

# Perceiving Intonational Cues in a Foreign Language: Perception of Sentence Type in Two Dialects of Spanish

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## 1. Introduction

Research interest in segmental second language (L2) phonology has grown substantially since the initial strides of Flege and his colleagues in the 1980s (e.g., Flege, 1981, 1987, 1995; Flege & Hillenbrand, 1984), and has recently produced a number of full length books and edited volumes (e.g., Bohn & Munro, 2007; Hanson Edwards & Zampini, 2008; Major, 2001). Meanwhile, recent years have seen an explosion of research on intonational phonology in both English and Spanish. However, very few studies have considered the intonation of second or foreign language learners (see Henriksen, Geeslin & Willis, 2010; Nibert, 2005 for notable exceptions in L2 Spanish intonation). In fact, according to Major (2001), “there is a dearth of SLA research in tone and intonation” (p. 17). There may be several reasons why this intriguing area of second language acquisition has been largely unexplored. For example, the development of methodological and theoretical approaches to suprasegmental phonology has historically lagged behind segmental phonology. Even with recent advances, the application of traditional intonational phonology methodology to the study of second language learners may not be appropriate considering studies in second language acquisition (SLA) often prefer interactive conversational activities, as opposed to the controlled laboratory approach typically employed in intonational phonology. The study of the L2 intonation of Spanish may be particularly challenging. It could be argued that the Spanish intonational system presents a moving target for adult learners. Dialectal variation in Spanish intonation has long been supposed and has recently been documented in a systematic way (e.g., Prieto & Roseano, 2010; Sosa, 1999). Therefore, perhaps the greatest challenge facing the L2 Spanish researcher is that it can be extremely difficult to confidently identify the intonational target of a given L2 Spanish learner. It would not be atypical for a learner in the United States to receive input from several varieties of Spanish which present drastically different intonational systems (Argentine, Caribbean, Castilian, and Mexican, for example).

Despite its challenges, early studies on L2 intonation have begun to lay the groundwork necessary for its systematic study. Nibert (2005) found that both intermediate and advanced learners were able to perceive intonational phrasing patterns (phrase accents) when sentence level syntax was simple, but that only advanced learners were able to approach native-like perceptions of phrasing with more complex syntax. It could therefore be argued that this relatively high achievement in intonational perception of phrasing with simple syntax is related to the relative closeness of the Spanish and English systems. It should be noted that the participants in Nibert’s study listened exclusively to speakers of Peninsular Spanish which is similar to American English in its use of intermediate phrases and intonation phrases (Beckman & Pierrehumbert, 1986; Nibert, 1999, 2000; Pierrehumbert & Beckman, 1988). However, the fact that the advanced learners were also able to perceive intonational phrasing with complex syntax suggests that only the advanced learners had become relatively accurate when an element was introduced that is not characteristic of their first language. Nibert demonstrated

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that perception studies can be used to demonstrate relative differences in L2 Spanish intonation across levels. Likewise, Kimura, Sensui, Takasawa, Toyomaru and Atria (2010) showed that 21 Japanese learners of L2 Spanish consistently failed to perceive stressed syllables of words with rising pitch accents, while they had no problem with falling accents. According to Kimura et al., Japanese is considered a “pitch accent” language as opposed to a “stress accent” language, which means that it is characterized by a falling pitch from the accented mora to subsequent mora, and lacks a distinctive rising accent, such as the one used in Spanish. As for the development of production abilities, Henriksen, Geeslin and Willis (2010) studied the production of L2 Spanish intonation during a seven week study abroad program in León, Spain. Results showed that by the end of the program, the four learners either modified their intonational production of declaratives, absolute interrogatives, and pronominal interrogatives by increasing their more dominant patterns or changed their final boundary tone inventory to become more native-like. Thus, they demonstrated that intonational acquisition can develop considerably during even a short study abroad immersion program.

Given the growing interest in the previously unexplored area of L2 Spanish intonation, the current study sets out to further explore L2 Spanish intonation by (1) investigating the roles of native and target language features in L2 perception, and (2) directly addressing the challenge of variable L2 Spanish intonational input, as was discussed above, by proposing two pairs of research questions:

1. How well do learners of Spanish as a foreign language perceive the most common intonational cues that are used to distinguish broad focus declaratives and absolute interrogatives? Are advanced learners more accurate in their perceptual abilities than beginning learners?
2. Are advanced learners similar in their perception of L2 Spanish intonation regardless of the input that they have received? Does extensive exposure to a particular intonational variety through study abroad lead to higher perceptual accuracy in that specific dialect?

The following section provides a brief overview of relevant research on the intonation of Spanish and English and the perception of sentence type in Spanish. Then, the methodology of the experiment carried out for the current study is described, followed by a discussion of its results and their implications.

## 2. The research context

### 2.1. Intonation in American English and Spanish

In both English and Spanish, intonation often communicates sentence type, with different contours being associated with different sentence types. However, it can also make an independent contribution to the meaning of an utterance. For example, intonation may convey attitude, emotion, and/or pragmatic intent (Levis, 2002). Therefore, in an effort to control for affective meaning, this paper focuses solely on pragmatically neutral broad-focus declaratives and absolute interrogatives.

The term *American English* is used here to refer to what has been called “General American English” (e.g., Liu, 2009). In this variety of English, declarative intonation is characterized by a high pitch accent associated with the stressed syllable of lexically-stressed words, a low phrase accent, and a low boundary tone: H\* L-L% in ToBI transcription (Liu & Xu, 2007). This contour is often described as a fall (See Figure 1). On the other hand, absolute interrogatives typically use a rising final contour with a low pitch accent, a high phrase accent, and a high boundary tone or L\* H-H% (See Figure 2). Historically, a distinction has also been claimed between high-rising (H\* H-H%) and low-rising (L\* H-H%) final rises in absolute interrogatives (e.g., Cruttenden, 1997), but Levis (1999, 2002) found that American speakers of English do not distinguish in meaning between the two. While a clear fall-versus-rise contrast has been observed in final position, there does not seem to be a consistent difference in prenuclear (i.e., non-final) intonational cues. Eady and Cooper (1986) found no difference in F0 topline between neutral (i.e., broad) focus statements and questions until the last key word. However, some research on sentences with narrow focus has found a salient difference in F0 between statements and yes-no questions (i.e., absolute interrogatives) beginning at the first stressed syllable of the first content word (Lui & Xu, 2007). During stressed syllables F0 is high or falling in

statements, and it is rising in questions even in the first content word, whether or not it is focused or if the focus is realized later in the sentence.

Figure 1. H\* L-L% falling contour for *She got a ninety-five*. from Levis (2002)

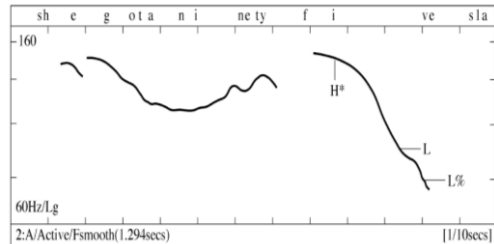
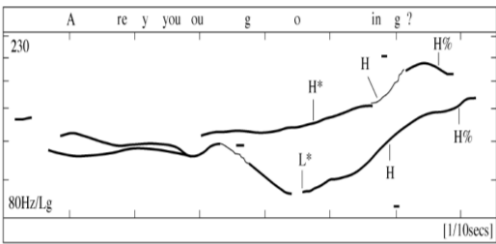


Figure 2. Comparison of H\* H-H% and L\* H-H% on *Are you going?* from Levis (2002)



The intonation of most varieties of Spanish is somewhat similar to English in the contours that are associated with declaratives and absolute interrogatives. For example, in Castilian and Mexican varieties, declaratives are characterized by falling final pitch movement and absolute interrogatives by a final rise (Face, 2004, 2008; Willis, 2005). For Castilian Spanish, more specifically the Spanish of Madrid, Face (2004) documented several differences in these sentence types. First, while both broad focus declaratives and absolute interrogatives have a rising pitch accent on the first stressed syllable, which usually peaks post-tonically, the peak of absolute interrogatives is frequently higher. Second, in utterances with three stressed words, the pitch of absolute interrogatives commonly falls gradually throughout the medial portion of the utterance before it reaches the final stressed word, whereas in declaratives the medial stressed word has another rising pitch accent. Finally, the final stressed syllable in declaratives has another rise and then the pitch falls to the end of the utterance. For absolute interrogatives, the pitch stays low through the onset of the final stressed syllable and then rises to the end of the utterance. However, further south in the Castile-La Mancha autonomous community, Henriksen (2010, 2012) found some noteworthy differences from Madrid Spanish. Henriksen’s Manchego Spanish speakers from the Ciudad Real province did not produce statistically higher prenuclear pitch accents in absolute interrogatives. In fact, while both early-rise (H\*;H%) and late-rise (L\*H%) interrogatives were documented, the initial pitch accent of the Manchego interrogatives was phonetically very similar to that of declaratives, meaning that in most cases, the utterance final fall-versus-rise contrast seems to be the main cue used to distinguish declaratives and absolute interrogatives. This falling versus rising final boundary tone, similar to American English and many varieties of Spanish, is not employed by some well know varieties of Spanish.

Figure 3. Broad focus declarative contour for *Mariana miraba la luna* from Face (2007)

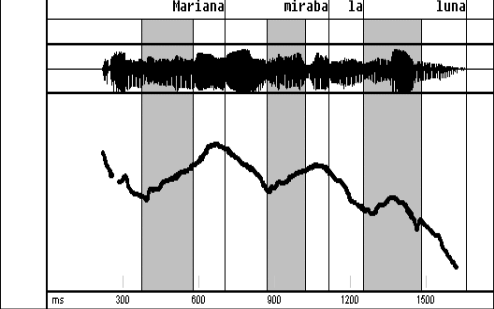
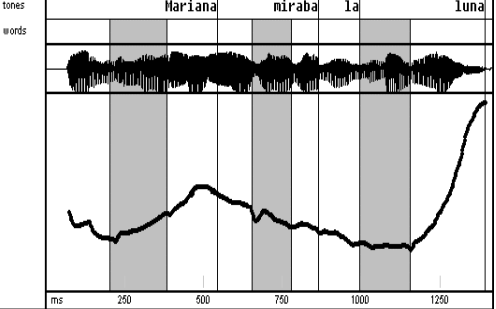


Figure 4. Absolute interrogative contour for *Mariana miraba la luna* from Face (2007)



Caribbean and Canary Island varieties of Spanish are known to employ a final falling intonation in absolute interrogatives (Alvord, 2010; Quilis, 1987). The absolute interrogatives of Venezuelan Andean Spanish do not typically use a final rise either. In fact, according to Astuc, Mora, and Rew (2010), “one of the most distinctive characteristics of Venezuelan Andean Spanish is the intonation of yes-no questions” (p. 220). Broad focus declaratives have falling final tones, similar to many varieties,

with delayed prenuclear peaks (L+>H\*), high nuclear accents (H\* or L+H\*), and low boundary tones (L%) (See Figure 5). The pitch accents of absolute interrogatives are extremely similar. In fact, prenuclear accents receive the same label (L+>H\*), because they do not differ in alignment; and both sentence types use low boundary tones (See Figure 6). Therefore, absolute interrogatives are distinguished from declaratives mainly by exaggerated pitch scaling and a circumflex nuclear pitch accent (Astuc, Mora, & Rew, 2010; Méndez, Mora, & Rojas, 2008; Méndez, 2010; Mora, 1993). The term circumflex refers to this type of rising-falling nuclear pitch accent. Figures 5 and 6 show that the shape of their contours is quite similar, but the peaks of the absolute interrogatives are significantly higher, which is reflective of the exaggerated pitch scaling.

Figure 5. Broad focus declarative contour for *Bebe una limonada* from Astuc et al. (2010)

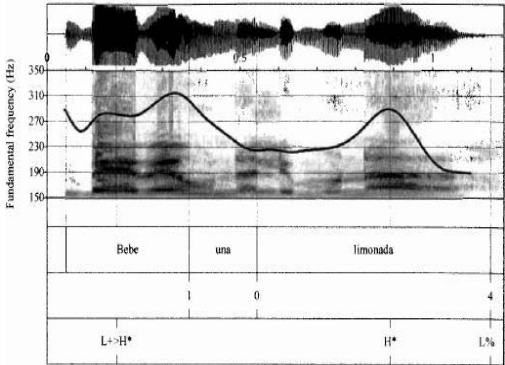
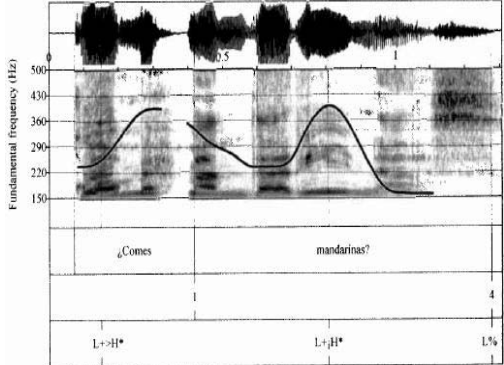


Figure 6. Absolute interrogative contour for *¿Comes mandarinas?* from Astuc et al. (2010)



2.2. The perception of intonational cues

In order to contextualize the perception experiment that is employed in this study of second language Spanish intonation, it is important to point out that its methodology and justification are heavily based on the perception work conducted with native speakers. Although many researchers have used perception studies to further develop intonational phonology, we will mention here only those studies that are related to the two dialects of Spanish that are used in the current study.

For Madrid Castilian Spanish, Face (2005, 2007) detailed the role that intonational cues play in the perception of declaratives and absolute interrogatives for native speakers. Face (2005) showed that native speakers could perceive sentence type with nearly 95% accuracy solely upon hearing the height of the initial peak. This accuracy increased to an even higher level when they heard the medial pitch movement. By manipulating the pitch of an utterance so that these cues would be combined in contradictory ways, Face (2007) showed that while both initial peak height and the presence or absence of a medial rise are important cues, it is the final rise or fall which carries the most perceptual weight. In other words, a final rise would lead listeners to perceive an interrogative even when all other cues would indicate a declarative.

As for Venezuelan Andean Spanish, Mora, Rojas, Méndez, and Martínez (2008) showed that native Spanish speakers from various regions of Venezuela could accurately perceive sentence type based solely on prosodic content. They compared the accuracy of the perception of utterances with lexical content to utterances that had been synthesized. Although perception of the synthesized utterances did not reach 100% accuracy, it did reach an overall accuracy of 78%: 82% for declaratives and 74% for absolute interrogatives (2008).

3. Methods

In order to compare the intonational perceptual abilities of learners of Spanish as a foreign language to the abilities of native speakers, answer the research questions, and thus begin to address the inherent challenges of Spanish L2 intonation, the present study makes use of a gating experiment. This experiment involved the recording of three speakers of Spanish, the creation of the gating

listening task, and the recruitment of 43 learners of Spanish as a second language along with a small control group of three native speakers to perform the listening task.

The first Spanish speaker was a male native speaker of Castilian-Manchego Spanish who was born and raised in Toledo, Spain. The second was a male native speaker of Venezuelan Andean Spanish who was born and raised in Mérida, Venezuela. The last was a female native speaker of English who was born and raised in the upper Midwest region of the United States. This third speaker was a graduate instructor of Spanish at a large Midwestern university in pursuit of an advanced degree in Hispanic literature and culture. This nonnative speaker was included to provide an idea of the input that beginning learners often receive on a daily basis. All three speakers were living and working in the United States at the time of recording. A background questionnaire was used to confirm this information and to gather other potential variables that could affect the intonation of these individuals (see Appendix A).

For the recordings, the speakers performed a reading task. The task consisted of a series of forty contexts and sentences. Each of the sentences was part of a pair: one broad focus declarative and one absolute interrogative (see Appendix B). The two sentences of each pair were lexically and syntactically identical. The contexts were included to ensure a precise reading that would require either a broad focus declarative or an absolute interrogative intonational pattern. The speakers were asked to imagine they were speaking with a friend or family member. They were also encouraged to repeat any false starts or errors in reading. Care was taken in the selection of the sentences to make sure that they were appropriate for even beginning level Spanish students. Additionally, voiceless and stop consonants were avoided to ensure a clear reading of the F0 curve. Half of the pairs included three stressed words (e.g., *Daniel miraba la luna*) and the other half consisted of only two (e.g., *Miraba la luna*). The sentences with three stressed words allowed the production of the Castilian speaker from Toledo to be directly compared to previous research on Madrid Castilian Spanish and its perception (Face, 2004, 2005, 2007)<sup>1</sup>. The intonational patterns of the Venezuelan Andean speaker were compared to the two stressed word sentences described and illustrated by Astruc, Mora, and Rew (2010). The general pattern of Venezuelan Andean declaratives and absolute interrogatives has also been described elsewhere (Mendez, 2010; Mendez, Mora & Rojas, 2008; Mora, 1993). As for the pattern of the nonnative speaker of Spanish, she consistently produced a medial pitch accent in absolute interrogatives with three stressed words. In fact, the pattern of her interrogatives closely resembled that of her declaratives until the final stressed word, as there were rising pitch accents on all prenuclear (i.e., non-final) stressed syllables. Beginning at the final stress word, her declaratives were categorically characterized by a final fall and her interrogatives by a final rise. Figures 7 and 8 show examples of the speaker from Toledo. Figures 9 and 10 show examples of the speaker from Mérida. Figures 11 and 12 show samples from the native English speaker. The twenty total pairs were analyzed with Praat (version 5.2.25) and five pairs, three with two stressed words and two with three, were selected for how well they represented what has been documented for both Castilian and Venezuelan Andean.<sup>2</sup> The same 10 sentences (five pairs) were taken from each speaker.

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<sup>1</sup> It should be remembered, however, that important differences have been found between speakers from Madrid and speakers from the Ciudad Real province of La Mancha. While the city of Toledo is geographically closer to Madrid than in is to the Ciudad Real province, without a wide-scale production study with native speakers from Toledo, it is impossible to know exactly how absolute interrogatives are distinguished from declaratives in Toledo Spanish.

<sup>2</sup> The pitch track of all selected aural stimuli resembled the contours depicted in previous literature and were very similar to those presented in Figures 7-12. In the case of the Toledo Castilian and Venezuelan Andean stimuli, the peak height of the initial pitch accent of absolute interrogatives was always at least 10Hz higher than that of the declaratives. The height difference averaged 27.4Hz for Toledo Castilian and 31Hz for Venezuelan Andean.

Figure 7. Toledo Decl. *Miraba la luna.*

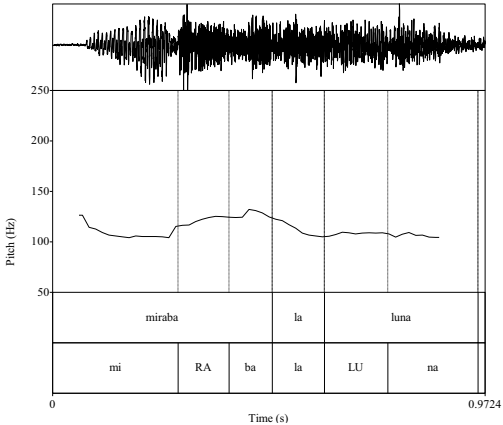


Figure 8. Toledo Inter. ¿Miraba la luna?

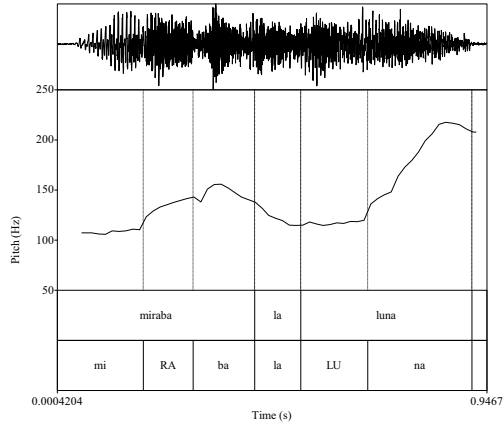


Figure 9. Ven. And. Decl. *Miraba la luna.*

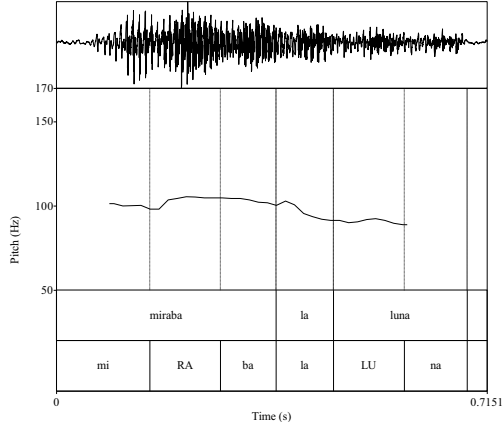


Figure 10. Ven. And. Inter. ¿Miraba la luna?

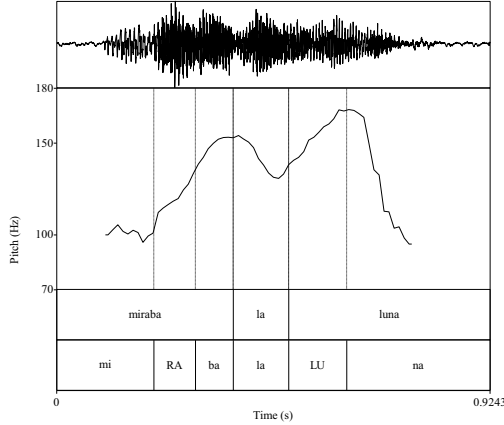


Figure 11. Nonnative Decl. *Miraba la luna.*

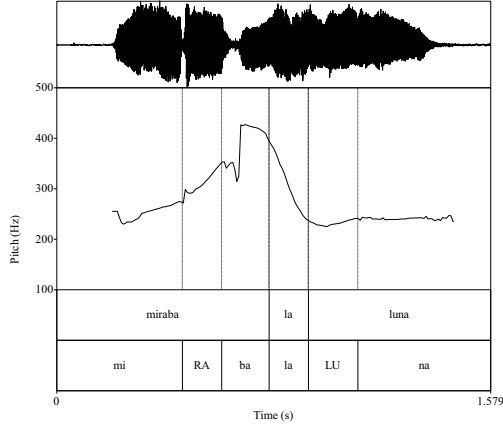
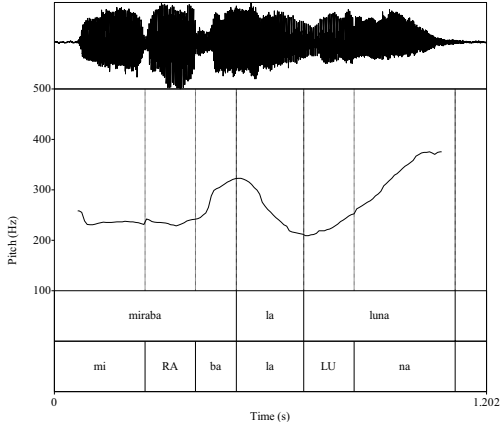


Figure 12. Nonnative Inter. ¿Miraba la luna?



Each of the six sentences with two stressed words was divided into two gates, and each of the four sentences with three stressed words was divided into three gates. In both two and three stressed word sentences, the first division was made just after the peak of the first stressed syllable. This first gate would sometimes include a small portion of the following word in order to capture the entirety of the initial peak. In utterances with three stressed words, a separate division was also made just before the third and final lexical item, so that the second gate would include both the initial and medial stressed words. In other words, these “gate 2” samples included everything but the nuclear pitch accent and the boundary tone.

After dividing the five pairs of utterances into gates, sound files were created that either included just the first gate, the first and second gates in the case of the phrases with three stressed words, or the whole utterance. The perception gating experiment was divided into two listening tasks. The first task included all the partial utterances: both the first gate and the first plus second gate samples in utterances with three stressed words. The second task was made up of the entire utterances. The sound files appeared in random order for both tasks. All together there were twenty-four listening stimuli per speaker (six 2-word 1<sup>st</sup> gates, four 3-word 1<sup>st</sup> gates, four 3-word 2<sup>nd</sup> gates, and ten entire utterances). These stimuli were presented to the listeners using Quia Web, a website designed for language instruction. The listeners were presented with one audio sample at a time and were required to select either statement or question for each sample. The text of each utterance appeared orthographically without punctuation and listeners were asked to listen to each sample up to three times.

The 43 learners were native speakers of American English who were studying Spanish as university students (16 males, 27 females). Their ages were between 19 and 56, and the average age was 22. The students were divided into four groups. Nineteen of them were enrolled in a second semester university language course. The second semester students are considered to be at the later stages of the beginning level of university-level language study. These students had very limited exposure to Spanish outside the classroom. Within the classroom, they had the unique experience of having the nonnative speaker included in this study as their instructor for both their semesters of Spanish. Furthermore, they were enrolled in a series of classes designed specifically for first time learners of Spanish. In other words, none of them had taken Spanish prior to enrolling in the first semester course. The other 24 learners were enrolled in third/fourth year Spanish content courses. Although a proficiency exam was not used in this study, this second group is expected to be at a significantly higher level. They had spent considerably more time studying Spanish. On average, an advanced student would have taken at least three additional courses in Spanish and many of them had extensive experience with Spanish outside the classroom. These 24 learners were further divided into three groups based on their experience studying abroad: nine of them had not studied abroad, nine had spent the previous semester studying in Toledo, Spain, and six had spent the previous semester in Mérida, Venezuela. The listeners completed a background questionnaire, also through Quia Web, to confirm their experience with Spanish and to gather other possible pertinent information (Appendix C). Three native Spanish speakers from Mérida, Venezuela also completed the listening task.

The results of the beginning learners give us the ability to examine the perceptual abilities of learners very early in their development. It is assumed that the L2 intonational system of these learners is based largely on their L1 intonational system, given their limited experience with Spanish. In response to the first research question, a cross-sectional comparison of the beginning and advanced learners can be used to determine if L2 intonational perceptual abilities become more accurate as learners advance to higher levels of proficiency. Additionally, considering the second research question, we can address the issue of whether or not intensive exposure to a particular intonational variety affects perception of specifically that variety by examining the results of the advanced learners that studied in Toledo and Mérida, given that these two dialects of Spanish are considerably different in their intonational patterns of absolute interrogatives. The performance of all 43 learners was statistically analyzed with SPSS Version 19.0. Lastly, because there were only three native speakers from Mérida, their results were not included in the statistical analysis, but were used as a point of reference for comparison.

## 4. Results

The results of the gating experiment begin by considering the general performance across both tasks. We will then examine the learners' performance for each task separately in reverse order, considering the second task (entire utterances) before the first task (partial utterances).

The single most telling result of the gating experiment is that the majority of learners of Spanish as a foreign language relied almost exclusively on utterance-final intonational cues when determining sentence type. The overall mean accuracy of the first task was a mere 58%, while the mean of the second task was 89%. In other words, averaging across all learners, the non-final intonational cues that were available only helped them to achieve a mean accuracy of 8% higher than what would be

expected for complete guessing. In general, learners were more accurate with declaratives (78%) than with interrogatives (63%). This could be indicative of an overall preference to suspect that an utterance is a statement and not assume that it is a question when expected interrogative cues are not perceived (cf. Face, 2005).

Although the learners’ perception of sentence type was quite accurate overall when they heard the entire utterance (89%), a closer look reveals that this does not hold true for all three speakers. A 3 (Dialect) x 2 (SentenceType) x 4 (Level) full-factorial ANOVA examined the effects of the dialect of the speaker (Toledo, Mérida, Nonnative), the type of sentence (Declarative, Interrogative), and the experience level of the learner (Beginner, Advanced-none, Advanced-Toledo, Advanced-Mérida). The advanced learners were grouped according to their study abroad experience. The ANOVA revealed a statistical difference based on experience level of the learner ( $F_{3,1266}=4.242$ ,  $p=.005$ , partial eta-squared=.01). Post-hoc LSD tests found that the perception of the beginners lagged behind that of advanced learners without experience abroad and advanced learners who studied in Mérida ( $p=.006$  and  $p=.003$ , respectively). The difference between beginners and advanced learners who had studied in Toledo was not significant ( $p=.185$ ). The ANOVA also showed highly significant differences in performance due to speaker Dialect ( $F_{2,1266}=160.1$ ,  $p<.0001$ , partial eta-squared=.202) and SentenceType ( $F_{1,1266}=136.7$ ,  $p<.0001$ , partial eta-squared=.097), as well as an interaction between Dialect and SentenceType ( $F_{2,1266}=221.2$ ,  $p<.0001$ , partial eta-squared=.259). Table 1 makes it quite clear that these significant differences are representative of the extreme difficulty that most learners had perceiving the absolute interrogatives of the speaker from Mérida. The mean accuracy was only 44%, meaning that, on average, learners heard the Venezuelan Andean interrogatives as statements more often than as questions. This led to a mean accuracy of only 72% for Mérida, as opposed to relative ease of perception for Toledo and the native English speaker (99% and 95%, respectively).

Even though the Venezuelan Andean absolute interrogatives were rather challenging for the majority of learners, the advanced learners that studied in Mérida may be picking up the intonational cues that are characteristic of this dialect. Table 2 shows that these learners reached 83% accuracy overall, eleven percentage points higher than the overall mean for the learners (72%). The ANOVA found a statistical main effect for Level ( $F_{3,1266}=4.242$ ,  $p<.01$ , partial eta-squared=.010) and a statistical interaction between Dialect and Level ( $F_{6,1266}=2.903$ ,  $p<.01$ , partial eta-squared=.014). Figure 13 (below) shows clear differences in how each learner level performed when listening to the different speakers. There was also a significant 3-way interaction between Dialect, SentenceType, and Level ( $F_{6,1266}=3.055$ ,  $p<.01$ , partial eta-squared=.014). In other words, the way that Dialect interacts with SentenceType depends on the experience Level of the learner. The ANOVA model for the entire utterance explained 43% ( $R^2=.430$ ) of the variance in perception of sentence type. The age, gender, and how often learners communicated in Spanish outside of the classroom were shown to be statistically insignificant ( $p>.05$  in all cases) and were therefore not included in the final ANOVA model.

Table 1. Learner accuracy in perception of entire utterances by dialect

Sentence type	Toledo (99%)	Mérida (72%)	Native English (95%)
Declarative	99%	97%	91%
Abs. Interrogative	100%	<b>44%</b>	99%

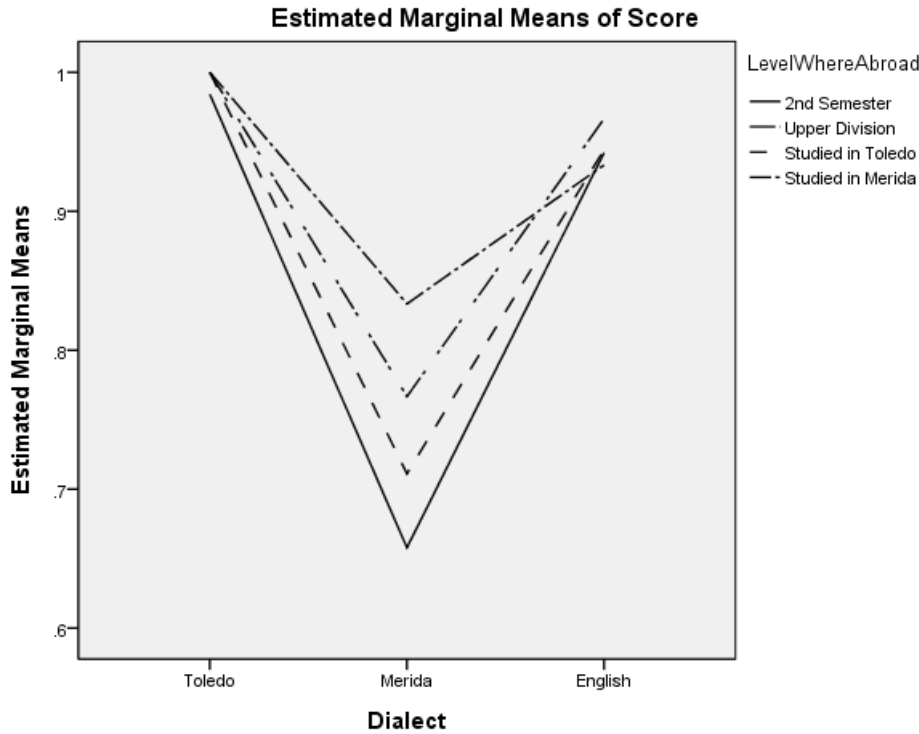
Table 2. The effect of study abroad on the perception of Venezuelan Andean entire utterances<sup>3</sup>

Experience abroad	Declarative (100%)	Interrogative (46%)	Total (73%)
Beginners	99%	33%	66%
Advanced-none	100%	53%	77%
Advanced-Toledo	100%	42%	71%
Advanced-Mérida	100%	<b>67%</b>	<b>83%</b>
Native Venezuelans	100%	80%	90%

<sup>3</sup> Please note that Table 2 includes the data of three native speakers from Mérida, but that these three participants were not included in any of the statistical analysis because of their small sample size.



Figure 13. Interaction between speaker dialect and learner experience level (p<.01)

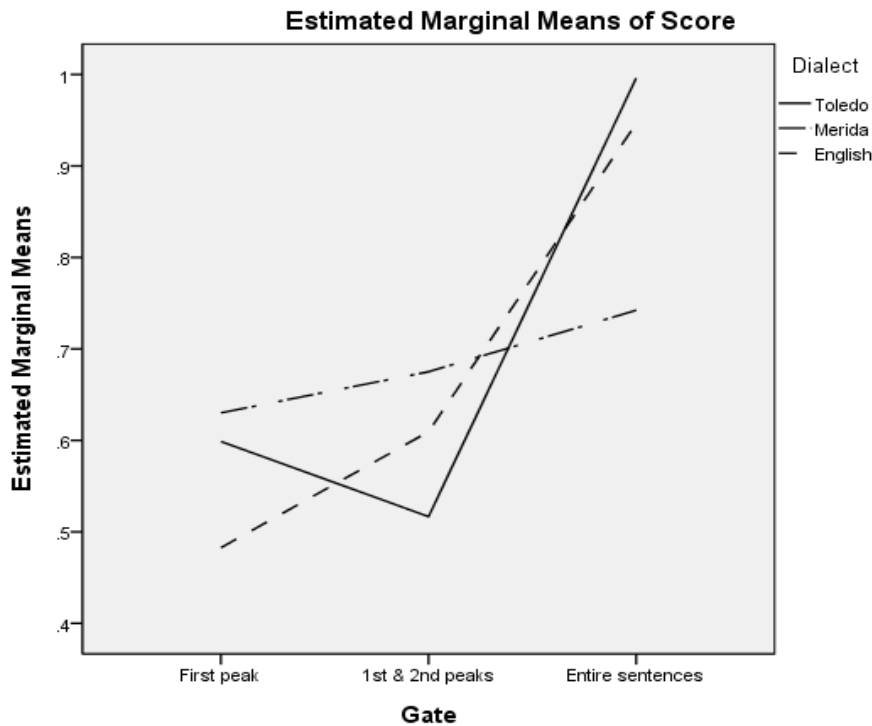


A second ANOVA was used to examine the previously explored variables (Dialect, SentenceType, Level) across the three gates. This model was not as strong, explaining 27% ( $R^2=.267$ ) of the variance in perception of sentence type. Gate was the most statistically significant main effect ( $F_{2,3024}=232.61$ ,  $p<.0001$ , partial eta-squared=.133). The main effects of Dialect ( $F_{2,3024}=11.242$ ,  $p<.0001$ , partial eta-squared=.007) and SentenceType ( $F_{1,3024}=99.133$ ,  $p<.0001$ , partial eta-squared=.032) were statistically significant once again. There were also significant interactions between Gate and Dialect, Dialect and SentenceType, SentenceType and Level, as well as a 3-way interaction among Gate, Dialect, and SentenceType ( $p<.05$  in all cases). Table 3 (below) presents the results organized by Gate and Dialect. These numbers represent mean scores without showing differences based on sentence type. Table 3 also shows the differences in learner experience level in gray shading. Figure 14 (below) shows the interaction between Gate and speaker Dialect.

Table 3. Learner perception of dialectical intonation cues by gate

Dialect	1 <sup>st</sup> gate	2 <sup>nd</sup> gate	Entire utterance
<i>Level Exper. Abroad</i>	<i>Mean (Beg, Adv, Tol, Mer)</i>	<i>Mean(Beg, Adv, Tol, Mer)</i>	<i>Mean(Beg, Adv, Tol, Mer)</i>
Toledo	60 (58, 63, 58, 60)	53 (55, 50, 56, 46)	99 (98, 100, 100, 100)
Mérida	63 (63, 64, 58, 67)	66 (64, 61, 61, 83)	72 (66, 77, 71, 83)
Nat Eng	47 (45, 52, 48, 48)	61 (62, 64, 56, 63)	95 (94, 97, 94, 93)
Total	57 (55, 60, 54, 58)	60 (61, 58, 57, 64)	89 (86, 91, 89, 92)

Figure 14. Interaction between gate and speaker dialect ( $p<.0001$ )



We can see that the Mérida variety is the most accurately perceived variety in the first and second gates. Furthermore, the higher than average intonational perception of Mérida non-final intonational cues is mostly reflective of the perceptual advantages of the learners who have studied abroad in Mérida. Upon hearing the first pitch accent of the Venezuelan speaker, the learners who studied in Mérida were able to perceive sentence type correctly 67% of the time. The results of the second gate are also quite interesting. Surprisingly, in comparison with the first pitch accent, the perception of Toledo Castilian sentence type decreased in accuracy when learners heard the first two-thirds of the utterance (i.e., not only the first, but also the second stressed word). This low accuracy for the Toledo second gate is a result of a very low mean accuracy (35%) for interrogatives. Here we should remember that the pitch of the Toledo interrogatives falls throughout medial position, which likely caused the learners to perceive them as declaratives. As for perception of Venezuelan Andean utterances, we again see an advantage for learners who had studied in Mérida. These learners accurately perceived the Venezuelan speaker 83% of the time, well above the overall learner average of 66%. Not surprisingly, the perception of the native English speaker’s utterances is not very accurate until the final stressed word, given that her utterances did not contain consistent intonational cues marking sentence type until the nuclear pitch accent.

5. Discussion

Returning to the original research questions, the results discussed in the previous section overwhelmingly indicate that many learners have trouble perceiving intonational cues that are not present in their first language. The majority of learners were unable to accurately perceive sentence type without the final pitch movement (58% for partial utterances). It is only when learners hear the entire utterances (90%) that their perception approaches the accuracy that native speakers of Castilian Spanish (95%) achieve upon hearing just the height of the first peak (Face, 2005)<sup>4</sup>. Furthermore, based

<sup>4</sup> As Face (2011) points out, it should be noted that differences in peak height could be gradient. It is entirely possible that the peak height differences of the Toledo Castilian aural stimuli of this study were lesser, or greater, than those in the experiments carried out with Castilian native speakers.

on the fact that the majority of learners had difficulty with the circumflex absolute interrogative pattern typical of Venezuelan Andean Spanish, they almost exclusively relied on a final rise as an indicator of an interrogative. Given that a final rise distinguishes interrogatives from the falling pattern of declarative in American English, it could very well be that learners' L2 intonational systems are based heavily on their L1. This reliance on the final rise could also be directly related to the typical absolute interrogative patterns of many varieties of Spanish to which learners would almost certainly have been exposed without studying in Mérida.

On the other hand, the results of this study provide evidence of a developing L2 intonation system. In response to the second part of the first research question, some advanced learners (i.e., those with no experience abroad or experience studying in Mérida) did perceive intonational cues of sentence type more accurately than the beginners. As for the second research question, an extended stay (a semester) in Mérida, Venezuela appears to lead to improved perception of L2 intonational cues in two ways. First, participants in the study abroad program in Mérida perceived the sentence type of Venezuelan Andean Spanish significantly more accurately when compared to other learners (83% compared to 72% learner mean). The 83% accuracy rate of the learners who studied in Mérida approaches the score of the three native speakers from Mérida who completed the listening task (90%). More native speaker data would be necessary for statistical analysis, but we can recall that the Venezuelan native speakers of Mora et al. (2008) only perceived the sentence type of synthesized Venezuelan Andean declaratives and absolute interrogatives correctly 78% of the time. Second, the results of the current study show that participants who study in Mérida may have a distinct advantage at deciphering sentence type based on prenuclear intonational cues. These learners achieved 67% accuracy when presented with only the first pitch accent of Venezuelan Andean utterances<sup>5</sup>. The advanced learners that studied in Toledo, Spain did not show perceptual advantages over other learners. We should interpret this result with caution, however, due to the fact that an extensive intonational study of absolute interrogatives has not been carried out with speakers from Toledo. While studying in Toledo, the learners may have been exposed to interrogatives with important distinctions in prenuclear position similar to those of Madrid (Face, 2005, 2007) and/or a lack of clear prenuclear distinction such as the interrogatives of Ciudad Real Manchego Spanish (Henriksen, 2010, 2012).

Returning to the perceptual advantages gained by learners who studied in Mérida, we can recall that the intonation of absolute interrogatives is one of Venezuelan Andean Spanish's most distinctive characteristics (Astuc, Mora, & Rew, 2010). On the other hand, the most important feature distinguishing declaratives and absolute interrogatives in Madrid Castilian and American English is a contrast between falling and rising final pitch movements. While Face (2005) showed that native speakers can make use of multiple cues including initial peak height and the presence or absence of a medial pitch accent, Face (2007) showed that utterance final pitch movement has the power to override earlier contradictory cues. Given this importance, and the fact that it coincides with learners' first language, it may not be surprising that learners are not picking up earlier cues. They may not need to make use of these early cues, given that the final rise and communicative context could be more than enough to indicate an interrogative. Or, as previously mentioned, the learners who studied in Toledo may not have been exposed to these early cues. In contrast, learners immersed in a context such as Mérida, Venezuela find themselves exposed to an absolute interrogative that would seem highly unusual to them. In fact, based on the results of this study, they may find it rather difficult to understand. Therefore, exposure to these rather unexpected cues may be specifically what led to more accurate perceptual abilities and thus development of an interlanguage intonational system that incorporates features of the L2. This result supports Nibert's (2005) finding that only advanced learners demonstrated native-like perceptual abilities when listening to complex syntactic elements that were not characteristic of their first language.

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<sup>5</sup> Here learners may be making use of not only differences in peak height, but also differences in slope of the rise and/or duration. Méndez (2010) claims that Venezuelan Andean absolute interrogatives are marked not only by higher peaks, but also by a reduction in vowel duration. The reader will notice that these learners did not achieve as high accuracy when hearing the higher peak of the Castilian absolute interrogatives.

6. Conclusion

This paper has presented the results of one of the first systematically organized investigations of the development of an interlanguage intonational system of learners of Spanish as a foreign language. It has documented some preliminary evidence that L2 Spanish intonation perception can develop during prolonged exposure to a distinct variety of Spanish (in this case, during a semester study abroad program). The learners who studied abroad in Mérida, Venezuela were clearly more able to accurately perceive the intonational cues of Venezuelan Andean Spanish than were the other L2 Spanish learners. This result also addresses one of the most difficult challenges of L2 Spanish intonation research by incorporating dialectal variation and showing that study abroad participants can be sensitive to that variation. However, this study is limited by its relatively few participants and the fact that learners were categorized as either beginners or advanced learners based on enrollment level without a proficiency test. Moreover, a larger number of native speaking participants, both from Toledo and from Mérida, would allow for stronger conclusions. While it does include three native speaking listeners from Mérida, this study relies heavily on comparisons to previous descriptions of native speakers’ perceptual abilities (Face 2005, 2007; Mora, Rojas, Méndez & Martínez 2008). A large scale investigation of the absolute interrogatives of Toledo, Spain would also strengthen the results and implications of this study. Additionally, the results of this study open potential avenues for future research. Considering the fact that the learners that studied abroad in Mérida, Venezuela were able to pick up on intonational cues which are not similar to those most commonly used in American English absolute interrogatives, future L2 intonation research should investigate more directly how well L2 intonation fits into models of speech learning (e.g., Best, 1995; Flege, 1987, 1995) that predict that L2 learners are more likely to discern L2 sounds that are dissimilar to those of their L1 (in this case, dissimilar intonational patterns). Lastly, the question of whether or not increases in the perception of L2 Spanish intonation are accompanied by developing interlanguage speech production will be left to future study.

Appendix A: Spanish speaker background questionnaire

Thank you for agreeing to take part in this study. Your participation involves completing the following questionnaire to provide information about your previous experience with the Spanish language.

ID (assigned by researcher): \_\_\_\_\_.

**Directions:** Fill out the following survey, either writing the information asked or marking with an X in the appropriate answer.

1. Age: \_\_\_\_\_
2. Sex (Mark with an X): Male \_\_\_\_\_ Female \_\_\_\_\_
3. Where were you born? \_\_\_\_\_
4. What dialect of Spanish do you consider yourself to speak? \_\_\_\_\_
5. What is your level of education in terms of highest degree completed? \_\_\_\_\_
6. Where did you attend primary school? \_\_\_\_\_
7. Where did you attend secondary school? \_\_\_\_\_
8. If you have attended a university or universities, where? \_\_\_\_\_, \_\_\_\_\_
9. How long have you been in the United States? (\_\_\_\_yrs or whole life) \_\_\_\_\_
10. Do you speak any languages other than Spanish and English?    Yes \_\_\_\_\_ No \_\_\_\_\_  
If so, which ones? \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
11. What language do you consider to be your dominant language? (or equal bilingual) \_\_\_\_\_
12. What percentage of your verbal communication, on average, is in Spanish? \_\_\_\_\_, English? \_\_\_\_\_
13. Do you have contact with Spanish speakers that speak a variety of Spanish that is different from your own?  
Yes \_\_\_\_\_ No \_\_\_\_\_ . If so, please explain by naming the variety and explaining the nature and frequency of the contact \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Appendix B: Speaking Task

Pairs of Lexically and Grammatically identical sentences:

1. Bebe una limonada.

2. Nadan en el mar.

3. Le devolvieron el dinero.

4. Miraba la luna.

5. Lleva un libro.

6. Le da el número.

7. Vienen mañana.

8. Salió normal.

9. Salió lo normal.

10. Terminó la banana.

11. Su abuelo le dio dinero.

12. Daniel miraba la luna.

13. Manuela la lleva de mañana.

14. Mariano mira un libro.

15. María come una banana.

16. Están leyendo en la librería.

17. Beben y nadan en el mar.

18. Tus hermanos hablan en la librería.

19. Le dieron el número de vuelo.

20. Mi amigo bebe en el bar.
1. ¿Bebe una limonada?

2. ¿Nadan en el mar?

3. ¿Le devolvieron el dinero?

4. ¿Miraba la luna?

5. ¿Lleva un libro?

6. ¿Le da el número?

7. ¿Vienen mañana?

8. ¿Salió normal?

9. ¿Salió lo normal?

10. ¿Terminó la banana?

11. ¿Su abuelo le dio dinero?

12. ¿Daniel miraba la luna?

13. ¿Manuela la lleva de mañana?

14. ¿Mariano mira un libro?

15. ¿María come una banana?

16. ¿Están leyendo en la librería?

17. ¿Beben y nadan en el mar?

18. ¿Tus hermanos hablan en la librería?

19. ¿Le dieron el número de vuelo?

20. ¿Mi amigo bebe en el bar?

Appendix C: Learner Background Questionnaire

Please answer all to the best of your ability. This is the final task. Please click “submit answers” when finished. Thank you very much for your participation!

Name: \_\_\_\_\_

1. What is you sex? ☐ Male ☐ Female.

2. How old are you? \_\_\_\_\_

3. What is your native language? ☐ English, ☐ Spanish, ☐ Other

4. What level is your current Spanish course(s) (if not currently enrolled, what was the level of your last Spanish class taken)? ☐ 1000, ☐ 3000, ☐ 5000, ☐ Native Spanish Speaker

5. Spanish is your... ☐ Major, ☐ Minor, ☐ required for your Major/Minor, ☐ none of the above

6. Where have you been exposed to Spanish? (mark all that apply)  
☐ Classroom ☐ Abroad ☐ At work ☐ At home ☐ Other

7. Where have you been exposed to Spanish THE MOST?  
☐ Classroom ☐ Abroad ☐ At work ☐ At home ☐ Other

8. If you recently studied abroad, in which program did you participate?  
☐ Toledo ☐ Mérida ☐ Other ☐ I have not studied abroad

9. If you have studied abroad, what semester/summer and year did you spend abroad?  
(e.g., Fall 2010; or 6-week summer 2009) \_\_\_\_\_

10. What Spanish-speaking countries have you visited/lived in and how long in each county?  
\_\_\_\_\_  
\_\_\_\_\_
11. What was the primary purpose of your visit to the Spanish-speaking countries? (mark all that apply)  
☐ study abroad ☐ vacation/travel ☐ service ☐ other ☐ N/A

12. How often would you say you communicate in Spanish outside of class?  
☐ never ☐ rarely ☐ sometimes ☐ often ☐ every day

13. With whom do you communicate in Spanish outside the class? (mark all that apply)  
☐ family ☐ friends ☐ co-workers ☐ significant other ☐ other

14. Where are the people with whom you communicate in Spanish from? \_\_\_\_\_

15. If you have a significant other, is he or she a native Spanish speaker? ☐ Yes, ☐ No

16. Other than English and Spanish, what other languages do you speak and how fluent are you in each?  
\_\_\_\_\_  
\_\_\_\_\_

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