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THE EFFECTS OF CONTEXT OF LEARNING ON THE PERCEPTION OF SPANISH STRESS BY JAPANESE SPEAKERS

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Abstract: *This study explores the effect of context of learning on the perception of Spanish lexical stress. Spanish is considered a mixed system (with predictable and unpredictable stress) and a stress-accent language. Tokyo Japanese is a good example of a language without stress, but with pitch-accent. Two groups of Japanese speakers (20 in Bogotá and 25 in Japan) and a control group of 20 Spanish speakers completed a stress identification task, consisting of nine sets of 3 syllable accentual minimal triplets with each having an oxytone (e.g., nabidó), a paroxytone (e.g., nabido), and a proparoxytone (e.g., nábido). The results demonstrated that there was a significant effect of context of learning, with learners in Japan (88%) having a significantly (p=0.000) higher error rate than the learners in Colombia (60%). Therefore, Japanese speakers had a higher accuracy rate in identifying stress position when the F0 peak is aligned with the stressed syllable than when there was an F0 peak displacement in a yes/no question. This study sheds highlights the effect of context of learning on L2 speech learning by demonstrating that immersion can enhance L2 stress perception.*

Keywords: context of learning; L2 phonological acquisition; perception; stress; Japanese; Spanish; F0 peak.

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1 Introduction

The objective of this study is to compare the effects of context of learning on the perception of Spanish lexical stress by late-Spanish Japanese bilinguals. This language pairing is understudied in the current literature available. Spanish and Japanese do not use the same acoustic cues to mark lexical prominence, since Japanese is a pitch accent language and not a stress accent one, as is the case with Spanish. The realization of a pitch accent in Japanese is as follows: a falling pitch from the accented mora to the subsequent mora, which is not affected by intonation. However, in Spanish, a higher pitch is not always aligned with the stressed syllable because intonation affects the pitch pattern. Given these differences in the phonetic realization of accents, Japanese learners of Spanish could fail to perceive stress position when listening to questions or exclamations in Spanish.

Immersion is a type of naturalistic context where learners can interact with the target language community. Since immersion offers learners the opportunity to interact with native speakers and have increased access to meaningful input, learners who spend some time immersed in a target language community are expected to become more native-like in their L2 than those who acquire an L2 in a regular classroom through their at-home institutional setting in their home country (Pérez-Vidal et al., 2011). However, research on L2 phonological acquisition via immersion is somewhat limited, and the present evidence regarding the effect of immersion on L2 speech learning is not consistent. In general, few studies have been carried out on the acquisition of specific phonological features through an immersive vs. traditional instructional setting. Even more scarce are studies examining the effect of immersion on L2 perception (Pérez-Vidal, Juan-Garau, and Mora, 2011, Avello, Mora & Pérez-Vidal, 2012). Furthermore, the findings to date are inconclusive regarding the hypothesis of whether immersion enhances L2 speech production and perception.

The rest of this paper is structured as follows: Section 2 presents the relevant theoretical background on Spanish lexical stress and the pitch accent system of Japanese; Section 3 reviews previous studies on the effect of context of learning on L2 speech learning; Section 4 presents our research questions and hypotheses; Section 5 describes our methodology; Section 6 presents our results; Section 7 discusses both the overall and pedagogical implications of our results; and Section 8 outlines some of the limitations of our study and future directions that can be pursued based on our findings.

2 Spanish Lexical Stress and Japanese Pitch Accent

2.1 Stress-Accent in Spanish

When considering syllable prominence, there are two types of languages: stress-accent and pitch-accent. The term stress generally refers to syllable prominence, in other words, the syllable that receives greater articulatory effort in its production and greater salience in terms of perception. In stress-accent languages, such as Spanish, a stressed syllable might contain a combination of the following properties to stand out over the rest of the syllables in a word: greater duration and amplitude, and a higher fundamental frequency (F0)/pitch (Couper-Kuhlen, 1986; Hayes, 1995; Ou, 2004; Hualde, 2012, 2014; Hyman, 2001, 2009, 2014). An example of it is how a higher pitch will not always be aligned with the stressed syllable because intonation will affect the pitch pattern. Therefore, a stressed syllable in Spanish differs from an unstressed syllable in terms of the quality of phonetic properties it may have (e.g., duration, amplitude, pitch). Furthermore,

while the terms pitch and fundamental frequency (i.e., F0) are often used synonymously, the term pitch deals with perception while F0 with production Kuang and Liberman (2018).

2.1.1 Spanish Stress Typology

Hualde (2005) defines stress as the degree of relative prominence that a syllable receives in comparison to other syllables in a given context. The perception of stress in Spanish as a second or first language activates an interrelation between certain acoustic parameters that marks the strength of a syllable. Duration, intensity, and fundamental frequency are the parameters that, acoustically speaking, are reflected within accent. The use of these parameters is very specific to each language. From the basis of these parameters arises the difference that each language has when contrasting the values of the three parameters when distinguishing the syllable with the greatest or weakest force. As for the perceptual component, differences arise in the strength or weight of pitch height, the duration and intensity needed to identify a syllable as stressed or unstressed (Apoussidou, 2011).

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 íntimo, intimo, and intimó (‘intimate,’ ‘I become close,’ and ‘he became close,’ respectively) that are contrastive because of the position of stress (Hualde, 2005). Such triplets in Spanish are highly frequent and must 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 on the last syllable of a word, as in bebé (‘baby’); (2) paroxytone words, where stress falls on the penultimate syllable, as in caníbal (‘cannibal’); and (3) proparoxytone words, where stress is on the antepenultimate syllable, as in matemática (‘math’). Stress typically cannot be placed on the syllable preceding this three-syllable window (matématica*). According to Hualde (2005), the exceptions are verbs that are formed when enclitic pronouns are added to them; for instance, entregándomelo (‘giving it to me’). Based on the above explanation above, Spanish has a free stress system with certain restrictions.

2.1.2 F0 Peak Displacement in Spanish to the Rightward Syllable of a Word

Although Spanish and Japanese have some phonological features in common, lexical prominence is perceived differently in both languages. On one hand, Japanese accent is defined by marking a decrease in tone after the more prominent mora (Tsujimura, 1996); whereas, in Spanish, depending on the context (e.g., isolated word; declarative, exclamatory, or interrogative sentences), the presence of acoustic correlates (i.e., F0, duration, and intensity) could be more subtle for indicating stress (Hualde, 2014). The realization of F0 as a cue to stress in Spanish exhibits variation in the position of excursions toward peaks when a word is isolated versus when found in interrogative and exclamatory contexts of full sentences; that is, when target words (i.e., particularly proparoxytones and paroxytones) are embedded in interrogative and exclamatory sentences and located in non-final position, F0 peaks tend displace to a post-tonic syllable rather than aligning with the stressed syllable (Garrido et al., 1993, 1995; Hualde & Kim, 2005; Llisterri, et al., 2002; Llisterri, et al., 2003; Llisterri et al., 2003; Prieto, Van Santen & Hirschberg, 1995; Xu, 1999). 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), F0 peak displacement occurs more than 70% of the time in the stressed words of Spanish declarative sentences and aligns with the stressed syllable approximately 25% of the time. Based on previous information, F0 peaks behave differently (i.e., peak displacement vs. alignment) depending on context. The displacement case would create a mismatch with the Japanese phonological system, while the

alignment case would not. The present study is concerned with this phenomenon, referring to it henceforth as F0 peak displacement and the emphasis will be on yes/no questions.

Figures 1, 2, and 3 containing the F0 contours demonstrate how Spanish has a different realization of F0 peaks in comparison with Japanese. In Figure 1 the F0 peak aligns with the stressed syllable because the intonation does not change. However, in a yes/no question, the F0 peak displaces to the next syllable, as seen in Figure 2. The same phenomenon happens with an exclamation (Figure 3). Figures 1-3 show how the F0 peak will align with the stressed syllable if the pitch pattern is not affected by the overall intonation pattern, as in Figure 1, but when the intonation changes, as in the question and exclamation in Figures 2 and 3, respectively, the F0 peak will not align with the stressed syllable. Instead, it will go to the next syllable, as shown in Figure 2, and create a false cue for Japanese speakers. Therefore, it is believed 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 in a yes/no question. The emphasis of this study is on yes/no questions specifically due to the contexts in which isolated words and declarative sentences with the target word in final position follow a falling intonational pattern. That is, the stressed syllable will be pronounced with a higher tone than the next syllable. These cases will favour Japanese speakers. However, yes/no questions would present a case that will not favour Japanese speakers. These types of questions present a generally rising toneme that will make the stressed syllable to be pronounced with a lower pitch as suggested by Kimura et al (2012). Thus, Japanese speakers would find difficulties to detect the stressed syllable correctly.

In the case of the Isolated and Final-affirmative contexts, the target word is framed aligning with the stressed syllable (Figure 1). This is one favorable situation for Japanese speakers. On the contrary, in Figure 2, the context of questions in final position supposes for them the least favorable situation of all, since in the absolute interrogative sentences, as is the case of the interrogative questions used in the present research, the final part presents generally a rising toneme that causes the stressed syllable to be pronounced with a lower pitch (except for high pitched words) This context makes it very difficult for Japanese speakers to perceive the stress (Kimura et al., 2012).

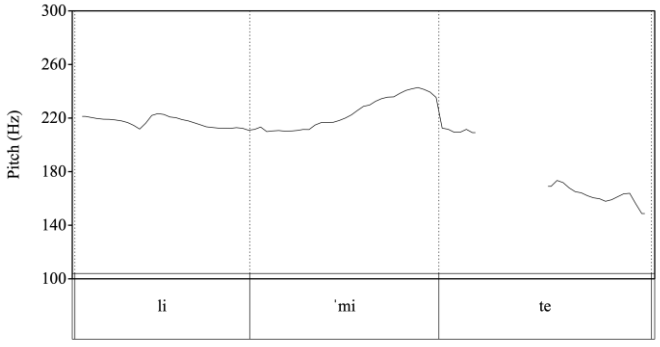

Figure 1: f0 contour of sequence *limite*

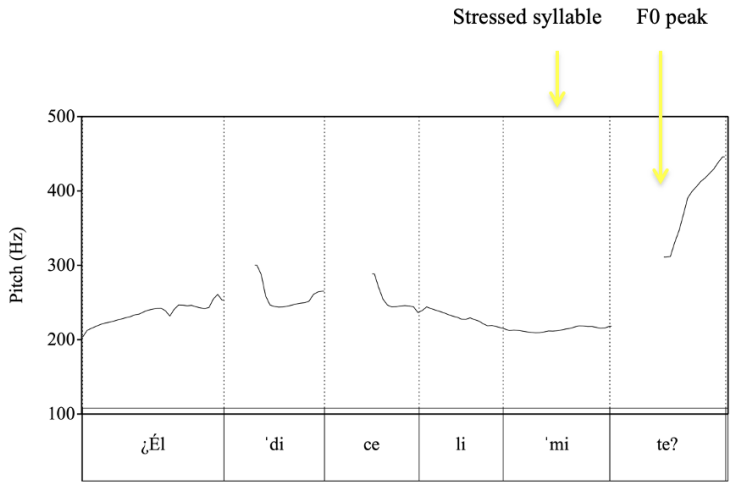

Figure 2: f0 contour of sequence *¿él dice limite?*

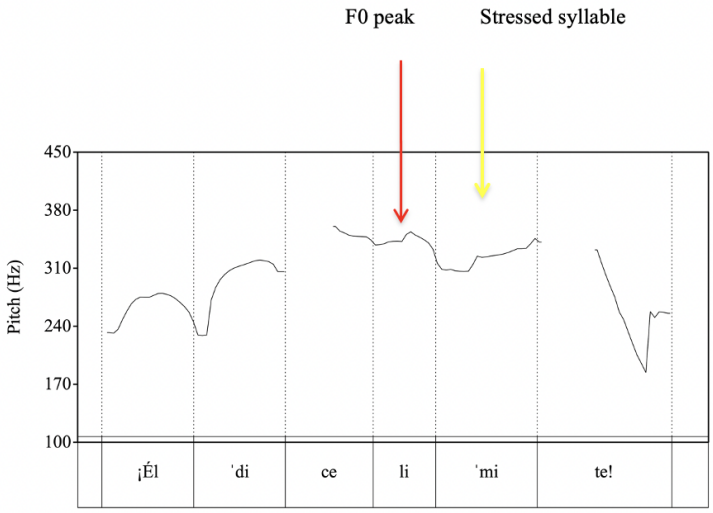

Figure 3: f0 contour of sequence *¡él dice limite!*

In the case that Japanese speakers could perceive Spanish stress, regardless of the displacement of the F0 peak, they will have lexical confusion; that is, instead of perceiving *limite* in a yes/no question, they would perceive limité (I limited) because of the false cue produced by the displacement of the F0 peak to the next unstressed syllable. Consequently, incorrect perception of word stress in L2 Spanish may create a miscommunication problem that can cause false recognition in opposition of segmental evidence (Cutler 1984, p. 80).

2.2 Pitch-Accent in Japanese

In pitch-accent languages, the articulatory and acoustic properties of relative prominence mainly depend on relative measures of pitch; that is, the primary cue to perceiving and producing prominence is pitch. 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 et al. (1998) define a pitch-accent language as follows: In a pitch-accent system the primary correlate of prominence is pitch, which has important constraints on the pitch patterns for words (p. 277).

Figure 4 illustrates a falling pitch from the syllable “Mo” to the syllable mi in the Japanese word momiji [mo↓midʑi] (‘maple’).

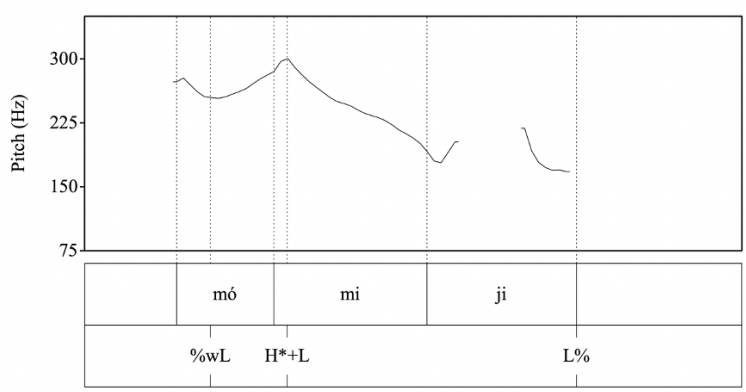

Figure 4: f0 contour recreated based on Kimura et al. (2012) for the sequence *Momiji*.

2.3 Comparative Analysis Between the Spanish and Japanese Stress Systems

F0 peak displacement may interact with the learners' L1 and miscue Japanese-speaking learners of Spanish because such displacement does not occur in Tokyo Japanese in any context (Kimura et al (2012). The f0 contour of the sequence tamago (‘egg’ in Japanese), both isolated and in a full sentence, in Figures 5 to 7 demonstrate how F0 maintains the same realization in different contexts in Japanese; that is, they show F0 in the accented mora rising from ma and falling on the next mora go in the word *tamago*.

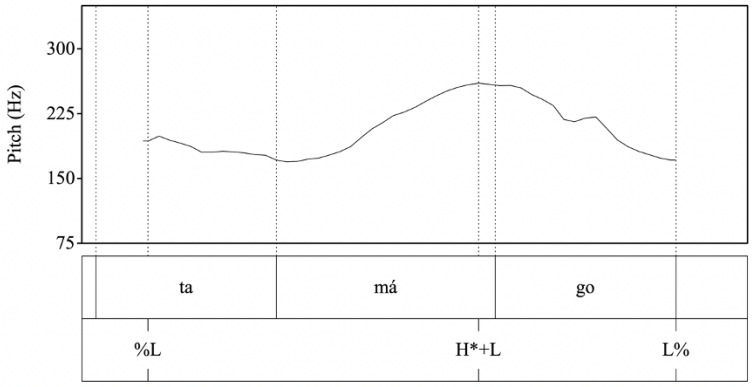

Figure 5: f0 contour recreated based on Kimura et al. (2012) for the isolated word *tamago.*

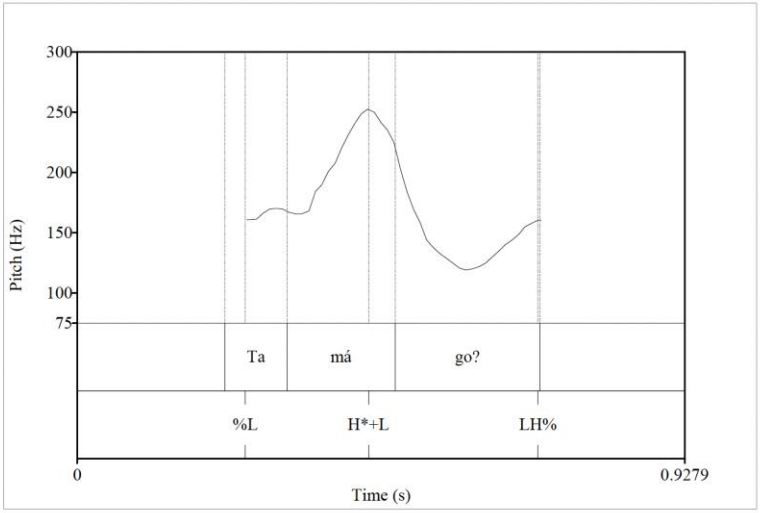

Figure 6: f0 contour recreated based on Kimura et al. (2012) for the isolated word *tamago?* in the form of a question.

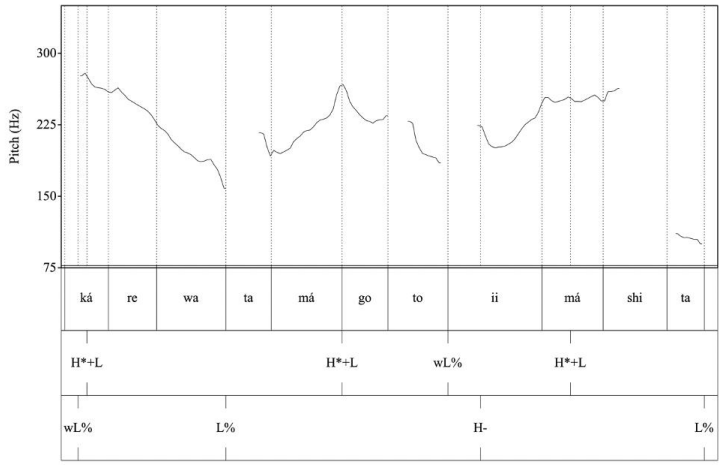

Figure 7: Oscillogram from Kimura et al. (2012) for the sentence *kare wa tamago to iimashita* (He said this is an egg).

Although typologically different and using distinct sets of acoustic cues to mark lexical prominence, stress-accent and pitch-accent share some of Trubetzkoy's (1969) functions of accent. This means that stress or pitch accent have a distinctive and a culminative function when marking prominence, with the distinctive function serving to differentiate words; for instance, in Spanish, the location of lexical prominence serves to distinguish the meaning of words with the same spelling: género ('gender'), genero ('I generate'), generó ('he generated'); sábana ('bed sheet') and sabana ('savannah'); lavo ('I wash') lavó ('he washed'). Likewise, in Tokyo Japanese, accent distinguishes the meaning of words: hashí ('bridge') and hashi ('chopsticks'); hana ('nose') haná ('flower'). The lack of minimal pairs following this pattern in Japanese, however, renders the 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; that is, words in both languages can only have one primary prominence; however, the way of marking this prominence is typologically different in both languages, as will be explained in Section 3. For

example, Japanese accent is characterized by the falling pitch from the accented mora to the subsequent mora, where this pitch pattern is not affected by the intonation. However, in Spanish the pitch pattern is affected by the intonation pattern and the stressed syllable is not always pronounced with a higher pitch than the nearby syllable.

3 Effects of Context of Learning

Language immersion is defined here as a study abroad experience in which students use L2 daily and at home or classroom experience refers to the explicit or classroom method where students stay in their home countries and learn at a traditional classroom a lot of information about the grammar and words. Studies on context of learning have contrasted the gains of students in a formal/traditional learning setting in comparison with students who go to a country where the target language is spoken as an L1. Díaz-Campos (2006) found a positive effect of context of learning, namely, that learners studying abroad outperformed an at-home group. Two groups participated in this study: one group consisted of 26 students who were studying Spanish in Alicante, Spain and the other group consisted of 20 students who were taking Spanish through formal instruction in the United States. The two groups took part in a read-aloud task and an interview. 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 a conversational style than their formal learner counterparts in a traditional classroom. The study concluded that combining immersion and instruction would be more beneficial for L2 phonological acquisition. However, this contrasts Díaz-Campos (2004) who found that immersion (i.e., one four-month term) did not help enhance students' L2 phonological acquisition in a read-aloud task. Moreover, the group who received classroom instruction, surprisingly, behaved more similarly to Spanish native speakers than the learners in the study abroad program.

Other studies have also compared gains between an immersion and an instruction group while also considering length of stay. 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 groups. A significant difference was not found, meaning that the two experimental groups were able to produce a robust distinction between the two L2 vowel contrasts in question /i: - ɪ/ and /æ - ʌ/. Regarding VOT, the participants' production of plosives did not benefit from their experience abroad and there was not a significant difference in the post-test. All in all, this study suggests that a study abroad experience ranging from three to six months is not a sufficiently long enough time frame to 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, considering pronunciation error counts and accentedness ratings. 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). The results revealed that the error production of non-native speakers decreased after the study abroad experience with short-term immersion. Moreover, foreign accent was positively affected by immersion time since the perceived degree of accentedness decreased from pre-test to post-test. These findings diverge from some of the previous research reviewed (Díaz-Campos, 2004; Pérez-Vidal et al., 2011; Avello and Lara 2014), which showed no L2 phonological gains from an immersion experience.

More evidence on the effects of study abroad and its comparison with formal instruction was provided by Mora (2008). This study aimed to investigate the effect of formal instruction and a study abroad experience by analysing the same participant group during the two contexts of learning rather than examining two separate speaker groups. Mora (2008) examined the production and perception of English voiceless plosives in adult Catalan/Spanish bilingual advanced learners of English, who, after six months of formal instruction in Barcelona, 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). The context of learning had a different effect on the perceptual and production abilities of the learners. Formal instruction had a positive effect on perceptual learning, where segmental perceptual ability improved over time and significant gains were maintained after a period of formal instruction. On the other hand, formal instruction did not have a positive effect on VOT acquisition; rather, study abroad had a positive effect on the participants' VOT production skills, albeit the gains were not maintained over time.

Other studies have delved into the effect of length of stay in the target language community compared to formal instruction. For instance, 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. Pérez-Vidal and colleagues (2011) differs from Mora (2008) because it found a positive effect in a different population with formal instruction on the perception and production of English phonemic contrasts. Study abroad experience, however, was not beneficial for the perception and production of English phonemic contrasts. 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%). 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 a study abroad experience. Regarding the production analysis, it was found that participants produced most of the vowel contrasts differently from native speakers of English, suggesting that formal instruction has more robust positive effects on vowel accuracy production and perception than a study abroad experience. Pérez-Vidal and colleagues (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 one's initial level of competence and the nature of academic practice can modulate the effect of immersion on L2 speech learning. In comparison, Pérez-Vidal & Elisa Barquin (2014) and Juan-Gurau, Salazar-Noguera & Prieto-Arranz (2014) demonstrated that domains such as lexico-grammatical competence or syntactic development demanded less immersion time to be beneficial for learners.

Other experimental results have demonstrated that the relationship between immersion and phonological gains is not as straightforward as researchers have originally hypothesized. Mora (2014) examined 198 bilingual Spanish/Catalan speaking learners of English in a longitudinal study over three years. The author compared the gains that participants obtained during the formal instruction context at the first and second testing stages to the gains obtained during study abroad at the second and third stages. Overall, participants obtained high scores, but not as high as those of native speakers. Concerning the longitudinal effect of context of learning, it was found that gains obtained during formal instruction were greater than those during study abroad (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 that the participants would have obtained a different outcome during an immersion period if they had received specific perception training focusing on the sound contrasts of English through formal instruction during their study abroad period.

Finally, 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 native English speakers immersed in Mexico. The results of the group that received formal instruction before going abroad were compared with a group who did not receive formal instruction but were in the same summer programme in Mexico. The results showed that participants produced the occlusive sounds with the highest accuracy (100%). The instruction group obtained higher accuracy percentages prior to the study abroad programme; hence, the instruction group outperformed the non-instruction group. These findings demonstrate that instruction prior to immersion is positive for L2 learner students; however, according to the author, instruction alone was not enough to accurately produce the fricative allophones. Immersion increased accuracy rates, and the instruction group improved, which demonstrates that an immersive context was beneficial for both groups. The above results demonstrate that instruction combined with immersion may lead to more gains than a single context of learning, which empirically corroborates the hypotheses other authors concluded in their studies.

In sum, the findings of the studies reviewed to this point are inconclusive with respect to the effect of immersion and instruction in a formal setting on L2 phonological learning. This could be due to difference in experimental design, but also the choices L2 learners make when they are immersed in the L2 target language (e.g., where they live, who they interact with, what percentage of the time they use the target language, etc.).

3.1 Effects of Context of Learning on the Perception and Production of Spanish Lexical Stress

Historically, L2 phonological acquisition and its relationship to context of learning (i.e., lexical stress) has not been studied thoroughly. More recently, a few studies have focused on the acquisition of Spanish lexical stress by learners who are in natural immersion settings. Romanelli and colleagues (2015b) conducted a study involving a perceptual training with English native speakers who were attending an intensive three-week immersion Spanish course in Mar del Plata, Argentina. 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. One issue to highlight is that 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 learners' linguistic gains, it is necessary to conduct a comparison between immersed and formally trained learners.

The predominant focus of the study by Face (2005) was to investigate whether L2 learners of Spanish at a beginner, intermediate, or advanced level of instruction make use of syllable weight information to make inferences on where stress falls in a word. To test this, the author presented a group of 30 students learning Spanish as an L2 with 100 nonce words differing in syllable weight (i.e., heavy, and light syllables for both bisyllabic and trisyllabic words). Participants were presented each word on a computer screen and instructed to indicate the portion of the syllable they perceived as stressed. The results demonstrated a clear progression of Spanish

level with regard to the use of syllable weight as a cue to determine which syllable is stressed; in other words, as students progressed toward a more advanced level of instruction in Spanish, they unconsciously began to perceive stress according to language rules of unmarked stress patterns. This is further highlighted by statistically significant results in the perception of both final and penultimate stress identification in the advanced learner group, in comparison to the beginner group, where neither of these factors were found to be significant.

The vast majority of previous research on L2 proficiency of lexical stress has focused on the production aspect, with very few studies examining the effect of perception. Therefore, the main goal of Gibson and Bernales (2020) was investigate to what degree language background and L2 training influence the perception of lexical stress. To analyze this, the authors included two groups of participants: (i) a monolingual English group of US students, and (ii) Spanish-English bilinguals living in Chile. Both groups filled out a language background questionnaire asking for overall language abilities in English, and English and Spanish separately, for the US and Chilean groups, respectively. In addition to this questionnaire, participants were provided with a list of words and asked to identify how many syllables they believed were in each word and where lexical stress would be placed. Results indicated that the US group performed better than the Chilean participants without phonetics training, but there was no notable difference between those with phonetics training. Furthermore, the Chilean participants with training performed better than those without it, confirming that both language background and L2 phonetics training influenced the perception of L2 lexical stress, with the latter being the stronger contributor.

The study by Ortín and Simonet (2021) focuses on examining the weak phonological processing routines related to stress from an individual's native language. In this case, the language of focus was L1 English speakers learning Spanish as an L2. A total of 107 individuals participated in the study, consisting of a control group comprised of native Spanish speakers who had learned English after the age of puberty and a target group comprised of English speakers enrolled in an L2 Spanish program. The participants were all required to complete a language profile questionnaire, along with three Spanish proficiency tests, including a passage cloze test, a cloze test with individual sentences, and the LexTale-Esp task, which is a tool used to assess Spanish vocabulary size. From these study tasks, native controls were found to be the most accurate in stress trials than in the baseline condition, as expected. For the L2 group, they were found to be less accurate in their processing of stress contrasts than in the baseline condition.

A series of studies by Face (2018, 2021) and Face & Menke (2020) have dealt with analyzing the ultimate attainment of stops, approximants, rhotics, spirants, and laterals in Spanish among individuals who are native speakers of English and have lived in central Spain for a number of years. In each of these individual studies, the author found that the native English speakers of Spanish were able to approximate native speakers of Spanish with a high degree of accuracy on certain target sounds such as stops and approximants. However, there was a considerable degree of individual variation for the production of laterals, spirants, and rhotics among the L2 learners when compared to the target productions of the native Spanish speakers, corroborating previous research.

In an effort to expand upon the experimental designs, results, and implications of the previous research outlined to this point, the present study investigates the perception of Spanish lexical stress in L1 Japanese learners who are advanced L2 speakers of Spanish immersed in an L2 language community (i.e., Bogota, Colombia), and compares them to L1 Japanese speakers who were studying L2 Spanish in Japan.

4 Research Questions and Hypotheses

Motivated by previous sections, the research questions guiding this study are as follows:

1. Does an immersion context result in a better identification of stress identification in Spanish paroxytone and proparoxytone words in interrogative and exclamation sentences in sentence-final position by advanced Japanese-speaking late learners in comparison to an instructional classroom setting?
2. Is there an effect of word (real vs. nonce)?

Based on these research questions, the following hypotheses are proposed:

1. It is predicted that there would be an effect of context of learning, where advanced Japanese-speaking late learners who have been 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, 2015b; Romanelli et al., 2014).
2. It is predicted that there would be an effect of type of words (Altmann, 2006). Real word should be easier than nonce words because the learners would have access to the stress patterns in their lexicon which they have learned in the classroom or in natural immersion settings (Altmann, 2006; Hymes, 1997; Romanelli et al., 2015b). It is predicted that there would be an effect of type of words (Altmann, 2006).

5 Methodology

5.1 Participants

Three groups totalling 64 participants whose ages ranged between 23 and 50 years old were tested in this study. The participants were divided into three groups based on their location of learning and their experience with Spanish: (1) non-immersed group (N = 24); (2) Immersed group (N = 20) and (3) native speakers of Bogota Colombian Spanish (N = 20). The participants in the non-immersed group lived in Tokyo, Japan and had been students of Spanish for three and a half years (i.e., in their final year of Spanish in Japan) at two large universities in Tokyo. Moreover, they were born in Japan, their ages ranged between 23 to 25 years, and they reported not having advanced proficiency in any other foreign languages. They had to complete a background questionnaire and a proficiency test to report their level. The participants had not lived in a Spanish-speaking country for more than six months before participating and spoke a variety of Tokyo Japanese. The immersed group was comprised of L1 Japanese speakers living in Bogota, Colombia. The Japanese-speaking participants in this group had lived in Bogota for five years. They were born in Japan and moved to Bogota during adulthood, where they were working. Their ages ranged from 20-50 years. They all reported not having advanced proficiency in any language other than Japanese and Spanish and spoke a variety of Tokyo Japanese. 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.

All participants were required to fill out a background questionnaire we created in addition to completing a stress identification task. The purpose of the background questionnaire was to collect demographic information from the participants, as well as information on their prior 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 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 immersed group and the non-immersed group) carried out the same test. This test was based on the proficiency of production and not on perception. The first component asked participants to read a short text aloud (El viento y el sol 'The North Wind and the Sun'). In this first part of the proficiency test, we recorded the participants' voices while they read the short text via Skype using the Easy Audio Recorder Lite application. The recording was then rated by native speaker judges. The excerpt produced by the Japanese-speaking learners of Spanish was evaluated using a Likert scale ranging from 1 to 5, where 1 was not at all advanced, and 5 was very advanced (adapted from Dörnyei & Csizér, 2012). The criterium behind the use of the Likert Scale with a 5-point scale is that we have a midpoint. The three rating is right in the middle, and it shows neutrality or mixed satisfaction. Thus, when calculating the mean weighted average, we are able to have a standard point of comparison.

The judges were asked to rate the Japanese speakers' production based on the overall clarity of 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 judgment task. The judges heard the Japan group first and the Bogota group second. The judges were allowed to listen to each recording a second time to confirm their judgments. The second component of the proficiency test consisted of 30 multiple-choice questions on morphology and 20 questions on vocabulary and context in a Spanish cloze test taken from Montrul (1997) and Slabakova (1997).

5.3 Stimuli for Tasks

An adult female speaker from Bogota, Colombia produced and recorded the audio stimuli. She was instructed to say the words in a natural way and at a normal rate of speech. The stimuli consisted of five triplets of trisyllabic Spanish nonce words (15 words), which differed only in the location of their primary stress (see target words in Appendix Table 3), and four triplets of trisyllabic Spanish real words (12 words; see Appendix Table 4). Then 15 words were multiplied by 5 different sentence types, totalling 75 words. The same treatment received the 12 real words to obtain 60 words. In total, 135 words per participant were analysed for this study, since 4 realizations of every nonce word elicited from Spanish native speaker were used to construct one quadruplet for each target word. The words in the isolated context served as fillers. Spanish's rhotic phonemes were not used in the stimuli for both the real and nonce words given that this class of sound has been reported as being difficult for Japanese learners of other languages that contain it (Aoyama & Flege, 2004, 2011; Yamada & Tohkura, 1992; Hattori & Iverson, 2009).

The stimuli for the peak alignment in the target words were inspected to confirm that the utterance-final peaks align within the stressed syllable and that non-final peaks exhibited displacement. In order to do the previous analysis, we used the software Praat.

5.4 Data Elicitation Tasks

Data for this study were collected via a stress identification task performed by the three groups of participants. 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 Kim and Hualde (2014), Kimura et al. (2012), and Llisterri et al. (2014). The stress identification task involved the following stimuli: nine sets of three syllable triplets, with each having an oxytone (e.g., nabidó), a paroxytone (e.g., nabido), and a proparoxytone (e.g., nábido) variant. The syllable structure of the stimuli was CVCVCV. Participants listened to the target words in the five different contexts outlined in Table 1. The same conditions were utilized in the presentation of real words to the participants, which outlined in Table 2.

Table 1: Structural contexts.

Sentence Type	Final Position	Non-final Position
Isolation	Context 1 **N**ábido	
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., ábrigo or ¿él dijo ábrigo ayer?) and had to indicate as quickly as possible the word they heard by clicking one of the three options (e.g., ábrigo- abrigo – abrigo) they were presented on a computer screen, as depicted in Figure 8.

Figure 8: Sample of the three options presented to participants.

Each word was presented in the five contexts specified above (Table 1). The randomization of the stimuli was different for every fifth participant. There were four sets of randomized blocks, with each block consisting of of nonce word blocks of triplets. Every nonce word block contained 75 nonce words: 5 triplet sets x 3 stress-based minimal triplet members x 5 different sentence types. Both tests had a duration of 30 minutes long each and, in this phase, no feedback was provided, and no sequence was repeated. The experiment was built and run using Psychopy 2 version 1.84.1 (Peirce, 2007, 2009).

Table 2: Structural contexts for real words.

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

In the second part of the perception task, participants listened to real and non-real words in isolation or embedded in a sentence (e.g., límite or ¿Él dijo límite ayer?) and indicated as quickly as possible which word they heard by clicking on one of the three options (e.g., límite - limite – limité) they were presented on a computer screen. Each word was presented in the five contexts specified in Tables 1 and 2.

6 Data Analysis and Results

6.1 Results of Proficiency Judgment Task

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 09 shows the average ratings based on level of the Japanese-speaking learners of Spanish. The results of the overall oral production were as follows: the immersed group was rated as 'advanced' by the judges, and for the non-immersed group, judges 1 and 3 rated them all as advanced, while judge 2 rated them as less advanced. A 1 to 5 scale was used, where 1 was not at all advanced, and 5 very advanced (adapted from Dörnyei & Csizér, 2012).

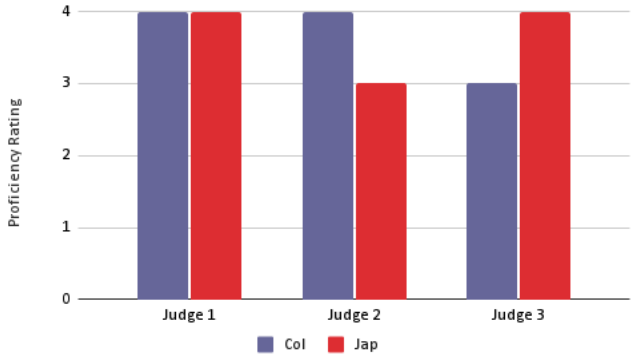

Figure 9: Average rating of oral production in the proficiency judgment test.

6.2 Effect of Context of Learning

We measure the perception of Spanish lexical stress through the analysis of Post hoc Bonferroni-corrected pairwise t-tests. We first compared the accuracy of learning environment through a 1-way, between subjects ANOVA. Figure 10 shows that the groups differed and that there was a significant main effect of learning environment; that is, immersed vs. non-immersed vs. Bogota L1 ($F(2) = 267.39$, $p < 0.001$, $\eta p2 = 0.90$, $OP > 0.99$). 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 immersed group (M = 0.48, SE = 0.01), and then the non-immersed group (M = 0.38, SE = 0.01). All pairwise differences were significant at the $p < 0.001$ level. As a whole, these results indicate that immersion significantly aided stress identification in L2 learners.

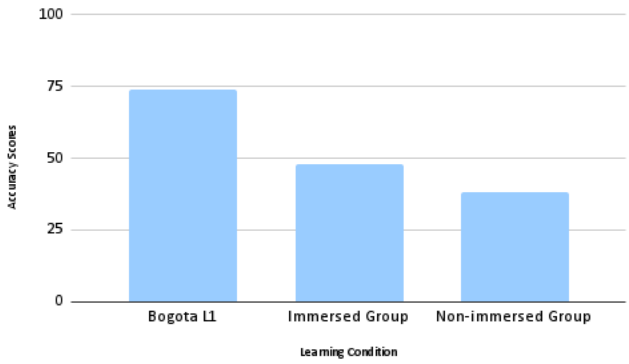

Figure 10: Estimated marginal means of accuracy for learning environment.

We next explored the relationship between learning context and stress position using a 3x3, mixed-model ANOVA with learning context as a between-subject factor and stress position as a within subject factor. Figure 11 provides the estimated marginal means for the effect of learning condition and stress position condition ($F(3.60,111.48) = 7.50$, $p < 0.001$ $\eta p2 = 0.20$, OP > 0.99). Paroxytone words were harder to perceive than proparoxytones for all three groups. As expected, the native speakers had the highest accuracy rates. As hypothesized, the immersed group obtained higher accuracy rates than the non-immersed group.

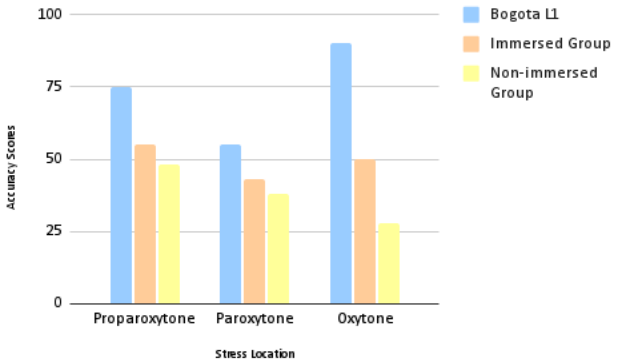

Figure 11: Estimated marginal means of accuracy for the interaction between learning condition and stress position.

We next explored the relationship between learning context and word position using a 3x2, mixed-model ANOVA with learning context as a between-subject factor and word position as a within subject factor. Figure 12 shows that there was an interaction between learning condition and word position ($F(2,62) = 9.71$, $p < 0.001$, $\eta p2 = 0.24$ OP = 0.98). Words in final position were easier to perceive than those in non-final position. This is telling us that peaks aligned within the stressed syllable (i.e., final position) are most likely easier to perceive than displaced peaks (i.e., non-final position). Given the pattern of the Japanese speakers L1, when peaks aligned within the stressed syllable, the perception was easier. This was also the case for the L1 speakers of Spanish. This result was not expected and might have been obtained due to the fact that the results were collapsed across both conditions of learning.

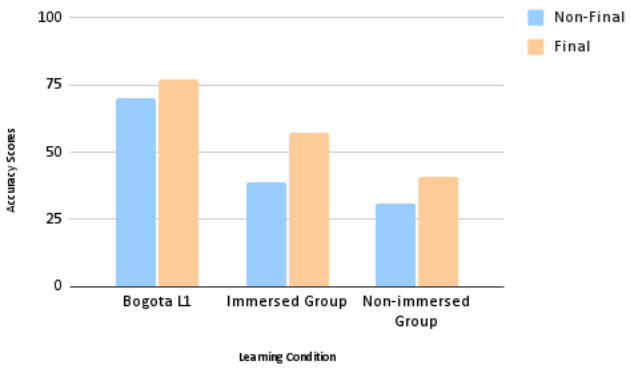

Figure 12: Estimated marginal means of accuracy for the interaction between learning condition and word position.

We next explored the relationship between learning context and sentence type using a 3x2, mixed-model ANOVA with learning context as a between-subject factor and sentence type as a within subject factor. Figure 13 presents the accuracy scores, which had a significant interaction between learning condition and sentence type ($F(2,62) = 5.18$, $p = 0.008$, $\eta p2 = 0.14$, OP = 0.81). Participants exhibited lower means of accuracy with yes/no questions than exclamations. As expected, the L1 group (MQ= 0.72 vs. ME 0.75) was generally more accurate than the immersed group (MQ= 0.44 vs. ME = 0.52) and the non-immersed group (MQ = 0.32 vs. ME = 0.43). Of particular interest to the research questions is that we found that the non-immersed group exhibited more difficulty perceiving lexical stress across the board in yes/no questions than the immersed group, as predicted.

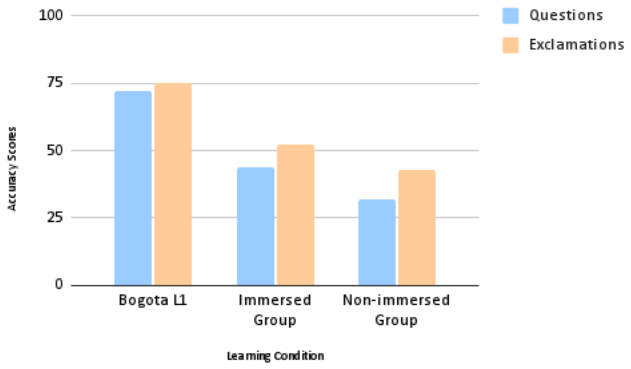

Figure 13: Estimated marginal means of accuracy for the interaction between learning condition and sentence type.

We next tested whether the relationships between learning condition, sentence position, and stress position were independent by conducting a 3-yaw, 3x2x3 mixed-model ANOVA with learning condition as a between group variable, and sentence position and stress position as within-subject variables. Figures 14, 15, and 16 show that there was a significant 3-way interaction between learning condition, sentence position, and stress position ($F(3.45, 106.81) = 9.12$, $p < 0.001$, $\eta p2 = 0.23$, 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 immersed groups, paroxytone and proparoxytone words in final position were easier to perceive than in non-final position. We had predicted that the immersed group would outperform the non-immersed group, but we had not predicted that the two groups would exhibit different

patterns of stress identification. In the immersed group, proparoxytone and paroxytones were easier in final position. In the non-immersed groups, however, proparoxytone and paroxytone were easier in the non-final position.

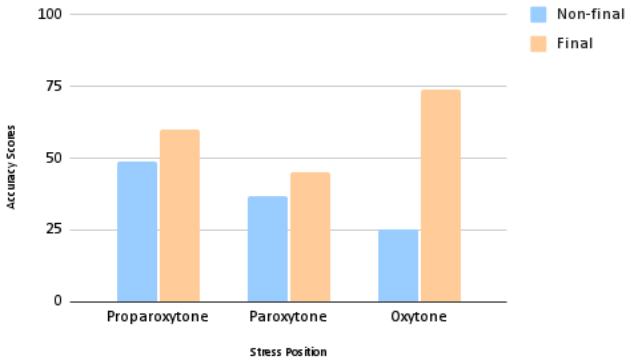

Figure 14: Estimate marginal means of accuracy for the interaction between immersed group, sentence position, and stress position.

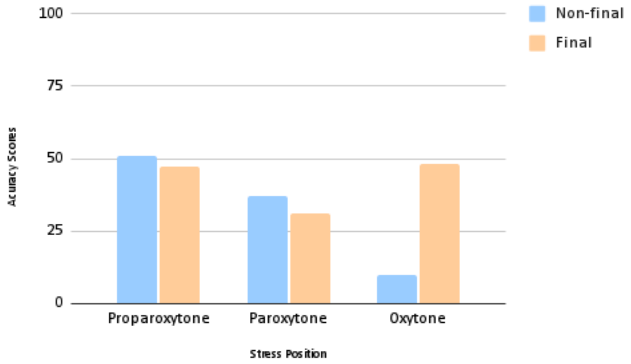

Figure 15: Estimated marginal means of accuracy for the interaction between non-immersed group, sentence position, and stress position.

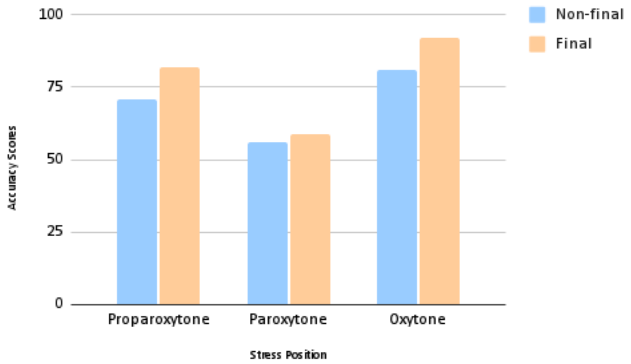

Figure 16: Estimated marginal means of accuracy for the interaction between Bogota L1 group, sentence position, and stress position.

Last, we explored the relationship between learning context and word type using a 3x2, mixed-model ANOVA with learning context as a between-subject factor and word type as a within subject factor. Figure 17 illustrates a significant interaction between learning condition and type of word ($F(2,62) = 9.68$, $p < 0.001$, $\eta p2 = 0.24$, OP = 0.98). The Bogota L1 group showed lower means of accuracy for nonce words (MN = 0.70) than for real words (MR = 0.78). For the immersed group, real and nonce words resulted in similar rates of accuracy (MR = 0.48 vs. MN

= 0.49). However, the non-immersed group obtained the opposite pattern with a lower mean of accuracy for real words than for nonce words (MR = 0.35 vs. MN = 0.39). The results of the perception of real and nonce words were not as expected.

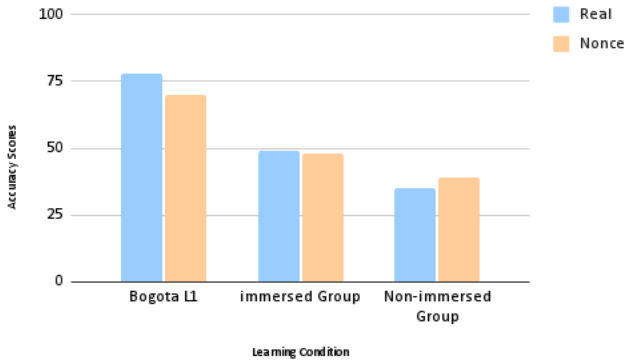

Figure 17: Estimated marginal means of accuracy for the interaction between learning condition and type of word.

7 Discussion

The main goal of the present study was to determine whether context of learning affects the perception of Spanish lexical stress by advanced Japanese-speaking late learners of Spanish. It was predicted that there would be an effect of context of learning, where learners who were immersed in Spanish in Bogota, Colombia would outperform the formally instructed Japan group in the correct identification of stress in paroxytone and proparoxytone words in interrogative and exclamative sentences (Pérez-Vidal et al., 2011; Romanelli et al., 2015a, 2015b; Romanelli et al., 2014). This hypothesis was confirmed, as there was a significant main effect of context of learning, and overall, the immersed learners outperformed the non-immersed learners in stress identification. This indicates that five years of immersion in the target language results in great benefits for the perceptual ability of the learners. Moreover, asymmetries, both with respect to accuracy rates and error types, were noted. For example, whereas the immersed group patterned with the native speakers of Spanish, exhibiting a higher accuracy rate in final position, when the results were collapsed for the exclamative and interrogative sentences, the non-immersed group had a higher accuracy rate in non-final position. An F0 peak that was shared between two syllables affected the two learners' groups differently at times. That is, there was a rise in the stressed syllable with a peak in the post-tonic syllable and a rise to a peak within the stressed syllable.

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 L2 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, Colombia, with those in the country of origin studying in a formal setting.

The second research question in this study focused on the effect of word type (i.e., real vs. nonce) on the perception of Spanish lexical stress, where an effect of type of word was

predicted where real words would be easier to produce (Altmann, 2006). Theoretically, real words should be easier than nonce words because learners would have access to the stress patterns in their lexicon that they have learned in the classroom or in natural immersion settings (Altmann, 2006; Hymes, 1997; and Romanelli et al., 2015b). No main effect of type of words was found and the difference between real and nonce words was not significant, therefore contesting the first hypothesis. 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, and 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 and Menegotto (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 and instead, they were using their own strategies to perceive Spanish lexical stress. Another reason might be the order of the words presented during the task. All the participants listened to the nonce words first and then the real ones. Maybe, they were more alert during the first part of the task dedicated to the nonce words. The participants might not have performed as well as they would normally 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 and fatigue effects into consideration.

7.1 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 has been observed in previous studies (Garrido et al., 1993; Llisterri et al., 1993,1995; Prieto et al., 1995; Xu, 1999; Ortega-Llebaria, 2006; Ortega-Llebaria & Prieto, 2007, 2010, and Ortega-Llebaria et al., 2013) and this study. Moreover, the results suggest that difficulties in the acquisition of Spanish lexical stress at least partly lie in perception, at least with respect to lexical stress in interrogative and exclamative sentences. Therefore, it is suggested that more time be dedicated to perceptual training in the classroom. We have adopted the recommended name, we predict that 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.

8 Limitations and Future Directions

A number of future studies can be conducted. First, in future studies, the perception of real vs. nonce words can be investigated, where the stimuli are better randomized. Second, future studies can examine the effect of perceptual training on the perception of stress placement of Japanese speakers. For example, future work could examine the potential effects of training on an immersion vs. a formal instruction group requires further examination. Moreover, very little is still known about whether formal instruction boosts the perception of Spanish stress alongside 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 & Menegotto, 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 study can be considered as a contribution in this area of phonological research that will help to start new discussions about this topic.

9 Conclusions

In this study we examined the effect of context of learning on Japanese speakers who were in Tokyo and in Bogota. The results yielded a significant effect of context of learning. We focused on the identification of stress in oxytone, paroxytone, and proparoxytone words in interrogative and exclamation sentences and also on the perception of real and nonce words. On the whole, in terms of the influence of the context of learning the findings 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. However, the results revealed differences between the group in immersion in Bogota and the group receiving formal instruction in Japan with respect to the perception of real and nonce words since the Japan group appeared to perform slightly better in the nonce word context, although the differences between the two contexts were not significant. Since these findings are inconsistent with the previous literature, more testing will be required to fully explain the effects of context of learning in the perception of nonce words specifically.

As mentioned previously, this study addresses the unique need for empirical studies on the perception of Spanish lexical stress by Japanese speakers in L2 phonological acquisition through immersion and formal instruction. The language pairing as well as the focus on perception in this study are what set this study apart from previous studies on the effect of immersion on L2 phonological acquisition research. However, more studies are required to get a more comprehensive view of the effects of context of learning and length of immersion in the perception of Spanish lexical stress by Japanese speakers. It is necessary to cover wider objects of analysis such as segmental and suprasegmental phenomena, the vowel similarities between Japanese and Spanish, as well as the adoption of different designs that include phonological training, pre- and post-immersion testing, and formal instruction during the immersion time.

APPENDIX

Table 3: Nonce Words Stimuli

Context 1: Target word in isolation	Context 2: Target word in final position of yes/no question	Context 3: Target word in non-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 nábido? did he say nábido?	¡él dijo nábido! he said nábido!	¿él dijo nábido ayer? did he say nábido yesterday?	¡él dijo nábido ayer! he said nábido yesterday!
na**<u>bi</u>**do	¿él dijo nabido? did he say nabido?	¡él dijo nabido! he said nabido!	¿él dijo nabido ayer? did he say nabido yesterday?	¡él dijo nabido ayer! he said nabido yesterday!
nabi**<u>dó</u>**	¿él dijo nabidó? did he say nabidó?	¡él dijo nabidó! he said nabidó!	¿él dijo nabidó ayer? did he say nabidó yesterday?	¡él dijo nabidó ayer! he said nabidó yesterday!
<u>tí</u>pimo	¿él dijo típimo? did he say típimo?	¡él dijo típimo! he said típimo!	¿él dijo típimo ayer? did he say típimo yesterday?	¡él dijo típimo ayer! he said típimo yesterday!
ti**<u>pi</u>**mo	¿él dijo tipimo? did he say tipimo?	¡él dijo tipimo! he said tipimo!	¿él dijo tipimo ayer? did he say tipimo yesterday?	¡él dijo tipimo ayer! he said tipimo yesterday!
tipi**<u>mó</u>**	¿él dijo tipimó? did he say tipimó?	¡él dijo tipimó! he said tipimó!	¿él dijo tipimó ayer? did he say tipimó yesterday?	¡él dijo tipimó ayer! he said tipimó yesterday!
<u>né</u>tico	¿él dijo nético? did he say nético?	¡él dijo nético! he said nético	¿él dijo nético ayer? did he say nético yesterday?	¡él dijo nético ayer! he said nético yesterday!
ne**<u>ti</u>**co	¿él dijo netico? did he say netico?	¡él dijo netico! he said netico!	¿él dijo netico ayer? did he say netico yesterday?	¡él dijo netico ayer! he said netico yesterday!

neti**có**	¿él dijo neticó? did he say neticó?	¡él dijo neticó! he said neticó!	¿él dijo neticó ayer? did he say neticó yesterday?	¡él dijo neticó ayer! did he say neticó yesterday?
mádino	¿él dijo mádino? did he say mádino?	¡él dijo mádino! he said mádino!	¿él dijo mádino ayer? Did he say mádino yesterday?	¡él dijo mádino ayer! he said mádino yesterday!
ma**di**no	¿él dijo madino? did he say madino?	¡él dijo madino! he said madino!	¿él dijo madino ayer? did he say madino yesterday?	¡él dijo madino ayer! he said madino yesterday!
madi**nó**	¿él dijo madinó? did he say madinó?	¡él dijo madinó! he said madinó!	¿él dijo madinó ayer? did he say madinó yesterday?	¡él dijo madinó ayer! he said madinó yesterday!
tánimo	¿él dijo tánimo? did he say tánimo?	¡él dijo tánimo! he said tánimo	¿él dijo tánimo ayer? did he say tánimo yesterday?	¡él dijo tánimo ayer! he said tánimo yesterday!
ta**ni**mo	¿él dijo tanimo? did he say tanimo?	¡él dijo tanimo! he said tanimo!	¿él dijo tanimo ayer? did he say tanimo yesterday?	¡él dijo tanimo ayer! he said tanimo yesterday!
tani**mó**	¿él dijo tanimó? did he say tanimó?	¡él dijo tanimó! he said tanimó!	¿él dijo tanimó ayer? did he say tanimó yesterday?	¡él dijo tanimó! he said tanimó yesterday!

Table 4: Real 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 número? did he say number?	¡él dijo número! he said number!	¿él dijo número ayer? did he say number yesterday?	¡él dijo número ayer! he said number yesterday!

num**e**ro	¿él dijo numero? did he say I number?	¡él dijo numero! he said I number!	¿él dijo numero ayer? did he say I number yesterday?	¡él dijo numero ayer! he said I number yesterday!
numer**ó**	¿él dijo numeró? did he say he/she numbered?	¡él dijo numeró! he said he/she numbered!	¿él dijo numeró ayer? did he say he/she numbered yesterday?	¡él dijo numeró ayer! he said he/she numbered yesterday!
m**é**dico	¿él dijo médico? Did he say doctor?	¡él dijo médico! he said doctor!	¿él dijo médico ayer? Did he say doctor yesterday?	¡él dijo médico ayer! he said doctor yesterday!
med**i**co	¿él dijo medico? Did he say I medicate?	¡él dijo medico! he said I medicate!	¿él dijo medico ayer? Did he say I medicate yesterday?	¡él dijo medico ayer! he said I medicate yesterday!
medic**ó**	¿él dijo medicó? Did he say he/she medicated?	¡él dijo medicó! he said he/she medicated!	¿él dijo medicó ayer? Did he say he/she medicated?	¡él dijo medicó ayer! he said he/she medicated yesterday!
l**í**mite	¿él dijo límite? Did he say limit?	¡él dijo límite! he said limit!	¿él dijo límite ayer? Did he say limit?	¡él dijo límite ayer! he said limit yesterday!
lim**i**te	¿él dijo limite? Did he say I/he/she limit?	¡él dijo limite! he said I/he/she limit!	¿él dijo limite ayer? Did he say I/he/she limit?	¡él dijo limite ayer! he said I/he/she limit yesterday!
limit**é**	¿él dijo limité?	¡él dijo limité!	¿él dijo limité ayer?	¡él dijo limité ayer!

	Did he say he/she limited?	he said he/she limited!	Did he say he/she limited?	he said he/she limited yesterday!
v**á**lido	¿él dijo válido? Did he say valid?	¡él dijo válido! he said valid!	¿él dijo válido ayer? Did he say valid yesterday?	¡él dijo válido ayer! he said valid yesterday!
val**i**do	¿él dijo valido? Did he say I respect/steem/ appreciate?	¡él dijo valido! he said I respect/ steem/appreciate!	¿él dijo valido ayer? Did he say I respect/steem/ appreciate yesterday?	¡él dijo valido ayer! he said I respect/ steem/appreciate yesterday!
valid**ó**	¿él dijo validó? Did he say he/she respected/ steemed/ appreciated?	¡él dijo validó! he said he/she respected/ steemed/ appreciated!	¿él dijo validó ayer? Did he say he/she respected/ steemed/ appreciated yesterday?	¡él dijo validó ayer! he said he/she respected/ steemed/ appreciated yesterday!

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