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# Task-related effects in the prosody of Spanish heritage speakers and long-term immigrants\*

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We compare the extent to which Spanish heritage speakers and long-term immigrants in the United States differ in their intonation of broad focus declaratives, and propose that the between-group variability is motivated by the specific language learning/literacy conditions of each group. Results from a phonetically balanced reading task and an elicited narrative revealed significant differences between the two groups in their realization of pitch accents in read speech but not in the narratives. These results suggest that less-controlled tasks are more representative of the bilingual status of adult bilinguals, and that metalinguistic tasks, such as reading aloud, should be implemented with caution, crucially among Spanish heritage speakers who are in a semi-diglossic situation in the United States.

**Keywords:** Spanish intonation; heritage speakers; long term immigrants; task effects

## 1. Introduction

Do long-term Spanish immigrants and heritage speakers living in the United States differ in their use of intonational contours? If they do, are these differences more prominent in reading or in semi-spontaneous speech? These questions guide the present study, which focuses on the Spanish prosody of long-term immigrants and heritage Spanish in contact with English, an area of research so far underexplored but crucial to our understanding of the factors affecting foreign accent perception, pronunciation in bilingual populations, and, eventually language change (Bongaerts, 1999; Colantoni & Gurlekian, 2004; Flege, Munro & MacKay, 1995; Major, 2010; Mennen, 2004).

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Bilingualism, broadly described, is the ability to communicate in two languages, and this process is sometimes assumed to be uniform and balanced. This assumption, however, is linguistically naïve, as bilingualism should not be seen as an end result but as a dynamic process constrained by internal and external factors (Grosjean, 2008). Age of onset of bilingualism, the type of linguistic structure or the patterns of language use and activation all conflate in the level of proficiency and dominance that bilingual speakers might eventually achieve (Silva-Corvalán, 2014). Although some bilingual speakers manage to maintain equal levels of dominance in both languages, their linguistic competence typically undergoes cross-linguistic influence, especially in areas related to phonetics and phonology (Au, Knightly, Jun, & Oh, 2002). Even adult native speakers who immigrate to a second language (L2) context with a completely developed first language (L1) often undergo L1 attrition (Schmid, Köpke, Keijzer, & Weilemar, 2004), namely the loss of previously developed L1 morpho-syntactic (Cuza, 2010), lexical (Dewaele & Pavlenko, 2003) or phonological properties (De Leeuw, Schmid, & Mennen, 2010; Major, 2010; Mennen, 2004). Cross-linguistic influence, age effects (early vs. late bilinguals) and reduced exposure and use of the native language are considered to be the main predictable variables in the attrition process (Bylund, 2009).

Spanish long-term immigrants and heritage speakers in the United States share similar characteristics. First, they are exposed to Spanish as native and heritage language, respectively, from an early age. Second, they both live in a context where English is the majority language; thus, they are subsequently exposed to reduced input and use of Spanish. However, these two populations are also different. In contrast to long-term immigrants, heritage speakers born and raised in the United States have been exposed to the dominant societal language since an early age, and are often not exposed to formal instruction in the minority language during childhood. English is their language of schooling and communication outside of the home environment, becoming, in most cases, the stronger language. Thus, heritage speakers differ from long-term immigrants in their knowledge of the minority language. They represent, however, a homogeneous group regarding their learning conditions and lack of schooling in Spanish. This triggers a quasi-diglossic behavior, previously documented at the morphosyntactic level (Cuza, 2013; Montrul & Sánchez-Walker, 2013). Prosody constitutes an ideal point of departure to link previous research in the attrition of Spanish morphosyntax with investigations on heritage speakers' phonology, and the impact of early childhood exposure to the minority language on heritage speakers' production (Au et al., 2002; Bullock, 2009), given the relationship existing between prosodic and syntactic language specific patterns (Ladd, 2008).

Taking into account the existing differences in English and Spanish suprasegmental features, as well as previous research, we examine the extent to which long-term immigrants (LTIs) and heritage speakers (HSs) converge in their Spanish prosody. Additionally, we explore the role that task effects may play in enhancing or blocking

such patterns of cross-linguistic influence (Major, 2010; Rao, 2013; Ronquest, 2012).<sup>1</sup> In what follows, we review the relevant literature to position our study among those few projects that have looked at task-effects and phonological transfer across two distinct but interrelated bilingual populations.

## 2. Background

### 2.1 Phonological transfer

Previous research documents significant patterns of L1 phonological attrition and convergence with L2 patterns in a language contact situation. This was initially documented at the segmental level by Major's (1992) pioneering work on the attrition of English VOT among American immigrants to Brazil. Later, De Leeuw et al. (2010) examined the extent to which adult German immigrants living in Canada and The Netherlands were perceived as having a foreign accent in their native language after prolonged residence in the L2 context. Results showed significant differences in the perceived level of foreign accent among these immigrants. Specifically, communicative situations that disfavored code-mixing strategies appeared to be more conducive to the maintenance of native-like pronunciation.

Hopp and Schmid (2012) examined the same population, and obtained similar foreign accent ratings in German for the two experimental groups (i.e. L2 learners of German and long-term immigrants). This L2 population, however, was not ideal since the L2 learners arrived in Germany around the age of 11 ( $M=15;6$ ). Thus, they might not have been as affected by critical period effects as reported in previous research (Flege, Birdsong, Bialystok, Mack, Sung, Tsukada, 2006).

Researchers have also focused on the role of phonological cross-linguistic influence and age of onset of bilingualism among HSs, and on whether their patterns of L2 convergence resemble those of adult L2 learners. Exposure to the heritage language during early childhood, and overall more input in the lifespan appear to enhance the HSs' phonological awareness, giving them an advantage over adult learners in terms of target pronunciation and less foreign accent (Au et al., 2002).

Concerning prosody, recent research (De Leeuw et al., 2010; Major, 2010) confirms the long-standing claim that intonation can be transferred in a language contact situation (Henríquez Ureña, 1921). Bilingual speakers have been found to associate

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1. For the purpose of this study, heritage Spanish is the language spoken by second-generation immigrants born and raised in the US, or who immigrated from an early age (Montrul 2008). Native Spanish, in contrast, refers to the language of first generation immigrants, acquired and completely developed in a monolingual context before intense contact with a L2.

intonation patterns with divergent pragmatic meanings (Colantoni & Gurlekian 2004) or to develop a “mixed system” (Gut, 2005) where the two languages become more similar (Simonet, 2008). Patterns of convergence towards the suprasegmental features of the dominant language have been attested among LTIs and HSs across different language pairs including English-French (Bullock, 2009), German-English (De Leeuw et al., 2010; Hopp & Schmid, 2013), Dutch-Greek (Mennen, 2004), Spanish-English (Rao, 2013), Spanish-Catalan (Romera & Elordieta (2013), and English-Portuguese (Major, 2010).

## 2.2 Phonological transfer in Spanish

Previous work on the acquisition of Spanish phonology among Spanish HSs and English-speaking L2 learners demonstrated that segmental and suprasegmental features are vulnerable to cross-language effects (Au et al., 2002). Most of the research on segmental features has centered on the realization of voiced and voiceless stops, and has shown that HSs (even those who only had a passive knowledge of Spanish) often outperformed L2 learners in approaching VOT values. HSs were also often rated as more native-like, when compared to L2 learners (see Knightly, Oh, & Au, 2003). Research on the production of voiced or voiceless stops revealed a strong positive correlation between VOT values in Spanish and task-related effects. Rao (2013) examined a group of 10 Spanish HSs from the Chicago area, who were divided into two groups: Group 1, which included HSs with higher proficiency scores and more experience and contact with Spanish during childhood and present, and Group 2, which included HSs with lower proficiency scores in Spanish and less contact with the language during childhood and present. Results from a picture description and a reading task showed clear effects per group and condition. Specifically, participants’ VOT values approached Spanish values more closely in the picture description than in the reading task. According to Rao, this asymmetry was due to transfer from English (HSs are trained to read in English, not in Spanish) as well as increased cognitive demands typical of reading tasks.

Regarding Spanish prosody specifically, researchers have found differences in peak alignment patterns in broad focus declaratives in Spanish in contact with Basque (Elordieta 2003), Quechua (O’Rourke 2004), Italian (Colantoni & Gurlekian, 2004) and Palenquero (Hualde & Schwegler, 2008) among others. Changes in peak alignment (generally resulting in an earlier peak alignment in bilingual speech when compared to monolinguals) are not the only result of language contact reported. Additional differences involve the magnitude of the fall in declaratives (Colantoni & Gurlekian, 2004; Colantoni, 2011) and the realization of questions (Gabriel, Pešková, Labastía, & Blázquez, 2013; Henriksen, Geeslin, & Willis, 2010). To our knowledge, no study has compared the intonation of HSs and LTIs, but some researchers have analyzed the developmental patterns of L2 phrasing (Nibert, 1999) and sentence

intonation (Henriksen et al., 2010) among English-Spanish bilinguals. In particular, this latter study revealed that L1 English-L2 Spanish speakers differed from monolinguals either in the realization of the pre-nuclear rise or in the more frequent use of rising final boundary tones.

### 3. Suprasegmental differences between English and Spanish

In the present paper we focus on phonetic differences in the realization of broad focus declaratives (i.e., possible answers to questions such as *What happened?*), which are the type of sentences that have been studied the most in both languages. Declaratives tend to end with a falling pitch contour in both languages with some exceptions. In American and Canadian English, especially among younger speakers, rising contours are more frequent than falling contours (Shokeir, 2008). This pattern is known in the literature as ‘uptalk’ or high-rising terminal (HRT) contour (see §5.1). In some varieties of Mexican Spanish, there is a nuclear rise at the end of declaratives; i.e. the nuclear accent is a rising pitch accent and the fall is not as steep as the one found in other Spanish varieties. This is known as the circumflex pattern, and it is likely to be in the input of our LTIs and HSs (Martín Butragueño, 2003; de la Mota, Martín Butragueño, & Prieto, 2010).

Spanish and English differ in the phonetic realization of pitch accents in broad-focus statements. Pre-nuclear rising pitch accents in Mexican Spanish are typically realized with the valley aligned within the stressed syllable and a peak in the post-tonic. This is especially the case of words with penultimate stress. The position of the peak, however, varies depending on the distance of the following tonal movement (Prieto, van Santen, & Hirschberg, 1995; Prieto, Shih, & Nibert 1996). In American English, the default pre-nuclear pitch accent is H\* with a peak aligned within the stressed syllable (Bartels, 1997).

### 4. Research questions and Hypotheses

The present study seeks to answer the following questions:

**RQ1:** To what extent do HSs and LTIs differ in the intonation of broad focus declaratives? Do they show similar or divergent suprasegmental patterns depending on their specific language learning conditions?

**RQ2:** If differences are found, are those differences more prominent in a reading task or in semi-spontaneous speech? That is, would bilingual speakers show more English-like prosodic patterns in narratives than in a more controlled task (i.e., reading a text aloud)?

We propose that differences in language use have consequences at the prosodic level, reflecting a continuum of more English-like patterns in formal tasks (i.e., reading of a text), and more Spanish-like patterns in less formal tasks (i.e., retelling a story). We predict both bilingual groups to be more metalinguistically aware of their pronunciation in tasks involving reading aloud, than in retelling a well-known story in a semi-spontaneous manner. However, both groups will diverge in their prosody and intonational contours. In particular, we expect the HSs to use more English-like contours than LTIs in the reading task than in the narrative due to transfer of their previously acquired English reading skills and phonological processing strategies (Durgunoglu, 2002). Thus, given the differences between English and Spanish in the realization of pitch accents and boundary tones in declaratives (Bartels, 1997; Sosa 1999), we predict more frequent rising accents with peaks aligned within the stressed syllable, larger pitch excursions in pre-nuclear accents and variable use of rising boundary tones in read speech (approaching the English norm) versus later peak alignment, smaller pitch excursions and falling contours in spontaneous speech (oral narrative).

## 5. The study

### 5.1 Participants

Sixteen Spanish-English bilinguals (8 per group) took part in the study. All participants completed a language history questionnaire, which elicited information on their age of onset of bilingualism, length of residence in the United States, languages of formal education, and patterns of language exposure and use. The questionnaire also included a self-assessment section, which measured the participant's rating in both languages across the four linguistic skills (reading, writing, speaking and listening). In addition, participants completed an adapted version of the DELE test as an independent measure of proficiency in Spanish (Cuza, Pérez-Leroux, & Sánchez, 2013). Following previous work, scores between 40 to 50 represented high proficiency, scores between 30 to 39 represented intermediate proficiency, and scores ranging between 0 to 29 were considered as low proficiency (see Appendix 1 for a summary).

The immigrant group included bilingual speakers living in El Paso, Texas. They were all born and raised in Chihuahua – Mexico and arrived in the United States after puberty. Their average age at testing was 35 (range, 22–54;  $SD=11.8$ ) and their reported length of residence in the United States was of 11.5 years. The majority of the participants (75%) were university students. As for patterns of language use, most participants reported speaking either 'a little more Spanish' or 'only Spanish' at home

and in social situations. At school, 63% reported speaking either ‘both’ or ‘a little more Spanish’, while 37% reported speaking ‘a little more English’. Their average score in the DELE proficiency test was 45.4/50 (high level) and their self-proficiency score in English was reported as adequate (2.7/4).

The heritage speaker group were of Mexican heritage; born and raised in the United States and currently living in northwest Indiana. Their mean age at testing was 20.5 (range, 19–26; SD=20.7) and they were all university students except one. Regarding patterns of language use, the majority of the participants reported speaking ‘English only’ or ‘mostly English’ at school (62%) and in social situations (62%), while 100% of them reported speaking ‘English only’ or ‘mostly English’ at work. At home, 36% reported using both languages and only 25% reported speaking ‘mostly Spanish’ or ‘Spanish only’. Most participants (75%) indicated feeling more comfortable in English and 25% reported feeling comfortable in both languages. Their average DELE score was 35.5/50 (intermediate level) and their self-proficiency score in English was reported as almost native (3.8/4).

## 5.2 Design and procedures

Participants completed perception and production tasks as part of a larger project investigating the phonological development of heritage Spanish in contact with English in the United States. For the purpose of the present chapter, we analyzed two production tasks: the reading aloud of a short text, “The North Wind and the Sun”, and the retelling of “The Little Red Riding Hood”.<sup>2</sup> Each participant was asked to read the passage several times before being recorded; they were also provided with a series of images to remind them of the plot of the story. The passage consisted of five sentences; the story was guided by 14 images.

## 5.3 Data Analysis

Regarding the reading activity, we analyzed each of the five sentences for a total of 126 words with penultimate stress and of 49 words with ultimate stress. To analyze the narrative, we transcribed all narratives and then selected all broad focus declaratives for the analysis. Table 1 summarizes the number of utterances analyzed per group and the distribution of words with ultimate and penultimate stress (words with antepenultimate stress were not analyzed).

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2. A copy of the materials is available through the University of Toronto Romance Phonetics Database (<http://rpd.chass.utoronto.ca/>); username: rpd; password: romphon)

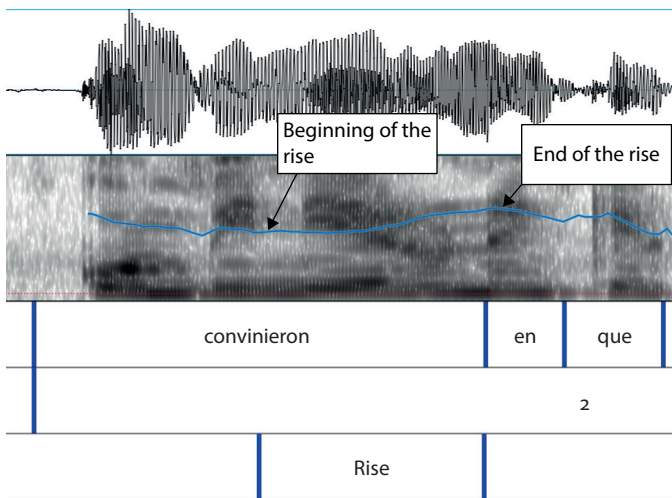


**Table 1.** Total number of broad focus declaratives analyzed per group and distribution of words with penultimate and ultimate stress (Task 2: Little Red Riding Hood)

Group	Utterances	Stress: penultimate	Stress: ultimate
HS	65	204	86
LTI	86	128	33

The analysis, which was performed with PRAAT 5.3.12, involved the following aspects. First, all broad-focus declaratives were extracted and transcribed, including those that contained miss-pronunciations and false starts. Second, intonational phrases were marked and boundary tones, as well as pitch accents, were labeled following the guidelines for Spanish ToBI labeling (Aguilar, De la Mota, & Prieto, 2009).

In order to allow for an initial comparison between our groups, we did not make a distinction between either the position or the number of accents in the phrase, as we were interested in comparing all pre-nuclear accents independently of their position in the phrase. This is related to the fact that it was extremely frequent for HSs to have short intonational phrases that consisted of one pitch accent and a nuclear configuration (see §6.4.1 below). Nuclear configurations are defined as the nuclear accent plus the final boundary tone, which, in the case of words with ultimate stress may be conflated into the same syllable. Finally, and only in the case of rising accents, the characteristics of the rise were analyzed by marking the highest peak and the preceding



**Figure 1.** Illustration of the labeling of rising gestures. Arrows indicate the beginning of the rise aligned with the beginning of the stressed syllable in *convinieron*, ‘they agreed’, and the end of the rise at the end of the post-tonic syllable. The second tier indicates the number of intonational phrases. Sound file extracted from the reading task and produced by LTI8

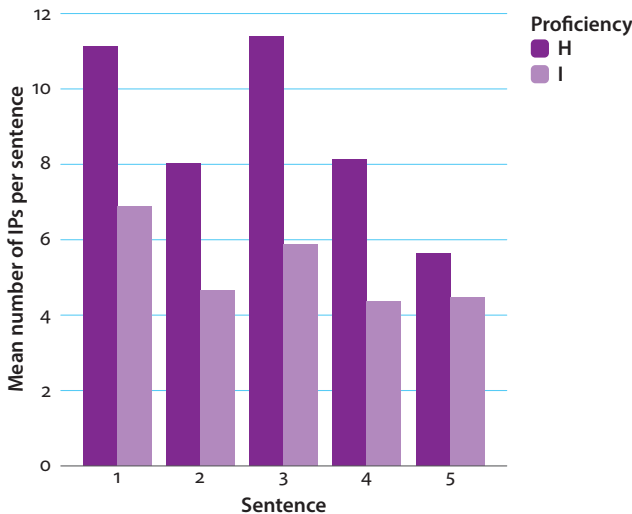
valley as well as the duration of the rising gesture (rise time = (peak-valley)/duration of rise<sub>ms</sub>). F0 was measured in ERB. A minimum difference of 0.5 ERB between a valley and a peak was used to label an F0 movement as a rise (see Figure 1 for an illustration of the different measurements).

Different statistics (chi-square and Mantel-Haenzel tests and repeated-measures ANOVAs) were computed with SPSS 20 for Mac to explore our research questions. Dependent variables included the different measurements mentioned above. The only linguistic independent variable considered was word stress (penultimate vs. ultimate) and the non-linguistic variables were the bilingual group and gender. In all cases, the p-value was set at .05.

## 6. Results

### 6.1 Reading task: “The North Wind and the Sun”

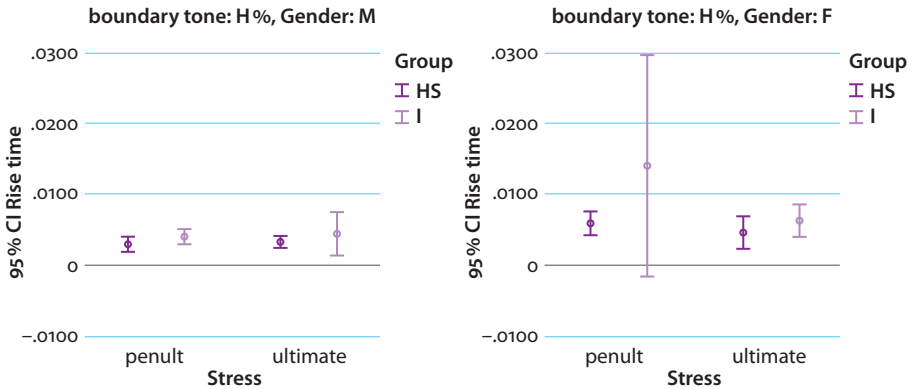
Results from the reading task showed differences between HSs and LTIs in their overall fluency, which is a consequence, among other things, of the number of intonational phrases (IPs) per sentence produced by each group. As Figure 2 shows, the HSs produced on average a greater number of intonational phrases than the LTIs. This was expected given the differences in literacy in Spanish.



**Figure 2.** Number of intonational phrases (IPs) per sentence organized by group (Heritage vs. Immigrant speakers). The numbers on the horizontal axis indicate each sentence extracted from the text

HSs also exhibited a slightly higher proportion of rising boundary tones than LTIs (HS: 57% vs. LTI: 54%) but those differences did not reach significance, as indicated by a chi-square test ( $\chi^2(1,474)=1.282, p=.257$ ).<sup>3</sup>

Since we are interested in comparing the phonetic realization of the rise, we examined only the characteristics of the rising nuclear configurations in each group by gender and by stress type. Figure 3 displays the results of the slope of the rise:



**Figure 3.** Rising nuclear configurations: slope of the rise organized by stress pattern of the word (penultimate vs. ultimate). Left: male participants (N=6); Right: female participants (N=10)

Both the female and male HSs had less steep slopes (i.e. less pronounced rises) than LTIs, and this was particularly the case when we compared the rising patterns produced by female speakers in words with penultimate stress. In this context, female LTIs displayed higher means, despite exhibiting more variability than HSs (LTIs: mean=0.11; s.d.=0.5; HSs: mean=0.005; s.d.=0.006). However, differences in slopes between groups did not reach significance ( $F(1,274)=2.3; p=.12$ ).

Regarding the distribution of pitch accents by group, both groups produced mostly rising accents. This is represented in Figure 4.

The rising accents produced were further compared for some phonetic characteristics, including the alignment patterns and the slope of the rise. As mentioned in §4, we expected to find a higher proportion of rises aligned within the stressed syllable among HSs than among LTIs, and this is indeed what Figure 5 illustrates.

3. The groups also differed in the proportion of falling boundary tones (HS: 34% vs. LTI: 41%) and in the use of sustained pitch (HS: 8.9% vs. LTI: 4.4%). Given the low percentage in the use of sustained pitch movements, those boundary tones were excluded from the statistics.

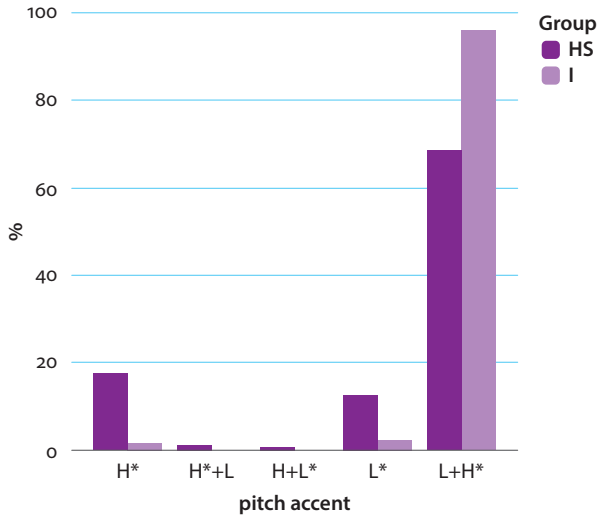


Figure 4. Distribution of pitch-accent types by group

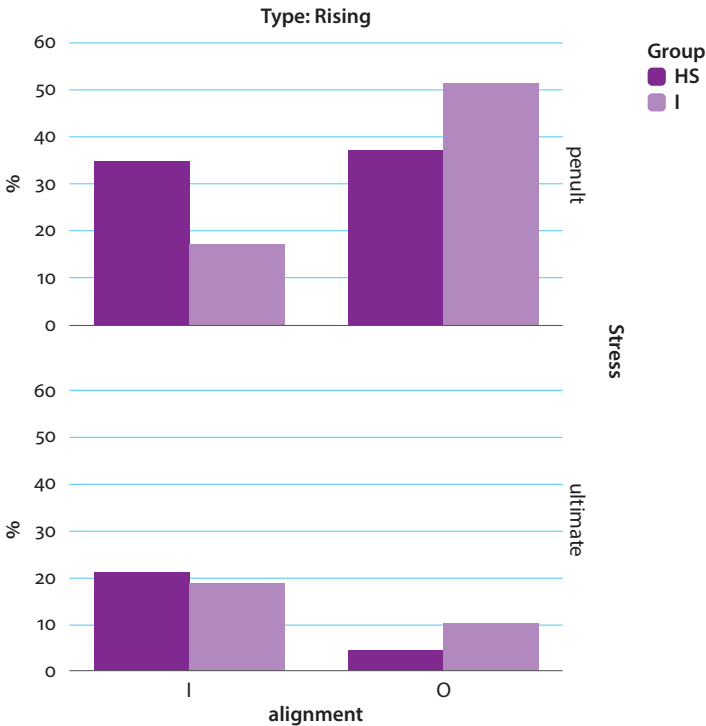


Figure 5. Proportion of rising pitch accents with a peak aligned within (I) and outside (O) the stressed syllable by group (Heritage vs. Immigrant) and word stress (penultimate, top panel vs. ultimate, bottom panel)

A chi-square test showed that the proportion of rising accents with a peak aligned within the stressed syllable was significantly higher for HSs than for LTIs in words with penultimate stress ( $\chi^2(1,224)=12.13$ ,  $p < .0001$ ). Furthermore, the difference almost reached significance in words with ultimate stress ( $\chi^2(1,90)=3.04$ ;  $p=.08$ ), which were less frequent in the sample.

To conclude our comparison of the reading task, we analyzed the characteristics of the rise, in order to determine whether the early alignment observed in the HS group is the result of differences in the duration of the rising gesture. Results showed a steeper mean slope for LTIs than for HSs. This was the case for both female and male speakers in both stress conditions. Results of a repeated-measures ANOVA analysis revealed significant differences between groups ( $F(1,311)=7.2$ ,  $p=.008$ ) and gender ( $F(1,311)=9.06$ ,  $p=.003$ ) but there was no significant interaction between gender and group. These differences, however, were related to durational differences: the mean duration of the rise for the LTI group was significantly shorter than the mean duration for the HS group ( $F(1,311)=7.64$ ;  $p=.006$ ).

Although some of the variables examined here did not reach significance, our results show that there is a cumulative difference in the reading task between both groups. First, HSs divided utterances into a higher number of intonational phrases; those phrases tended to finish with rising boundary tones with a steeper rise than the ones produced by LTIs. Pitch accents were also different. In particular, HSs had longer rising gestures than LTIs and peaks were preferably aligned within the stressed syllable.

## 6.2 Narrative: “Little Red Riding Hood”

Comparing participants’ performance within and across groups is clearly more complex in semi-spontaneous speech. Often, the level of performance varies along multiple dimensions including vocabulary selection, morphosyntactic complexity or recollection of the story. Although we do not examine these factors here, they do have an impact on the prosodic structure of the utterance. As such, we considered it important to begin this subsection by presenting summary statistics that globally describe the performance of both groups in Table 2.

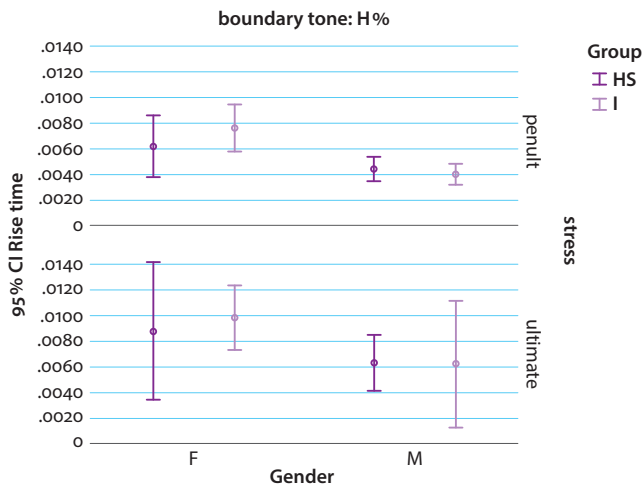
**Table 2.** Summary statistics comparing the realization of broad-focus declaratives analyzed per group. Mean number of statements analyzed; intonational phrases (IP) x statement; pauses longer than 200ms and fillers

Group	Statements	IP x statement	Pauses	Fillers
HSs	4.77	4.38	1.87	0.90
LTIs	5.40	2.83	0.90	0.04

The data in Table 2 offer some information to begin our between-group comparison. First, the number of broad focus declaratives that we were able to extract from speakers in each group was different. LTIs produced on average more utterances than HSs. Second, as was the case in the reading tasks, HSs tended to produce more intonational phrases per utterance than LTIs, which is also suggested by the fact that they produced more pauses than LTIs. Finally, the presence of fillers, albeit not high, also differentiated both groups. HSs tended to incorporate English-like fillers (i.e. *ahm, so*) to their Spanish narratives.

We now turn to analyze the phonetic characteristics of the nuclear rise, which involves the last pitch accent and the boundary tone. Comparing the type, frequency and phonetic properties of final contours is a complex task, especially when dealing with oral narratives because, although caution was exercised when selecting the utterances for analysis, it was not always straightforward to determine whether two statements had the same pragmatic meaning. Additionally, the words selected by each speaker were different and for that reason results should be interpreted with caution.

Both groups showed similar proportions of rising (HS=52.9% vs. LTI=52.7%), falling (HS=33.7% vs. LTI=37.3%), and sustained pitch contours (HS=13.5% vs. LTI=10%). A Mantel-Haenszel test revealed that groups did not significantly differ in the use of contour types ( $\chi^2(2,409)=1.46; p=.48$ ). Differences in the characteristics of the rise (Figure 6) were not significant between bilingual groups, as revealed by the results of a repeated-measures ANOVA ( $F(1,222)=.145; p=.703$ ), suggesting a rather similar use of nuclear configurations for both groups. Significant differences were found, though, between gender ( $F(1,222)=9.647; p=.002$ ) and words with penultimate and ultimate stress ( $F(2,222)=4.251; p=.015$ ).



**Figure 6.** Characteristics of final rises (slope) displayed by group and gender. Top panel: words with penultimate stress; bottom panel: words with ultimate stress

We now discuss the characteristics of the pitch accents. Figure 7 displays the distribution of accent types by group. Rising accents were the most frequent in the sample, but LTIs had a slightly higher proportion of rising accents than the other group.

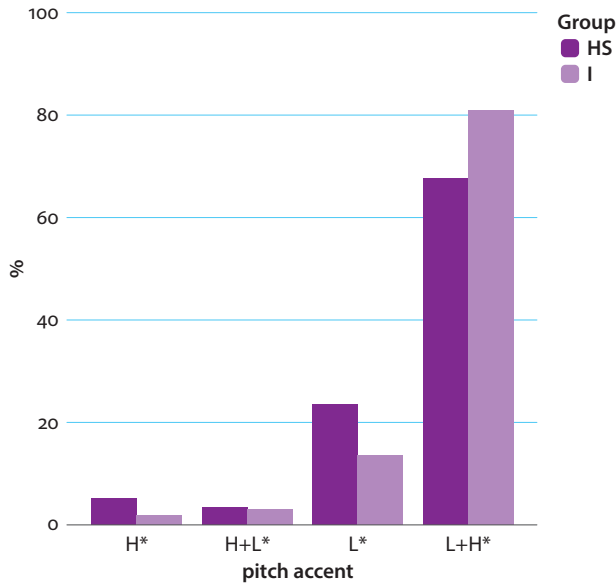
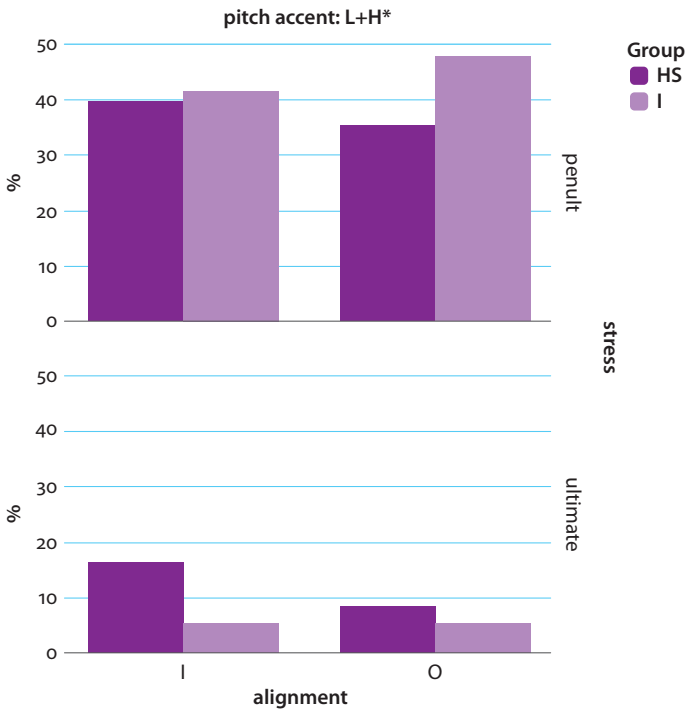


Figure 7. Distribution of pitch-accent types by bilingual group

As in §6.3.1, we compared the proportion of peaks aligned within the stressed syllable between groups, since we predicted a higher number of peaks aligned within the stressed syllable in the HS group. Figure 8 displays the results of such comparison, and shows that LTIs had a higher proportion of peaks in the post-tonic than the HSs. These differences, however, did not turn out to be significant for words with penultimate ( $\chi^2(1,199)=.951$ ;  $p=.259$ ) or ultimate stress ( $\chi^2(1,43)=2.05$ ;  $p=.096$ ) because in this task HSs had a higher proportion of peaks inside the stressed syllable than in the reading task (see Figure 5). In other words, the lack of significant differences is the result of LTIs showing variability in peak alignment across tasks, which is consistent with the patterns observed in previous studies among monolingual Spanish speakers (see Face, 2003).

Our final comparison involves the characteristics of rising accents, since we were expecting to find larger pitch excursions in the HS than in the LTI group. Results of a repeated-measures ANOVA indicated that there was a significant effect of group ( $F(1,241)=4.86$ ;  $p=.02$ ) and gender ( $F(1,241)=4.41$ ;  $p=.03$ ) and a significant group\*stress interaction ( $F(1,241)=4.03$ ;  $p=.04$ ). The source of the difference becomes apparent when analyzing Figure 9. Indeed, both groups produced similar rises in



**Figure 8.** Proportion of peaks aligned within (I) and outside (O) the stressed syllable in pre-nuclear pitch accents organized by group and by word-stress

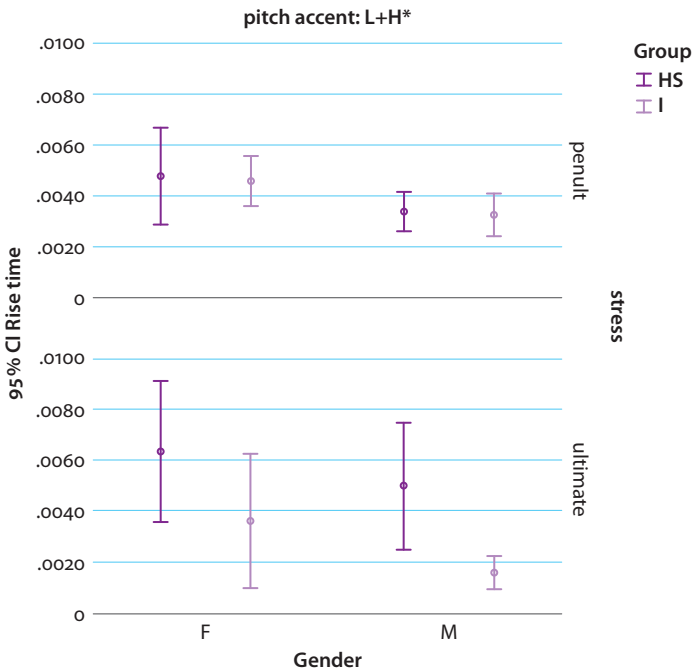
words with penultimate stress but some differences emerged in words with ultimate stress, which were also less frequent in the sample. Thus, we can tentatively conclude that our two experimental groups produced phonetically similar pitch accents with the most frequent word-type.

In summary, narratives produced by both groups differed clearly in some macro prosodic properties. Typically, the HSs produced more intonational phrases per statement, more pauses and more fillers than LTIs. However, the analysis of the intonational contours (nuclear configurations and pitch accents) revealed more similarities than differences: groups did not differ in the frequency or shape of nuclear configurations or in the distribution and shape of pitch accents, with the possible exception of the rise in words with ultimate stress.

## 7. Discussion

Table 3 below allows us to address the first research question concerning the melodic differences between groups. We can conclude that, at least at the intonational level,





**Figure 9.** Characteristics of the rise (slope) in rising pitch accents organized by type of word (penultimate vs. ultimate stress), gender and group

those differences are not large, especially in narratives. Some differences in the alignment of pitch accents and characteristics of the rising gestures emerged in the reading task, but the HS group resembled closely the LTI group in the use of nuclear configurations and pitch accents when telling the story.

**Table 3.** Qualitative summary of the results organized by tasks. Shaded cells indicate significant differences between groups

Task	IP x statement	Nuclear contour	Nuclear rise (slope)	Pitch accent: alignment	Pitch accent: slope
Reading	8.85 (HS) vs. 5.25 (LTI)	H > L > M (both groups)	n.s.d.	Earlier alignment in HSs than LTIs	Steeper slope in LTIs than HSs
Story	4.38 (HS) vs. 2.83 (LTI)	H > L > M (both groups)	n.s.d.	n.s.d.	n.s.d. in penults

What is particularly revealing for our purpose is the way in which groups behaved in both tasks. The LTI group displayed rather consistent prosodic patterns across tasks

(similar phonological and phonetic prosodic patterns), with the exception of the increasing number of peaks aligned within the stressed syllable in the narrative. This, however, shows that, at least in what concerns alignment patterns, LTIs behaved similar to monolingual Mexican speakers (alignment alone) and to the Peninsular speakers analyzed by Face (2003) in their different proportions of peaks aligned within the stressed syllable in spontaneous vs. read speech. The across-task behavior of HSs can be described as showing different types of differences *vis-à-vis* the LTI group. In the reading task, beyond the more obvious differences in the presence of self-corrections and mispronunciations, the HS participants tended to produce more IPs per statement than LTIs; statements usually ended with rising contours, and pitch accents had a different alignment pattern in contrast to LTIs.<sup>4</sup> The consistent differences in alignment did not come as a surprise; they have been reported in bilingual speech and they have been considered one of the main differences between L1 and L2 speech prosody (Mennen, 2004; Trofimovich & Baker, 2006). In the narratives, HSs still produced more intonational phrases per utterance when compared to LTIs but in this case the self-corrections are replaced by pauses and the presence of fillers. If we focus only on the comparison of the intonational contours, the two groups become more similar, particularly in the selection and realization of pitch accents. Thus, answering our second question (i.e. whether between-group differences were more prominent in read speech or in the narratives) is not straightforward; there are clear differences between groups in fluency but, in regards to intonation, the statements produced by both groups are more similar in the narrative than in the reading task. These findings are promising and are consistent with previous research comparing the production of voiced stops among heritage language learners with different proficiency levels in Spanish (see Rao 2013). More generally, they are consistent with task-effects (Tsimpli 2014) reported for bilinguals. Thus, the differences may be attributed in part to the fact that HSs, although literate and pursuing Spanish education at the university level, were not schooled in Spanish but in English, and thus, they are more used to reading in English than in Spanish. This needs to be corroborated by the analysis of the English production of these same subjects against a population of English controls, which is our next step. In order to fully answer our question, though, it would be crucial to deepen the individual analysis (the data in Appendix I may lead us to expect some individual differences), as well as to obtain accentedness ratings for all our speakers. Then we will be able to compare those ratings to our acoustic analysis. In so doing, we would be able to determine if naïve listeners are sensitive to differences in participants' performance across tasks.

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4. For reports of task-related effects in the realization of boundary tones in European Portuguese, see Mata, Moniz & Batista (this volume).

This has been our first exploration (and hopefully not the last) of this complex data. Beyond the analysis of the individual variability a more in-depth analysis of the linguistic variables is necessary. We have only looked at F0 but English and Spanish are known to differ in the use of duration, particularly in what concerns the acoustic correlates of lexical stress. We have indicated that there were differences in fluency, but we did not have space to explore disfluencies in read speech and in the story or to analyze morpho-syntactic and lexical differences in the production of both groups in the narratives.

## 8. Conclusions

The present chapter compared the intonation of broad focus declaratives in two groups of speakers who differed in their language history. The heritage speaker group learned Spanish at home and was educated in English, whereas the immigrant group had the opposite linguistic experience. We hypothesized then that these two groups would (1) diverge prosodically in read speech, and (2) would tend to converge in semi-spontaneous narratives. Our results showed that either language experience or the nature of the task triggered more salient differences in read speech than in semi-spontaneous speech (the narratives). Particularly, both groups were not statistically different in their realization of pitch accents in the narratives.

This was a first attempt in the prosodic characterization of the speech of two bilingual populations in the United States: heritage speakers to long-term immigrants. We have shown that less-controlled tasks are more illustrative of the speech of both groups, whereas the use of reading tasks provides a clear advantage to those who were educated in the language being tested (see also Tsimpli 2014). These results support current research in the acquisition of Spanish morphosyntax among heritage speakers (Cuza, 2013; Montrul, Davidson, de la Fuente & Foote, 2014) and speakers of minority languages in a diglossic context (Sánchez, 2008), which also document an advantage for oral vs. written tasks. Finally, these findings have potential implications for classroom practices in regards to the teaching of Spanish segmental and suprasegmental features to heritage language learners and English-speaking L2 learners, which may involve the introduction of more reading aloud exercises and the explicit discussion of prosodic differences between both languages.

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**Appendix 1.** Participants’ information. AOA=age of arrival; LOR; length of residence in the United States; DELE score; self proficiency rating of Spanish language skills

Participant	Sex	Age	Education	AOA	LOR	DELE	Speaking	Listening	Reading	Writing
HS1	F	19	University	Birth	NA	32	Adequate	Adequate	Adequate	Good
HS2	F	20	University	Birth	NA	38	Good	Native	Good	Adequate
HS3	F	18	High School	Birth	NA	37	Adequate	Good	Adequate	Adequate
HS4	F	19	University	Birth	NA	41	Good	Native	Good	Adequate
HS5	M	20	University	Birth	NA	36	Adequate	Good	Adequate	Adequate
HS6	F	19	University	Birth	NA	40	Good	Excellent	Good	Adequate
HS7	M	26	University	Birth	NA	38	Good	Good	Good	Adequate
HS8	M	23	University	Birth	NA	22	Good	Good	Native	Adequate
LTI1	F	25	University	15	10	44	Native	Native	Native	Native
LTI2	M	44	University	31	13	48	Native	Native	Native	Native
LTI3	F	29	University	15	14	46	Native	Native	Native	Native
LTI4	F	25	University	15	10	45	Native	Native	Native	Native
LTI5	M	22	University	18	4	44	Native	Native	Native	Adequate
LTI6	M	27	University	26	1	45	Native	Native	Native	Native
LTI7	F	54	University	35	31	45	Native	Native	Native	Native
LTI8	F	54	University	45	9	46	Good	Good	Good	Good