b. tipimo c. tipimó

9. Context 2: Target word in final position of yes/no question

¿él dijo tipimó?

a. típimo b. tipimo c. tipimó

9. Context 3: Target word in final position of exclamation

¡él dijo tipimó!

a. típimo b. tipimo c. tipimó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo tipimó ayer?

a. típimo b. tipimo c. tipimó

9. Context 5: Target word in non-final position of exclamation

¡él dijo tipimó ayer!

a. típimo b. tipimo c. tipimó

10. Context 1: Target word in isolation

madino

a. mádino b. madino c. madinó

10. Context 2: Target word in final position of yes/no question

¿él dijo madino?

a. mádino b. madino c. madinó

10. Context 3: Target word in final position of exclamation

¡él dijo madino!

a. mádino b. madino c. madinó

10. Context 4: Target word in non-final position of yes/no question

¿él dijo madino ayer?

a. mádino b. medino c. madinó

10. Context 5: Target word in non-final position of exclamation

¡él dijo madino ayer!

a. mádino b. madino c. madinó

11. Context 1: Target word in isolation

tánimo

a. tánimo b tanimo c. tanimó

11. Context 2: Target word in final position of yes/no question

¿él dijo tánimo?

a. tánimo b tanimo c. tanimó

11. Context 3: Target word in final position of exclamation

¡él dijo tánimo!

a. tánimo b tanimo c. tanimó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo tánimo ayer?

a. tánimo b tanimo c. tanimó

11. Context 5: Target word in non-final position of exclamation

¡él dijo tánimo ayer!

a. tánimo b tanimo c. tanimó

12. Context 1: Target word in isolation

nético

a. nético b. netico c. neticó

12. Context 2: Target word in final position of yes/no question

¿él dijo nético?

a. nético b. netico c. neticó

12. Context 3: Target word in final position of exclamation

¡él dijo nético!

a. nético b. netico c. neticó

12. Context 4: Target word in non-final position of yes/no question

¿él dijo nético ayer?

a. nético b. netico c. neticó

12. Context 5: Target word in non-final position of exclamation

¡él dijo nético ayer?

a. nético b. netico c. neticó

13. Context 1: Target word in isolation

mádino

a. mádino b. madino c. madinó

13. Context 2: Target word in final position of yes/no question

¿él dijo mádino?

a. mádino b. madino c. madinó

13. Context 3: Target word in final position of exclamation

¡él dijo mádino!

a. mádino b. madino c. madinó

13. Context 4: Target word in non-final position of yes/no question

¿él dijo mádino ayer?

a. mádino b. madino c. madinó

13. Context 5: Target word in non-final position of exclamation

¡él dijo mádinobayer!

a. mádino b. madino c. madinó

a. tánimo b tanimo c. tanimó

14. Context 1: Target word in isolation

tipimo

a. típimo b. tipimo c. tipimó

14.Context 2: Target word in final position of yes/no question

¿él dijo tipimo?

a.típimo b. tipimo c. tipimó

14.Context 3: Target word in final position of exclamation

¡él dijo tipimo!

a. típimo b. tipimo c. tipimó

14.Context 4: Target word in non-final position of yes/no question

¿él dijo tipimo ayer?

a.típimo b. tipimo c. tipimó

14.Context 5: Target word in non-final position of exclamation

¡él dijo tipimo ayer!

a. típimo b. tipimo c. tipimó

15. Context 1: Target word in isolation

nabido

a. nábido b. nabido c. nabidó

15. Context 2: Target word in final position of yes/no question

¿él dijo nabido?

a. nábido b. nabido c. nabidó

15. Context 3: Target word in final position of exclamation

¡él dijo nabido!

g. nábido b. nabido c. nabidó

15. Context 4: Target word in non-final position of yes/no question.

¿él dijo nabido ayer?

d. nábido b. nabido c. nabidó

15. Context 5: Target word in non-final position of exclamation

¡él dijo nabido ayer!

nábido b. nabido c. nabidó

Appendix:

N) Tables for Stress Identification Task with Real Words

Table 19. Stress identification task: target stimuli for participants (real words)

1. Context 1: Target word in isolation

número

a. número b. numero c. numeró

1. Context 2: Target word in final position of yes/no question

¿él dijo número?

a. número b. numero c. numeró

1. Context 3: Target word in final position of exclamation

¡él dijo número!

a. número b. numero c. numeró

1. Context 4: Target word in non-final position of yes/no question

¿él dijo número ayer?

a. número b. numero c. numeró

1. Context 5: Target word in non-final position of exclamation

¡él dijo número ayer!

a. número b. numero c. numeró

2. Context 1: Target word in isolation

medicó

a. médico b. medico c. medicó

2. Context 2: Target word in final position of yes/no question

¿él dijo medicó?

a. médico b. medico c. medicó

2. Context 3: Target word in final position of exclamation

¡él dijo medicó!

a. médico b. medico c. medicó

2. Context 4: Target word in non-final position of yes/no question

¿él dijo medicó ayer?

a. médico b. medico c. medicó

2. Context 5: Target word in non-final position of exclamation

¡él dijo medicó ayer!

a. médico b. medico c. medicó

3. Context 1: Target word in isolation

limite

a. límite b. limite c. limité

3. Context 2: Target word in final position of yes/no question

¿él dijo limite?

a. límite b. limite c. limité

3. Context 3: Target word in final position of exclamation

¡él dijo limite!

a. límite b. limite c. limité

3. Context 4: Target word in non-final position of yes/no question

¿él dijo limite ayer?

a. límite b. limite c. limité

3. Context 5: Target word in non-final position of exclamation

¡él dijo limite ayer!

a. límite b. limite c. limité

4. Context 1: Target word in isolation

válido

a. válido b. valido c. validó

4. Context 2: Target word in final position of yes/no question

¿él dijo válido?

a. válido b. valido c. validó

4. Context 3: Target word in final position of exclamation

¡él dijo válido!

a. válido b. valido c. validó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo válido ayer?

a. válido b. valido c. validó

4. Context 5: Target word in non-final position of exclamation

¡él dijo válido ayer!

a. válido b. valido c. validó

5. Context 1: Target word in isolation

numero

a. número b. numero c. numeró

5. Context 2: Target word in final position of yes/no question

¿él dijo numero?

a. número b. numero c. numeró

5. Context 3: Target word in final position of exclamation

¡él dijo numero!

a. número b. numero c. numeró

5. Context 4: Target word in non-final position of yes/no question.

¿él dijo numero ayer?

a. número b. numero c. numeró

5. Context 5: Target word in non-final position of exclamation

¡él dijo numero ayer!

a. número b. numero c. numero

6. Context 1: Target word in isolation

médico

a. médico b. medico c. medicó

6. Context 2: Target word in final position of yes/no question

¿él dijo médico?

a. médico b. medico c. medicó

6. Context 3: Target word in final position of exclamation

¡él dijo médico!

a. médico b. medico c. medicó

6. Context 4: Target word in non-final position of yes/no question

¿él dijo médico ayer?

a. médico b. medico c. medicó

6. Context 5: Target word in non-final position of exclamation

¡él dijo médico ayer!

a. médico b. medico c. medicó

7. Context 1: Target word in isolation

valido

a. válido b. valido c. validó

7. Context 2: Target word in final position of yes/no question

¿él dijo valido?

a. válido b. valido c. validó

7. Context 3: Target word in final position of exclamation

¡él dijo valido!

a. válido b. valido c. validó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo valido ayer?

a. válido b. valido c. validó

7. Context 5: Target word in non-final position of exclamation

¡él dijo valido ayer!

a. válido b. valido c. validó

8. Context 1: Target word in isolation

limité

a. límite b. limite c. limité

8. Context 2: Target word in final position of yes/no question

¿él dijo limité?

a. límite b. limite c. limité

8. Context 3: Target word in final position of exclamation

¡él dijo limité!

a. límite b. limite c. limité

8. Context 4: Target word in non-final position of yes/no question

¿él dijo limité ayer?

a. límite b. limite c. limité

8. Context 5: Target word in non-final position of exclamation

¡él dijo limité ayer!

a. límite b. limite c. limité

9. Context 1: Target word in isolation

medico

a. médico b. medico c. medico

9. Context 2: Target word in final position of yes/no question

¿él dijo medico?

a. médico b. medico c. medicó

9. Context 3: Target word in final position of exclamation

¡él dijo medico!

a. médico b. medico c. medicó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo medico ayer?

a. médico b. medico c. medicó

9. Context 5: Target word in non-final position of exclamation

¡él dijo medico ayer!

a. médico b. medico c. medicó

10. Context 1: Target word in isolation

numeró

a. númeró b. numero c. numeró

10. Context 2: Target word in final position of yes/no question

¿él dijo numeró?

a. númeró b. numero c. numeró

10. Context 3: Target word in final position of exclamation

¡él dijo numeró!

a. númeró b. numero c. numeró

10. Context 4: Target word in non-final position of yes/no question

¿él dijo numeró ayer?

a. númeró b. numero c. numeró

10. Context 5: Target word in non-final position of exclamation

¡él dijo numeró ayer!

a. númeró b. numero c. numeró

11. Context 1: Target word in isolation

límite

a. límite b limite c. limité

11. Context 2: Target word in final position of yes/no question

¿él dijo límite?

a. límite b limite c. limité

11. Context 3: Target word in final position of exclamation

¡él dijo límite!

a. límite b limite c. limité

11. Context 4: Target word in non-final position of yes/no question

¿él dijo límite ayer?

a. límite b limite c. limité

11. Context 5: Target word in non-final position of exclamation

¡él dijo límite ayer! a. límite b limite c. limité
12. Context 1: Target word in isolation validó a. válido b. valido c. validó 12. Context 2: Target word in final position of yes/no question ¿él dijo validó? a. válido b. valido c. validó 12. Context 3: Target word in final position of exclamation ¡él dijo validó! a. válido b. valido c. validó 12. Context 4: Target word in non-final position of yes/no question ¿él dijo validó ayer? a. válido b. valido c. validó 12. Context 5: Target word in non-final position of exclamation ¡él dijo validó ayer? a. válido b. valido c. validó

Table 20. Stress identification task: target stimuli for participants (real words)

1. Context 1: Target word in isolation

medicó

a. médico b. medico c. medicó

1. Context 2: Target word in final position of yes/no question

¿él dijo medicó?

a. médico b. medico c. medicó

1. Context 3: Target word in final position of exclamation

¡él dijo medicó!

a. médico b. medico c. medicó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo medicó ayer?

a. médico b. medico c. medicó

1. Context 5: Target word in non-final position of exclamation

¡él dijo medicó ayer!

a. médico b. medico c. medicó

2. Context 1: Target word in isolation

número

a. número b. numero c. numeró

2. Context 2: Target word in final position of yes/no question

¿él dijo número?

a. número b. numero c. numeró

2. Context 3: Target word in final position of exclamation

¡él dijo número!

a. número b. numero c. numeró

2. Context 4: Target word in non-final position of yes/no question

¿él dijo número ayer?

a. número b. numero c. numeró

2. Context 5: Target word in non-final position of exclamation

¡él dijo número ayer!

a. número b. numero c. numeró

3. Context 1: Target word in isolation

limité

a. límite b. limite c. limité

3. Context 2: Target word in final position of yes/no question

¿él dijo limité?

a. límite b. limite c. limité

3. Context 3: Target word in final position of exclamation

¡él dijo limité!

a. límite b. limite c. limité

3. Context 4: Target word in non-final position of yes/no question

¿él dijo limité ayer?

a. límite b. limite c. limité

3. Context 5: Target word in non-final position of exclamation

¡él dijo limité ayer!

a. límite b. limite c. limité

4. Context 1: Target word in isolation

numero

a. número b. numero c. numeró

4. Context 2: Target word in final position of yes/no question

¿él dijo numero?

a. número b. numero c. numeró

4. Context 3: Target word in final position of exclamation

¡él dijo numero!

a. número b. numero c. numeró

4. Context 4: Target word in non-final position of yes/no question.

¿él dijo numero ayer?

a. número b. numero c. numeró

4. Context 5: Target word in non-final position of exclamation

¡él dijo numero ayer!

a. número b. numero c. numero

5. Context 1: Target word in isolation

válido

a. válido b. valido c. validó

5. Context 2: Target word in final position of yes/no question

¿él dijo válido?

a. válido b. valido c. validó

5. Context 3: Target word in final position of exclamation

¡él dijo válido!

a. válido b. valido c. validó

5. Context 4: Target word in non-final position of yes/no question

¿él dijo válido ayer?

a. válido b. valido c. validó

5. Context 5: Target word in non-final position of exclamation

¡él dijo válido ayer!

a. válido b. valido c. validó
6. Context 1: Target word in isolation numeró a. númeró b. numero c. numeró 6. Context 2: Target word in final position of yes/no question ¿él dijo numeró? a. númeró b. numero c. numeró 6. Context 3: Target word in final position of exclamation ¡él dijo numeró! a. númeró b. numero c. numeró 6. Context 4: Target word in non-final position of yes/no question ¿él dijo numeró ayer? a. númeró b. numero c. numeró 6. Context 5: Target word in non-final position of exclamation ¡él dijo numeró ayer! a. númeró b. numero c. numeró
7. Context 1: Target word in isolation valido a. válido b. valido c. validó

7. Context 2: Target word in final position of yes/no question

¿él dijo valido?

a. válido b. valido c. validó

7. Context 3: Target word in final position of exclamation

¡él dijo valido!

a. válido b. valido c. validó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo valido ayer?

a. válido b. valido c. validó

7. Context 5: Target word in non-final position of exclamation

¡él dijo valido ayer!

a. válido b. valido c. validó

8. Context 1: Target word in isolation

límite

a. límite b limite c. limité

8. Context 2: Target word in final position of yes/no question

¿él dijo límite?

a. límite b limite c. limité

8. Context 3: Target word in final position of exclamation

¡él dijo límite!

a. límite b limite c. limité

8. Context 4: Target word in non-final position of yes/no question

¿él dijo límite ayer?

a. límite b limite c. limité

8. Context 5: Target word in non-final position of exclamation

¡él dijo límite ayer!

a. límite b limite c. limité

9. Context 1: Target word in isolation

medico

a. médico b. medico c. medico

9. Context 2: Target word in final position of yes/no question

¿él dijo medico?

a. médico b. medico c. medicó

9. Context 3: Target word in final position of exclamation

¡él dijo medico!

a. médico b. medico c. medicó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo medico ayer?

a. médico b. medico c. medicó

9. Context 5: Target word in non-final position of exclamation

¡él dijo medico ayer!

a. médico b. medico c. medicó

10. Context 1: Target word in isolation

validó

a. válido b. valido c. validó

10. Context 2: Target word in final position of yes/no question

¿él dijo validó?

a. válido b. valido c. validó

10. Context 3: Target word in final position of exclamation

¡él dijo validó!

a. válido b. valido c. validó

10. Context 4: Target word in non-final position of yes/no question

¿él dijo validó ayer?

a. válido b. valido c. validó

10. Context 5: Target word in non-final position of exclamation

¡él dijo validó ayer?

b. a. válido b. valido c. validó

11. Context 1: Target word in isolation

médico

a. médico b. medico c. medicó

11. Context 2: Target word in final position of yes/no question

¿él dijo médico?

a. médico b. medico c. medicó

11. Context 3: Target word in final position of exclamation

¡él dijo médico!

a. médico b. medico c. medicó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo médico ayer?

a. médico b. medico c. medicó

11. Context 5: Target word in non-final position of exclamation

¡él dijo médico ayer!

a. médico b. medico c. medicó

12. Context 1: Target word in isolation

limite

a. límite b. limite c. limité

12. Context 2: Target word in final position of yes/no question

¿él dijo limite?

a. límite b. limite c. limité

12. Context 3: Target word in final position of exclamation

¡él dijo limite!

a. límite b. limite c. limité

12. Context 4: Target word in non-final position of yes/no question

¿él dijo limite ayer?

a. límite b. limite c. limité

12. Context 5: Target word in non-final position of exclamation

¡él dijo limite ayer!

a. límite b. limite c. limité

Table 21. Stress identification task: target stimuli for participants (real words)

1. Context 1: Target word in isolation

válido

a. válido b. valido c. validó

1. Context 2: Target word in final position of yes/no question

¿él dijo válido?

a. válido b. valido c. validó

1. Context 3: Target word in final position of exclamation

¡él dijo válido!

a. válido b. valido c. validó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo válido ayer?

a. válido b. valido c. validó

1. Context 5: Target word in non-final position of exclamation

¡él dijo válido ayer!

a. válido b. valido c. validó

2. Context 1: Target word in isolation

numero

a. número b. numero c. numeró

2. Context 2: Target word in final position of yes/no question

¿él dijo numero?

a. número b. numero c. numeró

2. Context 3: Target word in final position of exclamation

¡él dijo numero!

a. número b. numero c. numeró

2. Context 4: Target word in non-final position of yes/no question.

¿él dijo numero ayer?

a. número b. numero c. numeró

2. Context 5: Target word in non-final position of exclamation

¡él dijo numero ayer!

a. número b. numero c. numero

3. Context 1: Target word in isolation

medicó

a. médico b. medico c. medicó

3. Context 2: Target word in final position of yes/no question

¿él dijo medicó?

a. médico b. medico c. medicó

3. Context 3: Target word in final position of exclamation

¡él dijo medicó!

a. médico b. medico c. medicó

3. Context 4: Target word in non-final position of yes/no question

¿él dijo medicó ayer?

a. médico b. medico c. medicó

3. Context 5: Target word in non-final position of exclamation

¡él dijo medicó ayer!

a. médico b. medico c. medicó

4. Context 1: Target word in isolation

limite

a. límite b. limite c. limité

4. Context 2: Target word in final position of yes/no question

¿él dijo limite?

a. límite b. limite c. limité

4. Context 3: Target word in final position of exclamation

¡él dijo limite!

a. límite b. limite c. limité

4. Context 4: Target word in non-final position of yes/no question

¿él dijo limite ayer?

a. límite b. limite c. limité

4. Context 5: Target word in non-final position of exclamation

¡él dijo limite ayer!

a. límite b. limite c. limité

5. Context 1: Target word in isolation

número

a. número b. numero c. numeró

5. Context 2: Target word in final position of yes/no question

¿él dijo número?

a. número b. numero c. numeró

5. Context 3: Target word in final position of exclamation

¡él dijo número!

a. número b. numero c. numeró

5. Context 4: Target word in non-final position of yes/no question

¿él dijo número ayer?

a. número b. numero c. numeró

5. Context 5: Target word in non-final position of exclamation

¡él dijo número ayer!

a. número b. numero c. numeró

6. Context 1: Target word in isolation

validó

a. válido b. valido c. validó

6. Context 2: Target word in final position of yes/no question

¿él dijo validó?

a. válido b. valido c. validó

6. Context 3: Target word in final position of exclamation

¡él dijo validó!

a. válido b. valido c. validó

6. Context 4: Target word in non-final position of yes/no question

¿él dijo validó ayer?

a. válido b. valido c. validó

6. Context 5: Target word in non-final position of exclamation

¡él dijo validó ayer?

a. válido b. valido c. validó

7. Context 1: Target word in isolation

médico

a. médico b. medico c. medicó

7. Context 2: Target word in final position of yes/no question

¿él dijo médico?

a. médico b. medico c. medicó

7. Context 3: Target word in final position of exclamation

¡él dijo médico!

a. médico b. medico c. medicó

7. Context 4: Target word in non-final position of yes/no question

¿él dijo médico ayer?

a. médico b. medico c. medicó

7. Context 5: Target word in non-final position of exclamation

¡él dijo médico ayer!

a. médico b. medico c. medicó

8. Context 1: Target word in isolation

limité

a. límite b. limite c. limité

8. Context 2: Target word in final position of yes/no question

¿él dijo limité?

a. límite b. limite c. limité

8. Context 3: Target word in final position of exclamation

¡él dijo limité!

a. límite b. limite c. limité

8. Context 4: Target word in non-final position of yes/no question

¿él dijo limité ayer?

a. límite b. limite c. limité

8. Context 5: Target word in non-final position of exclamation

¡él dijo limité ayer!

a. límite b. limite c. limité

9. Context 1: Target word in isolation

valido

a. válido b. valido c. validó

9. Context 2: Target word in final position of yes/no question

¿él dijo valido?

a. válido b. valido c. validó

9. Context 3: Target word in final position of exclamation

¡él dijo valido!

a. válido b. valido c. validó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo valido ayer?

a. válido b. valido c. validó

9. Context 5: Target word in non-final position of exclamation

¡él dijo valido ayer!

a. válido b. valido c. validó

10. Context 1: Target word in isolation

numeró

a. númeró b. numero c. numeró

10. Context 2: Target word in final position of yes/no question

¿él dijo numeró?

a. númeró b. numero c. numeró

10. Context 3: Target word in final position of exclamation

¡él dijo numeró!

a. númeró b. numero c. numeró

10. Context 4: Target word in non-final position of yes/no question

¿él dijo numeró ayer?

a. númeró b. numero c. numeró

10. Context 5: Target word in non-final position of exclamation

¡él dijo numeró ayer!

a. númeró b. numero c. numeró

11. Context 1: Target word in isolation

límite

a. límite b limite c. limité

11. Context 2: Target word in final position of yes/no question

¿él dijo límite?

a. límite b limite c. limité

11. Context 3: Target word in final position of exclamation

¡él dijo límite!

a. límite b limite c. limité

11. Context 4: Target word in non-final position of yes/no question

¿él dijo límite ayer?

a. límite b limite c. limité

11. Context 5: Target word in non-final position of exclamation

¡él dijo límite ayer!

a. límite b limite c. limité

12. Context 1: Target word in isolation

medico

a. médico b. medico c. medico

12. Context 2: Target word in final position of yes/no question

¿él dijo medico?

a. médico b. medico c. medicó

12. Context 3: Target word in final position of exclamation

¡él dijo medico!

a. médico b. medico c. medicó

12. Context 4: Target word in non-final position of yes/no question

¿él dijo medico ayer?

a. médico b. medico c. medicó

12. Context 5: Target word in non-final position of exclamation

¡él dijo medico ayer!

a. médico b. medico c. medico

Table 22. Stress identification task: target stimuli for participants (real words)

1. Context 1: Target word in isolation

validó

a. válido b. valido c. validó

1. Context 2: Target word in final position of yes/no question

¿él dijo validó?

a. válido b. valido c. validó

1. Context 3: Target word in final position of exclamation

¡él dijo validó!

a. válido b. valido c. validó

1. Context 4: Target word in non-final position of yes/no question

¿él dijo validó ayer?

a. válido b. valido c. validó

1. Context 5: Target word in non-final position of exclamation

¡él dijo validó ayer?

válido b. valido c. validó

2. Context 1: Target word in isolation

limite

a. límite b. limite c. limité

2. Context 2: Target word in final position of yes/no question

¿él dijo limite?

a. límite b. limite c. limité

2. Context 3: Target word in final position of exclamation

¡él dijo limite!

a. límite b. limite c. limité

2. Context 4: Target word in non-final position of yes/no question

¿él dijo limite ayer?

a. límite b. limite c. limité

2. Context 5: Target word in non-final position of exclamation

¡él dijo limite ayer!

a. límite b. limite c. limité

3. Context 1: Target word in isolation

válido

a. válido b. valido c. validó

3. Context 2: Target word in final position of yes/no question

¿él dijo válido?

a. válido b. valido c. validó

3. Context 3: Target word in final position of exclamation

¡él dijo válido!

a. válido b. valido c. validó

3. Context 4: Target word in non-final position of yes/no question

¿él dijo válido ayer?

a. válido b. valido c. validó

3. Context 5: Target word in non-final position of exclamation

¡él dijo válido ayer!

a. válido b. valido c. validó

4. Context 1: Target word in isolation

medicó

a. médico b. medico c. medicó

4. Context 2: Target word in final position of yes/no question

¿él dijo medicó?

a. médico b. medico c. medicó

4. Context 3: Target word in final position of exclamation

¡él dijo medicó!

a. médico b. medico c. medicó

4. Context 4: Target word in non-final position of yes/no question

¿él dijo medicó ayer?

a. médico b. medico c. medicó

4. Context 5: Target word in non-final position of exclamation

¡él dijo medicó ayer!

e. a. médico b. medico c. medicó

5. Context 1: Target word in isolation

numero

a. número b. numero c. numeró

5. Context 2: Target word in final position of yes/no question

¿él dijo numero?

a. número b. numero c. numeró

5. Context 3: Target word in final position of exclamation

¡él dijo numero!

a. número b. numero c. numeró

5. Context 4: Target word in non-final position of yes/no question.

¿él dijo numero ayer?

a. número b. numero c. numeró

5. Context 5: Target word in non-final position of exclamation

¡él dijo numero ayer!

a. número b. numero c. numero

6. Context 1: Target word in isolation

valido

a. válido b. valido c. validó

6. Context 2: Target word in final position of yes/no question

¿él dijo valido?

a. válido b. valido c. validó

6. Context 3: Target word in final position of exclamation

¡él dijo valido!

a. válido b. valido c. validó

6. Context 4: Target word in non-final position of yes/no question

¿él dijo valido ayer?

a. válido b. valido c. validó

6. Context 5: Target word in non-final position of exclamation

¡él dijo valido ayer!

a. válido b. valido c. validó

7. Context 1: Target word in isolation

número

a. número b. numero c. numeró

7. Context 2: Target word in final position of yes/no question

¿él dijo número?

a. número b. numero c. numeró

7. Context 3: Target word in final position of exclamation

¡él dijo número!

a. número b. numero c. numeró

7. Context 4: Target word in non-final position of yes/no question

¿él dijo número ayer?

a. número b. numero c. numeró

7. Context 5: Target word in non-final position of exclamation

¡él dijo número ayer!

a. número b. numero c. numeró

8. Context 1: Target word in isolation

limité

a. límite b. limite c. limité

8. Context 2: Target word in final position of yes/no question

¿él dijo limité?

a. límite b. limite c. limité

8. Context 3: Target word in final position of exclamation

¡él dijo limité!

a. límite b. limite c. limité

8. Context 4: Target word in non-final position of yes/no question

¿él dijo limité ayer?

a. límite b. limite c. limité

8. Context 5: Target word in non-final position of exclamation

¡él dijo limité ayer!

a. límite b. limite c. limité

9. Context 1: Target word in isolation

medico

a. médico b. medico c. medico

9. Context 2: Target word in final position of yes/no question

¿él dijo medico?

a. médico b. medico c. medicó

9. Context 3: Target word in final position of exclamation

¡él dijo medico!

a. médico b. medico c. medicó

9. Context 4: Target word in non-final position of yes/no question

¿él dijo medico ayer?

a. médico b. medico c. medicó

9. Context 5: Target word in non-final position of exclamation

¡él dijo medico ayer!

a. médico b. medico c. medicó

10. Context 1: Target word in isolation

numeró

a. númeró b. numero c. numeró

10. Context 2: Target word in final position of yes/no question

¿él dijo numeró?

a. númeró b. numero c. numeró

10. Context 3: Target word in final position of exclamation

¡él dijo numeró!

a. númeró b. numero c. numeró

10. Context 4: Target word in non-final position of yes/no question

¿él dijo numeró ayer?

a. númeró b. numero c. numeró

10. Context 5: Target word in non-final position of exclamation

¡él dijo numeró ayer!

a. númeró b. numero c. numeró

11. Context 1: Target word in isolation

valido

a. válido b. valido c. validó

11. Context 2: Target word in final position of yes/no question

¿él dijo valido?

a. válido b. valido c. validó

11. Context 3: Target word in final position of exclamation

¡él dijo valido!

a. válido b. valido c. validó

11. Context 4: Target word in non-final position of yes/no question

¿él dijo valido ayer?

a. válido b. valido c. validó

11. Context 5: Target word in non-final position of exclamation

¡él dijo valido ayer!

a. válido b. valido c. validó

12. Context 1: Target word in isolation

límite

a. límite b limite c. limité

12. Context 2: Target word in final position of yes/no question

¿él dijo límite?

a. límite b limite c. limité

12. Context 3: Target word in final position of exclamation

¡él dijo límite!

a. límite b limite c. limité

12. Context 4: Target word in non-final position of yes/no question

¿él dijo límite ayer?

a. límite b limite c. limité

12. Context 5: Target word in non-final position of exclamation

¡él dijo límite ayer!

a. límite b limite c. limité

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2015). Contraste entre el acento japonés y el acento del español. (Contrast between Japanese and Spanish Accent systems) *Cuadernos de lingüística hispánica*, 27 (1) 33-56.