

A Sociolinguistic Analysis of Pre-nuclear Peak Alignment in Yucatan Spanish

Jim Michnowicz and Hilary Barnes
North Carolina State University and The College of Charleston

1. Introduction

Previous research has indicated that F_0 peak alignment with respect to the stressed syllable in broad focus declarative phrases differs across dialects of Spanish (Sosa 1999; McGory & Díaz-Campos 2002, among others). Many varieties show a pre-nuclear $L+\gt;H^*$ pattern, with the peak falling in the post-tonic syllable (Face 2003; O'Rourke 2004; McGory & Díaz-Campos 2002; Hualde 2005). At the same time, peak alignment has been shown to be susceptible to contact influence, with some contact varieties displaying a pre-nuclear $L+H^*$ pattern (early peak in the tonic syllable), an alignment pattern that is usually correlated with emphatic speech or narrow/contrastive focus in many non-contact varieties (Face 2001; Elordieta 2003 for Basque Spanish; O'Rourke 2004, 2005 for Cuzco Spanish; Colantoni 2011, Colantoni & Gurlekian 2004 for Buenos Aires Spanish). This paper presents a sociolinguistic analysis of pre-nuclear peak alignment in spontaneous speech in Yucatan Spanish (YS), a contact variety in Mexico. In previous research on YS, intonation is singled out as being a distinctive feature of the dialect, and is characterized as slow, halting or emphatic (Barrera Vásquez 1945/1977, Mediz Bolio 1951, among others). These descriptions suggest that suprasegmental features, specifically (early) peak alignment, may be an important factor in distinguishing YS from surrounding varieties. Additionally, YS intonation has been attributed to direct influence from the contact language, Yucatec Maya¹ (Nykl 1938, Barrera Vásquez 1945/1977, among others). However, intonational patterns in YS, including peak alignment, have never been quantified or studied acoustically. As an initial attempt to quantify the previous reports of intonation in YS, the present study will report results from a sociolinguistic pilot study and offer directions for future research. The two preliminary research questions are as follows: 1) Are the reported accent differences in YS due, at least in part, to differences in peak alignment vis-à-vis other varieties of Spanish (i.e. more early peaks)?; and 2) what is the pattern of peak alignment with respect to external factors such as speaker gender, age and language background? In order to suggest an initial answer to these questions, the rest of the paper presents the following organization: Section 2 will briefly review findings on peak alignment in a variety of Spanish dialects; Section 3 addresses the Spanish-Maya contact situation in Yucatan, and reviews previous claims on intonation in YS; Sections 4 and 5 summarize the research questions and methodology of the study; Section 6 presents the findings, while section 7 contextualizes the results and presents directions for future research.

2. Peak alignment in Spanish

Most work on peak alignment in Spanish intonation has focused on declaratives (see Prieto & Roseano 2009-2010 for an overview and examples; for a general cross-linguistic overview of intonation, see Ladd 1997). Navarro Tomás (1944) noted early on that in Spanish declaratives, the F_0 rises throughout the stressed syllable with the peak occurring in the post-tonic syllable. This has been corroborated by numerous recent studies where the peak is aligned either late in the stressed syllable or in the post-tonic syllable (Sosa 1999, Hualde 2002, Face 2001, among many others). In the case of the

¹ Hereafter this language will be referred to simply as “Maya”, as this is the term employed by speakers of the language.

final stressed syllable in a Spanish declarative utterance, the F_0 rises within the stressed syllable and the peak occurs in the tonic syllable rather than in the post-tonic syllable, thereby distinguishing final, or nuclear, F_0 rises and non-final, or pre-nuclear, F_0 rises. Face (1999) finds F_0 peaks in the final stressed syllable 98% of the time. Since research has shown that most of the dialectal variation in peak alignment occurs in pre-nuclear position, the current paper will focus only on those contexts.

Also relevant to the current paper is the difference in intonational patterns in lab speech versus spontaneous speech (Face 2003; Colantoni 2011). Many studies that have focused on peak alignment analyze lab speech (Colantoni and Gurlekian 2004, Alvord 2010a, b, among many others) given that it provides several advantages such as a means to control for utterance type and segmental and syntactic features, all of which can have an effect on peak alignment. The use of spontaneous speech, on the other hand, allows for the study of intonation patterns in a natural context. As discussed by Face (2003), there are significant differences between data obtained in a laboratory setting and that recorded via spontaneous interviews. Thus the results of laboratory studies may not fully represent what actually occurs in everyday speech. It is therefore important to note that the present study examines spontaneous speech in which utterances differ considerably in length and complexity (see Face 2003 for a detailed comparison of laboratory and spontaneous speech).

The study of Spanish intonation in contact with other languages has gained momentum over the past decade, in step with an increasing interest in Spanish intonation in general. Intonational patterns have been studied in Spanish in contact with English (Alvord 2010a, b), German (Lleo, Rakow, and Kehoe 2004), Basque (Elordieta 2003), Quechua (O'Rourke 2004, 2005), and for a previous contact situation with Italian in Buenos Aires (Colantoni 2011, Colantoni & Gurlekian 2004), among others. Results from these studies show that language contact can have an effect on pre-nuclear peak alignment. O'Rourke (2004) found that Spanish speakers in frequent contact with Quechua produced more early peaks, thus following a more Quechua-like pattern. Increased early peaks are also observed in Basque-Spanish (Elordieta 2003), and in Buenos Aires Spanish (Colantoni 2011, Colantoni and Gurlekian 2004), where early peaks are attributed to transfer from Italian. Not all contact varieties display early peaks, however, as in the case of Miami Cuban Spanish (Alvord 2010a) and Northeastern Argentine Spanish, in contact with Guarani (Colantoni 2011). Likewise, as noted by several authors (e.g. Colantoni and Gurlekian 2004), early peak alignment does occur in monolingual/non-contact Spanish varieties, but generally to show contrastive focus rather than broad focus in a declarative utterance. As Colantoni (2011) notes, a preference for early peak alignment in contact varieties appears to most often be direct transfer of intonational patterns from the contact language to Spanish, although it may also signal a simplification strategy on the part of bilingual speakers. This possibility will be discussed further in section 7.

3. Language contact and intonation in Yucatan Spanish and Maya

Spanish and Maya theoretically have been in contact for the last 500 years, beginning with the first Spanish incursions into the Yucatan peninsula in 1527 (Quezada 2001). Still, for the first several hundred years, Spanish-speakers were concentrated in a handful of urban centers (Mérida and Valladolid, among a few others) (Lipski 2004). Maya speakers have vastly outnumbered native Spanish-speakers throughout colonial and post-colonial history, with Spanish speakers only becoming a majority group in the mid-20th century (Lope Blanch 1987, INEGI, Mosely 1980). Since the 19th century, however, Spanish and Maya speakers have been in increasing daily contact, as Maya speakers have migrated to urban areas to work as domestic help, vendors, manual laborers, and importantly as nannies to Spanish-speaking families (Lipski 2004: 99, Michnowicz 2009, 2011). In these ways, as Lipski (2004: 99) notes: "...casi ningún yucateco urbano se escapa al contacto con las variedades del español con influjo maya²".

Regarding intonation, speakers themselves note the differences between YS and other varieties of Mexican Spanish. YS speakers refer to their accent as "pujado" "pushed", as noted in this quote from speaker F-72: "tenemos la fama los yucatecos que al hablar tenemos así un pujadito...que nadie tiene en otra parte de la República...[y] nos hacen mucha burla³". To the best of our knowledge there are no

² "...almost no urban Yucatecan is able to escape contact with varieties of Spanish with Maya influence".

³ "We Yucatecans are famous for having a little "push" when we talk...that no one else has in any other part of Mexico...and they make fun of us a lot".

quantitative acoustic studies of intonational patterns in this variety, thus the need for this initial pilot investigation. However, in spite of this lack of recent attention in the literature, earlier researchers have commented on intonation in YS, often attributing its distinctiveness to contact with Maya (for example, Nykl 1938). Barrera Vásquez (1945/1977: 341) states “[I]o que primero llama la atención al extraño que por primera vez oye el español yucateco, es su acento. Es allí dónde está presente la influencia maya en su forma más crónica...⁴”. Likewise, he refers to “[la] peculiar entonación⁵” of YS, and states that “la característica pronunciación de los yucatecos⁶” is due to Maya influence (Barrera Vásquez 1937: 9). Mediz Bolio (1951:19) affirms “[e]l acento yucateco, tan profundamente señalado, no es sino una consecuencia del acento maya original⁷”. He goes on to argue that this Maya influence has also permeated the monolingual Spanish-speaking population: “[p]or más que un yucateco no sepa pronunciar una sola palabra del idioma nativo [Maya], la entonación de su castellano, por castizo que sea, es de una inflexión y un estilo absolutamente mayas⁸” (p. 19). Suárez (1979: 77) states that one of the first characteristics noted by outsiders in Yucatan is “...la entonación fraseal lenta y pausada, fenómeno[s] que no son sino reflejos de la fonética nativa⁹”.

Scholarship on Yucatec Maya intonation up to this point has focused primarily on the patterning of lexical tones (Kügler & Skopeteas 2006; Kügler, Skopeteas & Verhoeven 2007; Gussenhoven & Teeuw 2008). In spite of increased attention to tonal patterns in Maya, Gussenhoven & Teeuw (2008: 50) note that, “[t]he phonetics and phonology of the tones of Yucatec Maya are less than clear” and “[t]here are no reliable statements on the word stress in the language”. According to Frasier (2009: 22), “there are no comprehensive studies of stress, and there are some disagreements in the literature about exactly where stress occurs”. There is additional difficulty in discussing phrasal intonation in what is described as primarily a lexical tone language, when, as noted above, scholars are not always in agreement on which syllables are stressed. In spite of these problems, there is some evidence in the literature that may be useful to the present discussion.

First, researchers agree that “[t]here is no phonological or phonetic expression of information structure” in Maya (Gussenhoven 2006; see also Kügler, Skopeteas & Verhoeven 2007, Gussenhoven & Teeuw 2008). In other words, unlike in Spanish, the difference between neutral and contrastive focus is not encoded intonationally - focus is not expressed through changes in F_0 . Thus, shifting Maya-speakers would have to learn the Spanish intonation system, in which contrastive focus is expressed (in part) through early pre-nuclear peaks.

Related to this is that Gussenhoven & Teeuw (2008) indicate that tones associate solely with phrase-internal long syllables and short word-initial syllables in Maya, syllables that, in spite of disagreements in the literature, their analysis also suggests are stressed. Thus, tones appear to be associated with stressed syllables in Maya, a fact which may have affected how shifting Maya-speakers processed and produced intonational peaks in L2 Spanish. In addition, some non-tonal Mayan languages (e.g. Kiche) have been shown to demonstrate consistent pre-nuclear early peaks. As Nielsen (2005: 48) observes, in Kiche “LH* (sic - that is, L+H*) is the default pitch accent, almost always occurring on the stressed syllable of a content word”. Although not conclusive, the evidence from Yucatec Maya tone placement combined with stress patterns in other Maya languages suggests that Maya speakers may tend to align peaks with stressed syllables. The possible implications of the differences between Spanish and Maya intonational systems will be addressed further in the discussion.

4. Research Questions

The goal of the present study is two-fold. First, following the call of Face (2003) for more studies on intonation in naturalistic speech, it seeks to analyze the patterns of pre-nuclear peak alignment in

⁴ “The accent is the first thing that draws the attention of a foreigner who hears Yucatan Spanish for the first time. That is where Maya influence exists in its most consistent form”.

⁵ “Peculiar intonation”

⁶ “The characteristic Yucatecan pronunciation...”

⁷ “The Yucatecan accent, so profoundly marked, is nothing but a consequence of the original Maya accent”.

⁸ “Even among Yucatecans who cannot speak a word of Maya, the intonation of their Spanish, as pure as it might be, has an inflexion and a style that are absolutely Maya”.

⁹ “...the slow and halting phrasal intonation, that is nothing but a reflection of Maya pronunciation”.

spontaneous YS as a preliminary step in determining if the *acento pujado/pausado*¹⁰ can be attributed to differences in pre-nuclear peak alignment (i.e. an increased rate of peaks in the stressed syllable in non-contrastive contexts compared with non-contact dialects); and second, following Thomas & Ericson (2007) who show how intonational features can serve as sociolinguistic variables, do peak alignment patterns differ across genders, age and language background (monolingual Spanish vs. bilingual Maya-Spanish) for these speakers of YS? This sociolinguistic analysis will serve as a preliminary step in addressing questions of potential Maya influence on intonation in YS.

5. Methodology

In order to offer an initial, tentative answer to the research questions outlined above, eight native speakers of YS were selected from a larger corpus, balanced for age, gender and language groups (4 men, 4 women; 4 older, 4 younger; 4 Spanish monolinguals, 4 Maya-Spanish bilinguals). Gender has been identified as an important factor in most studies of sociolinguistic variation (Labov 2001: 262), with women demonstrating both more conservative and more innovative patterns than men (see *The Gender Paradox* (Labov 2001)). Additionally, some previous studies have shown that women have tended to retain traditional YS forms, such as occlusive [bdg] and final -m (Michnowicz 2007, 2008 2011), whereas men use more pan-Hispanic variants. Age was included based on previous studies' findings that segmental features of traditional YS (occlusive [bdg], aspirated /ptk/, among others) are quickly standardizing among younger speakers (Michnowicz 2009, 2011, 2012). This may also be occurring for suprasegmental features, such as peak alignment. For the age groups, younger speakers have a mean age of 29; older speakers of 69. Finally, language background was included given that much previous research on YS attributes intonation patterns to direct contact with Maya (Barrera Vásquez 1937; Mediz Bolio 1951; among others). The monolingual speakers all come from monolingual Spanish families, although as previous research has demonstrated, that does not mean that they were not exposed to Maya and Maya-influenced Spanish from a young age through domestic workers, nannies etc. (Lipski 2004, Michnowicz 2009). The bilingual group is composed of fluent Maya-speakers, defined as those who grew up speaking Maya at home and continue to use it on a regular basis, although some of them primarily speak Spanish in their daily interactions. Two of the bilingual speakers had monolingual Maya-speaking parents, while two of them grew up in bilingual Maya-Spanish households. Of note also is that, with the exception of speaker M-44 (an anthropologist), language also overlaps with socio-economic class, with Maya-speakers coming from lower social classes, and Spanish-monolinguals coming from higher social classes. Demographic details for each of the speakers are presented in Table 1.

| Speaker code | Gender | Age | Occupation | Language group | Parents' Language(s) |
|--------------|--------|-----|---------------------------|----------------|----------------------|
| F-22 | Female | 22 | Law student | Spanish | Spanish |
| F-24 | Female | 24 | Domestic worker | Bilingual | Maya |
| M-25 | Male | 25 | Business manager | Spanish | Spanish |
| M-44 | Male | 44 | Anthropologist | Bilingual | Maya/Spanish |
| M-65 | Male | 65 | Maintenance worker/farmer | Bilingual | Maya |
| F-65 | Female | 65 | Housewife/vendor | Bilingual | Maya/Spanish |
| F-72 | Female | 72 | Housewife/nurse | Spanish | Spanish |
| M-76 | Male | 76 | Business owner | Spanish | Spanish |

Table 1. Demographic details for all speakers

¹⁰ Pushed or halting accent

Importantly, the goals of this study are not to offer a comparative phonological analysis of peak alignment, such as those found in laboratory studies on intonation. Instead, the focus is on determining if patterns of peak alignment in spontaneous speech can potentially account for previous descriptions of YS accent. Likewise, the patterning of peak alignment across social groups is quantified and analyzed. Therefore, naturalistic data taken from sociolinguistic interviews was used for this study. Standard sociolinguistic interview techniques (see Tagliamonte 2006) were followed, and topics of conversation included family, local traditions and hobbies. For each speaker, we measured 50 peaks related to the stressed syllable of words in pre-nuclear position, giving a total of 400 tokens (8 speakers X 50 tokens). As Face (2003: 123, following Ocampo 2002) notes, focus is often difficult to determine in spontaneous speech, yet focus (neutral vs. comparative, broad vs. narrow etc.) is of great importance in determining patterns of accentuation. Taking this fact into account for the present study, only clearly neutral phrases were included in the analysis. Specifically, tokens were considered within the envelope of variation if they met the following criteria: A) a stressed syllable not followed by another stressed syllable (i.e. the first of two consecutive stressed syllables was excluded); B) occurring in neutral declarative statements (interrogatives, imperatives and contrast statements were excluded); C) and not the last stressed syllable before a pause (i.e. the end of an intonational phrase, as these were considered nuclear and would therefore be more likely to show early peaks).

Two sample phrases with pitch tracks are seen in Figures 1 and 2 below. The first is from an older, male, monolingual Spanish-speaker¹¹. In this phrase, peaks were measured for *estoy*, *hablando*, *hace* and *muchos*, with early peaks visible in *estoy* ‘I am’, *hablando* ‘speaking’ and *hace* ‘ago’, but not in *muchos* ‘many’ (*años* ‘years’, as a nuclear peak, was not measured). The second is from an older monolingual speaker of YS¹². Peaks were measured for *tenemos* ‘we have’, *fama* ‘fame’, *yucatecos* ‘Yucatecans’, with early peaks evident in *tenemos* and *fama*, but not in *yucatecos* (*hablar* ‘speaking’, a nuclear peak, was not measured).

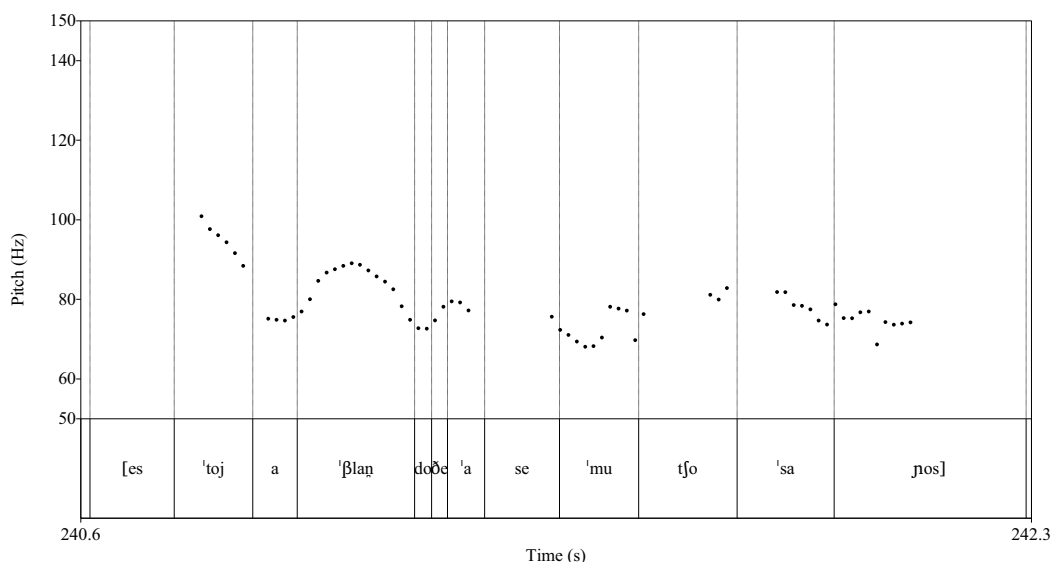


Figure 1. Intonation contour of an older, male, monolingual Spanish-speaker (M-76).

¹¹ Translation of phrase: “I am talking about many years ago”.

¹² Translation of phrase: “We Yucatecans are famous for, when we talk...”.

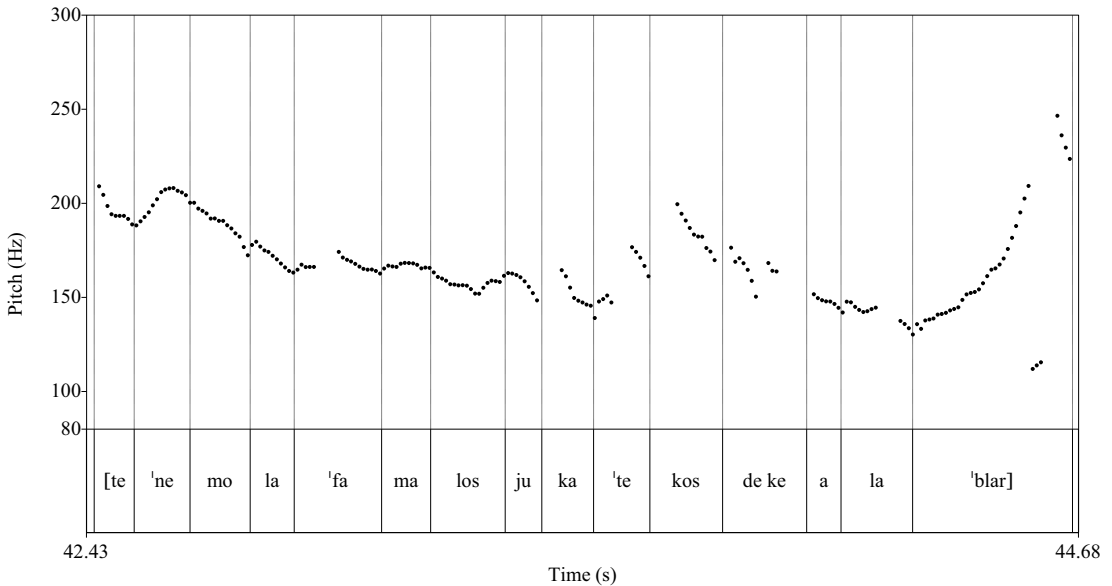


Figure 2. Intonation contour of an older, female, monolingual Spanish-speaker (F-72)

Following O'Rourke (2004), we measured the length of the stressed syllable and the distance from the peak to the end of the stressed syllable in Praat (Boersma & Weenink 2012). In other words, if the peak fell in the stressed syllable it received a negative value (early peak) and if the peak fell in the post-tonic syllable it received a positive value (late peak), as can be seen in Figure 3. Measurements were extracted to a spreadsheet using a Praat script (Kendall 2009). Data was then analyzed descriptively and statistically using R (R Development Core Team) and Rbrul (Johnson 2012).

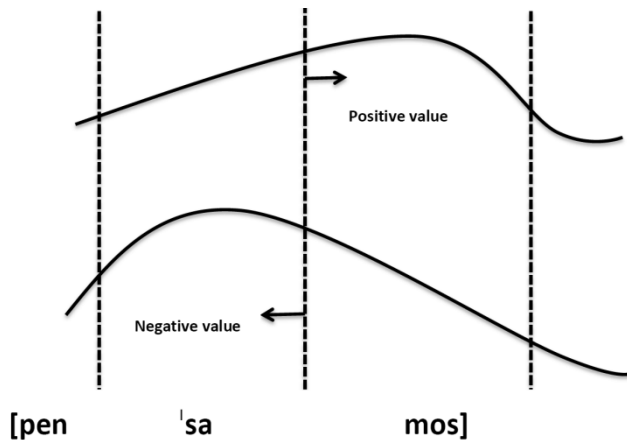


Figure 3: Example of peak alignment measurement. Adapted from O'Rourke (2004:327).

Given the naturalistic nature of the data, there are some important factors that may have an influence on peak alignment that could not be controlled. These factors include the presence of voiceless consonants and the number of words/syllables per phrase, which are often strictly determined in laboratory work on intonation. Thus comparisons with laboratory studies will be limited. However, some factors, such as the spacing of tonic syllables (i.e. tonal crowding - see Alvord 2010a, Face 2000, 2002, McGory & Díaz-Campos 2002), syllable structure (open vs. closed) (Prieto & Torreira 2007), and the presence or absence of voiceless segments that could cause artificial peaks, were controlled to the extent possible or accounted for through data coding; for example, a stressed syllable followed immediately by another stressed syllable was not counted, since the resulting measurement may result

in artificial early peaks as the peak is pushed back to avoid conflicting with a following peak¹³. With the exception of the exclusion of contiguous tonic syllables, we otherwise followed the Principle of Accountability (Labov 1969), whereby all occurrences of a variable are included in the study. In other words, every analyzable token¹⁴ that fell within the envelope of variation outlined above (i.e. no contiguous tokens, no tokens before a pause (nuclear peaks), and must be a neutral declarative - no interrogatives, imperatives or contrast statements) were included. So as previous researchers have noted (Face 2003; Colantoni 2011), while the study of intonation in spontaneous speech presents its own set of challenges, the present data provide us with a sense of YS patterns in everyday speech, and will enable us to answer the research questions posited above. This study is not meant to replace the valuable knowledge that can be gained from laboratory work that should be carried out on YS and is reserved for future study.

6. Results

Figure 4 presents the overall results for pre-nuclear peak alignment in spontaneous YS.

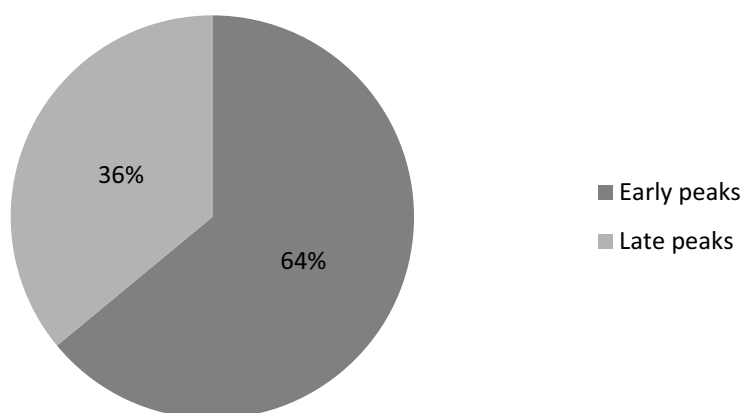


Figure 4: Overall rate of peak alignment.

The overall rate of early peak alignment in the present data is 64% ($n=257/400$). Of those, almost half (30%) occurred very early, in the first half of the stressed syllable. As a point of comparison, Face (2003) found 25% early peaks in spontaneous Castilian Spanish, and Rao (2005) reports an average of 38% early peaks for Central Mexican Spanish for all pragmatic categories in semi-spontaneous discourse¹⁵. Examining other contact varieties, Colantoni (2011: p. 195) found between 80%-100% early peaks in spontaneous Buenos Aires Spanish, but much lower rates of early-peak alignment in Spanish-Guarani bilingual Spanish in Northeastern Argentina (~ 25-30%), more in-line with the non-contact varieties outlined above (Castilian and Central Mexican). Comparing the present results on YS with these other studies of spontaneous speech, as well as with previous studies on laboratory speech, suggests that YS peak alignment most resembles other contact varieties (Basque: Elordieta 2003; Quechua: O'Rourke 2004, 2005).

As mentioned in the previous section, one possibility that could account for early peaks in spontaneous speech data is the phenomenon of tonal crowding; when a following stressed syllable pushes a peak back into the stressed syllable to avoid overlapping peaks. That is, early peaks may not be due to truly differing intonation patterns, but instead may be an artifact of unevenly spaced stressed syllables in a spontaneous utterance. This possibility is often tightly controlled in laboratory speech,

¹³ Thank you to Scott Alvord and Erik Willis for clarifying this discussion with their comments at HLS 2011.

¹⁴ Some tokens were excluded due to excessive background noise, such as a passing truck, birds singing, etc.

¹⁵ Rao (2005) found the following early peak rates: 22% for representatives, 30% for commissives, 36% for directives, 49% for declarations, and 54% for expressives. Rao (2006: 111) notes that early peaks arise most frequently in expressives due to their emotional and emphatic content.

with a specified number of tonic syllables per utterance and a minimum distance between them. The assumption here, following Alvord (2010a: 11) and McGory & Díaz-Campos (2002: 83), among others, is that if early peaks are an effect of tonal crowding due to the task or the particular data set, instead of representing true differences in intonation patterns, then the peak alignment should change based on the number of atonic syllables that intervene between the measured peaks; in other words, the fewer intervening syllables, the further back (towards or into the stressed syllable) the peak should be. This is what Alvord (2010a: 19) finds for Miami Cuban Spanish, a variety that presents post-tonic peak alignment. In the present data, however, no clear pattern arises regarding peak alignment and the number of intervening syllables between measurements for these speakers of YS, as seen in Table 2. Likewise, the number of intervening syllables was not a significant factor for peak alignment in the statistical analysis (see Table 4). Thus with the possible exception of speaker M-65, tonal crowding does not appear to account for the early peaks found for these speakers, further suggesting that the reported rate of early alignment is due to real differences in YS.

| # of intervening syllables | Bilinguals | | | | Monolinguals | | | |
|-------------------------------|------------|--------|--------|--------|--------------|---------|--------|--------|
| | F-65 | M-65 | M-44 | F-24 | M-76 | F-72 | M-25 | F-22 |
| 1 | -24.24 | -12.37 | -18.87 | .71 | -38.5 | -105.47 | -27.75 | -30.62 |
| 2 | -50.82 | 2.44 | -34.75 | -68.92 | -69.1 | -38.48 | 6.12 | -43 |
| 3+ | -19.6 | 2.28 | -34 | -63 | -50.06 | -35 | -7.46 | -16.89 |

Table 2. Average peak alignment (in ms) with respect to the number of intervening atonic syllables. A negative value indicates that the average peak occurred within the stressed syllable; a positive value that the average peak occurred in the post-tonic syllable.

Figure 5 and Table 3 present rates of peak alignment as a binary variable (early vs. late). Looking at each speaker, the range is from a low of 52% (speaker M-65) to a high of 82% (speaker M-76). As a point of comparison, Colantoni (2011) found between 80% and 100% early peaks in spontaneous Buenos Aires Spanish. Some differences can be observed among social groups. First, the bilingual group produced an average of 59.5% early peaks, compared to 68% for the monolingual Spanish group. This result would appear to argue against direct Maya influence on peak alignment, but further examination reveals that this trend is in large part due to the high rate of early peaks for speaker M-76 (82%). If this speaker is removed, Spanish monolinguals produced an average of 63% early peaks. Second, men produced an average of 60.5% early peaks, compared to 67% for women. Speaker M-76 continues to have an effect. If his data is removed, the average early peak rate for men drops to 53%. Finally, younger speakers produced early peaks an average of 61.5%, compared to 66% for older speakers (61% without speaker M-76). This preliminary result tentatively suggests that peak alignment in YS may not be standardizing across age groups, unlike what has been reported for segmental factors (Michnowicz 2009, 2011, 2012).

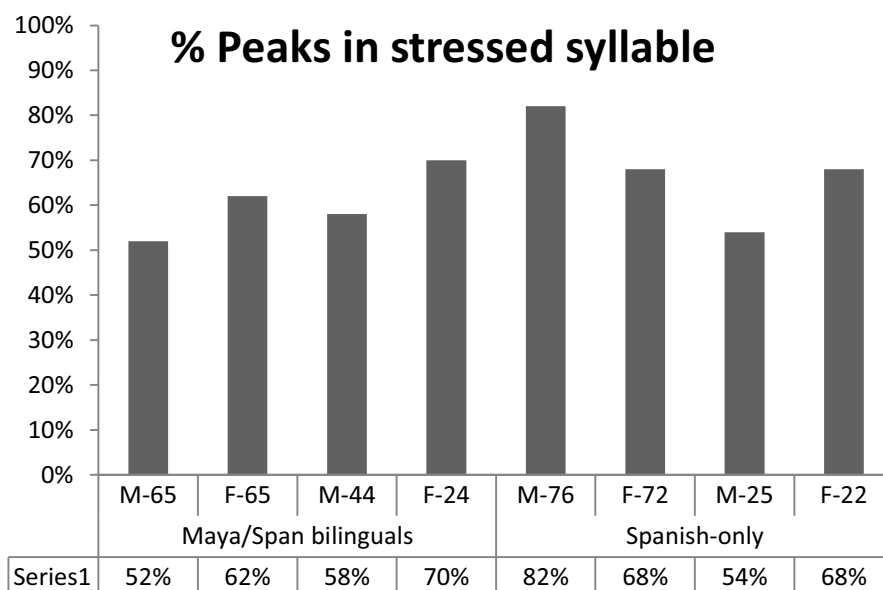


Figure 5: Percentage of early peaks (binary) by speaker

| Group | % early peaks |
|------------------------|---------------|
| Gender | |
| Men | 61.5% |
| Women | 67% |
| Age | |
| Younger | 62.5% |
| Older | 66% |
| Language | |
| Spanish-monolingual | 68% |
| Maya-Spanish bilingual | 60% |

Table 3: Percentage of early peaks (binary) by social group

In addition to examining peak alignment as a binary variable, it was also analyzed as a continuous measurement, as seen in Figure 6. In the chart, “0” marks the right boundary of the stressed syllable, from which the measurement was taken. Values to the left of 0 (i.e. negative values) represent early peaks. The dark lines in the boxplots indicate the median peak alignment value in ms for that speaker.

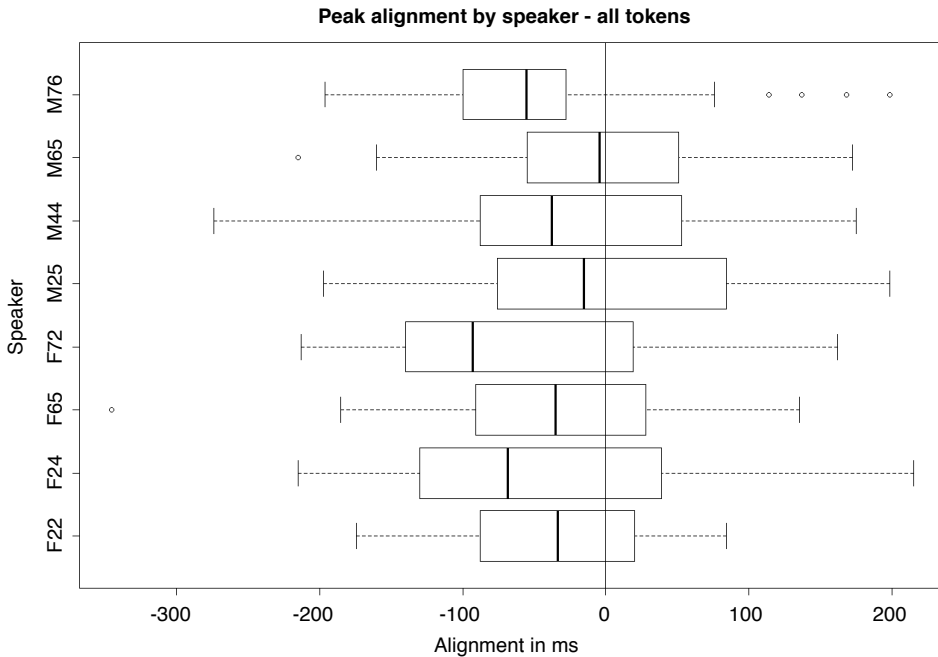


Figure 6: Peak alignment (continuous measurement) by speaker; all tokens

When all of the data is examined, all speakers have median peak alignment values less than 0 (i.e. early peaks), with a range of -93ms for speaker F-72 to -4.5ms for speaker M-65. Speakers M-65 and M-25, with median values near the end of the stressed syllable, display an alignment pattern more in line with results from laboratory studies on neutral declaratives in many non-contact varieties of Spanish. Speakers M-76, F-72, F-65, F-24 and F-22, on the other hand, display a pattern more similar to some contact varieties of Spanish (Elordieta 2003; O'Rourke 2004, 2005; Colantoni 2011), with median values well within the stressed syllable. Further details are observed regarding social groups. First, in general terms, women show lower median values than do men (as before, with M-76 being the exception). There is very little obvious trend with respect to speaker age; for example, F-22 and F-65 show very similar median values (-33 -35ms, respectively). Finally, language group also fails to show a consistent pattern, although Spanish monolinguals on the whole show earlier peaks than do Maya-Spanish bilinguals (see Table 4).

As mentioned previously, other factors that could account for the observed pattern of peak alignment in the data would have been controlled for in laboratory speech, such as syllable structure (with closed syllables producing a peak earlier in the stressed syllable (Prieto & Torreira 2007)), and the presence of voiceless segments creating an artificial peak in the F_0 contour. Although not exactly equivalent, laboratory speech can be approximated using spontaneous data by coding for the factors that would ordinarily be controlled. To confirm that the observed pattern is indeed due to real differences in peak alignment strategies, Figure 7 shows peak alignment for all speakers, but here only tokens in open syllables and without voiceless segments were included ($n=110$); all other tokens were excluded from Figure 7. When only open syllables and tokens without voiceless segments are considered, a very similar pattern emerges to that seen in Figure 6, which includes all 400 tokens. The median peak alignment values for all speakers, with the exception of M65, are negative, indicating early peaks (speaker M44's median is close to the end of the stressed syllable). While these patterns should be confirmed in laboratory speech in the future, the patterns observed in Figure 7, and the statistical analysis in Table 4, indicate that these speakers of YS employ early peak alignment, even when phonetic factors such as tonal crowding, syllable structure, and the presence of voiceless segments are accounted for.

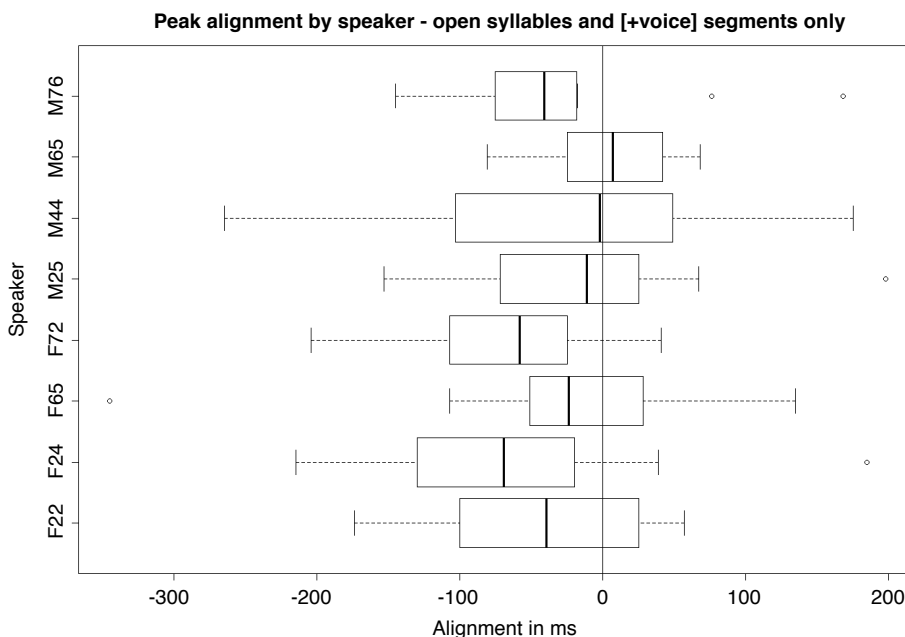


Figure 7. Peak alignment (continuous measurement) by speaker; open syllables and [+voice] segments only.

In order to quantify the patterns observed for the possible role of social and linguistic factors, preliminary multivariate statistical analyses were carried out using Rbrul (Johnson 2012), an implementation of Varbrul that allows for continuous variables and mixed-effects models. Although the small speaker pool in the present study precludes any definitive conclusions about the population as a whole, the statistical analysis will allow us to confirm trends seen in Figures 6 and 7, as well as identifying areas for further research with more speakers. The results from the one-level mixed effects model (with speaker as a random factor) are presented in Table 4.

| Factor Group | Coefficient | Tokens | Mean peak alignment (ms) | p value |
|---|-----------------|--------|--------------------------|---------|
| Gender | | | | |
| Men | 11.692 | 200 | -21.62 | 0.04 |
| Women | -11.692 | 200 | -41.78 | |
| Language | | | | |
| Maya-Spanish | 4.216 | 200 | -27.235 | 0.91 |
| Spanish only | -4.216 | 200 | -36.165 | |
| Age | | | | |
| continuous +1 | -0.2.89 | | | 0.28 |
| Syllable Type | | | | |
| Open | 10.955 | 297 | -26.172 | 0.03 |
| Closed | -10.955 | 103 | -47.641 | |
| Intervening | | | | |
| Syllables | | | | |
| continuous +1 | -2.377 | | | 0.51 |
| Speaker (random) | Std. Dev. 12.94 | | | |
| Deviance = 4753.831 df = 8 Grand Mean = -31.7 | | | | |

Table 4: Rbrul one-level analysis; peak alignment as continuous measurement

The results of the one-level analysis indicate that gender, syllable type and speaker (random) are significant predictors of peak alignment, with women producing significantly earlier peaks than men, as expected from Figure 6. Possible explanations for this small but significant gender difference will be addressed in the discussion. Likewise, in agreement with Figure 6, language group and age do not rise above the level of inter-speaker differences (see Johnson 2009). In other words, the observed patterns of variation are due to differences in individual speakers, and not necessarily to the behavior of the group(s) to which they belong, at least for the small number of speakers analyzed here. Based on this result, gender is a factor that should be explored further in future research using a larger subject pool. Regarding linguistic factors, as noted above, intervening syllable was not a significant predictor. While there was a significant effect for syllable type, with closed syllables favoring earlier peak alignment, importantly both syllable types have negative (early) means, indicating that in the present data syllable type determines how early the peak occurs, but not whether or not it is early (see Figure 7).

7. Discussion and conclusions

The present study found that these speakers of YS produced a higher rate of early peaks in spontaneous speech than speakers of many other varieties (64%). Based on naturalistic interviews, these results are not directly comparable to laboratory studies on peak alignment, but instead should be compared with the few studies that provide data for spontaneous speech. Again, Face (2003) found 25% early peaks in spontaneous Castilian Spanish, Rao (2005) found an average of 38% early peaks in semi-spontaneous Central Mexican Spanish, and Colantoni (2011) found between 80-100% early peaks in spontaneous Buenos Aires Spanish, similar rates in (non-contact) Western San Juan (Argentina) province, and lower rates in con-contact Córdoba Argentina Spanish and contact Northeastern Argentina Spanish. Although a direct comparison with laboratory data is not possible, it is still useful to use controlled studies as a general point of comparison (see also Colantoni 2011: 193). For example, de la Mota, Butragueño & Prieto (2010: 323) found that the predominant pattern in Mexico City Spanish prenuclear peaks is L+>H*, suggesting differences between YS and Mexico City Spanish intonation that should be explored further.

The results suggest that the perceived YS “accent” reported in earlier studies and by speakers of YS is due, at least in part, to the preference for early peaks, which can give a “staccato” or insistent sound to an utterance (Face 2003: 124). As mentioned previously, YS intonation has been described as “lenta y pausada¹⁶” (Suárez 1979: 77), suggesting a staccato rhythm. It is possible that the YS accent – *el hablar pujado* – is a combination of both suprasegmental (i.e. early peak alignment) and segmental features (such as hiatus due to an increased rate of occlusive [bdg] and the insertion of [ʔ]) (Michnowicz 2011, 2012)), which can also have an effect on intonational features. Other factors may be involved as well, such as tonic vowel lengthening (Lipski 2004), that need to be explored further.

Speaker gender showed a small but significant effect, with women favoring early peaks more than men. This could be perceived as going against the sociolinguistic tendency for women to use more standard or prestigious forms (Labov 2001), but more likely is related to social and geographic mobility, as men are more likely to travel for purposes of work, which brings them into increased contact with other varieties of Spanish, as has been argued for YS occlusive [bdg] (see Michnowicz 2011: 206-207 for discussion). Thus women continue to employ more traditional, less pan-Hispanic YS forms, at least for some segmental features ([bdg], final -m (Michnowicz 2007, 2008, 2011) and here, for early peak alignment also.

Speaker age was not found to be significant, although there is a small trend for older speakers to produce earlier peaks. Given that previous research on segmental variables has found rapid standardization among younger speakers of YS, the role of age on suprasegmental variables should be explored further in future studies.

Regarding reported Maya influence on YS intonation (Suárez 1979, Barrera Vázquez 1937), in the present data, no clear relationship appears between speaking Maya and peak alignment; that is, no pattern emerges for median peak alignment values (in Figure 6), and the difference between language

¹⁶ “slow and halting”

groups was not significant for these speakers (Table 4). This finding supports Barrera Vásquez' (1937: 19) assertion that monolingual Spanish-speakers and bilingual Maya-Spanish speakers do not differ in their intonation (see section 3). Were previous studies that attributed YS intonation to Maya influence therefore mistaken? It is certainly possible that differences in pre-nuclear peak alignment in YS may be due to other factors (including prosodic factors not examined here - cf. Colantoni 2011). There is, however, some evidence that would allow one to plausibly attribute YS intonation to contact with Maya, albeit indirectly. First, as outlined in section 3, studies on Maya intonation have shown that differences in focus are not expressed through prosodic means in that language (Gussenhoven 2006; Kügler, Skopeteas & Verhoeven 2007, Gussenhoven & Teeuw 2008). Therefore, Maya-speakers learning Spanish may not have interpreted differences in peak alignment in Spanish as important to the semantics of the utterance. This, combined with the fact that high tones associate with phrase-internal stressed syllables (Gussenhoven & Teeuw 2008), could have led Maya-speakers to more frequently align pre-nuclear peaks with stressed syllables as a default, independent of focus. This could occur as part of a process of simplification that speakers undergo as they acquire a new L2 system of intonation (Winford 2003; many others). As demonstrated in Colantoni (2011), language contact itself may not be sufficient to cause speakers to adopt early peaks as a simplification strategy, but one could argue that the process of L2 acquisition, which lends itself to simplifications and over-generalizations, combined with an L1 that allows early peaks in broad-focus constructions (such as Italian in contact with Buenos Aires Spanish), or alternatively with a language that does not mark focus prosodically (such as Maya), may result in the extension of early peaks to contexts not found in monolingual varieties of the language.

Finally, studies on language contact have demonstrated how interlanguage forms can become fossilized among a shifting speech community, leading that group to retain L2 features in their new language, even in subsequent generations that speak the target language natively (Winford 2003). As noted by Thomason & Kaufman (1988), these fossilized interlanguage forms can be spread to even monolingual populations, given the right demographic and situational contexts. This process has been argued to be responsible for many of the 'traditional' YS segmental forms, such as occlusive [bdg] (Michnowicz 2009, 2011). It is possible that the same processes played a role in developing YS intonation patterns. One of the expected outcomes of dialect mixing of Maya-influenced Spanish and monolingual Spanish (i.e. koineization) is a wide range of individual variation over several generations (see Kerswill 2002; Penny 2004), which is what the present study finds for peak alignment, and what other studies have found for segmental features of YS as well (Michnowicz 2008, 2011; Michnowicz & Carpenter 2012).

Of course, the scenario outlined above, while plausible, is still hypothetical, and more details about Maya phrasal intonation are needed before more definite conclusions can be made (see Lope Blanch 1987: 39). Finally, additional studies should also examine YS intonation in a laboratory setting, allowing for more controlled contexts and clearer comparisons with previous research on peak alignment. Additionally, Barrera Vásquez (1945/1977: 343) notes that YS interrogative intonation also differs from other varieties of Spanish. Thus multiple aspects of YS intonation are still unknown. The present study hopes to present a small piece of this puzzle, as well as establish that clearly this is an area that deserves more attention in the scholarly literature.

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