Declarative Intonation Patterns in Multiple Varieties of Spanish

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1. Introduction

Recent efforts have sought to capture the intonational structure of declaratives in Latin American and Peninsular varieties of Spanish using an autosegmental-metrical (AM) model of intonation (Ladd 1996), like that proposed for English by Pierrehumbert (1980). These include a description by Sosa (1999) of multiple Latin and Peninsular varieties, and also more specific descriptions of Castilian Spanish by Face (in press), of Mexican Spanish by Prieto and colleagues (Prieto, van Santen & Hirschberg 1995, Prieto, Shih, & Nibert 1996, Prieto 1998), and of northern Peninsular and Venezuelan Spanish by participants at the first Spanish ToBI workshop (Mendoza-Denton, McGory, & Díaz-Campos 1999; Hualde 2000).

The gross shape of the intonation pattern of declaratives has been described similarly among these researchers. In a prototypical declarative produced without any particular lexical emphasis, there is a pitch accent on each content word, and every accent after the first is downstepped relative to the preceding accent peak. Also, there is a fall to a low pitch at the sentence boundary, after the last pitch accent. This gives an overall impression of a gradually declining backdrop pitch range, a series of smaller and smaller peaks ending with a final fall in pitch at the end of the utterance.

There is less agreement as to the analysis and number of pitch accent types, about the potential for some content words to be produced without pitch accents, and the number and types of boundary pitch movements. The potential inventory of pitch accents, their location within declaratives, and the inventory of boundary tones is the subject of the current investigation.
Pitch accents are phonological categories that specify the fundamental frequency patterns associated with particular syllables. In Spanish, these associated syllables are stressed. Within an Autosegmental-Metrical (AM) analysis of intonation, pitch accent categories are assigned either a single H(high) or L(low) label or a combination of H and L labels. Falling pitch accents are represented as H+L, rising pitch accents as L+H, and level pitch accents as L or H. Important to these labels is the localization of an asterisk that is assigned to either the L or H component of the pitch accent. This asterisk denotes the localization of the tone target that is consistently realized within the stressed syllable. For example, the H target in a L+H* is typically realized within the stressed syllable. In the case of the pitch accent L*+H, the L target is aligned with the stressed syllable. Pitch accent categories that potentially exist in some or all varieties of Spanish are rising pitch accents (L+H* and L*+H), level pitch accents (L* and H*), and falling pitch accents (H+L* and H*+L).

The last pitch accent in an utterance is the “nuclear pitch accent”; and those produced before the nuclear accent are then “prenuclear pitch accents”. Earlier researchers of Spanish intonation have observed differences between these two positions in the timing of the accentual peak, with the peak typically being after the accentuated syllable in a prenuclear pitch accent and within the accentuated syllable of nuclear pitch accents (Navarro-Tomás 1948). Prenuclear and nuclear pitch accents have been classified as belonging to the same phonological category by Prieto and her colleagues (Prieto et al. 1996, Prieto 1998), Hualde (2000) and Nibert (1999). In this “one category” analysis, the observed differences in peak timing are different phonetic realizations of the same phonological pitch accent type. Prieto uses the label H* to refer to this pitch accent; Hualde and Nibert use the label (L+H)*. According to these accounts, the location of the pitch accent’s peak is influenced by stress clash and tonal crowding. Consequently, pitch accent variants can be described as allotones of a single pitch accent.

Sosa (1999) and Face (2000) have posited that multiple pitch accents exist in Spanish, and this was the consensus also at the first Sp_ToBI workshop. According to Face (2000), two pitch accents are consistently used in declaratives: L*+H is consistently produced in prenuclear position while L+H* is produced in nuclear position. Sosa (1999), on the other hand, posits that there are more than two pitch accents, but he agrees that the inventory of prenuclear and nuclear types differ. These pitch accent types are illustrated in Figure 1.

<table>
<thead>
<tr>
<th></th>
<th>Prenuclear</th>
<th>Nuclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sosa</td>
<td>H*+L, L*+H*</td>
<td>L+H, H+L*</td>
</tr>
<tr>
<td>Prieto and colleagues</td>
<td>H*</td>
<td>H*</td>
</tr>
<tr>
<td>Hualde, Nibert</td>
<td>L*+H</td>
<td>L+H*</td>
</tr>
<tr>
<td>Sp_ToBI participants</td>
<td>L*+H</td>
<td>L+H*</td>
</tr>
</tbody>
</table>

Figure 1. The number and type of pitch and nuclear positions in declaratives in Spanish intonation.

According to this “multiple category” content words do not affect the realization of pitch accents are accent categories.

Because of the downstepping pattern a content word is often produced with no rise, or no visible rise at all. There have been posited for the intonational status is a rise and no rise is not contrary Spanish intonation that posit one pitch type that can be produced with a nuclear L+H* pitch according to Prieto et al. (1995) and Hualde (2000), and the realization of the “increased” or “reduced” rise, contrasting pitch accent types. Sosa (1999) says “reduced” nuclear pitch accents do not have a rise, calling the first a H* pitch accent; it is also possible that content words need no rise and instead be deaccented. Participants rule out this possibility, and found that the earlier content word was produced with.

Why might these different accounts take into consideration the accentual syllables yet one group of researchers posits multiple pitch accents. One example of Spanish intonation exist and this possibility. Spanish intonation have concentrated on Mexican Spanish (1995, 1996, 1998, 2000); ToBI Workshop members observed in Spain; and Sosa observed multiple varieties in Colombia, Puerto Rico, Venezuela, Spain; and pitch accents that we ask in this study
Theories that specify the fundamental syllable categories In Spanish, these categories are assigned either a single label of H and L labels. Filling pitch accents as L+H, and level pitch accents as H. The location of an asterisk that is consistently realized within the syllable is L+H*.

The “nuclear pitch accent” and those “prenuclear pitch accents” are. Earlier observed differences between these two types, with the peak typically being after the nuclear accent and within the accented syllable (as in 48). Prenuclear and nuclear pitch accents are the same phonological category. According to Prieto et al. (1996, Prieto 1998), Hualde analyzes the observed phonetic realizations of the same pitch accent by the label H* to refer to this pitch peak L+H*.

According to these accounts, pitch accents are influenced by stress clash and tonal patterns can be described as allotones of a "reduced" nuclear pitch accent. Sosa (1999) posits that there are two types of "reduced" nuclear pitch accents, for a reduced F0 rise, the first a H* pitch accent, and the second a L* pitch accent. It is also possible that content words need not be produced with a pitch accent at all, and instead be deaccented.

Because of the downstep pattern in Spanish declaratives, the final content word is often produced with a very reduced rise within the stressed syllable, or no visible rise at all. There are three possible explanations that have been posited for the intonational status of this final content word. The difference between a rise and no rise is not contrasted in F0, and in accounts of Spanish intonation that posit one pitch accent type. The final content word is produced with a nuclear L+H* pitch accent according to Face (2000), a H* according to Prieto et al. (1995) and Prieto (1996), and a L+H* according to Nibert (2000) and Hualde (2000). Another possibility is that these differences in the realization of the "reduced" rise in the final content word are due to contrasting pitch accent types. Sosa (1999) posits that there are two types of "reduced" nuclear pitch accents distinguishing between a reduced F0 rise and no rise, calling the first a H* pitch accent and the second a L* pitch accent. It is also possible that content words need not be produced with a pitch accent at all, and instead be deaccented. Participants in the Sp_Tobi workshop (1999) did not rule out this possibility, and found deaccenting particularly noticeable when an earlier content word was produced with focus.

Figure 1. The number and type of pitch accents occurring in prenuclear and nuclear positions in declaratives according to different theories of Spanish intonation.

According to this "multiple categories" analysis, the segmental makeup of content words does not affect the realization of tone targets. Instead, differences in the realization of pitch accents are accounted for by there being different pitch accent categories.
there? (2) Are there separate inventories for prenuclear and nuclear position? And, (3) Can a content word be produced without an accent?

Navarro-Tomás (1948) describes the final pitch contours in declaratives in Manual de Intonación Española (Manual of Spanish Intonation). In this account he describes five different types of pitch movements called tonemas ‘tonemes’ all realized after the last stressed syllable at the right edge of the intonational phrase. Each toneme is associated with a different meaning. The first of these is a falling toneme produced with a steep falling pitch contour. In an emphatic discourse, the pitch fall is more dramatic. According to Navarro-Tomás, this fall indicates the end of a declarative sentence. The second is a rising toneme produced with a steep rising pitch contour. This rise indicates emphasis in the predicate between contrasting concepts. The third is a mid-falling toneme produced with a falling contour that is less dramatic or steep than the falling toneme. The mid-falling toneme indicates uncertainty in a declarative sentence. This contour expresses that the speaker produced a declarative statement with some hesitation. The fourth is a mid-rising toneme produced with a shallower rise than the rising toneme. Navarro-Tomás maintains that the mid-rising toneme indicates continuation and secondary contrasts between concepts. The fifth is a sustained toneme produced in the middle of a person’s pitch range. This boundary tone indicates incomplete meaning and an abrupt end without finishing an idea. If we use autosegmental metrical labels to describe the boundary tones proposed by Navarro-Tomás, we can describe both the falling and mid-falling toneme as a low boundary tone, L%; the rising toneme as a high boundary tone, H%; the mid-rising toneme as a rising boundary tone, LH%; and a sustained toneme as a mid boundary tone, M%.

Utterances in more recent accounts of intonation are produced with a limited number of boundary tones. Although all of the pitch tracks that Prieto et al. and Face show have only L% boundary tones, and these authors do not mention rising or sustained tones in their materials, this may be because their materials were read lists of sentences. Our test materials are a connected string of sentences in a longer, coherent discourse, which may give more opportunity for the other boundary pitch movement types noted by Navarro-Tomás (1948). If we suggest here that different pitch accent inventories might exist in multiple varieties of Spanish, then it is possible that different inventories of boundary tones might also exist. Another possibility is that the recording conditions have influenced the use of particular boundary tone types. The utterances that have been observed have for the most part, been produced as single sentences with little or no contextual information. Because of the nature of these utterances, the relationship between phrases that Navarro-Tomás suggests indicating continuation of an idea or the contrast between multiple ideas are not likely to exist in the target sentences in more recent observations. Questions regarding edge tones that we ask in this study are: (1) What is the possible inventory of edge tones in multiple varieties of Spanish? (2) What is the relationship between boundary tone choice and communicative function?

2. Methods

Sixteen native Spanish speakers were a part of the investigation. We obtained speech recordings from each of 8 different Spanish-speaking regions: Costa Rica, Chile, Mexico, Puerto Rico, Spain, and the United States. Each speaker took part in a sound-attenuated booth at The Ohio State University, then wrote a paragraph about cultural and linguistic aspects of their home country. They were also asked to write a complete story about an idea that was important to them. The paragraphs were written as a complete story, while the text was divided into support phrases that were independent units of thought. The text was divided into complete ideas, while those that connected ideas. This distinction allowed us to identify “word juncture” indicated by spaces between ideas labeled with a single slash “/”, two slashes “//”, and the end of a complete idea. Discourse analysis of the text is provided...
2. Methods

Sixteen native Spanish speakers provided the data for the present investigation. We obtained speech recordings from one male and one female speaker for each of 8 different Spanish dialects: Argentina, Colombia, Costa Rica, Chile, Mexico, Puerto Rico, Spain and Venezuela. The recording sessions took place in a sound-attenuated booth located in Cunz Hall within the Department of Linguistics at The Ohio State University. The 16 consultants read a paragraph about cultural and linguistic variability in the Spanish-speaking world written by Patricia Lunn (Michigan State University). We analyzed the most fluent of two repetitions.

To observe the potential relationship between the communicative function of a discourse segment and the choice of boundary tone, we identified the edges of discourse segments within the written text and the prosodic phrase edges from each speaker’s productions. To segment the text, we determined the discourse segment (DS) units defined by Grosz and Sidner (1986) as a segment of text with a complete communicative function or purpose. Within each DS, we further divided the text into supporting information of two types. Supporting phrases that were independent units and could be stated alone were considered complete ideas, while those that could not be stated alone were incomplete ideas. This distinction allowed us to label four types of discourse junctures: “word juncture” indicated by spaces between words, the end of an incomplete idea labeled with a single slash “/”, the end of a complete idea labeled with two slashes “///”, and the end of a complete DS labeled with three slashes “/////”. This discourse analysis of the text is provided in Figure 2.
**Overall Purpose:** Discuss similarities & differences among Spanish speaking people.

**DS1:** Describe the population and residence of Spanish speakers

*Hay más de trescientos millones de personas / que hablan español//
primariamente / en España y Latinoamérica//.*

[There are more than three hundred million people / who speak Spanish //
primarily / in Spain and in Latin America//.]

**DS2:** State that different varieties of Spanish exist

*Por razones históricas y geográficas / han divergido los varios dialectos
de la lengua //.*

[For historical and geographical reasons / there are various dialects of the
language //.]

[Not only do different accents exist / but there also different
words //.]

Se dice coche / piso y maíz en España //, auto / apartamento, y choclo en
Chile //, carro / departamento y elote en México. //

[People say coche / piso and maíz in Spain //, auto / apartamento and choclo
in Chile //, carro / departamento and elote in México. //]

**DS3:** Describe the cultural similarities among Spanish-speaking countries

*Sin embargo / las manifestaciones culturales del mundo hispanohablante...//
[Nonetheless /, cultural manifestations of the Spanish speaking world...//]

**arte / cine / deporte / literatura / música y televisión/**

[art / theater / deporte / literature / music and television/]

**sirven para compensar la diversidad lingüística/**

[serve to compensate for the linguistic diversity//.]

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**Figure 2. Discourse segmentation of the written text**

After completing a discourse analysis of the text, we identified the location
and type of each intonational phrase boundary by digitizing the speech and
extracting the fundamental frequency contour using the Entropicx, Inc., xwaves
signal analysis software. A native Spanish speaker (the second author) listened
to each recording and identified the location of a prosodic boundary. Next, we
examined pitch tracks in order to classify the type of boundary tone. We labeled
the type of tonal movement occurring at the right edge of these phrases using the
following criteria:

**H%:** a rising pitch pattern rising high within the speaker’s pitch range; higher
than the peak of a rising pitch accent

**M%:** a sustained or slightly falling F0 pattern in the unstressed syllable(s) after a
final pitch accent; or a low rising pitch pattern (no higher than that of a rising
pitch accent) within the utterance final stressed syllable

**L%:** a steep fall in F0 after the last pitch accent.

**LH%:** a fall in F0 after the final stressed syllable in the middle of the speaker’s pitch range

Example utterances with these edge tones:

5. The speaker in Figure 3 produced the utterance “right edge of personas and at the right edge of
the stressed syllables of these words, and the
range at the end of each word. The utterance
production of a LH% edge tone realized after
the stressed syllable followed by a slight
pitch range. There is no stressed syllable at
the end of voicing between *sin embargo* and *las is*
This is a clear example of a LH%. The final
It was difficult to distinguish between M%
utterance final syllable was stressed because
realized within the same syllable. A M% tar
manifestaciones because there is one post
production, there is little to no rise in the
labeled this as a M% edge tone. Figure
realization of a M% and H% providing a clear
to rise higher into a speaker’s pitch range within
the last syllable in España, as opposed to
F0 in the last syllable of principally prone
to penultimate stress, yet the F0 patterns are quite

We predicted that the choice of edge tone
location of the intonational phrase within the
discourse segmentation, that boundary is
different general functions: finality at the end,
continuation between complete ideas, and
ideas and words.
L%: a steep fall in F0 after the last pitch accent
LH%: a fall in F0 after the final stressed syllable followed by a short rise to the middle of the speaker’s pitch range

Example utterances with these edge tones are provided in Figures 3, 4, and 5. The speaker in Figure 3 produced the utterance with two L% tones, at the right edge of personas and at the right edge of español. The pitch rises within the stressed syllables of these words, and then falls within the speaker’s pitch range at the end of each word. The utterance in Figure 4 illustrates the production of a LH% edge tone realized after the word embargo. There is a fall after the stressed syllable followed by a slight rise to the middle of the speaker’s pitch range. There is no stressed syllable at the edge of this word, and cessation of voicing between sin embargo and las is evidence for a boundary juncture. This is a clear example of a LH%. The final edge tone in this example is a M%. It was difficult to distinguish between M% and H% edge tones when the utterance final syllable was stressed because the pitch accent and edge tone are realized within the same syllable. A M% target is more clearly seen in the word manifestaciones because there is one poststressed syllable in this word. In this production, there is little to no rise in the unstressed syllable [nes] and so we labeled this as a M% edge tone. Figure 5 illustrates the difference in the realization of a M% and H% providing a clear example of how the F0 continues to rise higher into a speaker’s pitch range when producing a H% as can be seen in the last syllable in España, as opposed to the leveling or slight falling off of F0 in the last syllable of principalmente produced with a M%. Both words have penultimate stress, yet the F0 patterns are quite different.

We predicted that the choice of edge tones would differ depending on the location of the intonational phrase within the discourse. We assume, based on the discourse segmentation, that boundary tones will be used to indicate three different general functions: finality at the end of discourse segments, finality or continuation between complete ideas, and continuation between incomplete ideas and words.
In order to isolate the location of final content words in utterances that could separate a H tone associated with a boundary tone in utterances ending in Figure 5. The location of a H pitch from the H target of the H% boundary alignment of L and H tones relative to using the following labels and criteria:

Early H: F0 peak is realized inside the
Late H: F0 peak is realized after the end
Falling HL: F0 fall within the stressed
and ending at offset
NO: No visual L or H target near or within
between surrounding tone targets

We used the waveform envelope
syllable edges. Early H alignment is ill-
F0 peak is produced within the stress
alignment is illustrated in Figure 3. Ein
utterance Hay más de trescientos miles
accent whose peak is not realized until
más is realized within the word de and
realized in a syllable after the accent.
Figure 6 below.
In order to isolate the location of pitch accent targets, we analyzed the two final content words in utterances that ended with a pitch fall (L%, H%). It is difficult to separate a H tone associated with a pitch accent from the tone associated with a boundary tone in utterances ending with H% or M%. This is illustrated in Figure 5. The location of a H pitch accent target in España is not discernable from the H target of the H% boundary tone. Pitch pattern descriptions based on alignment of L and H tones relative to the end of the stressed syllable were made using the following labels and criteria:

Early H: F₀ peak is realized inside the stressed syllable
Late H: F₀ peak is realized after the end of the stressed syllable
Falling HL: F₀ fall within the stressed syllable starting at stressed syllable onset and ending at offset
NO: No visual L or H target near or within the stressed syllable; F₀ interpolates between surrounding tone targets

We used the waveform envelope and spectrograms to isolate the stressed syllable edges. Early H alignment is illustrated in Figure 4. In this utterance, the F₀ peak is produced within the stressed syllable [bár] in embargo. Late H alignment is illustrated in Figure 3. Each content word at the beginning of the utterance Hay más de trescientos millones... is produced with a rising pitch accent whose peak is not realized until after the stressed syllable. The F₀ peak in más is realized within the word de and illustrates how pitch accent peaks can be realized in a syllable after the accented word. HL alignment is illustrated in Figure 6 below.
The last two content words in the utterance in Figure 6 are *dialectos* and *lengua*. The stressed syllables in these words are separated by 3 unstressed syllables, however the pitch does not sag between the F₀ peak in the third syllable of *dialectos* and the first stressed syllable in *lengua*. We labeled the pitch accent in the nuclear accent as having a falling HL pitch pattern. Finally, we used the label NO when there were no visible F₀ targets within the content word. In these cases, the F₀ pattern within the word was an interpolation between surrounding tone events, as illustrated in Figure 3. The final word in this utterance is *español*. The final syllable is stressed, yet there is no visual low or high tone target produced anywhere near the word final stressed syllable. Instead, F₀ interpolates between the H pitch accent target in *hablan* to the L boundary tone target at the end of the utterance.

3. Results: Pitch Accents

3.1. Pitch accents across all speakers

We looked at pitch contours over the last two content words in each intonational phrase. There were twelve distinct patterns observed with varying frequency. We limit our discussion to the combinations of pitch accent types produced in prenuclear and nuclear contexts that were used more than once by at least three dialect groups. These five pitch patterns and the total number of times they were used are listed in Figure 7. We have provided autosegmental metrical labels in parentheses as a description of the potential pitch accent types these patterns represent.

The most commonly used pattern is a pitch rise within the stressed syllables of the final two content words. The first accent is realized with late H peak, and the second with an early H peak. This pattern is what has been described as a prenuclear L*+H followed by a nuclear L+H* in a multiple accent analysis (Face 2000; ToBI Workshop 1999). We found these individual pitch accent patterns to occur in other combinations as well. Late peak alignment in the prefinal content word occurs in three of the five pattern types discussed here accounting for 69% of the data. The tendency for pitch accents in prefinal content words to be produced with late peak realization in our data set is consistent with findings by Prieto et al. (1996), Prieto (1998), Sosa (1999), the Sp_ToBI group (1999) and Face (2000). Late peak alignment was less frequent in the final content word, accounting for only 3% of productions. Early peak alignment was most typical in the final content word occurring in two of the five pattern types discussed here accounting for 45% of the data. It occurred less frequently in prenuclear position, accounting for 16% of the data.

Another pitch accent pattern that was produced frequently was a falling HL pattern in the nuclear accented word. Although HL was not used consistently in other combinations, it nonetheless accounted for 21% of these most commonly produced patterns. We were quite interested in this pattern because Sosa’s analysis (1999) is the only one that posits the existence of this pitch accent pattern.

We were unable to identify any patterns of many productions. The second author, however no sense of prominence on this final content accent occurred after a LateH pitch pattern. Spanish intonation has described this accent, we found that no visible tone commonly used pitch patterns.

<table>
<thead>
<tr>
<th>Pitch Pattern</th>
<th>AM description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LateH Early H</td>
<td>(L*+H L+H*)</td>
</tr>
<tr>
<td>LateH N0</td>
<td>(L*+H N0)</td>
</tr>
<tr>
<td>LateH FallingHL</td>
<td>(L*+H H+L*)</td>
</tr>
<tr>
<td>EarlyH EarlyH</td>
<td>(L+H* L+H*)</td>
</tr>
<tr>
<td>EarlyH LateH</td>
<td>(L+H* L*+H)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 7. Pitch patterns types and their counts.**

Two follow-up analyses were conducted of segmental affects on the realization of rising accents in order to determine if intonational crowding, as claimed by Prieto et al., instead distinct pitch accent types, as claimed in analysis was completed to observe the realization of the falling HL pitch pattern.

To observe the possible effects of prenuclear rising accents, we observed Late H accent patterns followed by varying numbers of unstressed syllables. The distribution of early and late peak patterns unaffected by stress clash. Both early and prenuclear accent when there are unstressed syllables. Contrary to predictions, occurs when there is only a single and early peak alignment occurs when 25% of occurrences. With this evidence separate pitch accent categories.

<table>
<thead>
<tr>
<th>Unstressed Syllables</th>
<th>One</th>
<th>Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late H</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Early H</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

**Figure 8. The distribution of late and unstressed accented with 1-5 intermittent unstressed syllables.**
We were unable to identify any pitch target in the final content word in many productions. The second author, a native Spanish speaker, also perceived no sense of prominence on this final content word. The nonexistence of a pitch accent occurred after a LateH pitch accent. Although no other accounts of Spanish intonation have described the final content word as having no pitch accent, we found that no visible tone target was realized in 16% of the most commonly used pitch patterns.

<table>
<thead>
<tr>
<th>Pitch Pattern</th>
<th>AM description</th>
<th>Times used</th>
<th>% of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>LateH Early H</td>
<td>(L*+H L+H*)</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>LateH N0</td>
<td>(L*+H NO)</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>LateH FallingHL</td>
<td>(L*+H H+L*)</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>EarlyH EarlyH</td>
<td>(L+H* L+H*)</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>EarlyH LateH</td>
<td>(L+H* L*+H)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Total Utterances</td>
<td></td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 7. Pitch patterns types and the number of times used across all subjects.

Two follow-up analyses were completed to observe the potential influence of segmental affects on the realization of the F0 peak in prenuclear and nuclear rising accents in order to determine if LateH and EarlyH patterns resulted from tonal crowding, as claimed by Prieto et al. (1995) and Hualde (2000), or were instead distinct pitch accent types, as claimed by Face (2000). A third follow-up analysis was completed to observe the potential influence of stress clash on the realization of the falling HL pitch pattern.

To observe the possible effects of stress clash on peak location in prenuclear rising accents, we observed the frequency of prenuclear EarlyH and LateH accent patterns followed by a nuclear LateH accents separated by varying numbers of unstressed syllables. These results are provided in Figure 8. The distribution of early and late peak alignment in prenuclear accent is unaffected by stress clash. Both early and late peak alignment occur in the prenuclear accent when there are one to five unstressed syllables between stressed syllables. Contrary to predictions of stress clash, late peak alignment occurs when there is only a single intermittent syllable (13% of occurrences), and early peak alignment occurs when there are five intermittent syllables (25% of occurrences). With this evidence, we suggest that L+H* and L*+H are separate pitch accent categories.

<table>
<thead>
<tr>
<th>Unstressed Syllables</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Five</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late H</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Early H</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

Figure 8. The distribution of late and early peaks in prenuclear rising accents with 1-5 intermittent unstressed syllables.
Second, we considered the possibility that the proximity of the L% boundary tone influenced the location of the peak of the nuclear pitch accent. We observed the distribution of nuclear pitch accents with early peaks and late peaks. Consistent with the stress patterns in Spanish, all utterances in our data set ended with a content word having zero to two poststressed syllables. The number of times a rising pitch accent was produced with early and late accentual peaks in words across these different stress positions is provided in Figure 9. Results indicate that the distribution of early peaks was similar across all stress types. In fact, early peaks were realized most often in words ending in one and two unstressed syllables where there was sufficient room for the peak to be realized later in the post stressed syllable. These results provide additional evidence that L+H* and L*+H are separate pitch accents, and the low occurrence of L*+H in nuclear position also suggests that L+H* is the preferred nuclear pitch accent.

<table>
<thead>
<tr>
<th>Proximity of L% boundary</th>
<th>Early H peak (L+H*)</th>
<th>Late H peak (L*+H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 syllable</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>1 syllable</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>2 syllables</td>
<td>17</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 9. The distribution of pitch accents with early and late peak alignment across all utterance produced with a final L% tone.

The third question we asked was if the production of a falling HL pitch pattern was influenced by the proximity of the prefinal and final stressed syllables. We believe that this pattern is a H+L* (see Figure 5). The two final content words are produced in the phrase dialectos de la lengua in this utterance. A rising pitch accent is evident in the first word dialectos. A late H target is realized in the poststressed syllable [tos]. The F0 remains high through to the beginning of the stressed syllable [légu] in lengua. At this point a steep fall begins that continues through to the end of the stressed syllable. We posit that this fall in pitch is due to a H+L* pitch accent. This fall is contrasted to the steep fall in the word personas illustrated in Figure 3. The phrase final pitch fall in personas continues from the stressed penultimate syllable to the end of the word. We posit that the L% boundary tone is realized at the edge of the word. The pitch fall in the word lengua (Figure 5) tapers off at the end of the stressed syllable and remains level until the end of the word. The fall within this stressed syllable is characteristic of a falling H+L pitch accent where the low target is realized near the end of the stressed syllable.

The distribution of nuclear HL is presented in Figure 10. If H+L* were a phonetic variation of a rising L+H pitch accent, we would expect to see the initial L target of a nuclear L+H pitch accent reappear when stressed syllables between the nuclear and prenuclear words were separated by more and more unstressed syllables. In other words, decrease as unstressed syllables increase between nuclear and prenuclear pitch falling pitch patterns. A falling pitch accent and five unstressed interwoven were two intervening syllables. The pitch accent.

These three separate observations lead us to hypothesize about the accent in Spanish. These are L+H results for individual dialects, we expect that category status of pitch accents in Spanish.

<table>
<thead>
<tr>
<th>No. of intermediate syllables</th>
<th>Zero</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Five</th>
</tr>
</thead>
</table>

Figure 10. The distribution of nuclear degrees of stress clash

3.2. Pitch accents within each dialect

Distributions of final and prefinal content words in all dialects are provided in Figure 11 and 12. The most often for each dialect is in both dialects. The content word labeled “NO” is produced most frequently in Puertorican Spanish. In these utterances, the prefinal content word produced a H+L* pitch accent is the most common in all dialects. The pitch accent patterns in various varieties of Spanish, Prieto's and workshop's analysis of Peninsular Spanish, and Accent in Chilean differ from all other varieties. The accent type in the prefinal content word varies across language groups except Castilian Spanish. In this study, we expected that Castilian Spanish...
availability that the proximity of the L% to the peak of the nuclear pitch accent is critical. Pitch accents with early peaks and late peaks in Spanish, all utterances in our data had zero to two poststressed syllables. The production of early and late accentual stress positions is provided in Figure 9. Early peaks was similar across all stress marks often in words ending in one and two syllables. These results provide additional support for the idea that L+H* is the preferred unstressed syllable. In other words, the frequency of HL pitch patterns would decrease as unstressed syllables increased. The number of unstressed syllables between nuclear and prenuclear pitch accents did not influence the frequency of falling pitch patterns. A falling pitch pattern occurred when there were between one and five unstressed intervening syllables, and was most common when there were two intervening syllables. This evidence suggests that H+L* is a separate pitch accent.

These three separate observations of the potential effects of stress clash and tone crowding lead us to hypothesize that there are at least three separate pitch accents in Spanish. These are L+H*, L*+H, and H+L*. In our discussion of results for individual dialects, we will use these labels to indicate the multiple category status of pitch accents in Spanish.

<table>
<thead>
<tr>
<th>No. of intermediate syllables</th>
<th>Times an HL pattern occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>0</td>
</tr>
<tr>
<td>One</td>
<td>5</td>
</tr>
<tr>
<td>Two</td>
<td>10</td>
</tr>
<tr>
<td>Three</td>
<td>6</td>
</tr>
<tr>
<td>Four</td>
<td>0</td>
</tr>
<tr>
<td>Five</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 10. The distribution of nuclear falling pitch patterns with varying degrees of stress clash

3.2. Pitch accents within each dialect

Distributions of final and prefinal pitch accents in the utterances of each dialect are provided in Figure 11 and 12, respectively. The accent type produced most often for each dialect is in boldface. Tone targets did not exist in the final content word (labeled “NO”) in some productions for all dialect groups, produced most frequently in Puerto Rican Spanish, and not in Mexican Spanish. In these utterances, the prefinal word receives the nuclear pitch accent. A L+H* pitch accent is the most common nuclear accent type in productions by all dialect groups except Chile (see Figure 11). Although previous analysis have used different labels to describe this pitch accent, these results are consistent with the pitch accent patterns in Carre’s and Hualde’s analysis of Peninsular varieties of Spanish, Prieto’s analysis of Mexican Spanish, and the ToBI workshop’s analysis of Peninsular and Venezuelan Spanish. The most common nuclear accent in Chilean speakers was H+L*, which makes Chilean quite different from all other varieties. The most frequently occurring pitch accent type in the prefinal content word (see Figure 12) was L*+H, produced by all language groups except Castilian speakers from Spain. Of all dialect groups in this study, we expected that Castilian speakers would be most likely to use pitch...
<table>
<thead>
<tr>
<th>Final content word</th>
<th>L+H*</th>
<th>L*+H</th>
<th>NO</th>
<th>H+L*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>3</td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Colombia</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Spain</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Argentina</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Venezuela</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total=94</strong></td>
<td><strong>46</strong></td>
<td><strong>7</strong></td>
<td><strong>18</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>

Figure 11: The distribution of pitch accent types in utterance final content words produced by speakers of 8 varieties of Spanish.

<table>
<thead>
<tr>
<th>Prefinal Content Word</th>
<th>L*+H*</th>
<th>L+H*</th>
<th>NO</th>
<th>H+L*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>11</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Venezuela</td>
<td>18</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total=94</strong></td>
<td><strong>68</strong></td>
<td><strong>19</strong></td>
<td><strong>4</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

Figure 12: The distribution of pitch accent types in penultimate content words produced by speakers of 8 varieties of Spanish.

multi dialects he observed. Specifically, a prenuclear position in the varieties of Puerto Rico, Venezuela, Cuba, and No. 9.

We identified 9 different combinations. We will direct the discussion to the final pattern, or tunes, and the number of each group are provided in Figure 13. The L+H*, was used by all dialect groups. It is used by Colombian and Venezuelan speakers and for observations of Venezuelan Spanish. Although Peninsular speakers produced it, they did not use these two pitch accents. Speakers more typically used a series of L*+H followed by a H+L* nuclear accent produced by Chilean speakers and was one of Argentine speakers.

<table>
<thead>
<tr>
<th>Final</th>
<th>L*+H*</th>
<th>L+H*</th>
<th>H+L*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total=94</strong></td>
<td><strong>30</strong></td>
<td><strong>20</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 13: The distribution of utterance.

Similar among all dialect groups was a H+L* accent and a L*+H as a prenuclear accent. The lack of pitch accent in certain dialects of Spanish. The results indicate that L+H* located in certain dialects of Spanish.
multi dialects he observed. Specifically, Sosa points out the used of L*+H in prenuclear position in the varieties of Spanish spoken in Colombia, Mexico, Puerto Rico, Venezuela, Cuba, and Northern and Southern dialects of Spain.

We identified 9 different combinations of pitch accent types in this dataset. We will direct the discussion to the five frequencies used patterns. These patterns, or tunes, and the number of productions by each dialect group are provided in Figure 13. The most commonly used pattern, L*+H L+H*, was used by all dialect groups except Castilian and was most frequently used by Colombian and Venezuelan speakers. These results are consistent with observations of Venezuelan Spanish made by the ToBI workshop group. Although Peninsular speakers produced a prenuclear L*+H and a nuclear L+H*, they did not use these two pitch accents together in the same tune. Peninsular speakers more typically used a mixture of two L+H* pitch accents. A prenuclear L*+H followed by a H+L* nuclear accent was the most common tune produced by Chilean speakers and was one of two most frequent tunes produced by Argentine speakers.

![Table 13](image)

Figure 13. The distribution of utterance final tunes in 8 dialects of Spanish.

Similar among all dialect groups is the frequent use of L+H* as a nuclear accent and a L*+H as a prenuclear accent. Also, if H+L* occurred, it was as a nuclear accent. The lack of pitch accent also was far more common in the final content word. The combinations that speakers use are less consistent. This lack of homogeneity may be because different pitch accent combinations are more common in particular dialects, or that these particular speakers preferred a particular combination over another. Another possibility is that speakers were not consistent in their placement of focus. Face (2000) and ToBI Workshop results indicate that L+H* located in prenuclear position is used to mark focal accent in certain dialects of Spanish. This may account for the nonexistence of L*+H as a prenuclear accent in Peninsular productions. If these speakers placed
the prefinal word in focus, then they might produce a L+H\% instead of a L\%+H pitch accent. Further investigations need to be completed in order to observe the likelihood of a particular pitch accent used for different types of focus in multiple varieties of Spanish.

4. Boundary tones
4.1. All speakers

The distribution of four boundary tones occurring at four juncture types is provided in Figure 14. The most frequently occurring boundary tone was L\%, produced in 43% of the utterances. This edge tone was produced at all four types of junctures, but was overwhelmingly preferred over the other edge tones at the end of complete ideas—accounting for 98% of boundary tones at this type of juncture—and discourse segment edges—accounting for 90% of boundary tones at this juncture type. The high frequency of L\% in these two contexts suggests that the L\% boundary indicates finality and completeness of information. L\% boundaries were used less often between words and incomplete ideas accounting for 21% and 32% of boundary tone type used at these junctures respectively. We posit that the boundary used at word junctures indicates continuation of information, or that an idea is not yet complete.

A rising edge tone, H\%, was the word junctures (51%) and incomplete ideas (43%) at a complete idea or incomplete idea indicating incompleteness as does the least often in this dataset. They occur and complete ideas accounting for 30% at junctures, respectively, and never were used. We cannot posit what this edge tone indicates, or its similar distribution across three juncture types.

Together, these results indicate that information is most likely to be indicated by finality, whereas finality is most likely to be indicated by completeness in the results are in part supportive of Navarro-Torres (2011). Tomás suggests that a falling tone indicates finality, we find that it may also be used within. He also suggests that a sustained tone (H\% in our analysis) are used to indicate a mid-rising tone (LH\% is also suggest that a mid-rising tone (LH\%) indicates a function. Finally, while Navarro-Torres suggests it indicates uncertainty. We also indicate continuation between incomplete ideas.

4.2. Edge tones across dialects

The frequency and type of edge tones are provided in Figure 15. Three boundary tones were produced with the phrases—in the Spanish varieties of Mexico, Puerto Rico, and Venezuela—6 of these language groups. The reverse was true for speakers from Colombia, and was produced least often by speakers from Argentina, Colombia, and Venezuela. The LH\% boundary tone occurred in about half of their phrases, and L\% boundaries were produced least often by speakers from Argentina and Colombia. The L\% boundary tone occurred in word junctures and incomplete ideas accounting for 45% and 33% respectively.
A rising edge tone, H%, was the most frequently occurring edge tone at word junctures (51%) and incomplete ideas (39%). This boundary tone did not occur at the end of a discourse segment, and represented only 4% of the boundary tones at a complete idea edge. We posit that H% indicates that the information within a phrase is incomplete. This supports Navarro-Tomás's analysis (1948) suggesting that this boundary is associated with incomplete meaning in cases where the listener is expecting the speaker to finish an utterance.

An M% boundary tone was used at the same junctures as the H%, but occurred with less frequency and so we suggest that it has the function of indicating incompleteness as does the H%. LH% boundaries were produced least often in this dataset. They occurred at word boundaries, incomplete ideas, and complete ideas accounting for 2%, 4%, and 3% of edge tones at these junctures, respectively, and never were produced at the discourse segment edge. We cannot posit what this edge tone might indicate given its infrequent use and its similar distribution across three juncture types.

Together, these results indicate that incompleteness or continuation of information is most likely to be indicated with H%, L% and M% edge tones whereas finality is most likely to be expressed with a L% boundary tone. These results are in part supportive of Navarro-Tomás's analysis. While Navarro-Tomás suggests that a falling toneme (L% in our analysis) is used for only finality, we find that it may also be used to convey other types of relationships. He also suggests that a sustained toneme (M% in our analysis) and a rising toneme (H% in our analysis) are used for continuation. Our data concur but also suggest that a mid-rising tone (LH% in our analysis) may also have a similar function. Finally, while Navarro-Tomás posits that a mid rising tones exists, he suggests it is indicates uncertainty. We suggest that a LH% boundary tone may also indicate continuation between information.

4.2. Edge tones across dialects

The frequency and type of edge tones produced by the 8 dialect groups are provided in Figure 15. Three boundary types including L%, H%, and M% occurred in at least some of the productions by all Spanish dialect groups. A L% boundary tone was produced with the highest frequency—in roughly half of the phrases—in 6 of the Spanish varieties including Argentina, Costa Rica, Spain, Mexico, Puerto Rico, and Venezuela. A H% also occurred frequently in productions by these 6 language groups—in roughly a fourth of the phrases. The reverse was true for speakers from Chile and Colombia. The H% was used in about half of their phrases, and L% occurred in about a fourth of the phrases. The M% boundary tone occurred in about a fourth of the productions by speakers from Argentina, Colombia, Spain, Mexico, Puerto Rico, and Venezuela and was produced least often by speakers from Chile and Costa Rica. From the frequency of these three boundary types in productions by the Spanish dialects...
we observed, we can posit that the inventory of boundary types in these 8 dialects include a L%, H%, and M%.

What is most interesting from these results is the existence of the LH% boundary tone in 5 of the Spanish varieties. It is produced with much less frequency, but this is potentially influenced by the discourse that the speakers were asked to produce. In other words, the need for a LH% may have been less given the content of the written text. This boundary tone did not occur in any of the utterances produced by Colombian, Costa Rican, and Puerto Rican speakers. It is possible that this mid rising edge tone is not in the inventory of boundary types in these three dialects suggesting that boundary tone inventories may differ among Spanish dialects.

We did not analyze the juncture type where boundary tones occurred for each dialect group. We do not know, for example, if a LH% was produced at the same junctures for speakers using different dialects. Therefore, we cannot suggest that each of the boundary tones has the same function in each of the dialects. We only suggest that the inventory of boundary tones may be different among the dialects that we observed.

![Graph showing frequency and type of edge tone in productions speakers of 8 Spanish dialects](image)

**Figure 15.** The frequency and type of edge tone in productions speakers of 8 Spanish dialects.

5. Conclusion

The present investigation has found whose distribution varies within each dialect. Pitch patterns within utterance final word of tone targets under conditions of tone are three accent types: a L-H* pitch accent within the stressed syllable, a L*-H* poststressed syllable, and a H±L* pitch accent on the stressed syllable with a H target at the end of the stressed syllable. The combination of pitch accents was a H-target. Accents occurred in other combinations, but the most frequent and most easily isolated were L±H* and L*-H* L. These accents have been reported in other Spanish (ToBI Workshop 1999) and in the dialects that we analyzed.

The results of this investigation are consistent with multiple edge tone types, and this structure of the discourse. Speakers are more likely to produce a nuclear H±, more likely to use a prenuclear L±H*, and more likely to use a L±H* L± that the tone L*-H* L±H* L± has been reported in Spanish (ToBI Workshop 1999) and in the dialects that we analyzed.
5. Conclusion

The present investigation has found multiple pitch accents types in Spanish, whose distribution varies within each dialect. When examining the alignment of pitch patterns within utterance final words, consistent differences in the location of tone targets under conditions of tonal crowding indicate that there are at least three accent types: a L+H* pitch accent is produced with an accentual peak within the stressed syllable, a L*+H is produced with an accentual peak in the poststressed syllable, and a H+L* pitch accent is produced as a fall within the stressed syllable with a H target at the onset of the stressed followed by a fall realized near the end of the stressed syllable. The most frequently occurring combination of pitch accents was a L*+H followed by a L+H*. These pitch accents occurred in other combinations as well, but prenuclear L*+H and nuclear L+H* were the most frequently used pitch accents. Finally, we were unable to isolate tone targets within the final and prefinal content words in some of the productions for most of the speakers and we suggest that not all content words need to be produced with pitch accents.

There were also differences among dialects suggesting that pitch accent inventories are not the same among Spanish dialects. Notable differences were found in productions by Chilean and Peninsular speakers. For the majority of dialects, L*+H L+H* was used most often. However, Chilean speakers were more likely to produce a nuclear H+L* accent and Peninsular speakers were more likely to use a prenuclear L+H* pitch accent. This was surprising, given that the tune L*+H L+H* L% has been described as prototypical for Peninsular Spanish (ToBI Workshop 1999) and was never used by the Peninsular speakers that we analyzed.

The results of this investigation also reveal that declaratives are produced with multiple edge tone types, and that boundary tone choice is affected by the structure of the discourse. Speakers used an L% boundary tone indicating finality at the edge of informationally complete utterances. It was used almost exclusively at the end of complete ideas and at the end of the entire passage. When the edge of a syntactically complete unit was informationally incomplete, speakers were less likely to use only a L% and multiple boundary types including H%, L%, and M% were produced instead. We also found a LH% boundary tone, one that has not been mentioned in previous analyses of Spanish intonation. This category type did not occur in the productions of all dialects indicating that either the LH% boundary tone is part of only some Spanish dialects, or that the discourse that we analyzed did not require its use.
References


Competence and Performance in Second Language Acquisition: Monolinguals and 2nd Gen. Tense/Aspects

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University of Illinois at Urbana-Champaign

1. Introduction

It has long been observed in the second generation Spanish-English bilinguals in the United States in many areas of language abilities—in syntax, morphology, and pragmatics. Nominal and verbal inflections (gender, number, and tense) are especially vulnerable to morphological erosion. According to Lipski (1993), Spanish-English children usually produce errors similar to those of monolinguals of Spanish, yet they appear to have higher bimodal domains, similar to that of Spanish native speakers. It has been observed that many aspects of first language production (Andersen, 1982; Dorian, 1982; Smith, 1983). Confirming these observations, Corvalán (1995) found that imperfect morphological distinctions by language dominant bilinguals, with particular sensitivity to tenses and numbers in productive contexts; and Zentella (1998) reports that imperfect tense in the speech of 50-100% of second generation bilinguals from New York City, where the influence of Spanish on English was very different from that of monolingual speakers. Morphological deficits can also show up in comprehension as well (Seliger 1996, Sharwood Smith 1997). Potential erosion of the Preterite/Infinitive distinction in second generation bilinguals from the perspective of characterization in more formal terms is a key feature of performance bilingual speakers (see a similar approach).

Within current grammatical theory and practice, functional categories have been defined between functional categories to include verbs, nouns, adjectives, adverbs, inflectional morphology or other way and present tense morphemes -ed, -s, plural and number agreement marker -s, relative clauses, and encode the functional (or grammatically related) information (morphemes, including tense and number).