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Declarative and yes/no question intonation in Montevideo Spanish

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Abstract of the Thesis

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This study offers for the first time empirical and theoretical data on the intonation of the Spanish variety spoken in Montevideo, the capital city of Uruguay. It proposes a phonological analysis of broad focus declarative and yes/no question utterances of simple, coordinated, and subordinated sentences recorded during fieldwork in Montevideo. The analysis relies on the Autosegmental-Metrical (AM) model (Pierrehumbert 1980) and the Sp_ToBI transcription system (Beckman et al 2002, Estebas-Vilaplana and Prieto 2009). The analysis of the F0 track shows that coordinated and subordinated sentences of both declarative and yes/no question utterances were parsed into utterance-medial IP (aligned with the 1st clause) and utterance-final IP (aligned with the 2nd clause). The data indicates that the Montevideo declarative intonation follows the Castilian Spanish pattern by marking medial IP with a rising boundary (H%) and marking final IP with a falling boundary (L%). Yes/no questions, on the other hand, deviates from the canonical pattern by marking medial IP with alternating rising boundary (H%) or falling boundary (L%) and marking final IP non-ultimate nuclear stress with a falling boundary (L%) and ultimate nuclear stress with a rising ending produced by the nuclear accent as a result of boundary tone deletion. This study also reports the same prenuclear contour in medial and final IP of both declarative and yes/no question utterances. From a traditional perspective, the prenuclear contour is characterized by alternating tonic right-edge peaks with post-tonic peaks. However, the data suggests that the variation in F0 peak alignment in prenuclear position is gradual and not categorical. Assuming the premise that the end of the tonic syllable is also the beginning of the post-tonic syllable at the metrical level, this study proposes this alignment variation results from a single pitch accent, an early rising pitch accent with a late peak aligned with the post-tonic syllable (L+>H*). The data also suggests that pitch height, like peak alignment, is phonologically specified by the pitch accent. The nuclear contour of declarative final IP contrasts

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with the prenuclear contour in peak alignment. It associates to an early peak aligned with the tonic syllable (L+H*). As for yes/no question final IP, the nuclear contrasts with the prenuclear contour in peak height. It associates to a late peak that reaches a target higher than the preceding prenuclear peak (L+>¡H*). This tall and late peak also marks the nuclear stress of the medial IP in both declarative and yes/no question utterances. It follows, then, that the medial and final IP of yes/no questions are marked with the same nuclear stress. Consequently, the contrast between the two falls to the boundary contour. When the boundary movement also has the same shape, then the data indicates that speakers rely on pitch height to contrast the two IP by producing a taller nuclear rise for final IP than for medial IP.

Dedication

I dedicate this work to
my Lord Jesus Crist, my loving husband Marcus,
my mentor and advisor "Beto" (Professor José Elías-Ulloa),
the Jorge family, my daughter Natalie, and my mother Edite,
for their crucial help and encouragement.

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Chapter 1

Introduction

1.1 Research goals

This research investigates some of the intonation patterns used by Montevideo Spanish speakers to communicate declarative statements and yes/no questions as well as the intonational structure of coordinated and subordinates sentences. The first investigations of the intonation patterns of Spanish were realized by Navarro Tomás (1944) on Castilian Spanish in the beginning of the 20th century. As the official language of over twenty countries, Spanish has a wide dialectal variation. The first goal of this study is to report on empirical data collected during fieldwork on a variety of Spanish never studied before, that spoken in Montevideo, the capital city of Uruguay. The second goal of this study is to contribute to the theory of intonational phonology by proposing an analysis of the pitch accents and boundary tones that communicate grammatical meaning in Montevideo Spanish and also by investigating the parsing of complex utterances into intonational phrases (IP) and the prosodic clues that identify an utterance-medial IP from an utterance-final IP. Each utterance was broken down into IPs and then analyzed for prenuclear pitch accents, nuclear pitch accents, and boundary tones. The acoustic description was carried out with Praat software (Boersma and Weenink 2010); the phonological analysis was modeled after the Autosegmental-Metrical (AM) model (Pierrehumbert 1980); and the labeling of tones was based on the transcription conventions of the Spanish Tone and Break Indices (Sp_ToBI) (Estebas-Vilaplana and Prieto 2009, Face and Prieto 2007, Beckman et al 2002).

1.2 Language background: Montevideo Spanish

Montevideo is the capital city of Uruguay, located in South America. The region surrounding Montevideo is called Rioplatense, which also encompasses Buenos Aires in Argentina and other suburban and coastal cities of Uruguay and Argentina. The area received massive immigrant groups from Spain and Italy starting in the 1870s. Spanish became the official and most widely used language of the area. The dialectal variety spoken in the region became known as Rioplatense Spanish. It differentiates itself from peninsular Spanish in the intonation, in some basic and slang vocabulary, and in the use of both voseo and yeismos.

1.3 Contributions to the field of Spanish intonation

Some of the intonation contours analyzed for Montevideo Spanish deviate from previous descriptions of canonical Spanish intonation on several levels, lending importance to this study in contributing to a better understanding of Spanish intonation as a whole. Montevideo's yes/no questions were pronounced with an ending circumflex contour (tall nuclear rise with boundary fall) instead of the canonical nuclear valley with boundary rise. Another unexpected characteristic found in the Montevideo Spanish data is that broad focus prenuclear stressed syllable was marked with a rising pitch accent whose high target was flexibly aligned anywhere from the end of the tonic syllable to the end of the post-tonic syllable. Previous studies attest that the canonical Peninsular Spanish produces broad focus prenuclear stressed syllables with post-tonic peak, while tonic peak is reserved for narrow focus. Finally, the data presented here suggests that the height of the pitch accent might have a contrastive function in distinguishing an incomplete thought (sentence-medial IP) from a complete thought (sentence-final IP), which puts into question the current definition of tonal height as an effect of upstepping and calls for further research of tonal height as a phonologically specified characteristic of the pitch accent.

1.4 Outline of the paper

This paper is organized as follows. Chapter 2 offers an overview of the theoretical background used for analysis of the data, namely the AM framework and Sp_ToBI transcription system. Chapter 3 presents the design of the experiment and recording procedures. Chapter 4 offers an acoustic description of the recordings as well as the distribution of contours. Chapters 5 and 6 offer a phonological analysis of the declarative and yes/no question intonation respectively. Finally, chapter 7 concludes the paper with a summary of the inventory of tunes for Montevideo Spanish and a conclusion.

Chapter 2

Theoretical framework

2.1 Autosegmental-metrical (AM) model of intonational phonology

The Autosegmental-Metrical (AM) model was first introduced by Pierrehumbert (1980) in her doctoral dissertation on the intonational phonology of English. It quickly expanded as a model for intonation studies in other languages as well (see Ladd 1996 for an overview). Sosa (1991) was the first scholar to extend this theory to the study of Spanish Intonation. Since then the AM model has become the framework for most intonational studies in Spanish. The AM model breaks down the speech into levels or tiers that can be analyzed independently. Each tier has a linear sequence of phonological representations of prosodic element. Elements on one tier might associate to elements on another tier and as such will influence the realization of one another in speech. In the case of intonation there is a segmental tier (words, syllables), a metrical tier (stress), and an intonational tier (tones).

The tone tier consists of a sequence of underlying complex tonal events or targets that are mapped into actual fundamental frequency (F0) surface contours. These tonal events are called pitch accents, phrase accents, and boundary tones. They are phonological units independent of the consonant and vowel segments of the utterance. The pitch accents mark metrically strong syllables, while the phrase accents and boundary tones mark the juncture of larger constituents. A set of rules specifies the transitions between the end of an event and the beginning of another, giving continuity to the F0 trace from one tonal event to another. The different tones can be identified by comparing the height of the fundamental frequency (F0) of individual pitches, such as a high (H) or a low tone (L), or by distinguishing melodic patterns that tend to occur together, such as a low valley that is always followed by a rise to a high peak (LH). Spanish intonation is characterized by the abundant use of melodic contours (Beckman et al 2002).

The stress tier consists of a linear sequence of tone bearing landmarks. This tier is formed by metrically strong syllables and phrase edges. Metrical stress refers to the syllable in a word that receives prominence over the others either through length, loudness, or pitch. The difference between the words *número* 'number' and *numeró*, 'numbered' (3rd person singular), for example, is the location of the metrical stress, which in the former word falls on the first syllable *nú* and in the latter falls on the last syllable *ró*. As for phrase edges, it refer to the juncture marking the end of a phrase. In the sentence *no sé, pero María lo sabe* 'I don't know, but Mary does', there is a

sentence-medial phrase edge at the end of the word *sé* and a sentence-final phrase edge at the end of *sabe*.

In the AM theory pitch accents associate to stressed syllables and boundary tones associate to phrase edges. The AM model also makes a distinction among pitch accents in regards to degree of prominence. The pitch accent that convenes the most prominence in a phrase is called nuclear pitch accent and it usually aligns with the main stress of the phrase. Any preceding pitch accent is called a prenuclear pitch accent. The literature on Spanish intonation has strong proponents of the hypothesis that sentence-final position is metrically strong and, for that reason, the nuclear pitch accent generally associates with the last stressed syllable of the phrase (Beckman et al 2002).

2.2 Spanish Tone and Break Indices (Sp_ToBI)

The Sp_ToBI is a list of tones and phonetic descriptions of the intonation patterns of Spanish. It expanded from the original ToBI conventions for English. The ToBI transcription system was first proposed by Pierrehumbert (1980) in her doctoral dissertation as a way to describe English intonation using general schematic transcription of intonational events. Under this system the intonation contour can be described using a sequence of low and high tones, which can occur individually as monotonal accents (L, H) or can form complex accents (LH, HL, LHL, etc.). This transcription system was quickly adopted by other languages for intonational studies, including Spanish. The transcription conventions for the Sp_ToBI were first discussed in a meeting of scholars in 1999 with the goal of developing a consensus transcription system that could capture the generalized intonation patterns of Spanish while allowing for specification of local patterns of dialectal origin. Such conventions were formally introduced to the academia in a paper called "Intonation across Spanish, in the Tones and Break Indices framework" by Beckman et al (2002). The Sp_ToBI is still a work in progress because of the many varieties of Spanish and the different analysis of the same tune by different scholars. Recent revisions of Sp_ToBI have been put forth by Face and Prieto (2007) and Estebas-Vilaplana and Prieto (2009).

2.2.1 Pitch accents: prenuclear and nuclear pitch accents

The intonation of Spanish is marked by rises and falls that align with metrically strong syllables. The first proposal of the Sp_ToBI suggests the following pitch accents (Beckman et al 2002):

L*+H   A rising accent with a low target (valley) aligned to the tonic syllable, producing a post-tonic peak.

L+H*   A rising accent with a high target aligned to the tonic syllable, producing a tonic peak.

H+L*   A falling accent with a low target aligned to the tonic syllable, producing a falling pattern in the tonic syllable.

H*   A peak without a preceding valley.

In these labels the "*" indicates which of the two tones is aligned with the tonic syllable. The other tone is realized in neighboring unstressed syllables. For example, a neutral declarative statement in Castilian Spanish may be uttered with a rising F0 in all the stressed syllables but with different F0 peak alignment for prenuclear and nuclear stressed syllables: post-tonic peak for prenuclear stress and tonic realization for nuclear stress. According to the pitch accents proposed by Beckman et al, the phonological representation of such utterance would be an L*+H pitch accent marking prenuclear stressed syllables and an L+H* pitch accent marking the nuclear stressed syllable.

On a review of the Sp_ToBI Face and Prieto (2007) have identified two problems with the annotations proposed by Beckman et al. Firstly, they argue that the use of the "*" notation to indicate tone alignment is ambiguous. In the case of the L*+H pitch accent, the "*" on the L target suggests that L is the strongest pitch of this bitonal contour; however, Castilian Spanish speakers perceived a tonic rise with post-tonic peak as a primarily high pitch on the tonic syllable. As for the L+H* pitch accent, the "*" on the H target leads to the interpretation that only the H target is aligned with the tonic syllable, when in reality the L target is also aligned with the tonic syllable. Secondly, Face and Prieto attest that Castilian Spanish actually has three contrastive rising contours, which cannot be accounted for in the proposed analysis by Beckman et al. They found that Castilian Spanish produces a late rising contour characterized by a low pattern during the tonic syllable and a rising pattern in the post-tonic syllable. This late rising accent contrasts with the other two early rising accents already attested in Spanish not only in meaning but also in the timing of the rising pattern. Under the original Sp_ToBI proposal only peak alignment is considered in the contrast between L*+H and the L+H*. Consequently, the L*+H notation would represent two rising accents, both the late rising accent and the early rising accent with post-tonic peak. Face and Prieto state the need for three phonologically distinct pitch accents and propose an analysis where the "*" indicates tone headiness or perceptual prominence instead of alignment, and the symbol "]σ" represents alignment of the tone to the tonic syllable

through a secondary association to this metrical position. The three rising pitch accents proposed by Face and Prieto are as follow:

L*+H   A rising accent headed by the L target, producing a rise in the post-tonic syllable.

L+H*]σ   A rising accent headed by the H target and with a secondary association to the tonic syllable, producing a tonic peak.

L+H*   A rising accent headed by the H target and unspecified for alignment, producing post-tonic peak.

Estebas-Vilaplana and Prieto (2009) corroborate the need for three rising accents but using distinct labels from those proposed in Face and Prieto. Instead of adopting the analysis of secondary association to explain the tonically-aligned peak, they propose a phonologically specified displacement of the peak to explain the post-tonically aligned peak. See these three rising pitch accents below:

L*+H   A rising accent where the L target is the strongest tone, producing a rise in the post-tonic syllable.

L+H*   A rising accent where the H target is the strongest tone but is not phonologically specified for alignment, producing a tonic rise with tonic peak.

L+>H*   A rising accent where the H target is the strongest tone and is phonologically displaced, producing a tonic rise with post-tonic peak.

The following figure 2.1 shows a comparison of the pitch accent labels and the phonetic F0 correlate proposed by Beckman et al (2002) in contrast with those proposed by Face and Prieto (2007) and Estebas-Vilaplana and Prieto (2009). The dotted lines represent the boundary of the stressed syllable.

Figure 2.1 – Schematic representation of the proposed pitch accents for the original Sp_ToBI and its revised versions.

Beckman et al (2002):
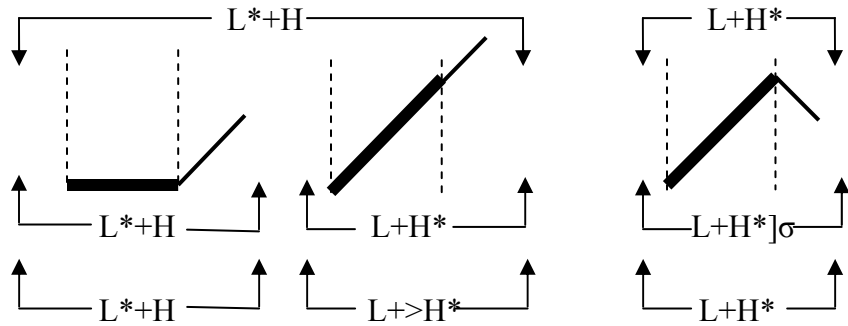
Face and Prieto (2007):
Estebas-Vilaplana and
Prieto (2009)

2.2.2 Boundary tones

The Sp_ToBI conventions proposed by Beckman et al (2002) stipulate three levels of boundary tone for Spanish, as described below:

H%   A rising pattern.

L%   A falling or leveled low pattern.

M%   A half rising, half falling, or mid-leveled pattern.

On a review of the Sp_ToBI, Estebas-Vilaplana and Prieto (2009) have posited the need for additional boundary tones in order to account for the contrast they have attested in the Spanish varieties of Madrid, Seville, and Mexico. The additional boundary tones proposed by them are described below:

HH%   A rising pattern to a very high target, taller than the H% rise.

LH%   An initially falling or leveled low pattern followed by a rising pattern.

HL%   An initially rising or leveled high pattern followed by a falling pattern.

LHL% A complex movement characterized by a falling-rising-falling pattern.

Chapter 3

Design of the experiment

3.1 Introduction

This chapter describes the design of the experiment conducted in Montevideo, Uruguay, in June of 2011 which originated the data for this study. The experiment consisted of recording and analyzing a number of sentences in Spanish pronounced by native speakers of the Montevideo variety. The target sentences formulated for the experiment were controlled for grammatical variables as well as sociolinguistic ones to facilitate the identification of the variables that might be responsible for each distinct intonation contour. These sentences were then inserted in individual dialogues that promoted a neutral reading of each target sentence without any particular focus or emphasis. A select number of informants were recorded pronouncing each of the target sentences, and these recordings were later digitalized for acoustic and phonological analysis.

The following section 3.2 presents examples of the target utterances used to collect the desired data and the variables tested during the experiment. Section 3.3 describes the selection process of informants who took part in the experiment and their sociolinguistic background. Section 3.4 offers the recording procedures of the utterances and explains the tasks performed by each participant during the experiment. Finally, section 3.5 describes the acoustic analysis of the data collected.

3.2 Target utterances

A total of 18 distinct target utterances were selected for this study. Of these, 9 were declarative statements and 9 were yes/no questions. Each target utterance was inserted into a short dialogue intended to prompt a broad focus context, and then they were printed in an index card which was handed to the participant. This approach was adopted to motivate the informant to use a conversational tone when saying the target utterances out loud. Examples of the dialogues used are given below in figure 3.1 in the original format used during the experiment. The desired utterances for recording are highlighted in boldface type. Since this study focused on specific variables, the sentences had to be tailored to suit the experiment. As a consequence, many of the sentences used are not phrases that a person would generally say in a day-to-day conversation. Nevertheless, this method of eliciting data is useful in providing a homogenous set

of utterances imitating spontaneous speech. See Appendix A for a complete list of all 18 target utterances and the corresponding contextualized dialogue.

Figure 3.1 – Sample dialogues used to prompt a broad focus declarative utterance and a yes/no question utterance. The target sentence is marked in boldface.

(Target: declarative statement)

    -Un amigo (pidiéndote información):
      "¿Qué pasó?"
    -Vos (le contestás):
      "Benito robó la bodega."

    -A friend (asking you for information):
      "What happened?"
    -You (answer):
      "Benito robbed the cellar."

(Target: yes/no question)

    -Vos (pidiéndole información a un amigo):
      "¿Lalo ganó el regalo?"

    -You (asking a friend for information):
      "Did Lalo win the gift?"

      Each target utterance was selected to fit the framework of the desired variables to be tested. There were several set of variables involved in the composition of target utterances. The main set of variables tested in the experiment relates to *sentence type*. This set of variables refers to the grammatical function of an utterance, which for our study could be a statement or an interrogative. The purpose of this set of variables was to see how Montevideo Spanish speakers use intonation to communicate the grammatical function of the utterance. Therefore, the target sentences were drawn from two of the main categories of sentence types: *declaratives* and *yes/no questions*. The declarative target sentences and the yes/no question ones all follow the syntactic structure subject-verb-object (SVO), this way speakers must rely on intonation to define the sentence type. The above figure 3.1 shows an example of each of these sentence types.

      Another set of variables tested in the experiment relates to the *complexity of the sentence structure*. This set of variables refers to the grammatical organization of the sentence into clauses, such as a sentence with a single clause or with two clauses. The purpose of this set of

variables was to see if the grammatical complexity of the sentence would influence the intonation of the different sentence types, such as if a declarative contour would be different for a simple SVO clause than for coordinated SVO clauses. Therefore, each group of sentence type consisted of a mix of three different structures: *simple*, *coordinated*, and *subordinated sentence structures*. The conjunctions *y* 'and' and *mientras* 'while' where used in the coordinated and subordinates sentences respectively. Figure 3.2 below shows examples of the three sentence structures used within each sentence type. The conjunctions are marked in bold and underlined. The expectation is that Montevideo speakers would mark the end of declarative utterances with the same intonation contour despite the complexity of the utterance.

Figure 3.2 – Examples of target declaratives with simple, coordinated, or subordinated sentence structure. The conjunctions are marked in bold and underlined.

Declaratives

Benito robó la bodega. (**simple**)
'Benito robbed the cellar.'

*La niña prendió una bengala **y** la doña pulió la moneda.* (**coordinated**)
'The girl lit a flare and the lady polished the coin.'

*Dora leía la novela **mientras** Manuel mordía la canela.* (**subordinated**)
'Dora was reading the novel while Manuel bit the cinnamon stick.'

Yes/no questions

¿Lalo ganó el regalo? (**simple**)
'Did Lalo win the gift?'

*¿Ramirez ganó el regalo **y** María ganó el dinero?* (**coordinated**)
'Did Ramirez win the gift and Maria won the cash?'

*¿El mago miraba al mendigo **mientras** el criminal negaba ao delito?* (**subordinated**)
'Was the magician looking at the beggar while the criminal denied the offense?'

Another set of variables relates to the *alignment of the IP within the utterance*. This set of variables refers to the fact that the complex sentences used in this experiment could be pronounced as a single IP or as two individual IP (one for each clause of the complex sentence). In the cases where a complex sentence was pronounced with two IP, the end of the first IP would be located utterance-medially, marking an incomplete thought, while the second IP would have

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its boundary utterance-finally, marking a complete thought. The purpose of this set of variables was to see if speakers would use different contours for the 1st and 2nd clauses of complex sentences. Therefore, within each group of sentence type the utterances were further organized into *medial IP* (the end of the IP does not correspond to the end of the utterance) and *final IP* (the end of the IP is aligned with the end of the utterance). Figure 3.3 below shows examples of how the speakers might pronounce declarative sentences with simple, coordinated, and subordinated structure. The bracket represents the IP boundary. The premises for such variable is that this behavior of differentiating the contour of medial IP from that of final IP has been attested in other Spanish dialects when listing items, in which case the non-final items of the list were enunciated with a different boundary contour from that used to mark the final item of the list (Sosa 1999).

Figure 3.3 – Examples of target declaratives parsed into possible IP. The boundary of each IP is indicated with a bracket.

Declarative with simple sentence structure
Benito robó la bodega]**(FINAL IP)**   'Benito robbed the cellar.'
Declarative with coordinated sentence structure
La niña prendió una bengala]**(MEDIAL IP)** *y la doña pulió la moneda*]**(FINAL IP)**   'The girl lit a flare and the lady polished the coin.'   or   *La niña prendió una bengala y la doña pulió la moneda*]**(FINAL IP)**   'The girl lit a flare and the lady polished the coin.'
Declarative with subordinated sentence structure
Dora leía la novela]**(MEDIAL IP)** *mientras Manuel mordía la canela*]**(FINAL IP)**   'Dora was reading the novel while Manuel bit the cinnamon stick.'   or   *Dora leía la novela mientras Manuel mordía la canela*]**(FINAL IP)**   'Dora was reading the novel while Manuel bit the cinnamon stick.'

Another set of variables relates to the *stress pattern of the last word of the phrase*. This set of variables refers to the fact that all the clauses used to form the target sentences end in a content word. Consequently, the last word of the clause can carry two tonal units – a nuclear accent in the stressed syllable and a boundary tone at the edge of the word. When the last word of the clause has ultimate stress, then both the nuclear accent and the boundary tone must be realized within the last syllable of the phrase. The purpose of this set of variables is to see if the location of the nuclear stress with respect to the phrase edge would affect the ending contour of the IP. Therefore, for all the sentence structures of each sentence type there were target sentences with *ultimate nuclear stress* and with *non-ultimate nuclear stress* (ante-penultimate and penultimate stress). Figure 3.4 below shows examples of several declaratives with coordinated structure and different stress pattern for the last word of the phrase. The nuclear stress is marked in bold and underlined.

Figure 3.4 – Examples of target declaratives with varying nuclear stress pattern. The nuclear stress is marked in boldface and underlined.

Declaratives with different nuclear stress pattern

*Daniel estudiaba benga**LÍ**]*IP *y **Diego** miraba al coli**BRÍ**]*IP **(ultimate nuclear stress)**
'Daniel was studying Bengali and Diego was looking at the hummingbird.'

*La **niña** prendió una ben**GA**la]*IP *y la **doña** pulió la mo**NE**da]*IP **(non-ultimate nuclear stress)**
'The girl lit a flare and the lady polished the coin.'

*Emilio borraba el **NÚ**mero]*IP *y Elena guardaba la **LÁ**mina]*IP **(non-ultimate nuclear stress)**
'Emilio was erasing the number and Elena was putting away the print out.'

The last set of variables tested in the experiment relates to *gender*. This set of variables refers to the well-known sociolinguistic phenomena of gender-related speech characteristics. The purpose of this set of variables was to see if there were any emergent intonation patterns that were characteristic of the speech of a specific gender in this dialect. Therefore, the pool of speakers selected for recording of the target sentences included *males* and *females*. The utterances recorded for the male speakers were compared to that of the female speakers to see if the same patterns occurred in both groups or not.

Other factors considered when selecting the target sentences were the voicing of the consonants and the stress pattern of the words in the sentence. Consonants with voiceless pronunciation (such as "ll", "t", "p") were avoided as much as possible in order to achieve uninterrupted F0 contours for digitalization and analysis. As for the stress pattern of all the words

in the sentences, situations of stress clash between adjacent stressed syllables was also avoided as much as possible by having two unstressed syllables separating consecutive stressed syllables so that speakers would have enough time to fully realize the intended accent of each stressed syllables. This was not always possible, but in all cases there was at least one unstressed syllable between two stressed ones.

3.3 Informants

Several people were recorded during the experiment but only a few fit the desired sociolinguistic characteristics. The recordings of six speakers (three female and three male) were selected in total for analysis. One of these female speakers produced very distinct declarative patterns, so her declarative utterances were discarded; however her yes/no question utterances were included in the analysis. In total, six speakers produced 9 yes/no question utterances each and five of these speakers produced 9 declarative utterances, generating a total of 99 recorded utterances for acoustic and phonological analysis.

In selecting the participants, it was taken into consideration their age, their level of education, their city of origin, their native language and that of their parents, and their ability to speak a second language. These factors were taken into account in order for the intonation of the target sentences to reflect variations in pronunciation caused only by the variables being tested and to limit variation in pronunciation caused by sociolinguistic differences. The six informants selected for final analysis formed a more uniform group of informants with respect to the sociolinguistic background. All six speakers were college students between the ages of 22 and 26 years old at the time of experiment. They were all born and raised in Montevideo. Their parents were also natives of Uruguay. None of the informants had lived abroad and all of them considered themselves to be monolingual speakers of Spanish. A few of them had some knowledge of English from private lessons taken during their teenage years, but none of them considered their English skills to be above basic. For the remainder of the study, the female speakers will be referred to as F1, F2, and F3, and the male speakers as M1, M2, and M3 in order to protect their privacy.

3.4 Recording procedures

Each informant met with the interviewer (the author) individually for a recording session. The informants were interviewed once and all the desired data was collected during that session. The interview took place in a private room devoid of noise. Prior to recording, I talked to the informant about general topics in order to help the informant relax and settle in. Then, I informed the speaker in general terms of my interest in learning more about the Spanish spoken in Uruguay. I emphasized that by no means was the speaker's grammar or pronunciation under

scrutiny for grammatical errors and that the informant should try to speak in the most casual way possible. They remained unaware of the specific purpose of the experiment.

Next, the informant was shown how to use the microphone and how the voice recorder worked. The microphone used was a headset Shure WH30XLR, which was placed in front of the speaker's mouth. The voice recorder was a hand held Zoom H4, which contained a memory card to store the files. These files were later transferred to a computer for acoustic processing.

Before completing the actual task for the experiment, the informant undertook a short practice activity to become familiar with the types of dialogues that would be presented to him during the actual activity and to learn which sentences were expected to be said out loud for recording. We practiced recording these sentences until the speaker understood what was expected of him. These practice utterances were not considered for the analysis.

During the actual activity, the recording of the target utterances was broken down into two parts. First, the speaker went through all the contextualized target declaratives (9 in total), which were presented to him at a random order. Then, we took a five minute break and proceeded to the following set of contextualized target sentences which consisted of the yes/no questions (9 in total) also presented at random order. Each dialogue was printed in an index card and presented to the speaker one at a time. He was asked to read the dialogue to himself first and signal when he was ready to say the target sentence out loud. Finally, I would record the speaker saying the target sentence out loud. Each utterance was recorded as an individual file. More often than not the target sentence was recorded only once and the speaker would move on to the next dialogue. Sometimes, however, the speaker would have to repeat the recording of a target sentence because he felt he did not say it correctly, or he stumbled with the words, or he said it too slowly or too fast and did not sound natural and relaxed. When this happened, the sentence was recorded again, and later I chose only one of the recordings for analysis.

3.5 Acoustic analysis

The audio files containing the target utterances were analyzed using the Praat software (Boersma and Weenink 2010), a free computer program that calculates the pitch contour of an utterance by pinpointing the F0 (vertical axis) across time (horizontal axis). The pitch track of each target utterance was annotated with three tiers: word tier, lexically stress tier, and tone tier. Figure 3.5 below shows an example of a digitalized declarative utterance. In this figure, the pitch track is not a continuous line due to microprosodic effect of the voiceless consonant "t". The lack of vocal cord vibration during this consonant produces the pause in the F0 contour. The tiers mark the pitch track vertically with dotted lines, allowing the reader to see the word and syllable boundaries in the pitch track. Furthermore, the stressed syllables are highlighted in gray for easier identification of the tone-bearing locations. Tonal units are annotated directly in line with stress syllables (specifically in the middle of the vowel) and the end of intonational phrases. The

words and syllables were transcribed using the Spanish writing alphabet, and the transcription of the tonal units follow the Sp_ToBI labeling system (Estebas-Vilaplana and Prieto 2009) (see chapter 2 for tone labels and parameters).

Figure 3.5 – Pitch track of a declarative utterance. The vertical lines mark syllable boundaries and the shaded columns highlight the stressed syllables.
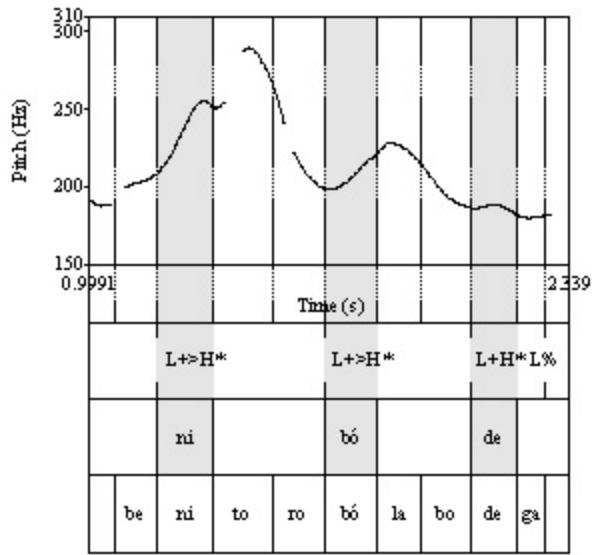
*Be**ni**to ro**bó** la bo**DE**ga.* Speaker F1
'Benito robbed the cellar.'

Once the intonation contour of all the target utterances was graphed and annotated, the acoustic analysis was carried out by compiling the relevant information for the study. For that, I took into account the shape of the F0 movement before, during, and after each stressed syllable, and also at the end of each clause. It was also taken into account the location where the F0 changed direction (where it started rising, or falling, or leveling out) in relation to the prosodic sentence, as well as the range and height of each movement. This acoustic analysis was then compared among speakers and cross referenced with the variables tested. The results are presented in the following chapter 4.

Chapter 4

Results of the attested surface contours

4.1 Introduction

This chapter categorizes and describes the surface configuration of the several intonational phrases (IP) recorded during broad focus readings of declaratives and yes/no questions. The target utterances were designed with phrases that had three stressed syllables. In order to identify IP alignment within each utterance we looked for clues in the shape of the F0 movement and in the location of discursive pauses. As expected, simple sentences were consistently uttered with a single IP, while complex sentences were uttered with two consecutive IP. Each complex utterance had a distinctive F0 movement near the end of the first clause, just before the conjunction, suggesting the association of a boundary tone to this metrical location. The conjunction and the second clause were then uttered with another IP. In addition to the apparent boundary contour at the end of the first clause, approximately 70% of the complex sentences were uttered with a recursive pause between the first clause and the conjunction, which stands as further evidence of the realization of an IP boundary at the end of the first clause. For that reason, the IP that aligns with the first clause of a complex sentence will be referred here as a medial IP, and the IP that aligns with the second clause of a complex sentence or with a simple sentence will be referred to as final IP.

The following section 4.2 describes each of the variables tested for and its productivity in eliciting phonetically distinct IP contours. Section 4.3 and 4.4 describe, respectively, the declarative and the yes/no question IP contours attested. Within these sections the prenuclear contour is described separately from the ending contour of medial IP and final IP, namely the nuclear and boundary contours. Section 4.5 offers a discussion of the semantic-syntactic structure of the target utterances and how it might have affected the intonation patterns elicited. Finally, section 4.6 concludes with a summary.

4.2 Experimental variables and the emergence of distinct IP contours

Many variables were tested and observed as possible triggers of distinct IP contours. These variables were the following: (1) *sentence type* (declarative and yes/no question); (2) *complexity of the sentence structure* (simple sentence structure, coordinated sentence structure, and subordinated sentence structure); (3) *alignment of the IP within the utterance* (medial IP and

final IP); (4) *stress pattern of the last word of the phrase* (non-ultimate nuclear stress and ultimate nuclear stress); and (5) *gender* (female speech and male speech). Some variables were more influential than others in triggering distinct contours.

The variable that triggered the most number of IP patterns was *sentence-type* (declarative and yes/no question). The speakers produced exclusive IP contours for each sentence type. The distinction was attested in the ending F0 movements of the IP, given that the same prenuclear contour was used to pronounce declaratives and yes/no questions. Some of the declarative IP and yes/no question IP were differentiated from one another through the boundary contour, while others were differentiated through the nuclear contour.

Another variable tested in the elicitation of distinct F0 movements was the *complexity of the sentence structure* (simple sentence structure, coordinated sentence structure, and subordinated sentence structure). This variable did not trigger distinct IP contours. The same final IP contour emerged in sentences with simple, coordinated, or subordinated structure. Likewise, the same medial IP contour was attested in sentences derived from coordination as well as from subordination. There is no evidence of a specific contour being realized for a specific sentence structure.

Alignment of the IP within the utterance (medial IP and final IP) was a variable largely responsible for the elicitation of distinct contours. Montevideo speakers consistently differentiated the F0 contour of a medial IP from that of a final IP. In our data, two strategies seem to be at work in differentiating the two IP. The first strategy is to assign different ending contours to each IP, e.g., assigning a rising boundary for the medial IP and a falling boundary for the final IP (see the declaratives in section 4.3). The second strategy is to manipulate the pitch of the last F0 movements of each IP, e.g., producing a taller nuclear rise for the final IP than that produced for the medial IP (see the yes/no questions in section 4.4).

The *stress pattern of the last word of the phrase* (non-ultimate nuclear stress and ultimate nuclear stress) was responsible for eliciting distinct final IP contours for both declarative and yes/no question utterances. In declaratives the contours that were dependent of the stress pattern emerged in alternation with the primary contour which was independent of the stress pattern. In yes/no question, the contour that was dependent of the stress pattern emerged at complementary distribution with the primary contour. As for the medial IP, the nuclear stress pattern did not elicit distinct contours on either declaratives or yes/no questions. It did, however, affect the distributional pattern of yes/no question medial IP contours.

The last variable considered, *gender* (female speech and male speech), did not produce distinct IP contours. The female and male speakers used the same IP contours to mark declaratives and yes/no questions.

4.3 Declarative utterances

Montevideo Spanish speakers produced most of the declaratives with the same combination of medial IP and final IP contour. However, a few other less frequent final IP contours did emerge in the data. Figure 4.1 below shows the most common pronunciation of a declarative, while figures 4.2 (a), (b), and (c) show the other three less frequent final IP contours. These less frequent patterns were attested in some correlation to the nuclear stress pattern.

The categorical distinction between the medial IP and the final IP of a declarative utterance was realized in the ending F0 movements of the IP (nuclear and boundary contours), since the prenuclear configuration was the same for both. The prenuclear stressed syllables were generally uttered with a sequence of tonic F0 rises peaking anywhere from the end of the tonic syllable to the end of the post-tonic syllable, and realized as such that the next prenuclear rise was shorter than the previous one. As for the ending F0 movements, the medial IP ended with a continuous tall rise that started in the nuclear stress and extended to the phrase edge, while the final IP generally ended with a short nuclear rise followed by a boundary fall (given in figure 4.1). There were a few cases where the final IP emerged with either a tonic plateau followed by a boundary fall (given in figure 4.2(a)), a low contour through the nuclear stress extending to the boundary (given in figure 4.2(b)), or a small rise in the nuclear stress extending to the phrase edge (given in figure 4.2(c)). These contours alternated with the preferred contour.

Figure 4.1 –The most frequent declarative intonation pattern: a medial IP of nuclear and boundary tall rise and a final IP of nuclear short rise and boundary fall.
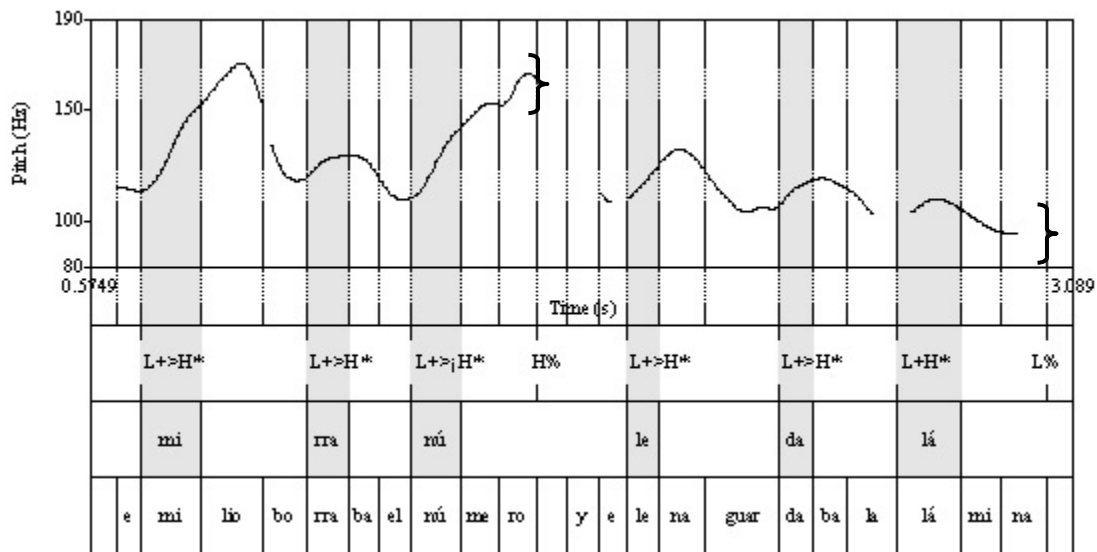
*E**mi**lio bo**rra**ba el **NÚ**mero*]medial IP *y El**e**na guar**da**ba la **LÁ**mina.*]final IP Speaker M2
'Emilio was erasing the number and Elena was putting away the print out.'

Figure 4.2 (a), (b), and (c) – Three other less frequent contours attested in declarative final IP: (a) a final IP of nuclear plateau and boundary fall, (b) a final IP of nuclear and boundary low F0, and (c) a final IP of nuclear and boundary short rise.
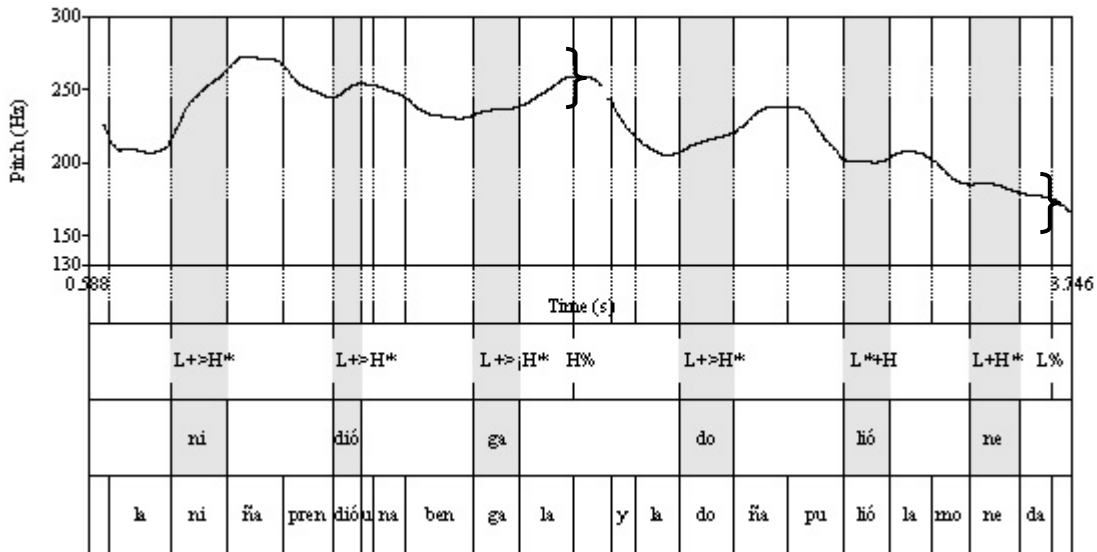
(a)

*La **ni**ña pren**dió** una ben**GA**la*]medial IP *y la **do**ña pulió la mo**NE**da.*]final IP Speaker F3
'The girl lit a flare and the lady polished the coin.'
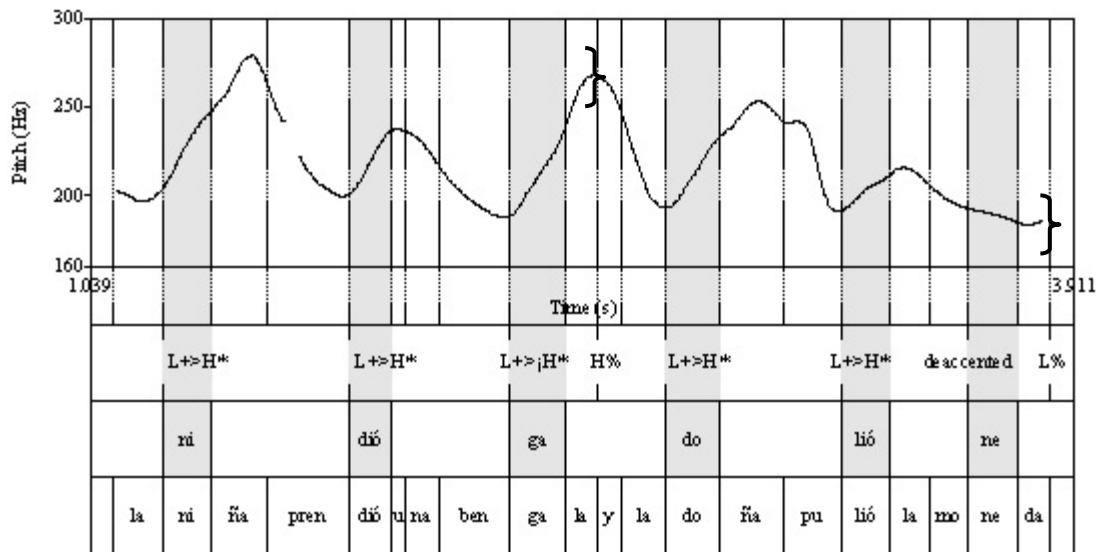
(b)

*La **ni**ña pren**dió** una ben**GA**la*]medial IP *y la **do**ña pu**lió** la mo**NE**da.*]final IP Speaker F1
'The girl lit a flare and the lady polished the coin.'
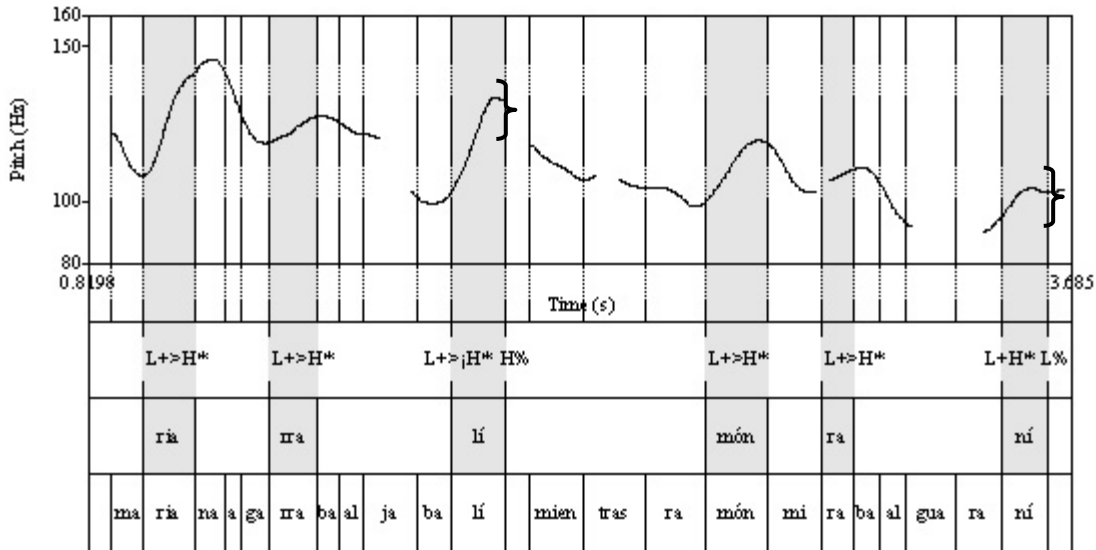
(c)

Mariana agarraba al jabaLÍ]medial IP *mientras Ramón miraba al guaraNÍ.*]final IP Speaker M2
'Mariana was grabbing the wild boar while Ramon was looking at the Guarani.' (an aboriginal)

4.3.1 Declarative prenuclear configuration

The prenuclear stressed syllables of declarative utterances were realized with a similar configuration for both medial IP and final IP. The main contour attested had flexible realization in the alignment of the peak and had context-dependent realization of the pitch range, as illustrated in figures 4.3 (a) and (b). Two other less frequent contours are illustrated in figures 4.4 (a) and (b). An alternative realization of the main prenuclear contour was also attested in the data and will be described in the following section 4.3.1.1.

The most common contour, illustrated in figures 4.3 (a) and (b), occurred in 88% of the prenuclear stressed syllables. This contour was characterized by a rising F0 that generally started at the beginning of the tonic syllable. The end of the contour was flexible, occurring between the end of the tonic syllable and the end of the post-tonic syllable, as shown in figure 4.3 (a) (see section 4.3.1.1 below for an alternative realization of the peak). These different peak alignments are all considered to be versions of a single pitch accent. There is no specific context triggering one peak alignment over another. Some tendencies were observed in the distribution of these alignments, and they will be discussed in chapter 5. In addition to flexible peak alignment, the prenuclear contour had varying pitch range according to the position of the prenuclear stressed syllable. The second prenuclear position always emerged with a smaller pitch range than the preceding first prenuclear position. This produced a descending stair-case configuration from one prenuclear stressed syllable to the next.

Sometimes the prenuclear stressed syllable emerged with a phonetically distinct F0 shape from that attested in the majority of cases. The contour given in figure 4.4 (a) was attested in 3% of the prenuclear stressed syllables. In this case, the prenuclear stressed syllable was pronounced with a late rise, characterized by a leveled F0 during the tonic syllable and a rising pattern in the post-tonic syllable. As for the contour given in figure 4.4 (b), it was attested in 9% of the prenuclear stressed syllables. It was realized as a plateau during the tonic syllable that often extended into the post-tonic syllable as well. Notice that the F0 stops falling during the tonic syllable and remains leveled for a while before falling again. Both of these contours were largely attested in the second prenuclear stressed syllable, where they appear to alternate freely with the main rising contour. There was just a single late rise attested in the first prenuclear position and no plateaus realized in this position.

Montevideo's declarative prenuclear contour is somewhat distinct from the canonical Spanish but it also shares some similarities. Castilian Spanish also has a rising F0 during the tonic syllable, but words with neutral reading are realized with a peak in the post-tonic syllable, while words with focus are realized with a peak at the end of the tonic syllable (Hualde 2005). The flexible alignment described here for Montevideo Spanish between tonic and post-tonic peaks for neutral prenuclear stress has also been attested in Buenos Aires Spanish (Gabriel et al 2010) and in Peruvian Amazonian Spanish (Garcia 2011). Another similarity with Castilian Spanish is the progressively lower pitch range. This is a well-known phenomenon across Spanish dialects (Beckman et al 2002). Castilian Spanish also has a similar late rising contour to that attested in Montevideo but it emerges in yes/no question prenuclear position with narrow focus. This accent does occur in neutral context for Caracas Spanish (Sosa 1999). As for the plateau contour, it appears to be treated as a reduced phonetic realization of the early rising contour in Beckman et al (2002).

Figure 4.3 (a) and (b) – Examples of the declarative prenuclear contour: tonic early rise with (a) flexible peak alignment between the end of the tonic syllable and the end of the post-tonic syllable, and (b) progressively lower pitch range.

(a)

L+>H*   L+>H*   L+>H*

(Ma)__nuel__ mor(día)   *(E)__le__na*   *__Do__ra...*   Speaker M2

(b)

L+>H*   L+>H*

Lor__e__na derra__mó__ una...   Speaker F1
'Lorena shed a…'
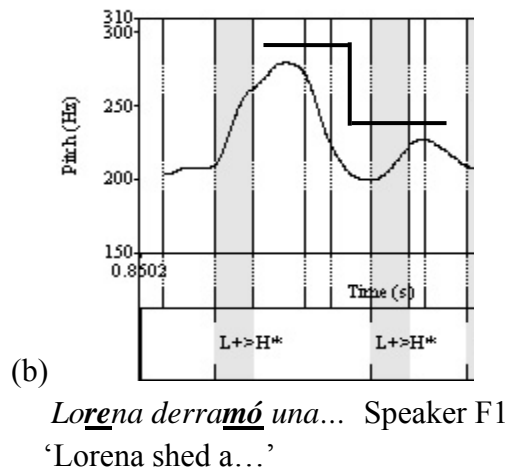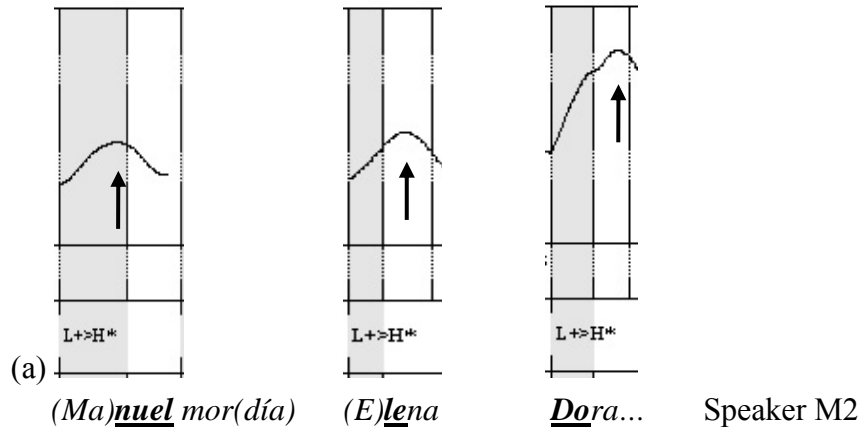
Figure 4.4 (a) and (b) – Two other contours attested in declarative prenuclear position: (a) a late rise in the post-tonic syllable, and (b) a plateau.

(a)   L*+H   (b)   L+>H*

(pu)__lió__ la   *(mi)__ra__ba al co(librí)*   Speaker F3
'polished the'   'was looking at the hummingbird'

22
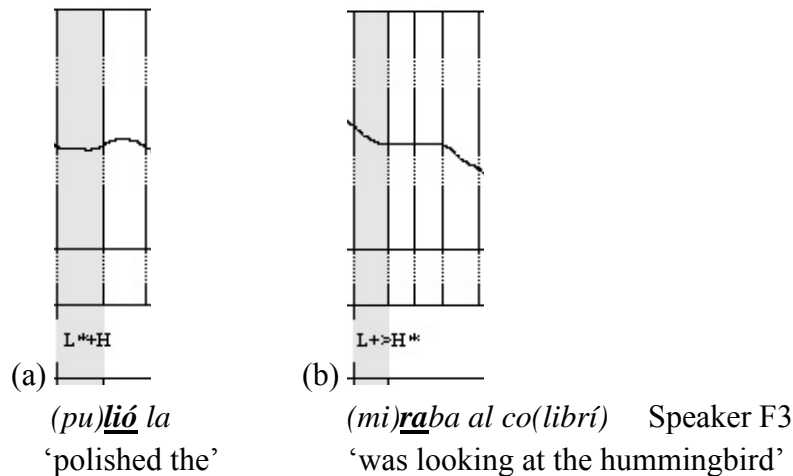
4.3.1.1 Alternative realization of the prenuclear contour

Sometimes the main prenuclear contour (a tonic F0 rise to a peak) was realized with a shoulder-like peak, as illustrated in figure 4.5 below. This pattern was attested in 9% of the prenuclear stressed syllables that had a tonic rising contour, either in the first prenuclear position or the second. The other 91% emerged with a pointy peak. The difference between this shoulder-like realization and the pointy peak one is the time frame of the high target realization. In the example given below, instead of rising for the duration of the contour the F0 stops rising earlier but remains high for a little while, producing a shoulder-like peak. This pattern is not categorized here as a distinct prenuclear contour because it shares many phonetic similarities to the main prenuclear contour. It has a rising F0 at the beginning of the tonic syllable and the pitch remains high for at least the duration of the tonic syllable, often extending into the post-tonic syllable as well, and it occurs at apparently free variation with the pointy peak realization.

Figure 4.5 – Alternative realization of the declarative prenuclear contour: tonic early rise with a shoulder-like peak.

*(bo)**rra**ba el*   Speaker M2
'was erasing the'

4.3.2 Declarative final IP ending contour

The speakers marked the final IP of declarative utterances with four distinct endings. The most frequently attested IP contour is illustrated in figure 4.6 below, and the other three less frequent IP contours are illustrated in figures 4.7 (a), (b), and (c). The most frequently attested IP contour emerges in all contexts of nuclear stress pattern, while the other three less frequent IP contours are partially related to specific nuclear stress patterns.

The most frequent IP contour was attested in 40% of the final phrases and is given in figure 4.6 below. It ends in a small nuclear rise followed by a boundary fall. The nuclear contour was realized with a tonic F0 rise that started at the beginning of the nuclear stressed syllable, like

the prenuclear contour. However, unlike the prenuclear contour, the peak of the nuclear contour was always realized in the tonic syllable, even when the nuclear stress fell in antepenultimate position. Like the prenuclear rise, this nuclear contour was also realized with a reduced pitch range in contrast with the preceding rising accent. Consequently, the nuclear F0 rise was the shortest F0 rise of the whole final IP. After the tonic peak the F0 fell to a low target at the phrase edge.

One of the less frequent IP contours was attested in 20% of the final phrases and is illustrated in figure 4.7 (a). It ends in a nuclear plateau followed by a boundary fall. This IP ending is distinct because instead of rising during the nuclear stress, the F0 remains leveled high for a while. It then resumes falling to the phrase edge. Notice that the plateau is also realized at a lower pitch range than the previous F0 peak of the phrase. The fact that the F0 stops falling temporarily during the nuclear stress suggests that a tone target is associated to this syllable. This configuration was only attested in non-ultimate nuclear stress, and largely in a context of possible stress clash with the preceding prenuclear accent, when there was only one unstressed syllable between the prenuclear and the nuclear stressed syllables.

Another less frequent IP contour was attested in 27% of the final phrases and is illustrated in figure 4.7 (b). It ends in a low nuclear contour that extends to the phrase edge. This IP is distinct from the other two contours described above in that no apparent F0 movement is realized during the nuclear stressed syllable. The F0 starts falling after the medial prenuclear stress and continues falling to a low pitch near the phrase edge, without any other movement around the nuclear stressed syllable. This configuration was largely attested in penultimate and ultimate nuclear stress position, with only one occurrence in antepenultimate position.

The final less frequent IP contour was attested in 13% of the final phrases and is given in figure 4.7 (c). It ends in a small nuclear/boundary rise. At the beginning of the nuclear stressed syllable the F0 starts rising as expected. However, it remains high until the end of the syllable, which is also the phrase edge, given that this configuration was exclusively realized in ultimate nuclear stress position. No boundary fall is attested in this context, which has a much smaller amount of time to realize both a nuclear accent and a boundary tone.

Hualde (2005) states that neutral declaratives in Spanish as a whole may surface with either of two of the ending contours used by Montevideo speakers: the short nuclear rise with boundary fall (see figure 4.6), and the low nuclear/boundary contour (see figure 4.7 (b)). He states that both endings occur with different degrees of frequency depending on the Spanish variety, and that when both are used in the same dialect, the configuration with low nuclear/boundary contour is more neutral than the configuration with small nuclear rise and boundary fall, which sounds more lively or emphatic.

Figure 4.6 – The primary declarative final IP ending contour: a nuclear rise and boundary fall.
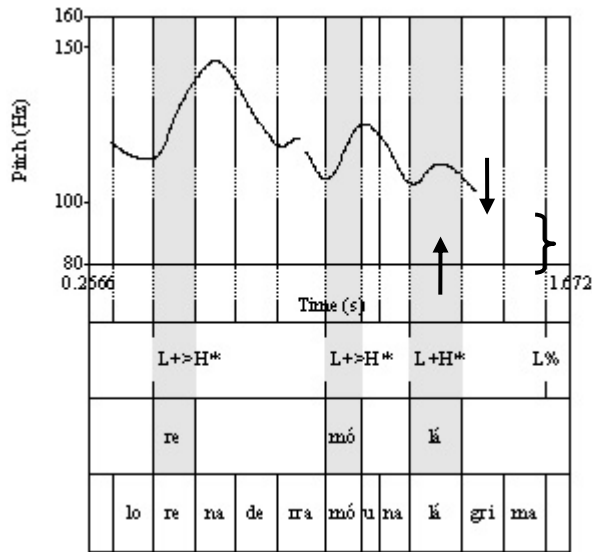
*Lo**re**na derra**mó** una **LÁ**grima.*]_{final IP} Speaker M2
'Lorena shed a tear.'

Figure 4.7 (a), (b), and (c) – Three other less frequent declarative final IP ending contours: (a) a nuclear plateau and boundary fall; (b) a nuclear and boundary low F0; and (c) a nuclear and boundary short rise.
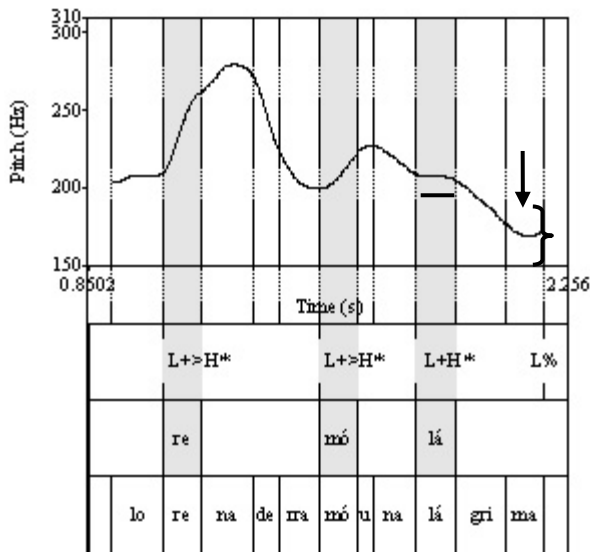
(a)

*Lo**re**na derra**mó** una **LÁ**grima.*]_{final IP} Speaker F1
'Lorena shed a tear.'

25
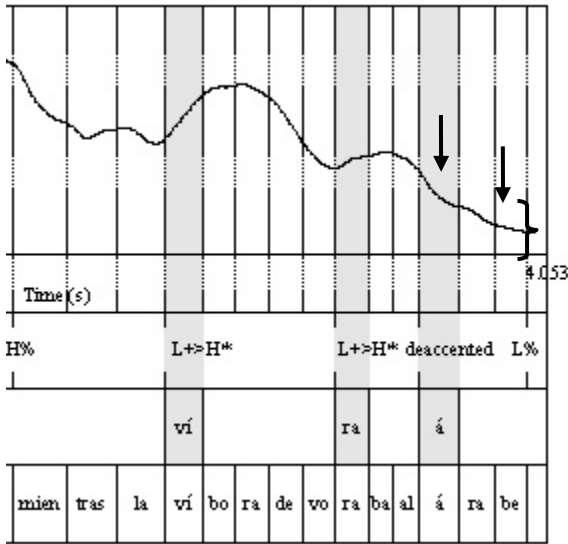
(b)

*...mientras la **víbora** devo**raba** al **Á**rabe.*]_{final IP} Speaker F3

'…while the snake devoured the Arab.'
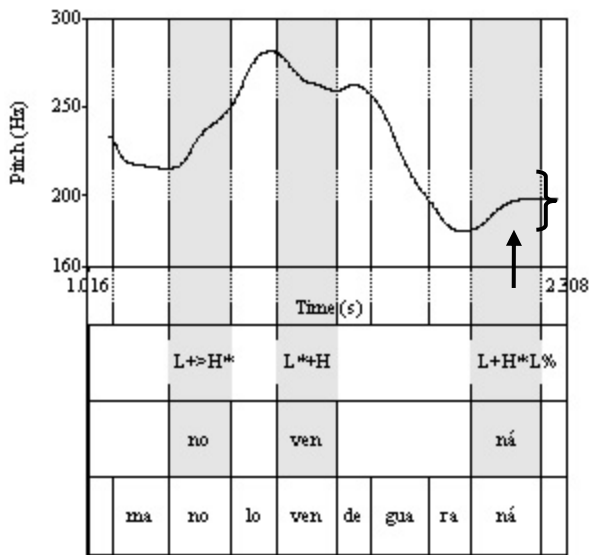
(c)

*Ma**no**lo **ven**de guara**NÁ**.*]_{final IP} Speaker F3

'Manolo sells guarana.' (type of soda)

4.3.3 Declarative medial IP ending contour

The declarative medial IP was consistently uttered with the same ending contour, which is illustrated below in figure 4.8. The ending F0 movements of the medial IP was characterized by a continuous F0 rise that started near the beginning of the nuclear stressed syllable and extended through the post-tonic syllables reaching a tall high target at the phrase edge. The

medial IP nuclear/boundary rise was always as tall as, and often taller than, the medial prenuclear rise. Sometimes it was even taller than the first prenuclear rise.

Sosa (1999:125) attested the same continuous rising ending in the intonation of non-final items of an enumeration statement. The contour attested in non-final items of enumeration statements seems to have the same function as the contour attested here for the declarative medial IP, which is to communicate unfinished thought and the intention to continue speaking.

Figure 4.8 – The declarative medial IP ending contour: a nuclear and boundary tall rise.
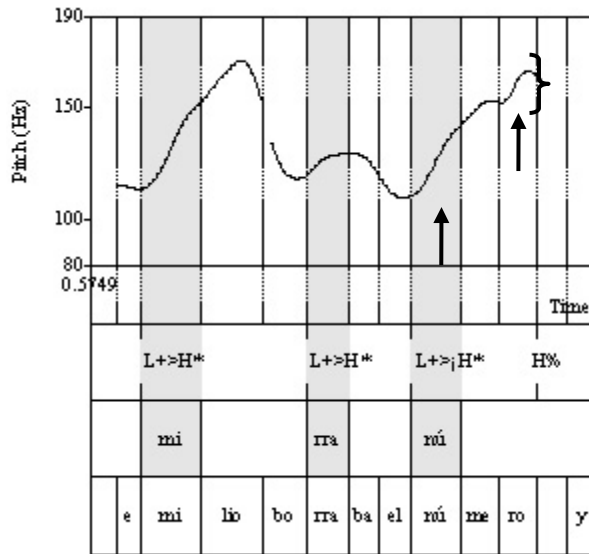
*E**mi**lio bo**rra**ba el **NÚ**mero*]_{medial IP} *y….* Speaker M2
'Emilio was erasing the number and ….'

4.4 Yes/no question utterances

Montevideo Spanish speakers combined two medial IP contours with two final IP contours in the pronunciation of yes/no questions. The choice of IP contour was largely dependent of the nuclear stress pattern. The two most frequent pronunciations of yes/no questions with non-ultimate nuclear stress are illustrated in figures 4.9 (a) and (b), while the pronunciation of yes/no questions with ultimate nuclear stress was almost unanimously realized with the pattern illustrated in figure 4.10. There was only a single utterance with ultimate nuclear stress that did not follow this configuration, and that is presented in figure 4.11.

The categorical distinction between the medial IP and the final IP of a yes/no question was realized in the last F0 movements of the IP (nuclear and boundary contour), and also in the distribution of the contour. This is because the body of the IP had similar prenuclear

configuration in all cases, with a sequence of progressively lower tonic rises whose peak aligned anywhere from the end of the tonic syllable to the end of the post-tonic syllable.

Both medial IP and final IP could emerge with one of the following two ending contours: a tall nuclear rise followed by a boundary fall, or a tall nuclear/boundary rise. In medial IP these ending contours alternated freely in phrases with non-ultimate nuclear stress (see figures 4.9 (a) and (b)). If the nuclear stress was ultimate, however, the medial IP almost always emerged with a tall nuclear/boundary rise (see figure 4.10), with the exception of the single case given in figure 4.11 where the medial IP ended with the contour generally reserved for non-ultimate nuclear stress, a boundary fall. Notice that this exceptional medial IP also has a distinct prenuclear configuration, with the first and second prenuclear rises having a much smaller pitch range than in all other utterances.

In final IP the distribution was distinct in that the two contours occurred in complementary distribution. Final phrases with non-ultimate nuclear stress always ended with a tall nuclear rise followed by a boundary fall (see figures 4.10 (a) and (b)). On the other hand, final phrases with ultimate nuclear stress always ended with a tall nuclear/boundary rise (see figures 4.11 and 4.12).

Notice that the medial IP and final IP of yes/no questions often ended with the same surface shape contour (see figures 4.9 (a) and 4.10). In such cases, the distinction between medial IP and final IP seems to be realized through the pitch height. Speakers marked the final IP with a taller nuclear rise than that of medial IP.

Figure 4.9 (a) and (b) – The two intonation patterns of yes/no questions with non-ultimate nuclear stress: (a) a medial IP and final IP both with nuclear tall rise and boundary fall; and (b) a medial IP of nuclear and boundary tall rise and a final IP of nuclear tall rise and boundary fall.
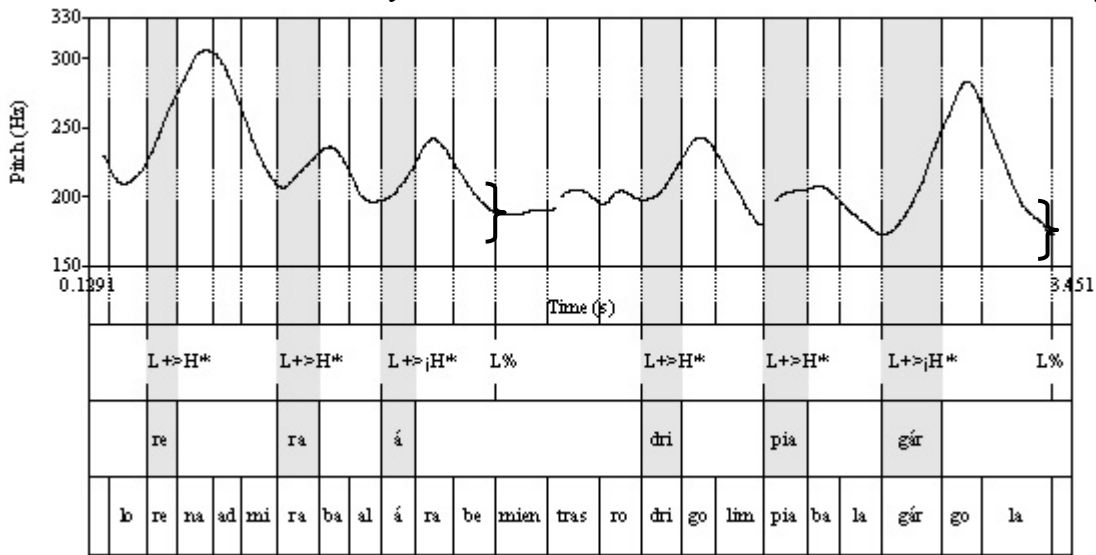
(a)

¿Lorena admiraba al Árabe]medial IP *mientras Rodrigo limpiaba la GÁRgola?*]final IP Speaker F2
'Was Lorena admiring the Arab while Rodrigo cleaned the gargoyle?'

(b)

¿Ramírez ganó el reGAlo]medial IP *y María ganó el diNEro?*]final IP Speaker F1
'Did Ramirez win the gift and Maria won the cash?'

29
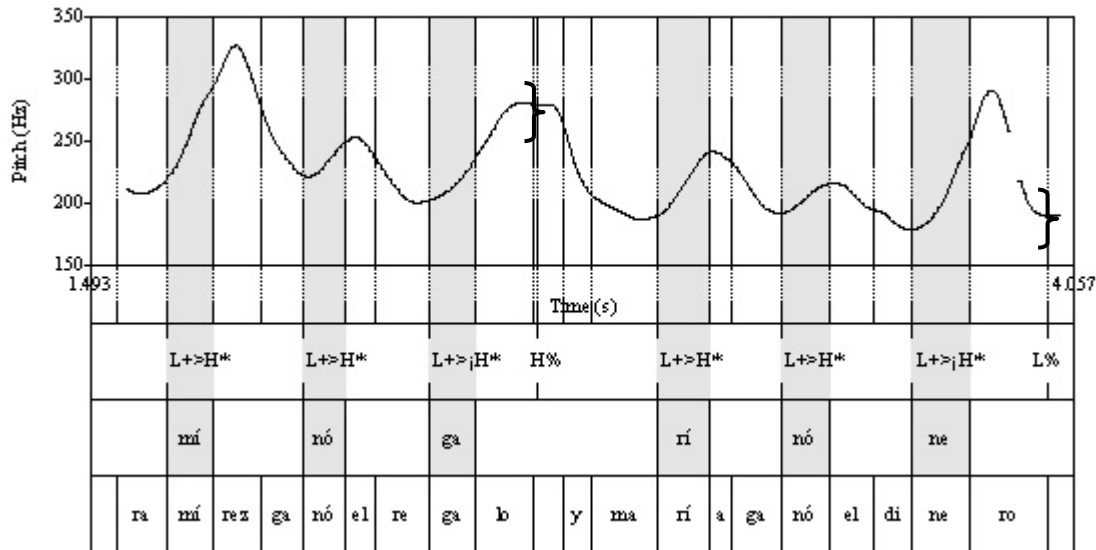
Figure 4.10 – The intonation pattern of yes/no questions with ultimate nuclear stress: a medial IP and a final IP both with nuclear and boundary tall rise.
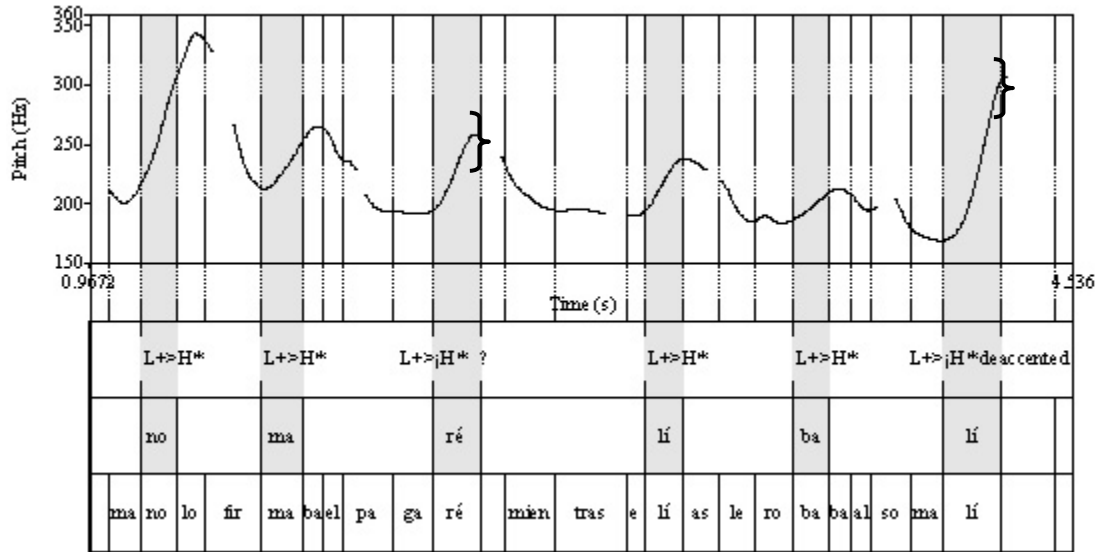
L+>H*	L+>H*	L+>¡H* ?		L+>H*	L+>H*	L+>¡H* deaccented
no	ma	ré		lí	ba	lí
ma no lo fir	ma ba el pa ga ré	mien tras e lí as le ro	ba ba al so ma lí			

*¿Ma**no**lo fir**ma**ba el paga**RÉ**]*medial IP *mientras El**í**as le ro**ba**ba al soma**LÍ**?]*final IP Speaker F1
'Was Manolo signing the promissory note while Elias stole from the Somalian?'

Figure 4.11 – The single case of a boundary fall in a yes/no question medial IP with ultimate nuclear stress.

L+>H*	L+>H*	?	L%	L+>H*	L+>H*	?	L%
da	ven	lí		rí	ven	ná	
da ni ven de un ja ba	lí		y ma rí a ven de gua ra	ná			

*¿**Da**ni **ven**de un jaba**LÍ**]*medial IP *y Mar**í**a **ven**de guara**NÁ**?]*final IP Speaker M2
'Is Dani selling a wild boar and Maria is selling guarana?' (type of soda)

30
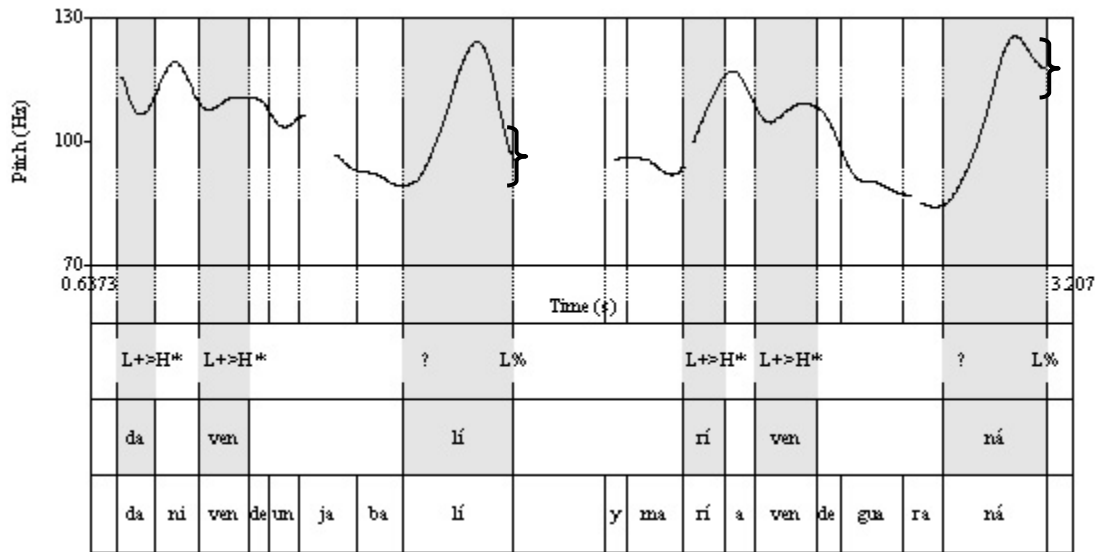
4.4.1 Yes/no question prenuclear configuration

The prenuclear stressed syllables of yes/no question utterances were realized with a similar configuration to that of declarative utterances for both the medial IP and the final IP. The most frequent prenuclear contour had flexible realization in regards to peak alignment, as illustrated in figures 4.12 (a) and (b). Two other less frequent contours attested are illustrated in figures 4.13 (a) and (b). An alternative realization of the main prenuclear contour was also attested in the data and will be described in the following section 4.4.1.1.

The most common contour, illustrated in figures 4.12 (a) and (b), was attested in 93% of the prenuclear stressed syllables. Like the declarative main prenuclear configuration, this contour was characterized by a rising F0 throughout the stressed syllable that ended anywhere from the end of the tonic syllable and the end of the post-tonic syllable (see figure 4.12 (a)). No specific context was consistent in triggering one alignment or another. Furthermore, the second prenuclear stressed syllable was always produced with a reduced pitch range in comparison to the first prenuclear stressed syllable, a behavior also attested in declarative utterances (see figure 4.12 (b)).

In a small number of cases the prenuclear stressed syllable emerged with a different contour. The contour given in figure 4.13 (a) was attested in 2% of the prenuclear stressed syllables. This contour was realized with a leveled pattern during the tonic syllable and a rising pattern in the post-tonic syllable. As for the contour given in figure 4.13 (b), it was attested in 5% of the prenuclear stressed syllables. The prenuclear stressed syllables in these cases had a plateau-like contour that often extended into the post-tonic syllable as well. Both contours occurred only in the second prenuclear stressed syllable, and in most cases in a context of possible stress clash with the previous prenuclear stressed syllable, where only one unstressed syllable separated the stressed syllables.

Figure 4.12 (a) and (b) – Examples of the yes/no question prenuclear contour: tonic early rise with (a) flexible peak alignment between the end of the tonic syllable and the end of the post-tonic syllable, and (b) progressively lower pitch range.

L+>H*   L+>H*   L+>H*

(a)

(Ma)**ría**   (Ro)**dri**go   (Ma)**ría**   Speakers F1, F3

(b)

¿La **no**via rega**la**ba la...?   Speaker F1
'Was the bride giving away the…?'
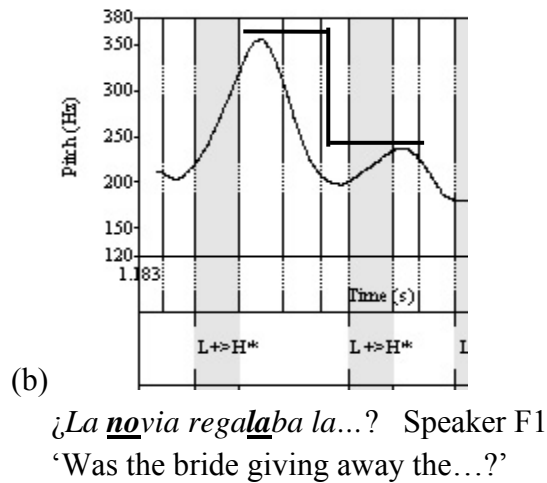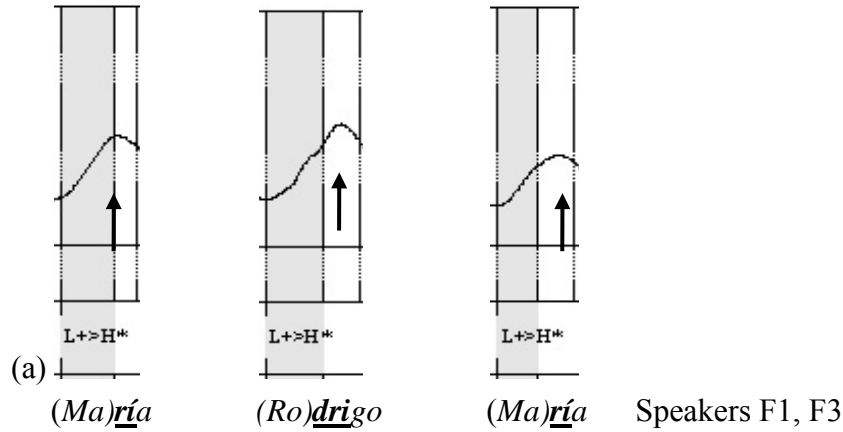
Figure 4.13 (a) and (b) – Two other contours attested in yes/no question prenuclear position: (a) a late rise in the post-tonic syllable, and (b) a plateau.

L*+H   L+>H*

(a)   (b)

(mi)**ra**ba al   (ga)**nó** el   Speaker F2
'was looking at'   'won the'
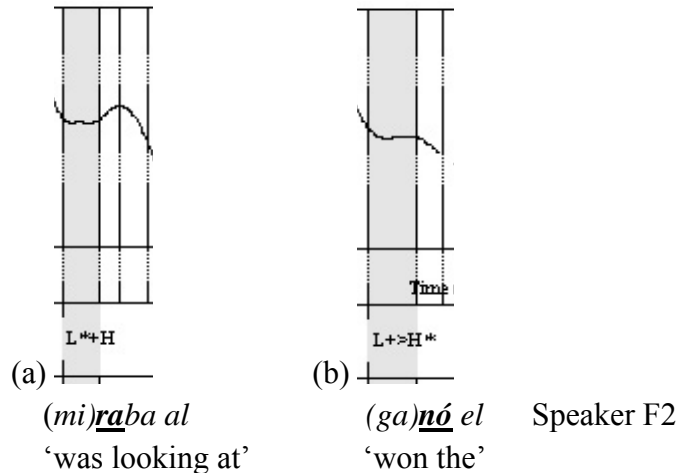
4.4.1.1 Alternative realization of the prenuclear contour

There were a few cases of prenuclear rising contours realized with a shoulder-like peak instead of the common pointy peak. Figure 4.14 below illustrates this alternative realization. This pattern was also attested in declarative prenuclear stressed syllables, but in yes/no questions it had a smaller frequency of 7% of the prenuclear stressed syllables that had a rising contour. In this configuration the F0 started rising at the beginning of the tonic syllable as expected, but when the rising pattern ended the F0 remained leveled high for a little longer. This pattern is phonetically similar to the main pattern in that it presents a tonic rise and a high pitch during the whole tonic syllable, and many times during the post-tonic syllable as well.

Figure 4.14 – Alternative realization of the yes/no question prenuclear contour: tonic early rise with a shoulder-like peak.

L+>H*

*ven*de un   Speaker M2
'sells the'

4.4.2 Yes/no question final IP ending contour

The final IP of yes/no questions emerged with two categorically distinct ending contours which were dependent on the stress pattern of the last word of the phrase. Phrases with non-ultimate nuclear stress emerged with the IP contour given in figure 4.15 below, and phrases with ultimate nuclear stress were realized with the contour illustrated in figure 4.16. The contours were differentiated in the final F0 movements (nuclear and boundary configuration).

The contour given in figure 4.15 marked phrases with non-ultimate nuclear stress. It ended in a tall rising pattern that started at the beginning of the nuclear stressed syllable and peaked somewhere between the end of the tonic syllable and the end of the post-tonic syllable. After the peak, the F0 fell sharply to a low target at the phrase edge. The difference between the nuclear contour and the prenuclear one is that it does not undergo the progressively lowering of pitch range. On the contrary, the yes/no question final IP nuclear rise was so tall that sometimes

it was as tall as the first peak of the utterance. The figures shown in the previous section 4.4 (see figures 4.9 (a) and (b)) allow for a better visualization of the height of the last F0 rise of the utterance in comparison to preceding prenuclear F0 rises. Notice that in those examples the nuclear rise of the final IP reaches the second highest F0 target of the whole utterance.

The contour illustrated in figure 4.16 marked all the phrases with ultimate nuclear stress. The last F0 movement of this contour was also characterized by a tall nuclear rise that started at the beginning of the tonic syllable and rose until the end of the tonic syllable which was also the edge of the phrase. No boundary fall is attested in this context, which is likely due to the lack of space. Notice that in this contour, the nuclear rise is also unaffected by the phenomenon that progressively lowers the pitch range of prenuclear tonic rises.

The canonical Castilian Spanish pattern for neutral yes/no question is quite different from the Montevideo pattern. It consists of a low nuclear contour followed by a boundary rise (Hualde 2005). This pattern is attested even when the nuclear stressed syllable is in ultimate position, in which case the F0 remains low during the first half of the nuclear stressed syllable and rises in the second half. Quilis (1993) does mention, however, that a nuclear rise followed by a boundary fall also emerges in Madrid Spanish, but for marked contexts, when the speaker wants to verify or double-check information. One variety of Spanish that has a similar pattern for neutral yes/no question as that attested in Montevideo Spanish is the variety spoken in Buenos Aires, which also uses a tonic rise with falling ending for non-ultimate nuclear stress and a rising ending for ultimate nuclear stress (Gabriel et al 2010, Lee 2010, Barjam 2004).

Figure 4.15 –The final IP ending contour of yes/no questions with non-ultimate nuclear stress: a nuclear tall rise and a boundary fall.
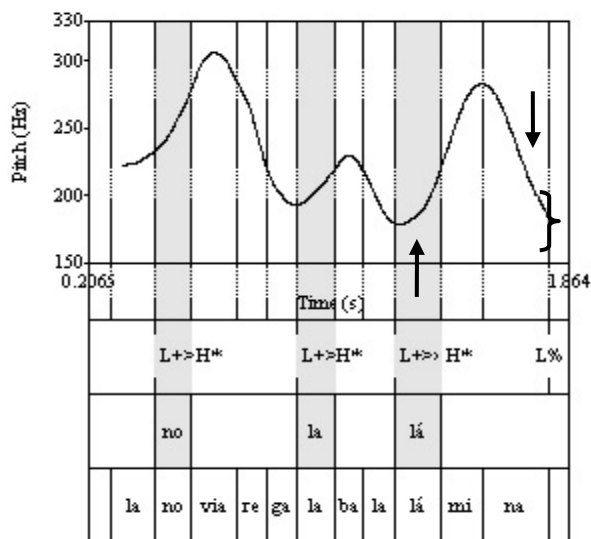
¿La **no**via rega**la**ba la **LÁ**mina?]final IP Speaker F2
'Was the bride giving away the print out?'

Figure 4.16 – The final IP ending contour of in yes/no questions with ultimate nuclear stress: a nuclear and boundary tall rise.
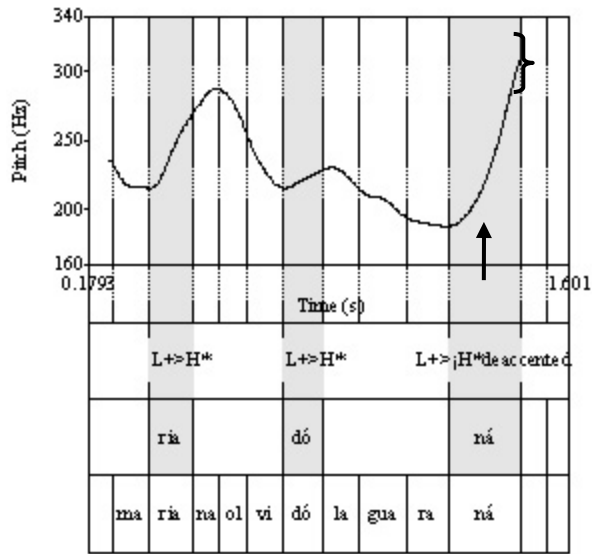
¿Mariana olvidó la guaraNÁ?]_{final IP} Speaker F2
'Did Mariana forget the guarana?' (type of soda)

4.4.3 Yes/no question medial IP ending contour

The medial IP of yes/no questions was also marked by two ending contours. Their distribution was partially influenced by the location of the nuclear stress. Phrases with non-ultimate nuclear stress emerged with either IP contour, as shown in figures 4.17 (a) and (b) below, while phrases with ultimate nuclear stress almost always emerged with the same IP contour, as exemplified in figure 4.18. The only exception to this is given in figure 4.19, a phrase with ultimate nuclear stress that did not emerge with the preferred IP contour used in this context. Some ambiguous endings were attested in a few phrases with non-ultimate nuclear stress, but these will be described in the following section 4.4.3.1.

These IP contours have a similar surface shape to the two IP contours attested in yes/no question final phrases. Sometimes the IP ended in a nuclear rise with boundary fall (figures 4.17 (a) and 4.19) and other times it emerged with a continuous rise from the nuclear stress to the phrase edge (figures 4.17 (b) and 4.18). Unlike the final IP, in medial IP both endings occurred in the context of non-ultimate nuclear stress (see figures 4.17 (a) and (b)). The IP with boundary fall is attested in 54% of the medial phrases, while the IP with rising ending is attested in 33%. The remainder of the medial phrases emerged with an ambiguous contour that cannot be easily categorized as a falling ending or a rising ending (see section 4.4.3.1). As for when the medial IP had ultimate nuclear stress, then the preferred ending was the final rising contour (see figure 4.18). There was only one instance where a falling boundary was produced in this context, as exemplified in figure 4.19. In this case, the tonic rise was realized only in the first half of the

nuclear stressed syllable, and a boundary fall was realized in the second half of the syllable. Notice that the prenuclear stressed syllables of this IP do not have the expected height of the prenuclear rises attested everywhere else.

Like the final IP, the medial IP nuclear rise was unaffected by the progressively lowering of pitch range attested in prenuclear position. Differently from the final IP, howerver, is the pitch height of the medial IP. The final IP nuclear rise was always taller than the no-final IP nuclear rise. This pattern can be visualized in the previous figures 4.10 (a) and (b) and 4.11(section 4.4). Notice that the medial IP nuclear rise is only taller than (or as tall as) the previous adjacent prenuclear peak, while the final IP nuclear rise reaches an F0 target that is taller than almost all the preceding F0 rises of the utterance, with exception of the initial prenuclear rise.

Figure 4.17 (a) and (b) – The two medial IP ending contours of yes/no questions with non-ultimate nuclear stress: (a) a nuclear tall rise and boundary fall, and (b) a nuclear and boundary tall rise.
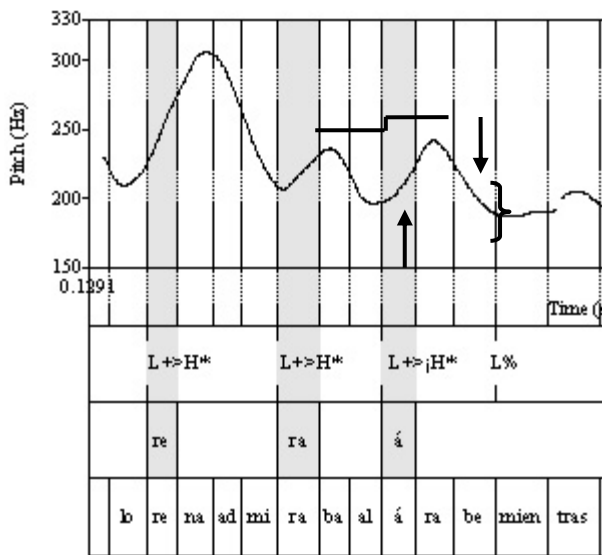
(a)

¿Lorena admiraba al Árabe]medial IP *mientras…?* Speaker F2
'Was Lorena admiring the Arab while…?'

350

300

250

200

150
1.493

Pitch (Hz)

Time (

	L+>H*		L+>H*			L+>¡H*	H%	
	mí		nó			ga		
ra	mí	rez	ga	nó	el	re	ga	lo	y

(b)
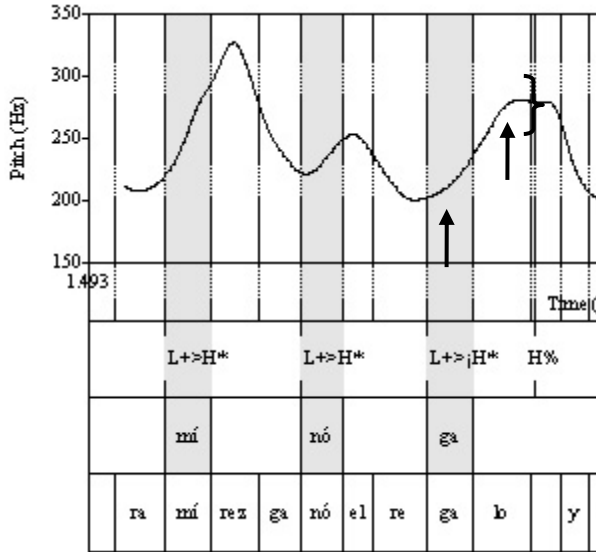
*¿Ra**mí**rez ga**nó** el re**GA**lo*]medial IP *y...?*   Speaker F1
'Did Ramirez win the gift and…?'

Figure 4.18 – The medial IP ending contour of yes/no questions with ultimate nuclear stress: a nuclear and boundary tall rise.

360
350

300

250

200

150
0.9672

Pitch (Hz)

Time (s)

	L+>H*		L+>H*			L+>¡H*	?		
	no		ma			ré		
ma	no	lo	fir	ma	ba	el	pa	ga	ré	mien	tras

*¿Ma**no**lo fir**ma**ba el paga**RÉ***]medial IP *mientras...?* Speaker F1
'Was Manolo signing the promissory note while …?'

37
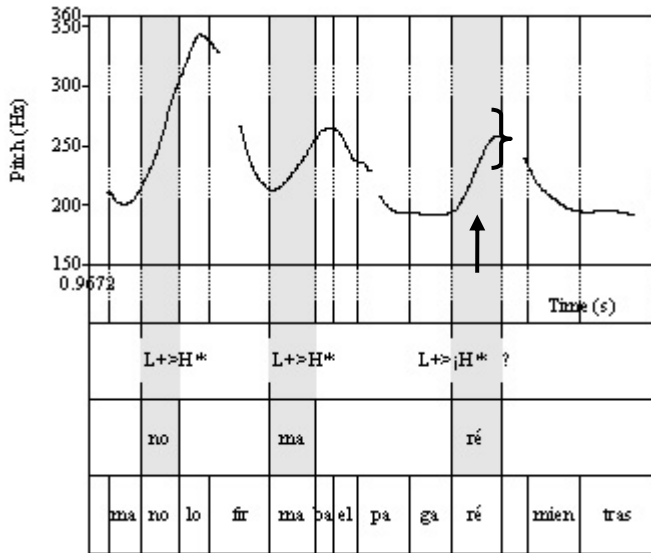
Figure 4.19 – The single case of a boundary fall in a yes/no question medial IP with ultimate nuclear stress.
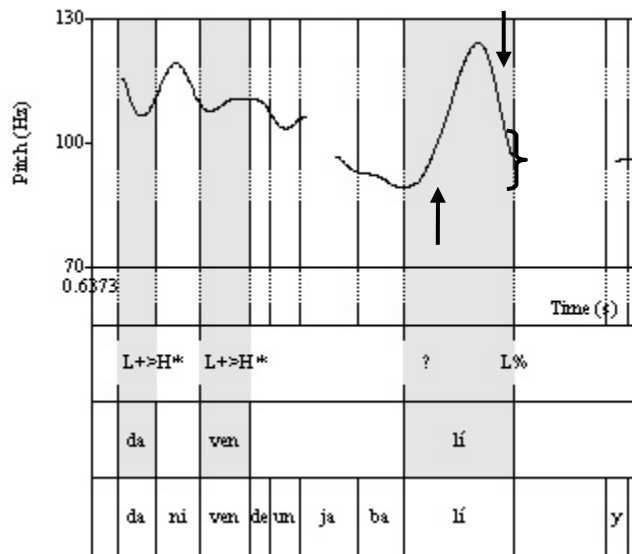
¿*__Da__ni __ven__de un jaba__LÍ*__]medial IP *y…?* Speaker M2
'Is Dani selling a wild boar and…?'

4.4.3.1 Ambiguous medial IP ending contour

A few medial IP with non-ultimate nuclear stress pattern emerged with an ambiguous contour that sounds like a rising ending, but looks like a possible rising-falling ending. This ambiguous contour is illustrated below in figure 4.20. Furthermore, there was one case of a medial IP with ultimate nuclear stress whose rising ending was extended beyond the phrase edge and continued into the conjunction. This case is shown in figure 4.21. These uncommon patterns were attested in subordinated sentence structure, where the conjunction was a disyllabic unstressed word.

The realization given in non-ultimate nuclear stress (see figure 4.20) has the expected tonic rise followed by a boundary fall. However, the boundary fall does not reach the speakers baseline at the phrase edge. Instead, the F0 reaches a mid-target and resumes the fall during the conjunction. A total of 12% of the medial IP with non-ultimate nuclear stress were uttered with a similar ending. What is ambiguous about this contour is that the medial IP sounds like it ends in a high pitch, but the since there is a partial falling pattern in the F0 shape before the phrase edge there could be a boundary low target instead of a high target associated to this phrase edge. There are two possible interpretations here. The speaker could have been aiming for a rising ending and simply stopped vibrating his vocal cords a little too early, producing this F0 drop at the very end, which continued into the next phrase in anticipation of the low target of the next phrase's initial pitch accent. Another possibility is that the speaker could have been aiming for a rising-falling ending but in the lack of time decided to push part of the falling contour into the conjunction.

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Evidence in favor of this hypothesis is found in a single case attested in ultimate nuclear stress context, given in figure 4.21. In this medial IP, the F0 starts rising in the nuclear stress syllable, as expected, but it does not end at the phrase edge. Instead, it continues rising into the first syllable of the conjunction. This case is not categorized as ambiguous since the medial IP sounds as if ending in a high pitch and the IP has a surface rising ending. However, since the rising ending continues into the conjunction, this example suggests that the medial IP can be pushed into the conjunction. The realization attested in ultimate nuclear stress context reinforces the ambiguity of the alternative realization attested in non-ultimate nuclear stress.

Figure 4.20 – The ambiguous ending contour attested in the medial IP of yes/no questions with non-ultimate nuclear stress: sounds like a rising boundary but looks like a falling boundary.
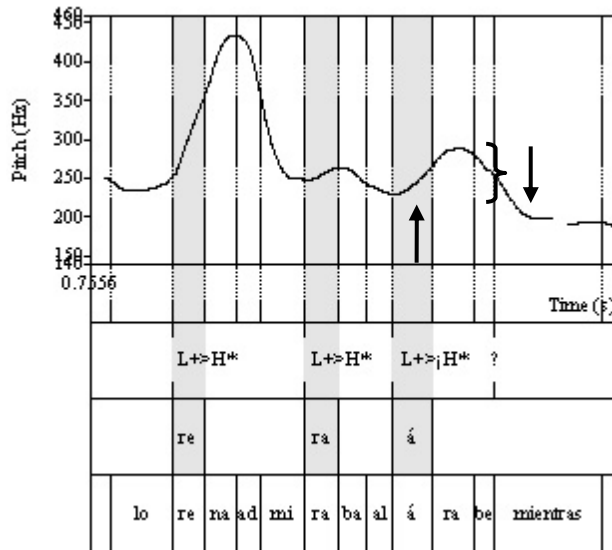
¿Lorena admiraba al Árabe]medial IP *(mientras…)?* Speaker F3
'Was Lorena admiring the Arab (while…)?'

Figure 4.21 – A unique realization of the medial IP rising ending of yes/no questions with ultimate nuclear stress.
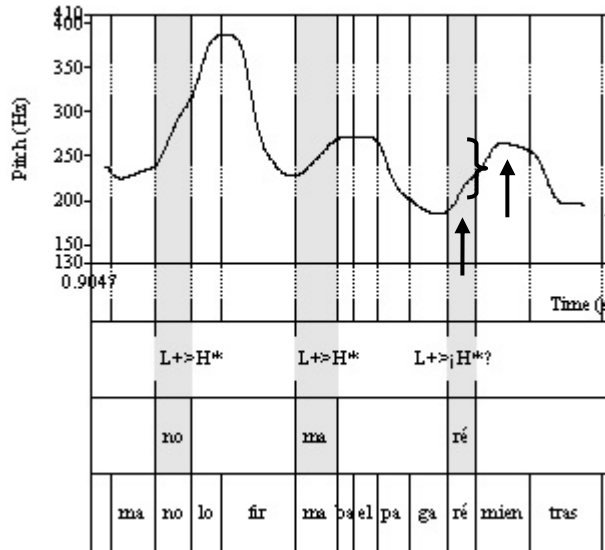
*¿Ma**no**lo fir**ma**ba el paga**RÉ**]*medial IP* mientras…?* Speaker F3
'Was Manolo signing the promissory note while…?'

4.5 Discussion: the syntactic-semantic structure of the target sentences

The previous sections of this chapter depict a pattern of prenuclear configuration where the primary contour was a tonic early rise to a late F0 peak. Yet, distinct contours are allowed to emerge in the second prenuclear position of the IP, such as a plateau and a late rise, but are not allowed to emerge in the first prenuclear position, with the exception of a single late rise attested in the first prenuclear position of a declarative utterance. In the Montevideo data, the first prenuclear stressed syllable not only heads the IP but also marks the subject of the clause. It appears that the assignment of contours to the first prenuclear position is governed by slightly different rules from those that govern the assignment of contours to the second prenuclear position. A parallel pattern of distinct distribution between first and second prenuclear positions has recently been attested in a dialect of Peruvian Amazonian Spanish (Garcia 2011). Garcia (2011) states that in the sample collected of neutral declaratives for Peruvian Amazonian Spanish the most frequent prenuclear contour in both first and second prenuclear positions was an early rise with a peak at the end of the tonic syllable. However, he also noted a distributional difference between these two positions given that almost half of the first prenuclear stressed syllables were pronounced with alternative contours, namely a tonic rise with post-tonic peak and a tonic rise with a shoulder-like peak that extended until the post-tonic syllable. On the other hand, the second prenuclear position was faithfully realized with the primary contour, tonic peak alignment. He calls the attention to the fact that in his data the initial prenuclear position of the utterance coincided with the grammatical position of the subject of the phrase.

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The Montevideo Spanish data presented in this chapter and the Peruvian Amazonian Spanish data presented by Garcia (2011) suggest that both Montevideo Spanish and Peruvian Amazonian Spanish give differential treatment to the first prenuclear position of the intonational phrase as structured for the respective studies. These dialects do that in different ways. Montevideo Spanish restricts the possible contours that can emerge in the first prenuclear position, while Peruvian Amazonian Spanish seems to use alternative contours to mark the first prenuclear position. These findings raise several questions about how prenuclear contours are assigned to the stressed syllables and what might trigger different phonetic realizations. Is the initial prenuclear position of the IP generally marked differently from other non-initial prenuclear accents? How much of the intonational contour is influence by the location of the grammatical constituents in the phrase? Is the grammatical subject triggering faithful realization to the primary contours in the case of Montevideo Spanish or assignment of alternating contours in the case of Peruvian Amazonian Spanish? Neither this study nor Garcia's (2011) offered enough data to test these hypotheses since the sentences analyzed had a fixed Subject-verb-object (SVO) order. It would be useful to look at the intonational pattern of sentences with varied word orders and different grammatical complexities of the constituents. A perceptual study might also give a better understand of the phonological nature of the different contours attested and the productivity of these contours in communication.

Another hypothesis to consider is that the syntactic and semantic structure of the complex target sentences used for this study might have prompted some of the sentences to be uttered with added pragmatic nuance, which would explaining the occurrence of alternating contours in second prenuclear position. The complex sentences used in the experiment were composed of two consecutive subject-verb-object (SVO) phrases connected by a coordinating or subordinating conjunction, and each phrase had a different informational content for the subject and predicate. Figure 4.22 below presents a diagram exemplifying the syntactic and semantic content of a coordinated sentence and of a subordinated one used in the elicitation of intonation contours.

Figure 4.22 – A diagram of the syntactic/semantic structure of (a) a target coordinated declarative and (b) a target subordinated declarative.

Subject	Verb	Object	Conjunction	Subject	Verb	Object
a) la niña 'the girl'	prendió 'lit'	una bengala 'a flare'	y 'and'	la doña 'the lady'	pulió 'polished'	la moneda 'the coin'
b) Dora 'Dora'	leía 'was reading'	la novela 'the novel'	mientras 'while'	Manuel 'Manuel'	mordía 'bit'	la canela 'the cinnamon stick'

The figure given above suggests that the mirror syntactic structure of the connecting phrases puts the subject or the predicate of one phrase in a position of possible comparison with the subject and predicate of the connecting phrase. This syntactic makeup could have incited a reading with some degree of emphasis on specific constituents of the phrase and, consequently, triggered the emergence of other F0 contours in the second prenuclear position of the phrase in order to accentuate the information given in the subject or the predicate of the utterance. This might have occurred in spite of the fact that the sentences were contextualized to elicit a broad focus reading.

4.6 Conclusion

Declaratives utterances were marked with distinct contours from yes/no question utterances. Within these sentence types, the speakers used different IP contours to differentiate medial phrases from final phrases. The difference could be made through the surface shape of the IP or through manipulation of the pitch height.

The prenuclear configuration of final IP and medial IP had similar phonetic characteristics in all sentence-types. The majority of the prenuclear stressed syllables were pronounced with the canonical Spanish of an F0 rise that started at the beginning of the tonic syllable and continued rising for the duration of the tonic syllable to a late peak (Hualde 2005). The canonical Spanish pattern for broad focus is to align the end of F0 rise in the post-tonic syllable. In Montevideo Spanish this sometimes resulted in alignment at the boundary between tonic and post-tonic syllable. In a few cases the peak was realized as a shoulder-like peak. Furthermore, the rising contour of the second prenuclear stressed syllable reached a lower pitch range than the rising contour of the first prenuclear stressed syllable in all sentence types, which created the visual image of a staircase in the intonation of prenuclear stressed syllables. Several prenuclear stressed syllables emerged with other surface shapes that, in some dialects of Spanish, might be used for added pragmatic/contrastive meaning, namely a late rise and a plateau. In the

data analyzed, these surface shapes always emerged in second prenuclear position, with the exception of a single case in first prenuclear position of a declarative utterance. The plateau contour was attested in declaratives and yes/no questions but with a larger frequency in declarative utterances. Likewise, the late rising contour was also attested in declaratives and yes/no questions.

The intonational marker of declarative or yes/no question was realized in the nuclear and boundary contours, given that their prenuclear configuration was similar. The final IP of declarative utterances followed the canonical Spanish pattern by generally ending in a small nuclear rise and a boundary fall (Hualde 2005). The medial IP was marked with an opposite contour, a tall nuclear rise that merged into the boundary rise. This medial IP has been attested in enumeration statements of Spanish dialects (Sosa 1999).

The final IP of yes/no questions did not have the expected canonical pattern with low nuclear pitch and tall boundary rise. Instead, the final IP was characterized by a tall nuclear rise with late peak followed by a steep boundary fall. When the nuclear stress was ultimate, however, the boundary fall was not realized, so the final IP ended in a rising contour. The medial IP had alternating endings from a tall nuclear rise with late peak and sharp boundary fall to a tall nuclear rise that extended to a boundary high target. This alternation was not realized in ultimate nuclear stress, where all medial IP ended in a rising contour. When both yes/no question medial and final IP emerged with the same surface contour, then the speakers manipulated the pitch height of the ending contour to differentiate the medial IP from the final IP.

These patterns confirm the hypothesis that intonation is used to contrast between sentence-types. Each sentence type was uttered with its own set of unique nuclear and boundary contours. The same cannot be said of the medial IP. Some of the yes/no questions had a similar contour for medial IP as did the declaratives medial IP, characterized by a tall nuclear rise that merged with a boundary high target. This raises the question of how important it is in communication to distinguish between sentence-types at the medial IP position, and which strategies can be used to accomplish this goal. Another interesting question is how speakers indicate the intention to continue a thought or how they indicate the end of a thought. Many complex utterances marked the end of the first clause with a different surface contour from that which marked the end of the second clause. But there were also many yes/no questions with similar surface contours for the first and second clauses of the sentence. The data suggests that in these cases the speakers use the pitch height of the ending F0 movements as a contrastive tool. This and other questions will be discussed in the analysis chapters that follow.

Chapter 5

Analysis of declarative intonation

5.1 Introduction

This chapter offers an analysis of the phonological makeup of the declarative surface contours attested in the recordings of Montevideo Spanish. Coordinated and subordinated sentences were parsed into medial IP and final IP. Both IP had the same prenuclear configuration. The contrast between the two was realized in the nuclear and boundary configurations. Medial IP and final IP always emerged with distinct surface ending contours.

In general, the patterns attested for Declarative utterance in Montevideo Spanish follow the canonical Castilian Patterns. Medial IP ends in a rising pattern and final IP end in a falling pattern. One difference is that for Montevideo Spanish the prenuclear contour produces a peak at the end of the tonic syllable as well as in the post-tonic syllable, while in Castilian Spanish broad focus prenuclear accent produces post-tonic peak only.

When comparing the declarative intonation with the yes/no question intonation analyzed, the contrast between sentence type is clearly realized in the ending contour. The prenuclear configuration was the same for both sentence types. The ending contour of the medial IP also has the same surface realization for both declarative and yes/no question utterances. It appears that the distinction is made in the height of the ending contour. The final IP was marked with the same boundary contour for both sentence types, but the nuclear pitch accent was distinct. The distinction was realized in the peak align and peak height.

The following section 5.2 proposes an analysis for the prenuclear pitch accent, while sections 5.3 and 5.4 offer an analysis of the nuclear pitch accent and boundary tone of medial IP and final IP respectively. Section 5.5 provides a summary.

5.2 Prenuclear configuration of medial IP and final IP

5.2.1 Prenuclear contour: early rise with late peak

The large majority of the prenuclear stressed syllables emerged with a rising contour that started near the beginning of the tonic syllable and had flexible ending, aligning in the vicinities of the post-tonic syllable. Figure 5.1 below shows examples of the alternating peak alignment

attested in the data. The shaded area corresponds to the tonic syllable and the unshaded area to the post-tonic syllable.

Figure 5.1 – Examples of the early rising contour attested in declarative prenuclear position.

L+>H*	L+>H*	L+>H*	L+>H*	
(mi)__raba__	*(bo)__rraba__*	*(E)__lena__*	*(E)__milio__*	Speakers M1, M3, M2, F3
'was looking'	'was erasing'	'Elena'	'Emilio…'	
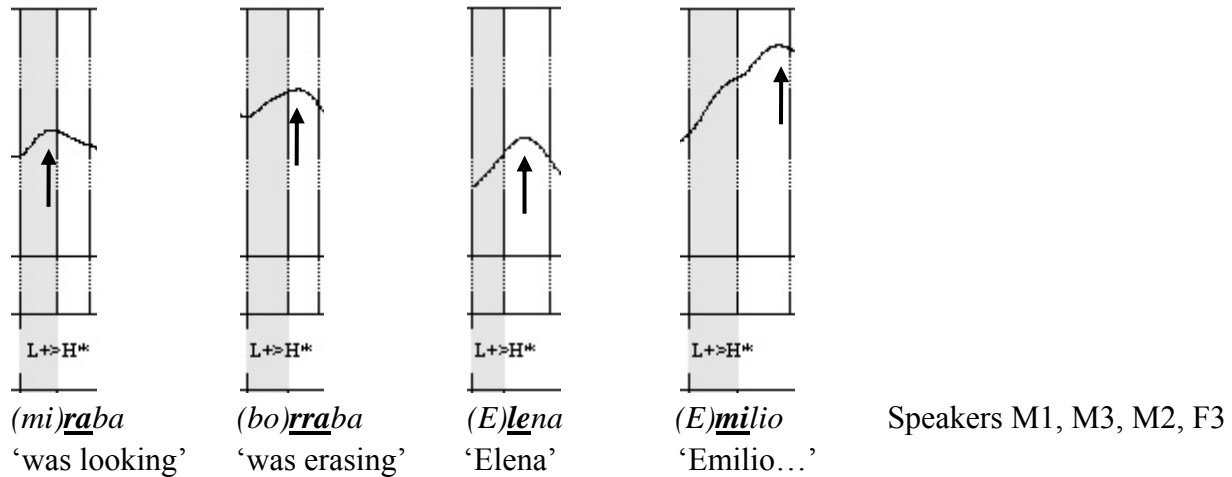
These examples show that the end of the rising pattern varied a lot. The first two F0 rises given above ended near the boundary between the tonic syllable and the post-tonic syllable; the last two F0 rises ended in the middle and the end of the post-tonic syllable respectively. Furthermore, a small number of early rises surfaced with a shoulder-like peak that maintained the high target leveled high for a little while. The end of the shoulder-like peak was also flexibly aligned between the end of the tonic syllable and the end of the post-tonic syllable. This alternative realization will be discussed in section 5.2.1.2.

In previous Spanish intonation studies under the Sp_ToBI conventions the alignment position near the boundary between tonic and post-tonic syllables receives the label of 'tonic alignment', while alignment in the middle or end of the post-tonic syllable receives the label of 'post-tonic alignment'. If we consider these categories of labeling, then the ratio between tonic alignment and post-tonic alignment in our data was approximately 1:1.2. The distribution was fairly balanced, with slightly more early rises with post-tonic alignment than with tonic alignment. In Castilian Spanish these two categories of peak alignment are contrastive. A post-tonic peak emerges in broad focus context while a tonic peak emerges in narrow focus (Face and Prieto 2007, Face 2002, 2001). Recent studies have proposed that peak alignment is encoded in the phonology of the pitch accent and that some languages may use different peak alignment for contrastive purposes while others may use them as allotones either at free variation or in complementary distribution (Prieto et al 2005). Under this interpretation, the Montevideo Spanish variety would have tonic and post-tonic peaks as allotones in broad focus context. Recent fieldwork has brought to light other dialects of Spanish that pattern with the Montevideo

variety by realizing prenuclear stressed syllables in broad focus context with alternating peak alignment, namely Buenos Aires Spanish and Peruvian Amazonian Spanish (Gabriel et al 2010, Garcia 2011). These varieties seem to have a preference for tonic peak alignment, alternating with a minority of peaks aligned in the post-tonic syllable. Both Gabriel et al (2010) and Garcia (2011) adopt the analysis that these dialects use a pitch accent with tonic peak alignment as the primary prenuclear pitch accent and that an allotone pitch accent with post-tonic alignment surfaces at free variation.

Despite the alternating alignment realization attested in Montevideo Spanish, one characteristic shared by all the early rises in prenuclear position is that the contour never ends within the tonic syllable, as is often the case for nuclear position of final IP (see section 5.4.1 for nuclear early rise). The rising patterns shown above in figure 5.1 encompass the whole tonic syllable and many times it also encompasses part of the post-tonic material. A better visualization of this is shown in figure 5.2 below, which presents the interpolation of the sample rising patterns given above in 5.1a. The shaded area corresponds to the tonic syllable.

Figure 5.2 – Interpolation of the sample prenuclear early rises previously given in figure 5.1.

This interpolation shows that the shortest rising pattern ends at the end of the tonic syllable and the longest one reaches the end of the post-tonic syllable, with the other rises aligning somewhere in between these extremes. This suggests that the alignment of the peak is not categorically distributed between tonic and post-tonic syllable, but rather it is a gradual alignment over a spectrum that starts near the beginning of the post-tonic syllable and ends at the end of the post-tonic syllable. The gradual positional distinction of peak alignment suggests that they are phonetic realizations of the same underlying pitch accent, rather than the realization of two distinct allotones. With that in mind, an alternative way to look at the tonic alignment in the case of Montevideo Spanish takes into account the fact that the end of the tonic syllable is also the beginning of the post-tonic syllable. After all, the boundary between two syllables is a transition from one speech segment to another. It is not a clear cut edge.

We propose that the broad focus declarative prenuclear pitch accent of Montevideo Spanish is a bitonal pitch accent annotated as L+>H* and realized as an early tonic rise with late peak. Under this analysis both a low target and a high target associate to the tonic syllable. The interpolation between the two targets produces the rising pattern. The diacritic "*" indicates that the H target is head of the pitch accent, which has implications on the phonetic realization of the contour as well as the perception of pitch. Phonetically, the H headiness causes the F0 to start rising right from the beginning of the tonic syllable, where the L target is realized. Acoustically, this early rising pattern gives the perception of a high pitch on the tonic syllable (Face and Prieto (2007). The diacritic '>' indicates that the H target must end late in relation to the boundaries of the tonic syllable. Consequently, the rising pattern must encompass at least the whole tonic syllable, so a peak will be produced in the vicinities of the post-tonic syllable. Note that recent revisions of the Sp_ToBI analyze this pitch accent slightly differently in that it does not consider peaks aligned at the boundary between tonic and post-tonic syllables (Estebas-Vilaplana and Prieto 2009).

5.2.1.1 Downstep

One of the visible characteristics of the prenuclear contour was a global decrease in pitch range as the utterance progressed. Each subsequent rising pattern was realized with a smaller pitch range than the previous one, producing a visual staircase effect. For an example of this phenomenon in our data see figure 5.3 below.

Figure 5.3 – The staircase effect of downstep in declarative prenuclear position.
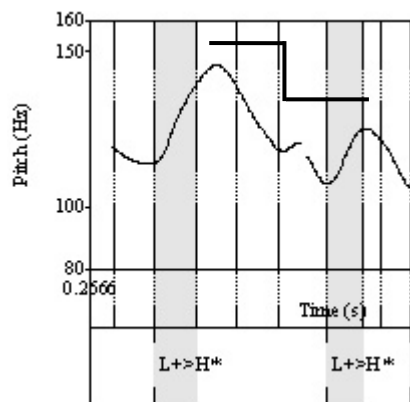
Lorena derramó una...   Speaker M2
'Lorena shed a…'

This pattern of pitch range compression is referred to as downstep and is well attested in other dialects of Spanish (Beckman et al 2002). Downstep is widely accepted in the literature of Spanish intonation as recursive strategy. For that reason it is considered to be a predictable phonetic effect encoded in the implementation of pitch accents, and not in the phonology of the pitch accent itself. In other words, the same pitch accent that associates to the first prenuclear stressed syllable also associates to the second prenuclear stressed syllable, but because of downstep the second contour will surface in a smaller scale. In our data, the staircase effect is especially visible in the final IP of declaratives because it also affects the nuclear pitch accent (see figure 5.13 in the future section 5.4.1.1).

5.2.1.2 Alternative shoulder-like peak realization

A few of the prenuclear early rises attested in declarative utterances were realized with a shoulder-like peak instead of a pointy peak. These occurred in approximately 9% of the early rising contours attested in prenuclear position. These syllables were realized with a rising pitch accent that started near the beginning of the tonic syllable, but once a high target was reached the pitch remained leveled high for a little while. This behavior was attested in both first and second prenuclear positions and with varying alignment. Examples are given below in figure 5.4.

Figure 5.4 – Examples of the prenuclear early rising accent realized with a shoulder-like peak.

L+>H*	L+>H*	L+>H* deac	
(mi)__raba__	*__ví__bora*	*(pu)__lió__ la mo(neda)*	Speakers M2, F3, M3
'was looking'	'snake'	'polished the coin'	
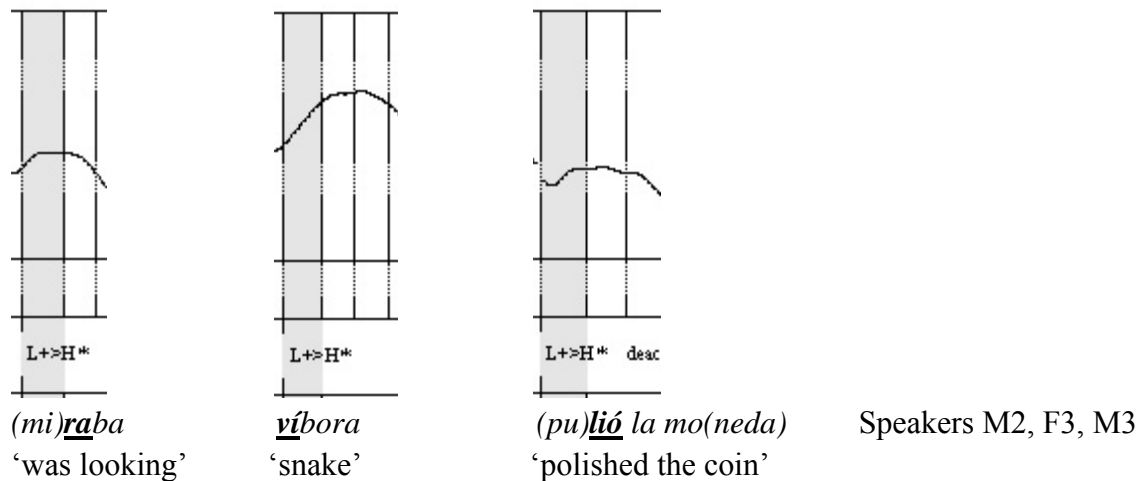
A similar contour has been attested by Garcia (2011) in Peruvian Amazonian Spanish (PAS), but with some differences. In PAS this contour is restricted to the first prenuclear position and the rising component always ends within the tonic syllable. In other words, the third example shown in figure 5.4 above was not attested in PAS. Garcia (2011) could not identify any contrastive meaning or contextual cue associated to the emergence of this shoulder-like peak

besides the fact that it associates to the subject of the phrase. Since it was restricted to initial prenuclear position, he proposes that this is the product of a tritonal pitch accent.

For the Montevideo data, we propose that this contour is a phonetic realization of the L+>H* pitch accent because it shares many phonetic similarities. It occurs in both first and second prenuclear positions in alternation with the main realization; it has a rising component starting near the beginning of the tonic syllable with flexible peak alignment; and the domain of the contour encompasses at least the duration of the tonic syllable. More research is necessary to better understand the nature of this contour and to confirm this analysis as well as to find out if this shoulder-like peak realization carries additional meaning.

5.2.1.3 Peak alignment

The declarative utterances collected for Montevideo Spanish show the prenuclear L+>H* pitch accent being realized with varying alignment of the H target. A further look at the data suggests that contextual cues might be influencing the realization of the L+>H* pitch accent in Montevideo Spanish. To better understand the alignment of the H target we grouped the different realizations of F0 peak into three general alignment locations: 1) peak aligned near the beginning of the post-tonic syllable, 2) peak aligned near the middle of the post-tonic syllable, and 3) peak aligned near the end of the post-tonic syllable. Shoulder-like peaks were also considered according to where the contour ended. Next, the contours were divided by context: first or second prenuclear position, and then further subdivided between ultimate stressed syllable and non-ultimate stressed syllable. See figure 5.5 below for the results. T stands for 'tonic syllable', PT for 'post-tonic syllable', and H for 'high target'. The rows reflect the alignment position, and the columns reflect the context in which they were attested. When the stressed syllable was in ultimate position, there was at least one unstressed syllable separating it from the next stressed syllable, and in more than half of the cases there were two or more unstressed syllables. This stress pattern was intended to give speakers enough time to fully realize the pitch accent.

Figure 5.5 – Distribution of the different peak alignment attested in declarative prenuclear position.

Peak alignment realization of the early rising prenuclear pitch accent (L+>H*)		First prenuclear position		Second prenuclear position		Total	
		Non-ultimate stress	Ultimate stress	Non-ultimate stress	Ultimate stress		
Alignment near T/PT boundary	(1) H near beginning of PT	5	12	26	14	**57**	
Alignment within PT	(2) H near middle of PT	23	2	5	3	**33**	**71**
	(3) H near end of PT	28	1	8	1	**38**	

This data shows that all three alignment positions were attested in all contexts but with different distributional patterns. In general, alignment within the PT (middle to end of PT) has a slightly higher frequency in the data than alignment near T/PT boundary as previously mentioned in section 5.2.1 (71 compared to 57). A closer look into the contexts given in figure 5.5 above reveals that post-tonic alignment, despite occurring more frequently in the data, is only preferred in first prenuclear position and only when the stress is non-ultimate. In all other contexts the peak was largely realized near the T/PT boundary.

This distribution pattern suggests that the first and second prenuclear positions of the declarative IP are treated differently in regards to alignment realization. Speakers prefer to mark the first prenuclear position with a peak later in the post-tonic syllable (as long as the stressed syllable is not ultimate) and the second prenuclear position with an earlier near the T/PT boundary. This pattern adds further attention to the hypothesis proposed in chapter 4, section 4.6, that the first prenuclear position of the IP is treated differently from the second prenuclear position. As previously stated, a similar behavior was also attested in Peruvian Amazonian Spanish in that speakers sometimes marked the first prenuclear position of the IP with a different contour (Garcia 2011). Considering that in our data and in Garcia's (2011) data the first prenuclear position of the IP coincides with the syntactic subject of the phrase, further research is necessary to investigate if the syntax of these sentences is causing this apparently differential treatment.

It is also quite interesting the fact that in first prenuclear position ultimate stress seems to attract the alignment closer to the T/PT boundary. This was true even when the ultimate stressed

syllable was followed by two or more unstressed syllables, which would give the speaker enough time to realize a post-tonic alignment and still produced the F0 fall needed to reach the low target of the next pitch accent. It would be interesting to investigate in future research if the syntax of the phrase is imposing a boundary restriction on the pitch accent by limiting the realization of the contour to the domain of the word in order to mark the edge of the subject of the phase.

In summary, the distribution attested here suggests that the phonetic realization of the L+>H* pitch accent in Montevideo Spanish has a strong correlation to the location of the stressed syllable in the IP. This leads to the hypothesis that the initial prenuclear position might be treated differently from the second prenuclear position. Further research might shed some light into the true nature of this alignment alternation and also in identifying the cause for this alignment alternation.

5.2.2 Alternative contour: plateau

A few of the declarative prenuclear stressed syllables emerged with a different surface contour, one that lacks a rising pattern altogether. The plateau contour was exclusively attested in the second prenuclear position and emerged in a total of 18% of the second prenuclear stressed syllables. The realization of this contour started near the beginning of the tonic syllable, where the speaker would halt any preceding movement of the F0 and maintain the pitch somewhat leveled during the tonic syllable, often extending into the post-tonic material as well. See figure 5.6 below for an example of a plateau contour.

Figure 5.6 – The plateau contour attested in some of the declarative prenuclear stressed syllables located in second prenuclear position.

L+>H*
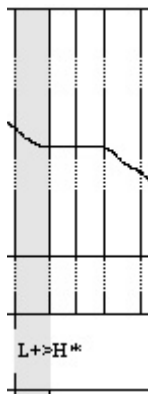
(mi)__raba__ a co(librí)   Speaker F3
'was watching the hummingbird'

The absence of a rise does not necessarily indicate the absence of a pitch accent. The above figure shows an initially falling F0 from a previous pitch accent, but once the speaker reached the tonic syllable she maintained the F0 somewhat leveled for a while before resuming the falling pattern to the next tonic syllable. This speaker is clearly manipulating the F0 around the tonic syllable, which suggests that a pitch accent is associated to this syllable. The plateau contour attested in our data had the same domain as the early rising contour. It always encompassed the whole tonic syllable and often extended into the post-tonic syllable as well.

I propose that this contour is a truncated phonetic realization of the L+>H* pitch accent. The L+>H* pitch accent associates to the tonic syllable but its realization is suppressed to a point that the rising shape does not surface. Notice that the plateau is realized at a lower pitch target than the preceding contour despite the absence of a low-to-high rising pattern. This appears to be caused by downstep, which is further evidence that this surface contour has an underlying L+>H* pitch accent. As such it is subject to the effects of downstep even in its truncated form.

It is important to note that it was not always easy to identify a plateau versus a rise with small pitch range. Some of the prenuclear stressed syllables emerged with such a low rising contour that resembled a plateau. Our data does not provide strong evidence as to the different linguistic implications of a truncated rising accent (a plateau) versus a compressed one (a small rise or just a small peak). The plateau could be a tool of emphasis, elicited by the syntactic-semantic structure of the target sentences as discussed in the previous chapter 4, section 4.6. Further research is necessary to confirm the true phonological nature of this contour and the phonetic/phonological processes that lead to this truncated realization.

5.2.3 Alternative contour: late rise

Very few prenuclear stressed syllables emerged with yet another contour, a low valley in the tonic syllable followed by a late rise that started near the post-tonic syllable. There were only five instances of this contour in the data, one in first prenuclear position and four in second prenuclear, adding to a total of 4% of all the prenuclear contours attested. Figure 5.7 below gives an example of this late rising contour.

Figure 5.7 – The low valley with late rise contour attested in a small number of declarative prenuclear stressed syllables.

L*+H
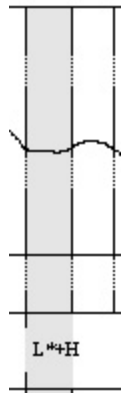
*(pu)**lió** la*   Speaker F3
'polished the'

This contour is phonetically distinct from the early rising contour since the tonic syllable is realized with a low contour and the rising pattern is displaced to the post-tonic syllable. Three of the five late rises attested were in a context of possible tonal clash with the preceding stressed syllable (one unstressed syllable separating two tonic syllables). It could be argued that the rise was pushed into the post-tonic syllable due to the small amount of time for the F0 to drop from the high target of the preceding pitch accent. We have discarded this hypothesis because many other contexts of possible stress clash were realized with the expected early rise. Furthermore, two of the late rising contours attested in the data were not in stress clash positions. Another hypothesis, then, is that this is a different pitch accent. After all, a similar contour has been attested in other dialects of Spanish and analyzed as a different pitch accent from the early rising contour (Face and Prieto 2007).

We propose that the late rise attested in this dialect is a distinct bitonal pitch accent, annotated as L*+H, where both a low and a high target associate to the tonic syllable but the low target is the head of the contour. The phonetic consequence of the L headiness is that the contour realizes a low valley during the tonic syllable, and the rising pattern occurs later, near the beginning of the post-tonic syllable. Further research needs to investigate the use of this contour in the Montevideo dialect.

5.2.4 Summary

Montevideo speakers generally marked the declarative prenuclear stressed syllable with an early rise with late peak contour, analyzed as an L+>H* pitch accent. When fully realized, this pitch accent produced a rising pattern that started near the beginning of the tonic syllable and

had flexible alignment ranging from the beginning of the post-tonic syllable to the end of it. In a few cases the contour was realized with a shoulder-like peak. This pitch accent is affected by downstep, the progressively lowering of pitch range. Consequently the second prenuclear contour surfaces with a smaller rising pattern. As for the domain of the pitch accent, the end of the contour appears to be randomly aligned, but a closer look into the distribution of the different alignment shows that in first prenuclear position the tendency is for the contour to align closer to the end of the post-tonic syllable. The only exception was when the first prenuclear stress was located in the last syllable of the word, in which case the alignment was attracted to near the beginning of the post-tonic syllable. On the other hand, in second prenuclear position the tendency is for the contour to align near the beginning of the post-tonic syllable independently of the stress pattern.

An alternative phonetic realization of the prenuclear pitch accent occurred when the rising pattern was truncated to a tonic plateau. This realization was only attested in second prenuclear position. Another contour was also attested in the data, realized as a low tonic valley with late rise in the post-tonic syllable. This contour is analyzed as an L*+H pitch accent. It occurred in a very small number of stressed syllables, with only a single occurrence in first prenuclear position and all others in second prenuclear position.

Figure 5.8 below shows the frequency of the different pitch accents and its main surface realizations attested in the prenuclear position of Montevideo Spanish. Note that the total number of 1st prenuclear stressed syllables differs from the total number of 2nd prenuclear stressed syllables. That is because a couple of the recorded phrases had a brief interruption in the F0, and thus did not register the surface contour of the F0 for that tonic syllable.

Figure 5.8 – Frequency of the different pitch accents and its main surface realizations attested in the prenuclear position of declarative utterances.

Underlying pitch accent	Surface contour	1st prenuclear position (72 N)	2nd prenuclear position (74 N)	Total
L+>H*	**Early rise with late peak** (pointy peak or shoulder peak)	99%	77%	**128**
	Plateau	-	18%	**13**
L*+H	**Valley with late rise**	1%	5%	**5**
	Total	**100%**	**100%**	**146**

The figure above clearly shows that the early rise with late peak is the primary realization of the L+>H* prenuclear pitch accent of neutral declaratives in Montevideo Spanish. Alternatively, speakers produced several plateau realizations of the L+>H* pitch accent in second prenuclear position (18%) and a few late rising L*+H pitch accents in both 1st and 2nd prenuclear positions (1% of the 1st prenuclear and 5% of the 2nd prenuclear). One hypothesis is that both the plateau and the valley with late rise can be means of emphasizing certain parts of the utterance. After all, the syntactic-semantic structure of complex target sentences could have led the speakers to contrast the two phrases of a complex sentence with one another (see chapter 4, section 4.6, for discussion). Further research is necessary to confirm the analysis proposed here and the hypothesis that these alternative realizations might have emphatic purposes.

5.3 Medial IP nuclear and boundary configuration

5.3.1 Contour: nuclear early rise with tall late peak and boundary rise

The medial IP of complex declarative utterances consistently ended with a final rising pattern that started early in the nuclear stressed syllable and remained high until the end of the IP. See figure 5.9 below for an example of this nuclear and boundary contour. The shaded syllable is the nuclear stressed syllable. The bracket indicates the end of the IP.

Figure 5.9 – The declarative medial IP ending contour: a nuclear early rise with tall late peak and a rising boundary.
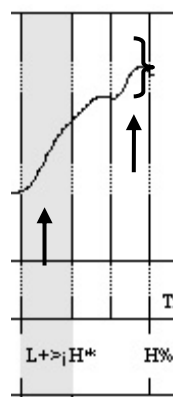
NÚmero]medial IP Speaker M2
'number'

The interpolation of the nuclear contour and the boundary contour produces the illusion of a single tonal element. However, the literature on Spanish intonation and our data as well are replete with evidence that two separate tonal units are at play here. One tonal unit associates to

the nuclear stressed syllable and another tonal unit associates to the edge of the phrase. The beginning of the nuclear contour can be clearly identified in the figure shown above, as the F0 starts rising from a low valley at the beginning of the tonic syllable. The boundary contour can also be clearly demarcated from the fact that the rising pattern continues until the edge of the phrase. What is not clearly defined is where the nuclear pitch accent ends and the boundary tone starts. There is no reason to assume that this nuclear contour has a distinct peak alignment from that attested in prenuclear position. Yet, the height of the rising pattern shows that this contour does not suffer downstep like the prenuclear contour does. See figure 5.10 below for the complete medial IP that corresponds to the nuclear and boundary contours given in figure 5.9.

Figure 5.10 – An example of the height achieved by the declarative medial IP rising ending as it reaches a target as high as the first prenuclear peak.
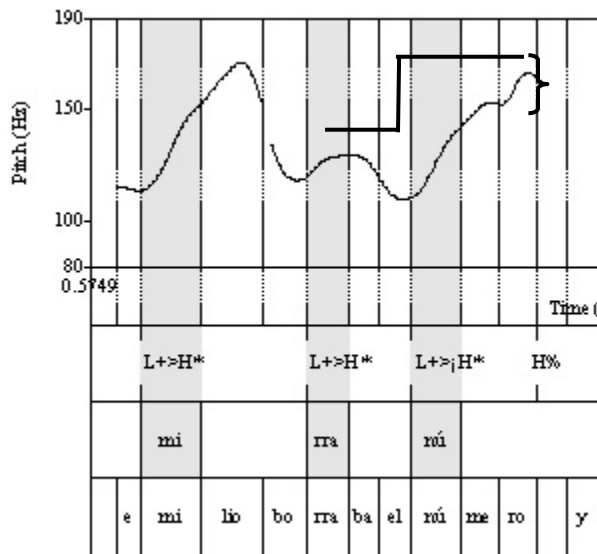
*E**mi**lio bo**rra**ba el **NÚ**mero*]medial IP *y…* Speaker M2
'Emilio was erasing the number and…'

In this example, the rising pattern that started near the beginning of the nuclear stressed syllable rose at a sharp angle that rapidly brought the F0 to a pitch higher than the preceding prenuclear rise. In approximately 2/3 of the medial IP analyzed, the last contour was as high as, or higher than, the initial prenuclear peak. The other 1/3 of the medial IP were only higher than, or as high as, the preceding prenuclear peak.

We propose that declarative medial IP is marked with a bitonal nuclear pitch accent L+>¡H* followed by a monotonal boundary tone H%. In this analysis both a low and a high target associate to the tonic syllable. The high target is the head of the contour, as indicated by the symbol "*" after the H. Once a valley is reached at the beginning of the nuclear stressed

56

syllable the F0 starts rising immediately to realize the H. The symbol ">" determines the domain of the H target within the time frame of the tonic syllable, specifying that the H target must align late in relation to the tonic syllable. The rising pattern must be realized through the whole tonic syllable at least and may continue into the adjacent post-tonic syllable as well. The symbol "¡" indicates the domain of the H target within the global pitch range of the IP, blocking the effects of downstep and specifying that the H target must reach a higher peak than the preceding prenuclear peak. In declarative medial IP the nuclear peak may even be as tall as, or taller than, the initial prenuclear peak. Finally, the nuclear pitch accent is followed by an H% boundary tone, which maintains the contour high until the end of the phrase.

An argument could be made for an analysis of pitch height specification as a feature of the boundary tone rather than the pitch accent. Evidence against this hypothesis comes from the fact that many of the medial IP analyzed here did not have a rising pattern until the very end of the phrase. Instead, a brief plateau or downward tilt was realized at the very end (see the following section 5.3.1.1 for this alternative realization). This pattern suggests that once the specified height is achieved, the speaker can choose to simply maintain the F0 high to produce the boundary tone. The same is attested for yes/no question medial IP that ends in a rising pattern (see section 6.3.1 in the following chapter).

The literature on Spanish Intonation has attributed differences in pitch height to the phonetic effects of downstep (pitch range compression) or upstep (pitch range expansion). However, the data analyzed in this study suggests that the pitch height of the ending contour is a contrastive feature of the pitch accent, rooted in the phonology of the dialect. This feature does not simply raise a pitch accent. It defines the domain of the H target within the global pitch range of the utterance. As a consequence, it blocks the recursive effects of downstep. Barjam (2004) has also implied that peak height can be phonologically specified when he proposed that Buenos Aires Spanish has an underlying pitch accent that specifies the peak height. He uses the symbol "^" and annotates the pitch accent as L+^H* (an H target aligned to the tonic syllable and with a peak realized at either the same height or slightly shorter than the preceding peak). In our analysis we chose to use the symbol "¡" instead. Barjam (2004:19) finds the need for a peak that is phonologically specified for height because this feature is crucial in distinguishing a declarative from an interrogative in his data of Buenos Aires Spanish. In the Montevideo data we have found that in some of the complex declarative utterances, the pitch height of the nuclear contour is crucial in distinguishing a medial declarative IP from a final declarative IP (see section 5.4.2). Also in complex yes/no questions peak height is differentiates a nuclear stress from a prenuclear one in final IP (see section 6.4 in the following chapter). Going one step further, not only does the Montevideo data suggest the need for a phonological specification of the pitch height, but it also suggests the need for categories or levels of pitch height specification. In yes/no question, the medial IP and the final IP sometimes are differentiated from one another solely in the level of the height achieved by the nuclear stress (see chapter 6). Likewise, a declarative medial IP and a yes/no question medial IP are distinguished from one another

through different heights achieved by the nuclear pitch accent (compare figure X with figure X). Our data does not provide enough evidence to fully understand how the phonology of this dialect distinguishes levels of pitch height, so we have restricted our analysis to a general pitch height feature that blocks the effects of downstep, allowing the H target to realize a target as high as, or taller than, the preceding prenuclear peak.

5.3.1.1 Alternative boundary tone realization

The realization of the medial IP rising ending had some variation during the very last syllable of the phrase. The rising pattern always reached the last syllable of the word, but only in 67% of these cases did it continued rising until the very end of the last syllable. In the remaining 33% of the cases the rising pattern stopped somewhere within the last syllable (usually halfway into the syllable) and the rest of the contour was realized with a brief plateau or downward tilt. See figure 5.11 below for these alternative realizations of the boundary rise. The brackets indicate the end of the IP. These cases were always attested in non-ultimate nuclear stress pattern and at free alternation with the main realization of rising to the end. They were also attested in both coordinated and subordinated sentences. This distribution suggests that the downward slope or plateau are phonetic realizations of the H% boundary tone. In these cases the ending contour has probably reached its specified target and the downward tilt or plateau occur in anticipation of the low target of the upcoming phrase's initial prenuclear accent.

Figure 5.11 – Alternative realizations of the rising boundary tone of declarative medial IP: a brief downward tilt or plateau.

noVEla]medial IP   (no)VEla]medial IP   Speakers M2 and M3
'soap opera'   'soap opera'
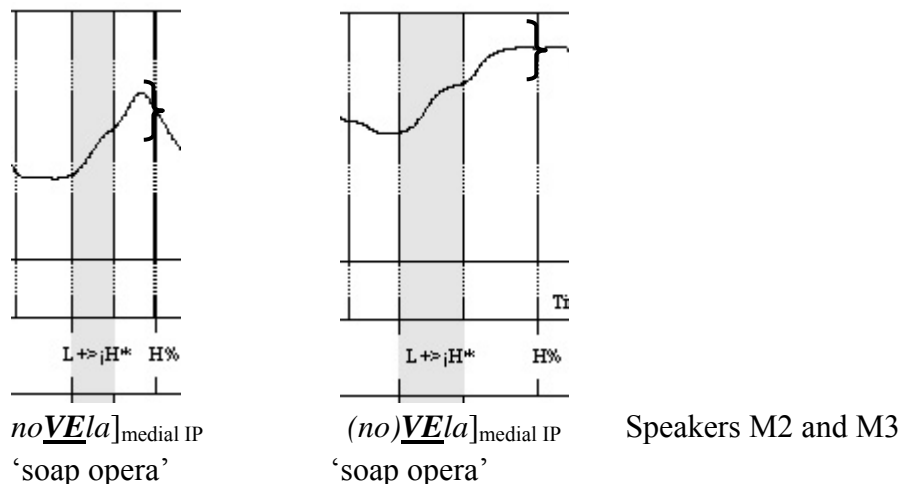
5.3.2 Summary

Montevideo speakers consistently marked the end of declarative medial IP with a very tall nuclear and boundary rising pattern, analyzed as L+>¡H* pitch accent and H% boundary tone. These two tonal units interpolate with one another and produce an F0 rise that starts near the beginning of the tonic syllable and generally continues until the edge of the phrase reaching a much higher target than the preceding prenuclear rise. Often the nuclear-boundary pattern rises higher than the initial prenuclear rise. A large number of this final rises were realized with a brief downward tilt or plateau near the edge of the phrase; probably due to reduction in the speed of vocal cords vibration at the end of the IP or in anticipation of the beginning of the next phrase.

The diacritic "¡" on the nuclear pitch accent specifies a tall pitch height and is considered to be a phonological feature of the pitch accent. In declarative medial IP this phonological marker produces a pitch accent that reaches the highest or second highest target of the IP. As a consequence, this pitch accent is not susceptible to the effects of downstep (progressive compression of the pitch range of consecutive accents). Further research is necessary to investigate this proposed feature, especially in cases of yes/no question complex utterances where the distinction between a medial IP and a final IP sometimes seems to be realized solely in height differences of the nuclear pitch accent (see the next chapter 6).

5.4 Final IP nuclear and boundary configuration

5.4.1 Main contour: nuclear early rise with early peak and boundary fall

The ending of these final IP of declarative utterances had a few alternating patterns, but the preferred one was realized with a tonic peak in the nuclear stress followed by a falling F0 to the boundary. This realization occurred in all nuclear stress patterns and alternated freely with the other realizations that will be discussed in sections 5.3.3.2 (rising ending), 5.3.3.3 (nuclear plateau), and 5.3.3.4 (nuclear falling or leveled low contour). For an example of the preferred final IP nuclear and boundary contour see Figure 5.12 below. The bracket marks the phrase edge.

Figure 5.12 – The primary declarative final IP ending contour: a nuclear early rise with tonic peak followed by a boundary fall.
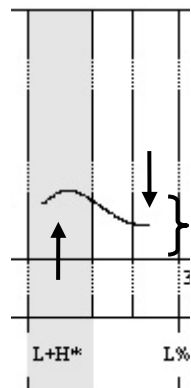
LÁmina]ₓfinal IP Speaker M2
'print out'

This nuclear rising configuration shares a common characteristic with the prenuclear rise, that of an early F0 rise near the beginning of the tonic syllable. What differentiates it from the prenuclear rise is the peak alignment. The nuclear rise is much shorter in time, with the peak consistently being realized within the tonic syllable, while the prenuclear rise always reaches the post-tonic syllable. It could be argued that this is a phonetic realization of the same pitch accent that marks prenuclear stress, in which case the early peak alignment could be justified as the result of early realization due to tonal clash with the boundary tone. We have discarded this hypothesis for the Montevideo dialect because the nuclear configuration of yes/no question final IP shows that a post-tonic peak and a boundary tone can be realized in the last word of the phrase (see section 6.3.2). In the data for yes/no question there is never an early peak realization in nuclear position.

I propose that the declarative final IP is marked by a nuclear bitonal pitch accent L+H* followed by a monotonal boundary tone L%. Under this analysis both an L and an H target associate to the tonic syllable. Since the H target does not have a specified domain, it must be realized within the boundaries of the tonic syllable. The H target is the head of the bitonal unit (indicated by the diacritic "*"), which causes the F0 to start rising as soon as the L target is realized at the beginning of the tonic syllable. This early rising pattern creates the acoustic perception of a high pitch in the tonic syllable (Face and Prieto 2007). Finally, this nuclear pitch accent is followed by the L% boundary target, which results in a falling pattern right after the nuclear pitch accent is realized. The nuclear annotation proposed here follows that suggested by Estebas-Vilaplana and Prieto (2009) in a revision of the Sp_ToBI conventions. Under the analysis proposed here, both the prenuclear L+>H* and the nuclear L+H* can produce a peak near the tonic/post-tonic boundary. For the nuclear L+H* pitch accent, the tonic right-edge is at

the end of the domain of possible peak alignment, while for the prenuclear L+¡H*, the tonic right-edge is the beginning of the domain.

5.4.1.1 Downstep

As previously mentioned in section 5.2.1.1, downstep is a recursive strategy in the intonation of Spanish that results in progressively lower pitch ranges of consecutive pitch accents. The exception we have attested in the data is when a pitch accent has a phonological feature that blocks the effects of downstep, as is the case of the nuclear pitch accent of declarative medial IP. Due to the effects of downstep, the nuclear pitch accent of the final IP was always the smallest rise of the phrase, as shown below in figure 5.13. Since downstep is considered to be a predictable phonetic strategy in the implementation of consecutive pitch accents, we have not encoded it in the label of the nuclear pitch accent.

Figure 5.13 – The effects of downstep from the first prenuclear pitch accent to the nuclear pitch accent of a declarative final IP, producing a descending staircase visual effect.
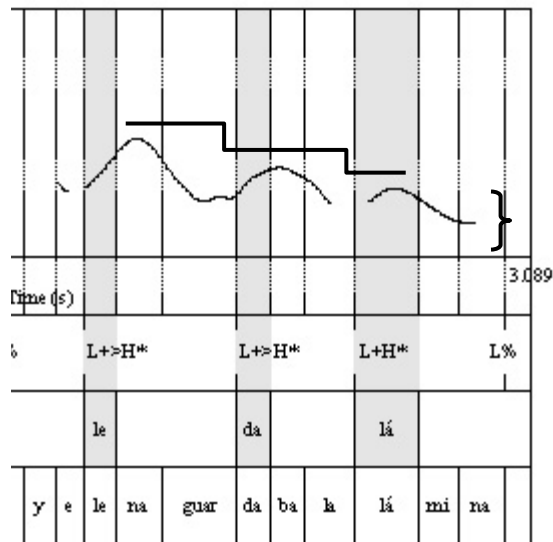
...*y* **E**le*na guar*da*ba la **LÁ**mina.*]_{final IP} Speaker M2
'… and Elena was putting away the print out.'

5.4.2 Alternative contour: rising ending

A few of the declarative final IP that had ultimate nuclear stress position emerged with a rising ending. A total of 6 of the 15 ultimate nuclear stressed syllables where uttered without the expected boundary fall. An example is given below in figure 5.14.

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Figure 5.14 – An alternative rising ending contour attested in some of the declarative final IP of ultimate nuclear stress.
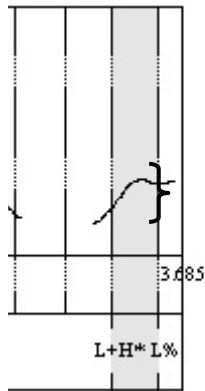
*guara**NÍ**]*final IP Speaker M2
'Guarani' (an aboriginal)

      The rising ending was only attested when the nuclear stressed syllable was the last syllable of the phrase; a context of very limited time frame for the realization of a rising pitch accent and a falling boundary tone. Furthermore, this contour alternated with a couple of cases in the same context that surfaced with a small boundary fall in the second half of the syllable. The alternation suggests that this rising ending results from boundary truncation, a phonetic strategy applied by the speaker in the lack of time to fully realize a boundary fall.

      We propose that this contour has an underlying L% boundary tone that partially realized. Note that this will not cause confusion in communication as to whether the phrase is a medial IP or a final IP because the final IP nuclear position associates to a different pitch accent from the medial IP nuclear position. To better visualize the contrast between medial IP rising ending and final IP rising ending, see figure 5.15 below. Notice that even when both IP end in a rising pattern the final IP is distinguished from the medial IP by the height of the rising ending. In medial IP the rising pattern always riches a higher target than the previous prenuclear rise, while in final IP the rising pattern is always smaller than the previous prenuclear rise. This further supports the analysis that Montevideo Spanish marks final IP and medial IP with contrastive nuclear contours.

Figure 5.15 – A complex declarative utterance with rising ending in both medial IP and final IP showing the contrast in height of the two nuclear rises.
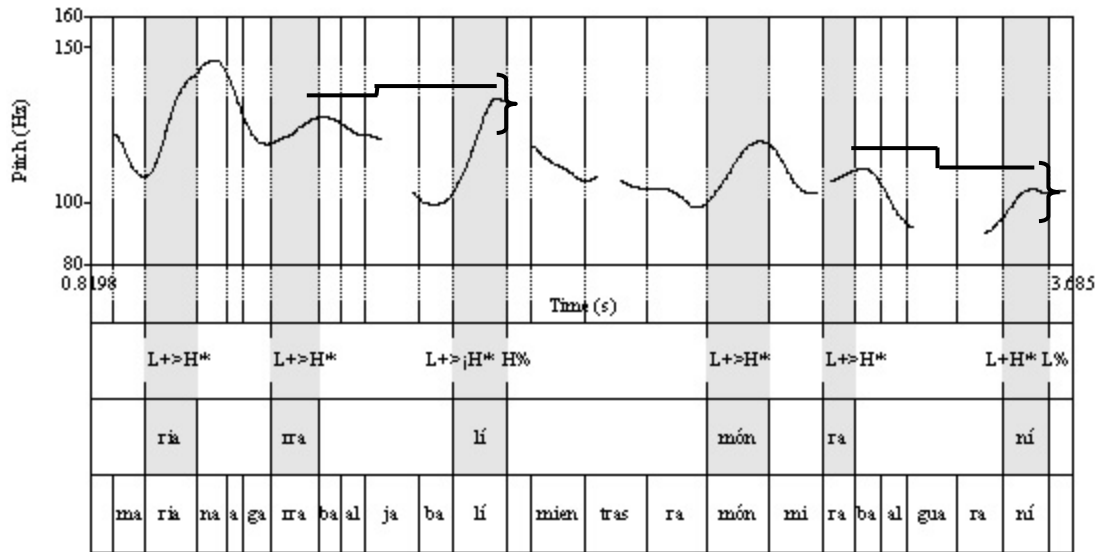
Mariana agarraba al jabaLÍ]medial IP *mientras Ramón miraba al guaraNÍ.*]final IP Speaker M2
'Mariana was grabbing the wild boar while Ramon was looking at the Guarani.' (an aboriginal)

5.4.3 Alternative contour: nuclear plateau

A few of the final IP with non-ultimate nuclear stress emerged with a nuclear contour that had a plateau instead of a rising F0. The F0 stopped falling near the beginning of the tonic syllable and remained leveled in a plateau for a little while before resuming the falling pattern to the boundary. A total of 8 of the 30 non-ultimate nuclear stressed syllables emerged with this plateau contour. An example is given below in figure 5.16.

Figure 5.16 – An alternative plateau contour attested in some of the declarative final IP nuclear stressed syllables that were located in non-ultimate stress position.
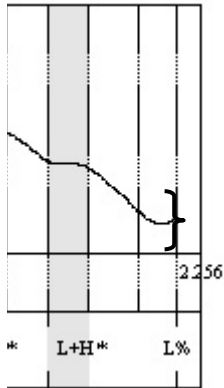
*(u)na **LÁ**grima]*final IP Speaker F1
'a tear'

This example shows that the speaker manipulates the F0 in the vicinities of the tonic syllable. This suggests that a pitch accent associates to the nuclear stress. We propose that this contour is a surface realization of the nuclear L+H* pitch accent. The pitch accent is truncated, resulting in the suppression of the rising pattern. Instead, the high target is realized as a plateau. Notice that the plateau has the same domain of the fully realized pitch accent. In other words, the contour is restricted to the tonic syllable domain. A similar plateau pattern was attested in prenuclear position. In prenuclear position the plateau also conformed to the domain of the fully realized prenuclear pitch accent in that it always reached the post-tonic syllable. Compare this nuclear contour with the prenuclear plateau given previously in figure 5.6 in section 5.2.2

Our data does not offer enough information to hypothesize the reasons for the pitch accent truncation attested in final IP nuclear position and in prenuclear position as well. Further research needs to be conducted in order to identify the trigger for this contour and if there are any implications in communication.

5.4.4 Alternative contour: nuclear low pattern

Another pattern attested in the last word of the declarative final IP was a falling or leveled low pattern. It emerged in all nuclear stress contexts, but it was especially frequent in ultimate position, especially the leveled low contour which was only attested in ultimate position. A total of 13 of the 45 nuclear stressed syllables of final IP were realized in this fashion. See figure 5.17 below for examples of both a falling and a leveled low contour. The brackets represent the IP boundary.

Figure 5.17 – An alternative low contour attested in some of the declarative final IP nuclear stressed syllables.

*guara<u>NÁ</u>]*_{final IP}   *guara<u>NÁ</u>]*_{final IP}   Speakers M3 and F1
'guarana' (type of soda)   'guarana' (type of soda)
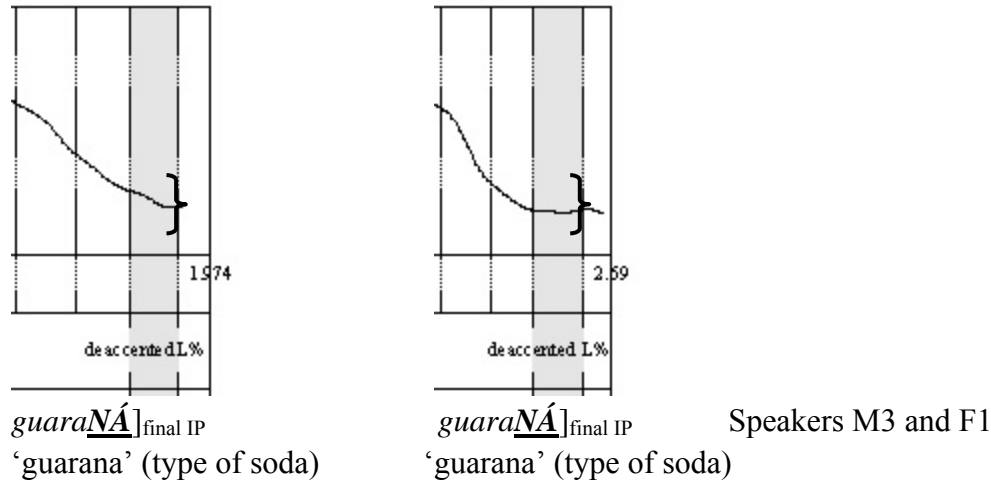
In both of the contours exemplified above the F0 shape at the end of the IP was characterized by a fall from the preceding prenuclear pitch accent to a low target near the end of the phrase. The F0 track did not change directions around the nuclear stress, suggesting that the nuclear stressed syllable seems to be realized without a specific tone target.

We propose that these patterns are the result of deaccentuation of the nuclear stressed syllable. A deaccented tonic syllable has no pitch accent associated to it. The contour realized is the interpolation from the prenuclear pitch accent to the low target at the boundary, without any specific movement in the vicinities of the tonic syllable. It could be argued that this tonic syllable has a low target associated to it, maybe an L* pitch accent. However, there is no reason to believe that Montevideo Spanish has two distinct nuclear pitch accents for broad focus declaratives.

The large number of truncated nuclear accents and deaccented nuclear stress attested in declarative final IP is not surprising considering that declarative IP is characterized by a gradual downward movement from the first stressed syllable to the last. This phonetic effect of downstep often produces such small rises in the last stressed syllable that the lack of a pitch rise in such position does not appear to affect the perception of finality which is carried in a final IP contour. Studies of Spanish intonation attest to the wide realization of falling contours in ultimate nuclear position of declarative final IP (Hualde 2005, Sosa 1999). Hualde (2005) posits that such patterns make the speech less lively and may be more frequent in daily conversation than the rising pattern.

5.4.5 Summary

Montevideo Spanish speakers preferred to mark the end of final IP (thus the end of the utterance) with a nuclear early rise with tonic peak followed by a boundary fall, analyzed as an L+H* pitch accent and L% boundary tone. This contour was attested in all stress pattern positions. This final contour starts with an F0 rise at the beginning of the tonic syllable to a short peak flexibly aligned within the tonic syllable, from where the F0 starts falling to the boundary. The early peak alignment was exclusive of the nuclear position of final IP and was never attested in prenuclear position. The final IP nuclear rise was always the smallest of all the preceding rising accents due to the effects of downstep.

An alternative phonetic realization of the final contour was a rising ending, analyzed here as a surface realization of the L% boundary tone. It was attested in ultimate nuclear stress as a result of boundary tone truncation. This contour was characterized by a rise in the first half of the tonic syllable and a plateau in the second half, giving the impression of a high boundary target. In reality, this contour alternates freely with the primary contour which emerges with different degrees of the falling pattern in this context. For that reason it is interpreted as a partially realized L% boundary tone. Downstep also affects this pitch accent, so the rising pattern is compressed in contrast with the preceding prenuclear rise.

Another alternative realization of the final contour was a plateau in the nuclear position, analyzed here as a surface realization of the L+H* pitch accent. It was attested in non-ultimate nuclear stress as a result of accent truncation. This contour was similar to the plateau attested in prenuclear position, with the difference that in nuclear position the domain of the contour is the tonic syllable.

The last contour attested was a falling or leveled low ending, analyzed here as a case of deaccented nuclear stress. This contour was attested in all stress pattern positions but was more frequent in ultimate nuclear position. This falling or leveled pattern is interpreted as interpolation between the prenuclear pitch accent and the boundary tone, with not specific tone target associated to the nuclear stressed syllable.

See figure 5.18 below for the frequency of the different nuclear + boundary contours attested and its main surface realizations. The contours are distributed according to the location of the nuclear stressed syllable.

Figure 5.18 – Frequency of the nuclear pitch accent and boundary tone and their main surface realization, attested in final IP of declaratives.

Underlying pitch accent and boundary tone	Surface contour	Stress pattern of the last word of the IP			Total
		Antepenultimate (15N)	Penultimate (15N)	Ultimate (15N)	
L+H* L%	Early rise with early peak + fall	40%	67%	13%	18
	Plateau + fall	47%	6%	-	8
	Early rise to the edge	-	-	40%	6
Deaccented nuclear L%	Falling or leveled to edge	13%	27%	47%	13
Total		100%	100%	100%	45

The figure above shows that the early rise with tonic peak followed by a falling pattern is the most frequent realization of the L+H* L% pitch accent and boundary tone that marks the end of a declarative final IP in Montevideo Spanish. Nevertheless, speakers produced several other realizations of these tonal units, namely a rising nuclear-boundary ending and also a nuclear plateau with boundary fall. Furthermore, several nuclear syllables were deaccented, thus being realized with a falling pattern or leveled low contour due to interpolation of the F0 fall from the previous prenuclear accent to the low boundary tone. Further research is necessary to shed some light into the processes that trigger these surface contours.

5.5 Conclusion

The declarative intonation pattern of Montevideo Spanish suggests that medial IP and final IP are marked with contrastive nuclear accent and boundary tone. The prenuclear contour is the same for both phrases. Prenuclear stressed syllables are primarily marked with a tonic rise whose peak align near the vicinities of the post-tonic syllable, analyzed as L+>H*. The end of the medial IP is largely marked with a tall tonic rise that merges with a boundary high target, analyzed as L+>¡H* H%. The end of the final IP is marked with two underlying contours. One is primarily realized as a tonic rise with tonic peak followed by a boundary fall, analyzed as L+H* L%. The other is realized as a falling or leveled low pattern through the tonic syllable to a low target at the phrase edge, analyzed as a deaccented nuclear stress and an L% boundary tone.

Figure 5.19 below shows the schematic association of the primary pitch accents and boundary tones that characterize a declarative utterance in Montevideo Spanish.

Figure 5.19 – Examples of the mapping of the primary pitch accents and boundary tones that mark a declarative utterance in Montevideo Spanish.

E**mi**lio bo**rra**ba el **nú**mero]IP y E**le**na guar**da**ba la **lá**mina**.**]IP
   | | | | | | | |
L+>H*   L+>H*   L+>¡H*   H%   L+>H*   L+>H*   L+H*   L%
                                          or
                                 deaccented

      The Montevideo neutral declarative intonation follows the Castilian Spanish pattern in that it marks the end of medial IP with a rising boundary and the end of final IP with a falling boundary. Some phonetic realizations were attested in the data, such as truncation of the prenuclear pitch accent and of the final IP nuclear pitch accents producing a surface plateau; a late rising accent that associated to a few prenuclear stressed syllables; and truncation of the final IP boundary fall resulting in a rising ending. Further research is necessary to support the analysis proposed for these cases and to shed some light into the phonetic/phonological processes that might be triggering these alternative realizations.

Chapter 6

Analysis of yes/no question intonation

6.1 Introduction

This chapter analyses the intonation contours used in the production of yes/no question utterances in the Montevideo Spanish dialect. Complex utterances were consistently uttered with a medial IP and a final IP. The speakers produced the same prenuclear configuration for both medial and final phrases. The nuclear and boundary movements had two alternating surface shapes in medial phrases and the same two alternating surface shapes in final phrases. The distribution of the two ending contours was distinct for medial and final phrases and was dependent on the nuclear stress pattern. Sometimes the speakers assigned the same IP contour to mark medial and final phrases. In these cases, it appears that peak height was manipulated in order to contrast the medial phrase from the final phrase.

The prenuclear configuration of yes/no question was the same as that of declarative prenuclear position. It follows that the contrast between these sentence types was exercised in the ending contour. For medial phrase the contrast sometimes relied on pitch height differences because the same medial IP used in declaratives was attested in yes/no question medial phrase. The final IP had the same boundary realization for declarative and yes/no question utterances but distinct nuclear contours. The distinction between sentence types was realized through the peak alignment and peak height of the nuclear contour.

In general, the yes/no question intonation patterns attested for Montevideo Spanish deviate in part from the Castilian Spanish patterns. As mentioned in the analysis of declarative utterances, prenuclear stressed syllables are marked with F0 peaks in the right-edge of the tonic syllable and in the post-tonic syllable, while the Castilian Spanish prenuclear contour is characterized by a post-tonic peak. Additionally, the end of the yes/no question utterance is primarily realized with a falling boundary instead of the canonical rising boundary.

The following section 6.2 offers an analysis of the prenuclear configuration. Section 6.3 proposes an analysis of the medial IP ending marker, and section 6.4 proposes an analysis of the final IP ending marker. Finally, section 6.5 concludes with a summary.

6.2 Prenuclear configuration of medial IP and final IP

6.2.1 Prenuclear contour: early rise with late peak

Yes/no question prenuclear stressed syllables emerged with a rising F0 that started at the beginning of the tonic syllable and had flexible peak alignment from the left edge to the right edge of the post-tonic syllable. Figure 6.1 below shows examples of several prenuclear stressed syllables and the different peak alignment.

Figure 6.1 – Examples of the early rising contour attested in yes/no question prenuclear position.

| L+>H* | L+>H* | L+>H* | L+>H* | |
| *(E)lías* | *(ro)baba* | *novia* | *(Lo)rena* | Speaker F1 |
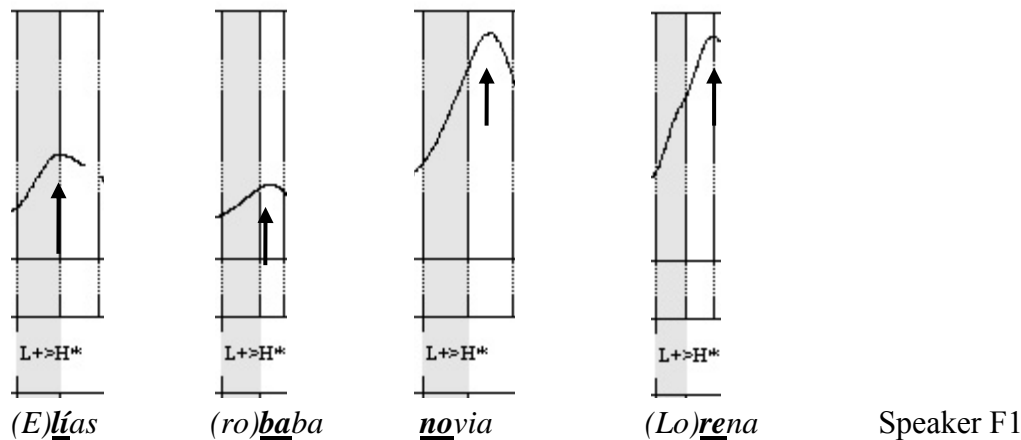
The same pattern was attested in declarative utterances (see figure 5.1 in chapter 5). As discussed in the previous chapter, recent research Spanish intonation shows evidence that peak alignment is contrastive (Prieto et al 2005, Face and Prieto 2007). These studies make a categorical distinction between a peak at the end of the tonic syllable and a peak in the post-tonic syllable in the analysis of contrastive pitch accents. Under this premise, the first two early rises shown in figure 6.1 would be analyzed as a pitch accent with tonic alignment and the third and fourth early rise would be analyzed as distinct pitch accent with post-tonic alignment. In the Montevideo data, however, a peak aligned at the end of the tonic syllable can be interpreted as a peak aligned at the beginning of the post-tonic syllable. This interpretation is motivated by the fact that alignment in prenuclear position seems to be gradual and not categorical (see figure 5.2 in chapter 5), suggesting they are phonetic realizations of the same pitch accent. For a more detailed discussion see section 5.2.1 of chapter 5.

We propose that the yes/no question prenuclear stress associates to the same pitch accent that marks declarative prenuclear stress, an early rise with late peak analyzed as L+>H*. This pitch accent produces a tonic rise that peaks in the vicinities of the post-tonic syllable. The rising pattern results from the H target being the head of this bitonal accent, indicated by the diacritic "*". It produces the acoustic impression of a high pitch in the tonic syllable (Face and Prieto

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2007). The end of the rise is realized late, as specified by the diacritic ">", which results in a peak flexibly aligned from the left edge to the right-edge of the post-tonic syllable.

6.2.1.1 Downstep

In the course of a yes/no question utterance, the prenuclear peak became shorter. Consequently, the second prenuclear peak reached a lower pitch than the first prenuclear peak. This produced the visual effect of a staircase in the pitch track of the utterance. See figure 6.2 below for an example of two consecutive prenuclear rising contours.

Figure 6.2 – The staircase effect of downstep in yes/no question prenuclear position.
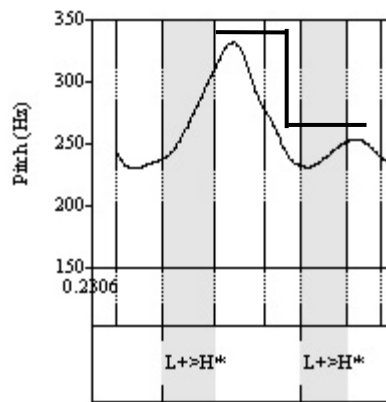
¿Ra**mí**rez ga**nó** el…? Speaker F2
'Did Ramirez win the…?'

This pattern was also attested in declarative utterances (see figure 5.3 in chapter 5). It is attributed to the effects of downstep, a common phonetic phenomenon of Spanish intonation that produces the progressive compression of the pitch range in the course of an utterance (Beckman et al 2002). In our data, the only time a pitch accent did not suffer the effects of downstep was when the peak height was phonologically specified by the pitch accent. An example of this is the nuclear contour of yes/no question final IP (see figure 6.20 later in this chapter).

6.2.1.2 Alternative shoulder-like peak realization

The early rise sometimes emerged with a shoulder-like peak in a few of the prenuclear stressed syllables in yes/no question utterances. In this realization the high target remained

leveled high for a little while. This realization emerged in 5% of the prenuclear early rising contours. An example is given below in figure 6.3.

Figure 6.3 – The realization of a prenuclear early rise with a shoulder-like peak.

L+>H*
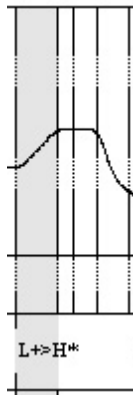
(fir)__ma__ba el pa(garé) Speaker F3
'was signing the promissory note'

The same realization was attested in declarative utterances but with a slightly higher frequency (see figure 5.4 in chapter 5). Garcia (2011) attested a similar pattern in Peruvian Amazonian Spanish (PAS). In his data the contour had a restricted distribution, emerging only in the first prenuclear position. He posits that for PAS this contour results from another pitch accent. Our data offers no evidence that this is the case for Montevideo Spanish. Due to its free alternation in the data and its shared phonetic similarities with the early rise with late peak contour, this realization is analyzed as having an underlying L+>H* pitch accent.

6.2.1.3 Peak alignment

A closer look at the data suggests that contextual cues might influence the peak alignment in prenuclear position. The following figure 6.4 presents the distribution of the prenuclear early rise according to alignment of the high target. PT stands for post-tonic syllable.

Figure 6.4 – Distribution of the different peak alignment attested in yes/no question prenuclear position.

Peak alignment realization of the L+¡H* early rise		First prenuclear position		Second prenuclear position		Total
		Non-ultimate stress	Ultimate stress	Non-ultimate stress	Ultimate stress	
Alignment near T/PT boundary	(1) H near beginning of PT	18	6	37	15	**76**
Alignment within PT	(2) H near middle of PT	45	-	13	4	**62** (89)
	(3) H near end of PT	19	-	4	4	27

Even though prenuclear peak alignment is flexible and gradient in Montevideo Spanish, it appears to be influence by the context. The same was true for declarative prenuclear configuration (see section 5.2.1.3 in chapter 5). The distribution shown above suggests that in the data collected speakers made a distinction between first and second prenuclear position. In first prenuclear position the peak was preferably aligned closer to the middle/end of the post-tonic syllable (except in ultimate stress), while in second prenuclear position it aligned more often near the beginning of the post-tonic syllable. The figure above also indicates that in first prenuclear position ultimate nuclear stress attracts the alignment to the left-edge of the post-tonic syllable despite a preference in non-ultimate nuclear stress to alignment later in the post-tonic syllable.

In the discussion provided for declarative prenuclear peak alignment, we have raised the hypothesis that the pattern attested in first prenuclear position could be triggered by the syntax of the phrase. A peak alignment later into the post-tonic syllable might be a strategy used to highlight the syntactic subject of the phrase. When the stress is ultimate, then the peak must be realized near the left-edge of the post-tonic syllable, where the boundary of the constituent is located.

A similar distributional pattern was attested in Peruvian Amazonian Spanish (Garcia 2011). Garcia attested that while the same prenuclear contour marked the first and second prenuclear positions, an alternative contour emerged in first prenuclear position only in several instances at apparently free variation with the primary prenuclear contour. Like the Montevideo Data, the PAS utterances also consisted of phrases with a fixed subject-verb-object word order. The occurrence of this alternative contour in PAS could also be a strategy to mark the syntactic

subject of the phrase through intonation. Due to the limited scope of this thesis, we could not test this hypothesis. It would be very interesting to test these impressions in future research.

6.2.2 Alternative contour: plateau

Another contour that was attested in the second prenuclear position of yes/no question was realized as an F0 plateau rather than the expected early rise. Only approximately 9% of the second prenuclear stressed syllables emerged with this realization. In this position the plateau alternated with the early rising contour previously discussed in section 6.2.1 and with a late rising contour which will be discussed in the following section 6.2.3. For now, see figure 6.5 below for an example of the plateau.

Figure 6.5 – The plateau contour attested in some of the yes/no question prenuclear stressed syllables located in second prenuclear position.

*ven*de un   Speaker F1
'is selling a'

This contour was also attested in Declarative utterances and was also restricted to the second prenuclear position (see figure 5.6 in chapter 5). Despite the fact that this contour lacks the expected rising pattern, the manipulation of the F0 around the tonic syllables suggests that a pitch accent associates to the stressed syllable. Notice that the F0 stopped falling near the beginning of the tonic syllable to remain leveled for a while before resuming the falling pattern to the next pitch accent.

We propose that this plateau has an underlying L+>H* pitch accent that was truncated, surfacing as a leveled high target instead of a rise. We cannot attest to the reason for the extreme reduction of the rising pitch accent into a plateau, but in chapter 4 (section 4.6) we posit that it could be an strategy of emphasis produced by the possibly implicit contrastive nature of the

syntactic-semantic structure of the target sentences used for data collection. Further research is necessary to identify the true nature of this contour, as well as the process that originate this surface realization and the possible linguistic implications.

6.2.3 Alternative contour: late rise

A third contour emerged in the second prenuclear position of yes/no questions. It was characterized by a low valley in the tonic syllable and a rise in the post-tonic syllable. There were only a few occurrences of this contour, marking 5% of the stressed syllables in second prenuclear position. In this position it alternated with the early rising contour previous discussed in section 6.2.1 and with the plateau realization discussed in the previous section 6.2.2. See figure 6.6 below for an example of this late rising contour.

Figure 6.6 – The low valley with late rise contour attested in a small number of yes/no question prenuclear stressed syllables located in second prenuclear position.

L*+H
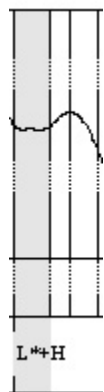
(mi)**ra**ba al   Speaker F2
'was looking at?'

This contour was also attested in declarative utterances, mainly in the second prenuclear position, but with a single occurrence in first prenuclear position (see figure 5.7 in chapter 5). In this realization the speakers are maintaining the F0 leveled during the tonic syllable and producing an F0 rise in the post-tonic syllable. A late rising contour has also been attested in other dialects of Spanish in contrast with the early rising contour (Face and Prieto 2007, Willis 2003).

As proposed in the analysis of declarative utterances, this contour is analyzed as an L*+H pitch accent. Under this analysis, a low and a high target associated to the tonic syllable but with the low target being the head of the contour (indicated by the diacritic "*"). This causes the F0 to

remain low for most of the tonic syllable and for the H target to be realized in the post-tonic syllable. The occurrence of this contour in our data could be a result of the syntactic-semantic structure of the target sentence, which might have led speakers to compare the information of the medial IP with the information of the final IP and, as a result, produce non-neutral intonation contours (see further discussion on this in section 4.6 of chapter 4). Further research is necessary to confirm this analysis and to identify the linguistic meaning associated to the use of this contour.

6.2.4 Summary

The prenuclear stressed syllable of yes/no question behaved similarly to the prenuclear stressed syllable of declaratives. The prenuclear stress was largely marked with an early rising pattern to a late peak in the vicinities of the post-tonic syllable, analyzed as an L+>H* pitch accent. In very few cases this pitch accent surface with a shoulder-like peak, where the high target remained leveled high for a little while.

Another variant of the L+>H* pitch accent was a plateau contour resulting from pitch accent truncation. It only occurred in a few stressed syllables in second prenuclear position. In these cases the rising pattern was inhibited and the pitch accent emerged as a leveled high plateau.

Another contour alternated with the early rise and the plateau in second prenuclear position, a low tonic valley with post-tonic rise, analyzed as L*+H. Very few instances of this pitch accent were attested and they were also restricted to second prenuclear position. We hypothesize that the emergence of both the plateau realization of the L+>H* pitch accent and the late rising L*+H pitch accent might be associated with syntactic-semantic structure of the target sentences, which might have triggered less neutral readings due by inciting comparison of the content in the first clause with the content in the second clause.

Figure 6.7 below shows the frequency of the pitch accents attested in yes/no question prenuclear position and their main surface realizations. Note that the total number of 1st prenuclear stressed syllables differs from the total number of 2nd prenuclear stressed syllables. That is because a couple of the recorded phrases had a brief interruption in the F0, and thus did not register the surface contour of the F0 for that tonic syllable.

Figure 6.7 – Frequency of the different pitch accents and its main surface realizations attested in the prenuclear position of yes/no question utterances.

Underlying pitch accent	Surface contour	1st prenuclear position (88 N)	2nd prenuclear position (89 N)
L+>H*	**Early rise with late peak** (pointy peak or shoulder peak)	88%	77%
	Plateau	-	8%
L*+H	**Valley with late rise**	-	4%
	Total	**100%**	**100%**

6.3 Medial IP nuclear and boundary configuration

6.3.1 Non-ultimate nuclear stress contour #1: early rise with tall late peak and boundary fall

For yes/no question medial phrase, the most frequent ending contour in non-ultimate nuclear position was characterized by a nuclear rise to a tall late peak followed by a falling pattern to the phrase edge. This ending was attested in 63% (15/24) of the medial phrases with non-ultimate nuclear stress position. This falling boundary alternated with a rising boundary at apparently free variation in this context (see the following section 6.3.2 for the rising boundary). See an example in figure 6.8 below.

Figure 6.8 – One of the two yes/no question medial IP ending contour attested in non-ultimate nuclear stress pattern: a nuclear early rise with a tall late peak and a boundary fall.

L+>¡H*   L%
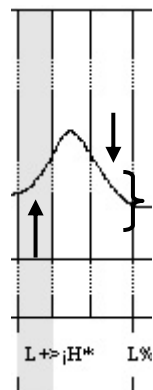
*Á**Rabe*]medial IP   Speaker F2
'Arab'

This contour is characterized by an F0 rise that starts near the beginning of the tonic syllable and has flexible peak alignment between the left edge and the right edge of the post-tonic syllable. After the realization of the nuclear peak, the F0 starts falling until reaching the phrase edge. Notice that the same peak alignment is attested in the prenuclear early rise (see the previous figure 6.1). The difference between the nuclear and prenuclear contours lies in the height of the peak. Figure 6.9 below shows a medial IP for comparison of the nuclear rise with the two preceding prenuclear rises.

Figure 6.9 – An example of the height achieved by the yes/no question medial IP characterized by a nuclear rise and boundary fall and attested in non-ultimate nuclear stress pattern.
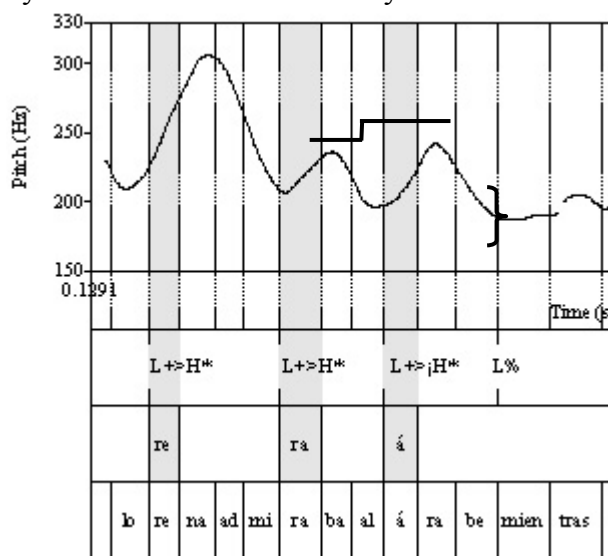
¿*Lorena admiraba al Árabe*]medial IP *mientras*…? Speaker F2
'Was Lorena admiring the Arab while…?'

This example shows that unlike the prenuclear contour, the nuclear rise does not undergo downstep. On the contrary, the nuclear contour was always realized with a broad pitch range, usually producing a peak taller than the preceding prenuclear peak but shorter than the first prenuclear peak. This suggests that the height of the nuclear contour is specified in the pitch accent.

We propose that this yes/no question medial IP is marked by a nuclear L+>¡H* pitch accent and an L% boundary tone. In this analysis, both a low and a high target associate to the tonic syllable. Since the high target is the head of the contour, indicated by the diacritic "*", the rising pattern starts right from the beginning of the tonic syllable, which gives the acoustic impression of a high pitch in the tonic syllable. The diacritic ">" specifies a late peak in the vicinities of the post-tonic syllable. The diacritic "¡" blocks the effects of downstep and

determine the realization of a tall peak. Barjam (2004) motivates this pitch accent as an underlying contrastive unit of Buenos Aires Spanish. More in depth discussion of this pitch accent is given in section 5.3.1 of chapter 5.

Since all the medial and final IP collected shared the same prenuclear configuration for declarative and yes/no question utterances, the ending contour is crucial in distinguishing sentence type and also continuation or finality of thought. Some of the complex yes/no question utterances emerged with the same nuclear rise and boundary fall ending in both medial IP and final IP. See figure 6.20 in section 6.4.1 below for an example of a complex yes/no question uttered in this fashion. This raises the question of how this dialect contrasts continuation or finality of thought in these utterances. The data indicates that the contrast is made in the height of the ending contour. The nuclear peak of the final IP was always taller than the nuclear peak of the medial IP. In this study we have proposed the same pitch accent for both medial and final IP, an L+>¡H* (see section 6.4.1 for analysis of the final IP ending contour). However, this analysis is too general and does not offer enough detail to account for the clearly contrastive distinction attested in this data. The Montevideo Spanish speakers appear to assign a very specific peak height to the final IP nuclear contour: it must be taller than the medial IP nuclear peak. The current Sp_ToBI conventions cannot account for this phenomenon. Further research is necessary to better understand the phonology behind peak height contrast and to offer a precise description of the intonational patterns of this dialect.

6.3.1.1 Alternative boundary tone realization

The yes/no question medial IP that was marked with a falling boundary appear to have flexible realization of the low target in that sometimes the falling pattern reached the speakers baseline by the phrase edge and at other times the falling pattern reached a mid-level target by the phrase edge and continued falling into the conjunction. A total of 60% of the falling boundary contours reached the speaker's baseline at the phrase edge, but the remaining 40% reached only a mid-low target by the phrase edge. See an example of this alternative realization in figure 6.10 below.

Figure 6.10 – An alternative realization of the falling boundary of yes/no question medial IP attested in non-ultimate nuclear stress.
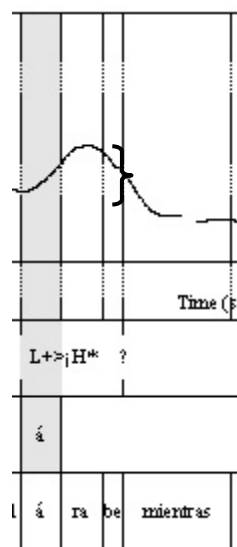
Á rabe]_{medial IP} *mientras*   Speaker F3
'Arab while'

The realization of the falling contour appears to have some correlation to the location of the nuclear stress. The majority of the phrases with antepenultimate nuclear stress had a full realization of the falling contour within the content word of the medial phrase, reaching the speaker's baseline by the phrase edge. Phrases with penultimate nuclear stress alternated between realizations of a target at the speaker's baseline and realizations of a mid-low target. This suggests that the mid-low target is a phonetic realization of the L% boundary tone, which is partially realized in the medial IP and partially realized in the conjunction.

6.3.2 Non-ultimate nuclear stress contour #2: early rise with tall late peak and boundary rise

The medial phrase of yes/no question could also be marked with a rising ending, characterized by a nuclear rise that extended to the phrase edge. This ending marked a total of 37% of the medial phrases with non-ultimate nuclear stress. This rising boundary alternated with a falling boundary at apparently free variation in this context (see the previous section 6.3.1 for the falling boundary). However, the majority of the cases emerged in the speech of the female speakers, and only one male speaker utilized this ending in his utterances. Figure 6.11 below shows an example of this rising ending.

Figure 6.11 – One of the two yes/no question medial IP ending contour attested in ultimate nuclear stress pattern: a nuclear early rise with tall late peak and boundary rise.
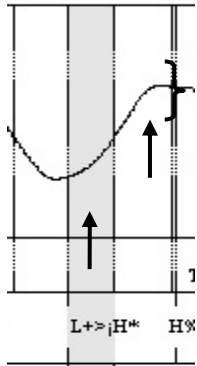
reGAlo]medial IP   Speaker F1
'gift?'

In this contour the nuclear stressed syllable was consistently uttered with an F0 rise that started near the beginning of the tonic syllable. The nuclear rise was followed by a rising boundary. Like the previously discussed medial IP contour with nuclear rise and falling boundary, this rising ending also reached a pitch target that was taller than the preceding prenuclear peak. Figure 6.12 below shows an example of a medial IP. Compare the final rise with the preceding prenuclear rises.

Figure 6.12 – An example of the height achieved by the yes/no question medial IP characterized by a nuclear and boundary rise and attested in non-ultimate nuclear stress pattern.
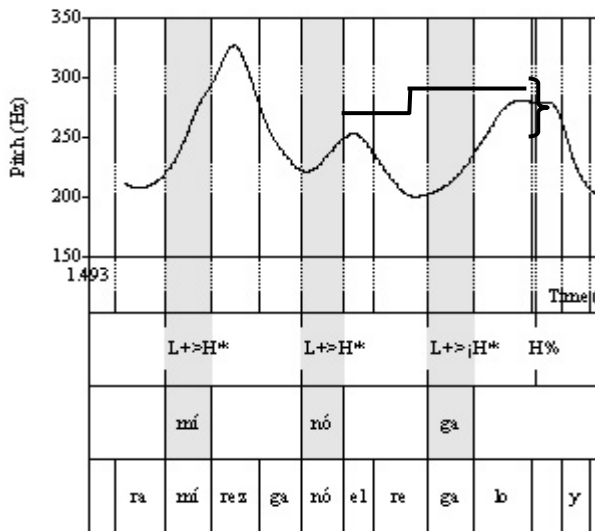
*¿Ra**mí**rez ga**nó** el reGAlo*]medial IP *y*…? Speaker F1
'Did Ramirez win the gift and…?'

The rising ending was as tall as, or taller than the adjacent prenuclear peak, and always shorter than the first prenuclear peak. Even though the peak of the nuclear rise cannot be clearly defined in this rising ending, we assume this nuclear stress associates to the same pitch accent that marks the medial IP with falling boundary discussed in the previous section. There is no evidence suggesting otherwise. We propose, then, that the medial IP with rising ending consists of an L+>¡H* pitch accent and an H% boundary tone. The H target is the head of the pitch accent, which produces an early rising pattern in the tonic syllable. The pitch accent is also specified for peak alignment and pitch height, producing a tall peak in the post-tonic syllable. The H% boundary merges with the nuclear pitch accent producing a single surface movement.

It is interesting to note that this secondary pattern was present in the speech of all the female speakers but only one of the male speakers. It would be interesting to conduct a study to see if this is gender-related intonation pattern.

6.3.2.1 Alternative boundary tone realization

The rising ending attested in some of the yes/no question medial phrases with non-ultimate nuclear stress surface with an alternative realization, characterized by a plateau in the last unstressed syllable of the phrase. Figure 6.13 below shows an example of this realization.

Figure 6.13 – An alternative realization of the boundary high target in yes/no question medial IP with antepenultimate nuclear stress.

L+>¡H*   H%
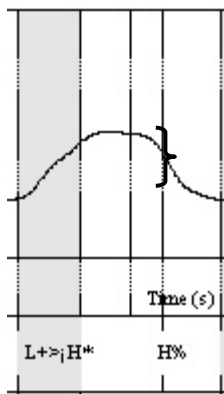
LÍbano]medial IP *y* Speaker F3
'Lebanon and...?'

The alternative plateau realization seems to be driven by the location of the nuclear stress. All the attested cases of a plateau occurred in the context of antepenultimate nuclear stress, while phrases with penultimate stress were realized with a rise to the edge (as in figure

6.12 in the previous section). This distribution suggests that the plateau is a phonetic realization of the H% boundary tone.

One hypothesis for this alternation is a phonological constraint on the height of the ending contour. The medial IP realizes a nuclear peak near the height of the preceding prenuclear peak in both medial IP contours (the falling boundary and the rising boundary). It seems that the medial IP cannot reach the height of the first prenuclear peak. Thus, once the nuclear rise has reached the specified height, the boundary can be realized as a plateau. This hypothesis seems to gain strength when comparing the height of the last rise of the yes/no question medial IP with the last rise of the yes/no question final IP. The height of ending contour seems to be a contrastive feature of this dialect (see future section 6.4 for final IP). Further support for this hypothesis comes from the realization of declarative's medial IP, as was discussed in chapter 5, section 5.3.1. The declarative medial IP was also marked with a rising ending that started near the beginning of the tonic syllable. The rising pattern continued until near the phrase edge. There were no realizations of boundary plateaus as attested here in yes/no question. However, the declarative ending contour did not seem constrained in height, as it more often than not was the highest rise of the medial IP. Consequently, there would have been no need to realize the boundary tone as a plateau.

6.3.3 Ultimate nuclear stress contour: early rise tall peak and ambiguous boundary tone

Medial phrases that ended in a tonic syllable (ultimate nuclear stress) were not realized with the same alternation of low and high boundary tones attested in non-ultimate nuclear stress contexts. Almost all of the ultimate nuclear stressed syllables emerged with a rising pattern from beginning to end, without even a partial boundary fall at the end of the syllable. Note that the end of the tonic syllable in this context coincides with the phrase edge. There was only one exceptional contour that did not follow this pattern. It will be discussed in section 6.3.3.2. For now, see figure 6.14 below for an example.

Figure 6.14 – The yes/no question medial IP ending contour attested in ultimate nuclear stress pattern: a rising ending with ambiguous boundary tone.

L+>¡H* ?
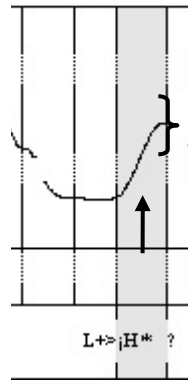
*paga**RÉ**]*medial IP*   Speaker F1
'promissory note'

The nuclear contour starts off with a rising F0 near the beginning of the tonic syllable, as expected from other stress pattern contexts. The rise continues until the end of the syllable which is also the phrase edge. The large majority of ultimate nuclear rising contours reached a pitch as high as, or higher than the preceding prenuclear rise. There were only a couple of occurrences of a smaller pitch. Below in figure 6.15 compare the pitch height of the nuclear rise with those of the prenuclear rises.

Figure 6.15 – An example of the height achieved by the yes/no question medial IP characterized by a nuclear and boundary rise and attested in ultimate nuclear stress pattern.
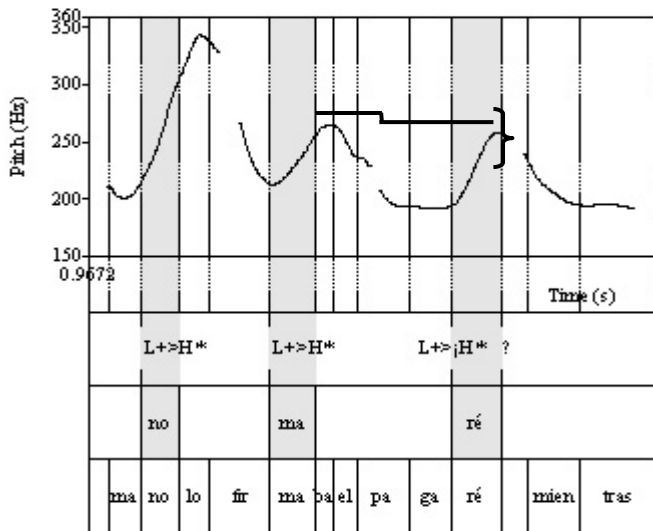
*¿Ma**no**lo fir**ma**ba el paga**RÉ**]*medial IP* mientras…?* Speaker F1
'Was Manolo signing the promissory note while…?'

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The evidence suggests that the nuclear stressed syllable in ultimate position associates to the same pitch accent that marks non-ultimate nuclear stressed syllables, a L+>¡H* pitch accent. As for the boundary tone, however, the evidence is ambiguous. Since both an H% and an L% associated to phrase edges in non-ultimate nuclear stress context, they could also theoretically associate to phrase edges of ultimate nuclear stress context. We could argue that a high boundary did associate to the phrase edge in ultimate nuclear stress context, since it would agree with the surface output we see in these examples. In this case the contour would be analyzed as an L+>¡H* H%. On the other hand, we could also argue that a low boundary target associates to the phrase edge in ultimate nuclear stress context and that it then suffers phonological deletion or deaccentuation due to the time constraint of the context. In this case, the contour would be analyzed as an L+>¡H* pitch accent and deaccented boundary. This hypothesis of boundary tone deletion or deaccentuation also finds support in the patterns attested in final IP of yes/no question, which strongly suggest that the final IP boundary marker is an L% but that in ultimate nuclear context it gets deleted (see the future section 6.4 on final IP). Due to the lack of evidence of the phonology of this boundary tone, we have deemed it ambiguous.

6.3.3.1 Alternative boundary tone realization

The rising ending attested in phrases with ultimate nuclear stress generally ended at the end of the syllable which was also the phrase edge. However, there was one instance of a rising ending that continued into the next IP. See figure 6.16 below.

Figure 6.16 – An alternative realization of the nuclear and boundary contour of ultimate nuclear stress context in yes/no question medial IP as the rising ending continues into the conjunction.
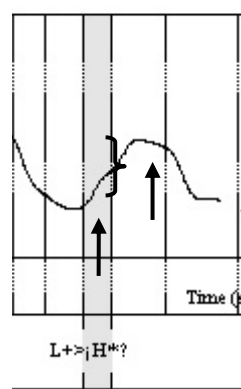
*paga**RÉ**]*medial IP *mientras*? Speaker F3
'promissory note while?'

The example above clearly shows that the nuclear rising pattern continued into the next IP. Since the conjunction is a function word, it does not carry stress. Thus, the alignment of the peak in the conjunction must be a realization of the nuclear L+>¡H* pitch accent. This was the only case attested in the data.

6.3.3.2 Exceptional case

As previously mentioned, there was one phrase with ultimate nuclear stress that did not end in a rising pattern. This phrase had a rising and falling pattern realized within the tonic syllable. See figure 6.17 below for an example.

Figure 6.17 – The exceptional nuclear and boundary contour that occurred in a single phrase with ultimate nuclear stress in yes/no question medial IP: an F0 rise with early peak and a full boundary fall.
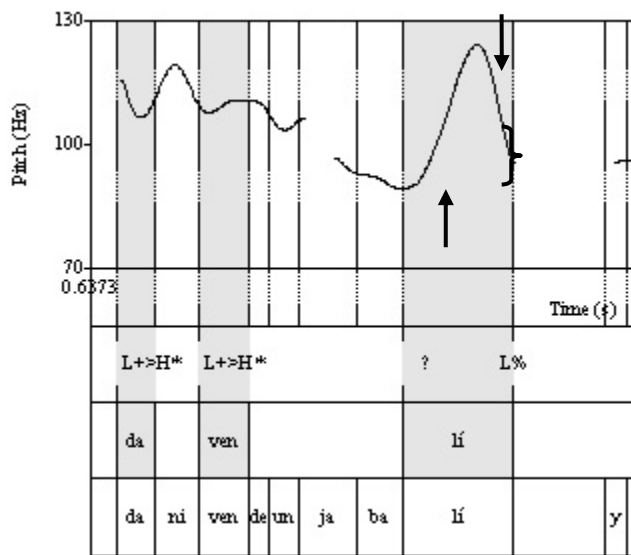
¿**Da**ni **ven**de un jaba**LÍ**]medial IP y…? Speaker M2
'Is Dani selling a wild boar and…?'

The nuclear stressed syllable was uttered with a rising F0 at the beginning of the tonic syllable and a tall peak around the middle of the syllable, from where the F0 descended rapidly to reach a low target at the end of the syllable which is also the phrase edge. This contour is exceptional for three reasons. First, the nuclear rise does not reach the end of the tonic syllable as attested everywhere else. Second, a falling boundary contour is realized in ultimate nuclear position instead of being deleted. And third, the nuclear rise reached a peak higher than the first

prenuclear rise, where all other nuclear contours remained within the pitch height of the second prenuclear rise.

In addition to the distinct nuclear/boundary movement, the utterance as a whole has characteristics that are unique. The prenuclear rise is realized with just a small rising contour, especially noticeable when comparing the first prenuclear accent of this exceptional utterance with the first prenuclear accent of other medial phrases (compare it with the previous figure 6.16). Also, the recursive pause at the end of the clause, just before the conjunction, is quite long. No other complex utterance had such marked pause between phrases. Lastly, this medial IP was followed by a similarly exceptional final IP (see figure 6.24 in section 6.4.2.1 below)

All these characteristics suggest that this nuclear pitch accent is distinct from the early rising pitch accent that associates to the other nuclear stressed syllable of the yes/no question medial IP. As this was the only instance in our data and there is no further evidence as to the nature of this contour, further research is necessary for an analysis of this pitch accent to be put forward. For now, we will label it an unknown pitch accent "?" followed by an L% boundary tone.

6.3.4 Summary

The medial IP of yes/no question was marked with either a nuclear rise with boundary fall or just a rising ending, and their distribution varied according to the location of the nuclear stressed syllable. In all cases analyzed, the nuclear contour was the same, characterized by a rising F0 from the beginning of the tonic syllable to a tall late peak flexibly aligned from the end of the tonic syllable to the end of the post-tonic syllable. This contour is analyzed as an L+>¡H* pitch accent. The phrase edge could be marked with a high pitch or a low pitch, which varied according to the location of the nuclear stress. In non-ultimate nuclear stress context an L% and an H% alternated at apparently free variation. In this context they could be easily differentiated through the surface contour. In ultimate nuclear stress, on the other hand, the phrase consistently ended in a nuclear rising pattern. In this context, the high target at the phrase edge could be a surface output of an H% boundary tone or a surface output of a deaccented phrase edge due to the lack of time in realizing a low tone. As such, the rising pattern in ultimate nuclear stress is considered ambiguous and is labeled "?". The following figure 6.18 shows the distribution and frequency of these contours according to the location of the nuclear stress in the data.

Figure 6.18 – Frequency of the nuclear pitch accent and boundary tone and their main surface realization, attested in the medial IP of yes/no questions.

Underlying pitch accent and boundary tone	Surface contour	Stress pattern of the last word of the IP		
		Antepenultimate (12N)	Penultimate (12N)	Ultimate (12N)
L+>¡H* L%	Tonic early rise with tall late peak + low boundary pitch	67%	58%	
L+>¡H* H%	Tonic early rise with tall late peak + high boundary pitch	33%	42%	
L+>¡H* ? (ambiguous boundary)	Tonic early rise with tall late peak + high boundary pitch			92%
? (ambiguous accent) L%	Tonic early rise with tall early peak + low boundary pitch			8%
Total		**100%**	**100%**	**100%**

The figure above shows that all nuclear stressed syllables, except for one, associated to an L+>¡H* pitch accent. In non-ultimate position this pitch accent was followed by either an L% or an H% boundary tone. In ultimate position, the phrase seems to end in the nuclear contour, so the boundary tone is considered ambiguous as it could be an H% or a deleted L%.

There was one single phrase uttered with an exceptional ending contour, realized as a rise and a fall in the ultimate nuclear stressed syllable. This contour is very distinct from all others, and the data does not offer evidence of the phonological configuration of this contour, so we have labeled it an unknown pitch accent followed by an L% boundary tone.

6.4 Final IP nuclear and boundary configuration

The final IP of yes/no questions emerged with the same surface shape contours attested in medial IP but with a different distribution. In final IP, there was no alternation of contour within the same context. The non-ultimate nuclear stress context was consistently marked with a falling ending and the ultimate nuclear stress context consistently marked with a rising ending.

Non-ultimate nuclear stress context always emerged with a tonic F0 rise that started near the beginning of the nuclear stressed syllable. The rise reached a very tall target in the vicinities of the post-tonic syllable. After the peak, the F0 fell sharply to a low target at the boundary.

Ultimate nuclear stress context also emerged with a tonic F0 rise which encompassed the whole tonic syllable all the way to the edge, where the phrase boundary was located. No partial falls were attested in this context. There was one exceptional utterance, however, where a partial fall was realized in the second half of the tonic syllable. This utterance also had an exception medial IP ending contour and an exceptional realization of pitch height. Consequently, it will be discussed separately.

6.4.1 Non-ultimate nuclear stress contour: early rise with tall late peak and boundary fall

Final IP with non-ultimate nuclear stress consistently emerged with a tall tonic rise followed by a sharp fall to the boundary. The tonic rise started near the beginning of the nuclear stressed syllable and encompassed the whole nuclear stressed syllable and often part of the post-tonic material as well, reaching a very high pitch at the end of the rising pattern. From there, the F0 fell quickly to reach a low target at the phrase edge. Figure 6.19 below shows an example of the non-ultimate nuclear stress ending contour.

Figure 6.19 – The nuclear and boundary contours that marked the end of yes/no question final IP with non-ultimate nuclear stress: a nuclear early rise with tall late peak and boundary fall.
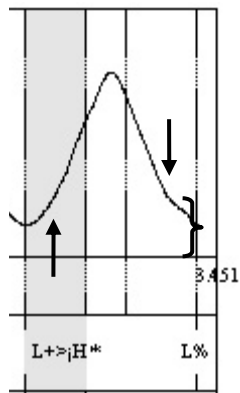
GÁRgola]_{final IP} Speaker F2
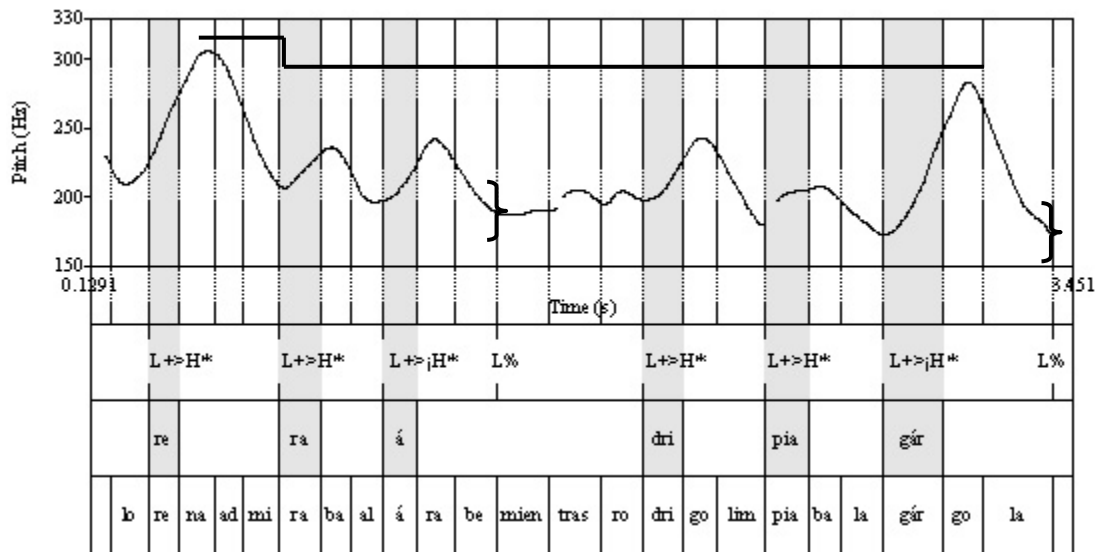gargoyle'

In the example given above the rising pattern ends in the adjacent post-tonic syllable. There were only a couple of rises that ended at the boundary between the tonic and the post-tonic syllable. More frequently the rising pattern continued into the post-tonic syllable. In

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antepenultimate position, the rising pattern would sometimes reach the end of the post-tonic syllable, but in penultimate nuclear position the rising pattern would end within the first half of the post-tonic syllable to leave enough time for a falling boundary pattern to be realized.

The falling pattern always reached the speaker's baseline by the phrase edge, even in penultimate nuclear stress context, when there was only part of the post-tonic syllable for the boundary target to be realized.

Another characteristic of this contour is that the nuclear rise does not suffer the effects of downstep. On the contrary, the final IP nuclear rise of all the sentences analyzed generally reached the second highest target of the utterance, losing only to the first prenuclear rise of the IP. This was true independently of the contour marking the end of the medial IP. This can be visualized in figure 6.20 below which presents two utterances, each with a different medial IP ending contour.

Figure 6.20 – Examples the height achieved by the final IP nuclear contour of yes/no questions with non-ultimate nuclear stress as it generally reaches the second highest target of the utterance.

¿*Lorena admiraba al Árabe*]medial IP *mientras Rodrigo limpiaba la GÁRgola?*]final IP Speaker F2
'Was Lorena admiring the Arab while Rodrigo cleaned the gargoyle?'

		L+>H*		L+>H*		L+>¡H*	H%		L+>H*		L+>H*		L+>¡H*	L%
		mí		nó		ga			rí		nó		ne	
ra	mí	rez	ga	nó	el	re	ga	b	y	ma	rí	a	ga	nó	el	di	ne	ro
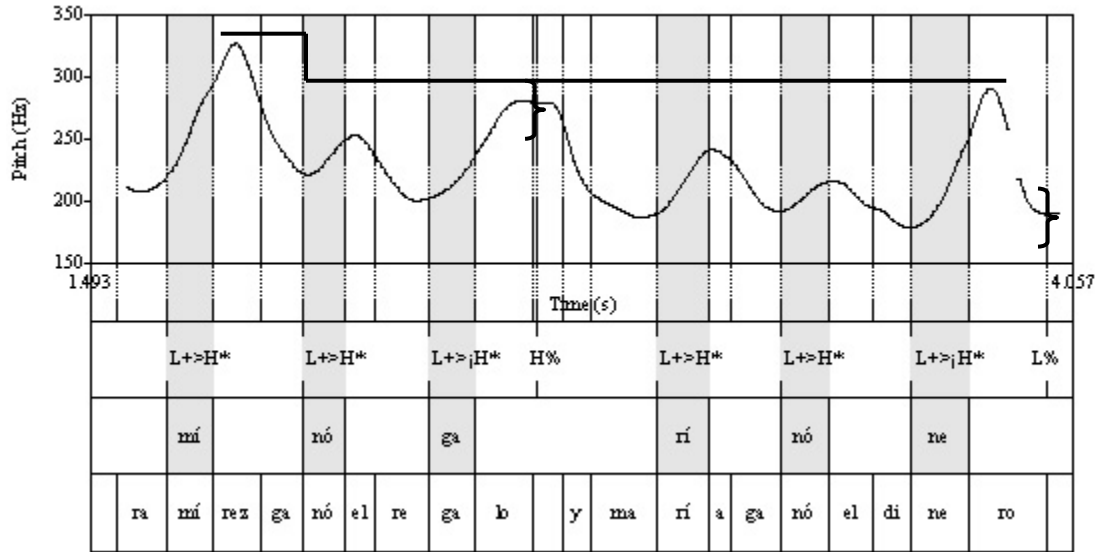
*¿ Ra**mí**rez ga**nó** el re**GA**lo*]medial IP *y Ma**rí**a ga**nó** el di**NE**ro?*]final IP Speaker F1
'Did Ramirez win the gift and Maria won the cash?'

The evidence suggest that these final IP are marked with a bitonal pitch accent followed by a monotonal boundary tone annotated as L+>¡H* L%. The nuclear pitch accent causes the F0 to start rising in the beginning of the tonic syllable due to the H target headiness (marked with a "*"). The assignation for a late and tall H target (">" and "¡" respectively) lead the rising contour to the vicinities of the post-tonic syllable in a sharp angle to reach a high target. Once that target is reached, the boundary tone L% associated to the phrase edge drives the F0 into a sharp fall.

This analysis assumes the same pitch accent for final IP and medial IP nuclear contours, even though the domain of the rise in regards to the pitch range is clearly different and intentional for each IP. When both the medial and final IP emerge with the exact same ending F0 movements, the height of the contour may be the only clue to communicating the meaning of continuation or finality of thought. Further research is necessary to understand how the height domain is computed in the phonology of the language so that we can advance the current Sp_ToBI transcription system to reflect the feature of pitch domain.

6.4.2 Ultimate nuclear stress contour: early rise with tall late peak and deaccented boundary

Yes/no question final IP that ended in a stressed syllable consistently emerged without a boundary fall. The stressed syllable was marked with an early F0 rise that encompassed the whole syllable. The end of the syllable coincides with the edge of the phrase, thus this final IP ends in a rising contour. See figure 6.21 below for an example.

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Figure 6.21 – The nuclear and boundary contours that marked the end of yes/no question final IP with ultimate nuclear stress: a rising ending due to deaccented boundary tone.
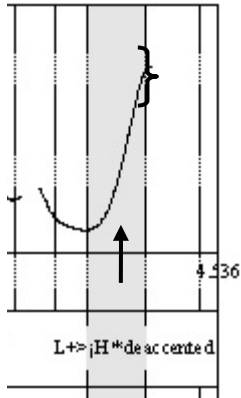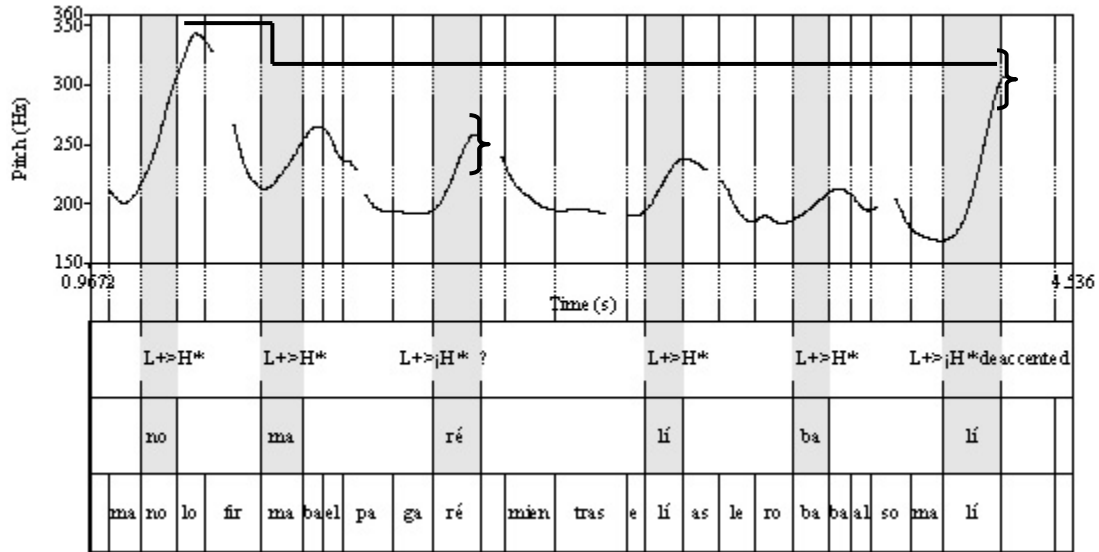

soma**LÍ**]_{final IP}   Speaker F1
'Somalian'

The rising contour seen in the example above starts near the beginning of the nuclear stressed syllable and encompasses the whole nuclear stressed syllable. This pattern has been attested in all stressed syllables so far, prenuclear or nuclear. As such, we assume the rising pattern is triggered by a pitch accent associated to the tonic syllable. As for the boundary, it appears to end in a high target. Nevertheless, the evidence suggests that the boundary marker for final IP is a low tone, since all of the non-ultimate nuclear stress contexts were marked with a low boundary tone. Speakers should be able to mark ultimate nuclear stress contexts with a low boundary tone as well, but no cases of a boundary low tone in this context are attested in the data. Keep in mind that the distribution attested in final IP is different from that attested in medial IP. Medial IP also had rising endings in ultimate nuclear stress context. They were deemed ambiguous because in non-ultimate nuclear stress context both low and high tones can be realized as boundary markers of medial IP. The cases analyzed here for final IP leave no room for ambiguity, considering that only low tones are used to mark final IP when there is at least one unstressed syllable available.

The final IP seems to have a categorical distinction in the final F0 movements correlated to the location of the nuclear stressed syllable. Non-ultimate stress context is marked with a boundary low tone, and ultimate stress context is not. This appears to be a case of adaptation of the contour to fit the limited amount of time. The boundary low target is found at the speaker's baseline, thus there is not enough room to realize both a tonic peak, specified to be late and tall, and a boundary fall to the speaker's baseline. Curiously, the speakers interviewed do not even realized partial boundary falls. It appears that the boundary contour has been deleted altogether in the acoustic processing of the utterance. This tone deletion can be made possible without interfering in the communicative function of the ending contour because the tall pitch target of the nuclear rise seems to suffice in carrying the meaning of finality of thought in cases where

realizing a low boundary tone is not feasible. All the rising endings attested in ultimate nuclear stress position reached the second highest peak of the utterance, falling short only of the first prenuclear pitch accent of the utterance. There was one exception to this height domain, but it will be discussed in the next section as an exceptional contour. For now, compare the height of the final IP rising ending with the preceding rising contours of the utterance by looking at the example given in figure 6.22 below.

Figure 6.22 – An example of the height achieved by the rising ending in ultimate nuclear stress context in yes/no question final IP as it reaches the second highest target of the utterance.

¿Ma**no**lo fir**ma**ba el paga**RÉ**]medial IP *mientras El**í**as le ro**ba**ba al soma**LÍ**?*]final IP Speaker F1
'Was Manolo signing the promissory note while Elias stole from the Somalian?'

The example shows that the final IP is marked with a rising ending that is higher than the rising ending marking medial IP and is almost as high as the first prenuclear rise of the utterance. This height pattern was also realized in final IP with non-ultimate nuclear stress. Thus, we assume that the same nuclear pitch accent associates to the last tonic syllable despite its location in relation to the phrase edge.

We propose that the final IP of yes/no question is marked with a bitonal nuclear pitch accent L+>¡H* and that the phrase edge is deaccented. This analysis explains the rising pattern seen in the F0 near the beginning of the tonic syllable and also the domain of the rise, which encompasses the whole tonic syllable (due to the specification of late target ">") and reaches a tall target (due to the specification of tall "¡"). It also explains why there are not even a few instances of partial falls realized at the end. The phrase edge is deaccented, thus the nuclear contour is realized alone, producing a rising ending contour.

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As mentioned in the previous section 6.4.1 about final IP with non-ultimate nuclear stress context, the analysis put forward here assumes the same pitch accent associated to the nuclear stressed syllable of medial IP and of final IP, even though there is a clear and apparently intentional pitch height contrast between these two positions. Further research needs to be carried out in order to understand the phonological nature and relationship of these apparently contrastive pitch heights and how they can be best transcribed.

6.4.2.1 Exceptional case

One yes/no question utterance with ultimate nuclear stress context emerged with an exception contour in both medial IP and final IP. The medial IP ending contour was previously discussed in section 6.3.3.2. The final IP ending contour had a partial falling pattern in the end of the tonic syllable. This was the only case of a falling pattern in final IP, even if partially realized. See this final IP exemplified in figure 6.23 below.

Figure 6.23 – An exceptional nuclear and boundary contour that occurred in a single utterance with ultimate nuclear stress in yes/no question final IP: an F0 rise with early peak and partial boundary fall.
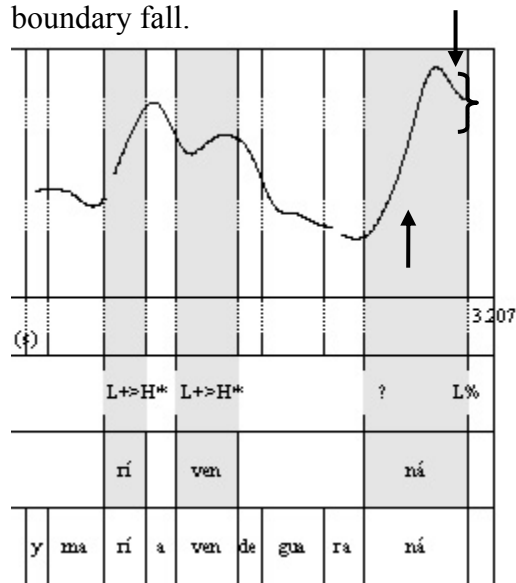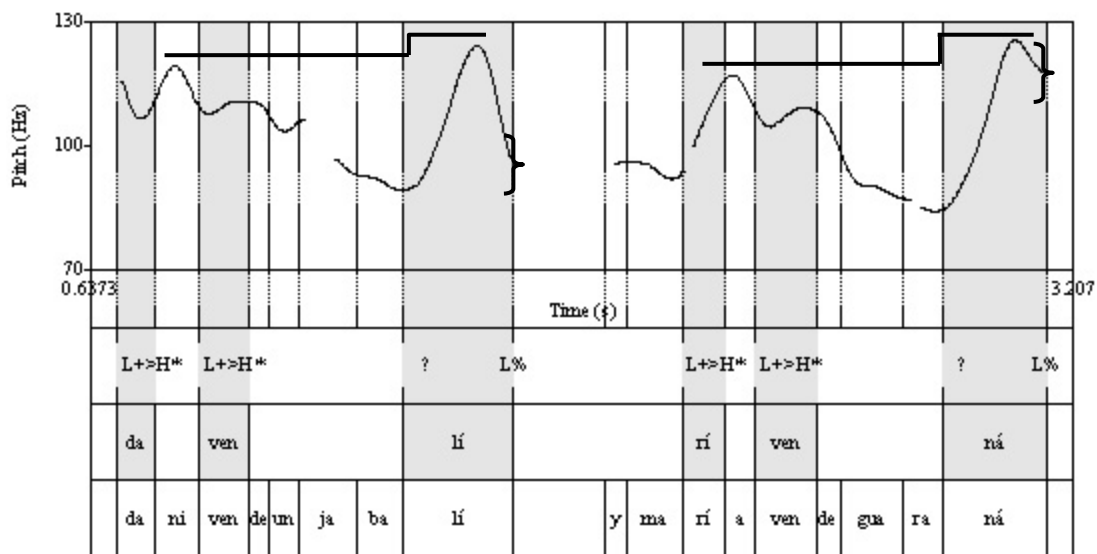

¿…y María **ven**de guara**NÁ**?]ﬁnal IP Speaker M2
'…and Maria is selling guarana?' (type of soda)

The example shows an early tonic peak with partial boundary fall at the end. It could be argued that this is just a phonetic realization of the expected final IP contour, in which the nuclear peak was pushed into the tonic syllable to create time for a low boundary tone, and the

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falling pattern was truncated for ease of pronunciation in the reduced amount of time available. Looking at the utterance as whole, however, it appears that this contour is phonologically distinct from the other ones. Figure 6.24 below shows the whole utterance in which this contour was attested.

Figure 6.24 – An exceptional yes/no question utterance attested in the data, with compressed prenuclear pitch range, overly tall final rises, and early nuclear peak realization followed by boundary fall in the tonic syllable.

¿***Da**ni **ven**de un jaba**LÍ**]*~medial IP~ y **Ma**rí**a **ven**de guara**NÁ**?*]~final IP~ Speaker M2
'Is Dani selling a wild boar and Maria is selling guarana?' (type of soda)

The first characteristic of this ending contour that separates them from the others is the realization of a boundary fall (a full falling pattern in medial IP and a partial one in final IP). This was the only case in the data of falling boundary contour in ultimate nuclear stress context. Secondly, the peak of the nuclear rise was realized early, within the tonic syllable, which is uncharacteristic of the yes/no questions analyzed. Thirdly, the final rise of each IP was not only realized at the same height, but also this pitch surpassed the height achieved by the first prenuclear rise of the utterance. Fourthly, the utterance as a whole is realized differently from the other yes/no question analyzed by compressing the prenuclear pitch accents a lot, which is especially noticeable in first prenuclear position. Compare this utterance with those given in figure 6.20 for better visualization.

As this was the only case attested in the data, there is not enough evidence to propose an analysis for these nuclear contours. As for the boundary, there is a clear low tone associated to the edges of both phrases. We labeled the nuclear contour as an unknown pitch accent "?"

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followed by an L% boundary tone. This exceptional utterance could be a result of contrast produced by the syntactic-semantic structure of the sentence. The speaker could be comparing the first phrase with the second one, producing these unique configurations. Further research is necessary to confirm this hypothesis.

6.4.3 Summary

The medial IP of yes/no question was marked with two categorical contours, a rising and falling or just a rising ending. They were distributed according to the stress pattern of the last word of the phrase. Both contours had the same nuclear configuration: an early F0 rise to a tall and late peak in the vicinities of the post-tonic syllable. This nuclear contour is analyzed as an L+>¡H* pitch accent, just like the nuclear contour attested in medial IP. Note however that medial IP and final IP have different domains in regards to the height of the rise. The final IP nuclear rise is always taller than the medial IP nuclear rise.

After the nuclear contour, the boundary realization varied depending on the location of the nuclear stressed syllable away from the phrase edge or at the phrase edge. Non-ultimate nuclear contours were consistently followed by a steep boundary fall to the phrase edge, analyzed as L%. The falling pattern always reached the speaker's baseline by the phrase edge. Ultimate nuclear contours were not followed by a boundary fall because the nuclear contour encompassed the whole syllable, thus the F0 has a high pitch at the phrase edge. This is analyzed as a deaccented phrase edge due to the lack of time for the realization of the expected low boundary tone.

There was only one partial fall attested in the data but in a context that suggests an exceptional contour is at play, for the whole utterance was realized differently from the other utterances. The overall prenuclear pitch range is compressed even in first prenuclear position. Both the medial IP and final IP nuclear contours peak around the middle of the tonic syllable and are followed by falling patterns in the second half of the tonic syllable (a complete fall in medial IP but a partial fall in final IP). Finally, both the medial IP and the final IP nuclear rises reach a taller-than-usual height that surpasses that of the first prenuclear rise of the utterance. See figure 6.25 below for a better visualization of the distribution of these contours in the data. The difference in the number of contours analyzed for each stress pattern results from some instances of final IP lacking part of the F0 track due to glottalization of aspiration towards the end of the utterance.

Figure 6.25 – Frequency of the nuclear pitch accent and boundary tone, and their main surface realization, attested in the final IP of Montevideo Spanish yes/no questions.

Underlying pitch accent and boundary tone	Surface contour	Stress pattern of the last word of the IP		
		Antepenultimate (18N)	Penultimate (17N)	Ultimate (13N)
L+>¡H* L%	Tonic early rise with tall late peak + low boundary pitch	100%	100%	
L+>¡H* deaccented boundary	Tonic early rise with tall late peak + high boundary pitch			92%
? (ambiguous accent) L%	Tonic early rise with tall early peak + low boundary pitch			8%
Total		**100%**	**100%**	**100%**

6.5 Conclusion

The yes/no question utterances analyzed show that speakers differentiate between prenuclear and nuclear position, as well as between the phrase edges of medial IP and final IP through the association of contrastive pitch accents and boundary tones.

Prenuclear stressed syllables are marked with the same pitch accent used to mark declarative utterances, a tonic rise with peak aligned near the vicinities of the post-tonic syllable. This contour is analyzed as L+¡H*.

The end of the medial IP is always marked with a tonic rise of late peak that is also specified to reach a high target. This tonic rise can be followed by two distinct boundary contours, a rise or a fall. However, when the nuclear stressed syllable coincides with the last stressed syllable of the phrase the expected alternation of boundary contours is not visible, since no falling boundary contours are realized in this position. Consequently, medial IP with ultimate nuclear stress consistently ended in a tonic rise. This pattern is considered ambiguous as it could indicate a high tone at the phrase edge or a deaccented phrase edge through deletion of the low boundary tone. The last F0 movements of the medial IP are analyzed as L+>¡H* L%~H% for non-ultimate nuclear stress context, and as L+>¡H* ? (ambiguous) for ultimate nuclear stress context.

The end of the final IP is marked with the same nuclear contour attested in medial IP, a tonic rise with late and tall peak. The speakers seem to distinguish between the medial and final IP nuclear contours by producing a taller pitch target in final IP than in medial IP. This is not reflected in the proposed label for the pitch accent but it needs to be taken into account for future research as it appears to be a contrastive strategy. In final IP the tonic rise is only followed by a boundary fall. However, like medial IP, when the nuclear stressed syllable corresponds to the last syllable of the phrase, the expected falling contour is not realized. This is interpreted as deaccentuation of the phrase edge through deletion of the low boundary tone. The last F0 movements of the final IP are analyzed as L+>¡H* L% for non-ultimate nuclear stress context, and as L+>¡H* deaccented boundary for ultimate nuclear stress context. Figure 6.26 below shows the schematic association of the primary pitch accents and boundary tones to simple yes/no question utterances and to complex yes/no question utterances.

Figure 6.26 – Examples of the mapping of the primary pitch accents and boundary tones that mark a yes/no question utterance in Montevideo Spanish.

Antepenultimate nuclera stress:
¿Ra**mi**rez ga**nó** el re**ga**lo]IP y Ma**ría** ga**nó** el di**ne**ro**?]**IP

    | | | | | | | |

  L+>H*   L+>H* L+>¡H* L%   L+>H* L+>H* L+>¡H* L%

                       or

                       H%

Ultimate nuclear stress:
¿**Da**ni **ven**de un jaba**lí**]IP y Ma**ría** **ven**de guara**ná?]**IP

  | | | | | | | |

L+H* L+>H*   L+>¡H* ?   L+>H*L+>H*   L+>¡H* deaccented

The Montevideo neutral yes/no question intonation behaves differently from the Castilian Spanish pattern. The final IP of Castilian Spanish yes/no questions, has a low nuclear contour and a boundary rise in the post-tonic syllable (Hualde 2005). Buenos Aires Spanish has the same final IP pattern attested in Montevideo Spanish, a tall nuclear rise with steep falling boundary and deaccentuation of the falling boundary contour when the nuclear stress is in ultimate position (Lee 2010). To the best of my knowledge, there are no works done with medial IP of yes/no questions.

Some alternative contours were attested in the data, such as reduction of the prenuclear pitch accent to a surface plateau; a late rising accent that associated to a few prenuclear stressed syllables; and the realization of an exceptional at the end of medial IP and final IP. Further research is necessary to support the analysis proposed for these cases and to shed some light into the phonetic/phonological processes that might be triggering these alternative realizations.

Chapter 7

Conclusion

7.1 Introduction

The phonological analysis of the F0 movements retrieved from broad focus declarative and yes/no question utterances of Montevideo Spanish provide an initial picture of the inventory of pitch accents and boundary tones that characterize the intonational phonology of this Spanish variety. The following section 7.2 categorizes the pitch accents and boundary tones attested in this dialect and gives a description of their phonetic correlate. Section 7.3 presents the contrastive use of these intonational units in the data collected. It shows how intonation is used to contrast between sentence types, between continuation and finality of thought, and between phrase-medial versus phrase-final stress. Finally, section 7.4 concludes with a summary.

### 7.2 Inventory of pitch accents and boundary tones

Montevideo Spanish speakers used three pitch accents and two boundary tones to utter broad focus declaratives and yes/no questions of simple, coordinated, and subordinated sentence structure in the data collected during fieldwork in Montevideo. They are presented below in figure 7.1. The shaded area represents the limits of the tonic syllable, while the white boxes stand for pre-tonic and post-tonic syllables.

Figure 7.1 – Inventory of pitch accents and boundary tones of Montevideo Spanish broad focus declaratives and yes/no questions and their schematic representation.
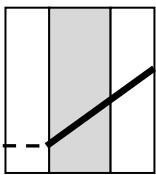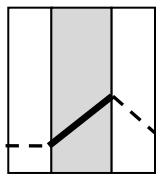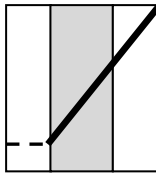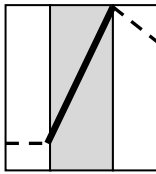
Pitch accents
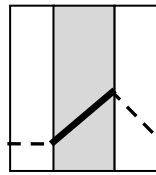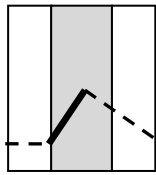
L+H* A rising pattern from the beginning of the tonic syllable to a peak flexibly realized in the tonic syllable. In our data it occurs as a nuclear accent in sentence-final declarative phrase.

L+>H* A rising pattern from the beginning of the tonic syllable to a displaced peak flexibly realized in the post-tonic syllable. In our data it occurs as a prenuclear accent across sentence types.

L+>¡H* A rising pattern from the beginning of the tonic syllable to a tall and displaced peak flexibly realized in the post-tonic syllable at a higher pitch than a preceding peak. In our data it occurs as a nuclear accent in sentence-final and sentence-medial yes/no question phrase, and sentence-medial declarative phrase.

Boundary tones
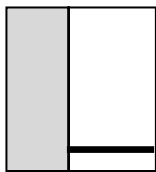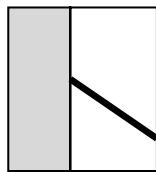
L% A falling or sustained low pattern near the phrase edge. In our data it occurs at the end of sentence-final declarative phrases, sentence-medial yes/no question phrases in alternation with H% (see below), and sentence-final yes/no question phrase.
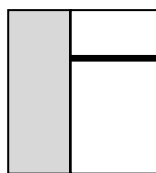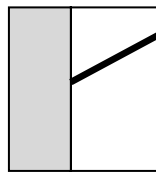
H% A rising or sustained high pattern near the phrase edge. In our data it occurs at the end of sentence-medial yes/no question phrase in alternation with L% (see above), and sentence-medial declarative phrase.

7.3 Contrastive uses `

7.3.1 Sentence type

The contrast between broad focus declarative and yes/no question in our data was realized differently in utterance-medial phrases and utterance-final phrases. Utterance-medial IP had contrastive boundary tones, while utterance-final IP had contrastive nuclear stress. There were, however, several yes/no question utterance-medial phrases that emerged with an alternating boundary tone that was characteristic of declarative utterance-medial phrases. Our analysis as it is cannot account for the sentence-type contrast in these cases. The contrast seems to be preserved in pitch height differences of the contour. The declarative medial IP ended in a high target that was usually taller than the initial prenuclear peak, while the yes/no question medial IP ended in a high target that was shorter than the initial prenuclear peak. This is a hypothesis that needs further research as it suggests that pitch height can be specified at the phonological level. See figures 7.2 and 7.3 for an outline of the association of contrastive sentence-type contours in the utterance of sentence-medial phrases and sentence-final phrases respectively.

Figure 7.2 – Outline of the contrast between sentence-types in medial IP.

Sentence-type contrast in medial IP	Nuclear stress	Phrase edge
Declarative contour	L+>¡H* (peak height is taller than the first prenuclear peak)	H%
Yes/no question contour	L+>¡H* (peak height is only taller than the adjacent prenuclear peak)	L% or H%

Figure 7.3 – Outline of the contrast between sentence-types in final IP.

Sentence-type contrast in final IP	Nuclear stress	Phrase edge
Declarative contour	L+H*	L%
Yes/no question contour	L+>¡H*	L%

7.3.2 Continuation versus finality of thought

Among each sentence type the speakers used a combination of nuclear and boundary contours to contrast sentence-medial from sentence-final phrases. That contrast results from the need to communicate continuation of thought (utterance-medial IP) versus finality of thought (utterance-final IP). In declaratives this contrast was achieved by assigning different nuclear and boundary contours to each phrase. In yes/no questions the contrast was sometimes realized in the boundary contour, and at other times the same ending was assigned for both medial and final phrases. These identical surface contours are not identical in pitch height, however, suggesting that the contrast is preserved in the difference in pitch height. Our analysis cannot account for these cases since both medial and final IP are assumed to have the same phonological configuration. Further research is necessary to confirm the hypothesis of pitch height as a contrastive feature. See figures 7.4 and 7.5 below for representations of the contrast between medial and final IP in declaratives and in yes/no questions respectively.

Figure 7.4 – Outline of the contrast between continuation and finality of thought in declaratives.

Continuation versus finality of thought contrast in declarative utterances	Nuclear stress	Phrase edge
Continuation (medial IP) contour	L+>¡H*	H%
Finality (final IP) contour	L+H*	L%

Figure 7.5 – Outline of the contrast between continuation and finality of thought in yes/no questions.

Continuation versus finality of thought contrast in yes/no question utterances	Nuclear stress	Phrase edge
Continuation (medial IP) contour	L+>¡H* (peak height is only taller than the adjacent prenuclear peak)	L% or H%
Finality (final IP) contour	L+>¡H* (peak height is only shorter than medial IP's first peak)	L%

7.3.3 Phrase-medial versus phrase-final stress

The data analyzed shows that Montevideo Spanish contrasts a stressed syllable located at the end of a phrase (nuclear stress) from other stressed syllables (prenuclear stress) by assigning different pitch accents to these positions. The prenuclear and nuclear accents attested in the data are rising accents. They differ in relation to peak alignment and peak height. The peak can be displaced into the post-tonic syllable and it can also be specified to produce a tall peak, thus being protected from the effects of downstep. See figure 7.6 and 7.7 below for representations of the contrast between prenuclear and nuclear stress positions in declaratives and yes/no questions respectively.

Figure 7.6 – Outline of the contrast between prenuclear and nuclear stress in declaratives.

Prenuclear versus nuclear stress contrast in declarative utterances	Declarative medial IP	Declarative final IP
Prenuclear contour	L+>H*	L+>H*
Nuclear contour	L+>¡H*	L+H*

Figure 7.7 – Outline of the contrast between prenuclear and nuclear stress in yes/no questions.

Prenuclear versus nuclear stress contrast in yes/no question utterances	Yes/no question medial IP	Yes/no question final IP
Prenuclear contour	L+>H*	L+>H*
Nuclear contour	L+>¡H*	L+>¡H*

7.4 Conclusion

This paper offered for the first time an acoustic description and phonological analysis of some of the intonational patterns of the Spanish variety spoken in Montevideo, Uruguay. The data collected resulted from recordings performed during fieldwork in Montevideo. The study analyzed targeted utterances of broad focus declarative and yes/no question types in order to investigate the specific intonational patterns of these sentence types. Additionally, the utterances collected had different sentence structure (simple, coordinated, and subordinated sentences) to explore differences in the intonation of non-final and final clauses.

The results show that sentence type as well as clause finality is contrasted through intonation. The phonological analysis proposes that a total of three rising pitch accents and two boundary tones combine to produce the necessary contrast between broad focus declarative and yes/no question utterances of simple or complex sentence structure. The rising accents differed in peak alignment and in pitch height. L+H* had a tonic peak that was subject to downstep. L+>H* had a displaced peak in the post-tonic syllable that was also subject to downstep. Finally, L+>¡H* had a displaced peak in the post-tonic syllable that was not subject to downstep because of the specification to realized a tall peak. The boundary tones were and L% and an H%.

In general, the declarative intonational pattern of Montevideo Spanish follows the canonical Spanish patterns, marking the end of declarative utterances with a falling boundary. The yes/no question, on the other hand, is distinct in that it end with a circumflex contours (tall nuclear peak followed by boundary fall), instead of the rising boundary characteristic of Castilian Spanish. Both sentence types associate to the same prenuclear pitch accent. This pitch accent diverges from the canonical broad focus prenuclear accent in that it realizes post-tonic peak alignment as early as the left-edge of the post-tonic syllable, a position related to phonological specification of tonic alignment and characteristic of narrow focus in Castilian Spanish.

The contrast relationships attested in the Montevideo data relied heavily on the nuclear and boundary contours because the same prenuclear accent associated to the different utterances. There were two contexts were an expected contrast was not attested because the utterances emerged with the same surface shape despite having distinct grammatical functions. One context was the utterance of some of the yes/no question medial clause versus the utterance of yes/no question final clause. The other context was the utterance of a declarative medial clause versus the utterance of some of the yes/no question medial clause. The analysis proposed in the previous chapters does not offer a way to contrast these utterances because the specific grammatical meaning appears to be imparted through the pitch height of the nuclear peak, e.g., a taller nuclear peak for yes/no question final clause than for yes/no question medial clause. These contexts encourage the hypothesis that pitch height may be phonologically specified in this dialect, a hypothesis that needs to be further studied.

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The material consisted of two main groups: neutral declaratives and yes/no questions. Within each of these categories there were sentences of simple syntactic structure, coordinated structure, and subordinated structure with varied nuclear stress pattern. These target utterances are presented below in clusters for ease of identification of the target contrast, even though the target utterances were presented individually with the eliciting question and at a random order within each sentence-type group.

Group 1 – Declaratives

Eliciting context

-*Un amigo (pidiéndote información):*
　　"¿Qué pasó?"
-*Vos (le contestás)*:
　　"**Target declarative**"

-A friend (asking you for information):
　　"What happened?"
-You (answer):
　　"Target utterance"

Simple declarative – nuclear stress variation

| Antepenultimate | *Lorena derramó una **LÁ**grima.* |
| | 'Lorena sed a tear.' |

| Penultimate | *Benito robó la bo**DE**ga.* |
| | Benito robbed the cellar.' |

| Ultimate | *Manolo vende guara**NÁ**.* |
| | Manolo sells guarana. (type of soda) |

Coordinated declarative – nuclear stress variation

Antepenultimate	*Emilio borraba el **NÚ**mero y Elena guardaba la **LÁ**mina.*
	'Emilio was erasing the number and Elena was putting away the print out.'
Penultimate	*La niña prendió una ben**GA**la y la doña pulió la mo**NE**da.*
	'The girl lit a flare and the lady polished the coin.'
Ultimate	*Daniel estudiaba benga**LÍ** y Diego miraba al coli**BRÍ**.*
	'Daniel was studying Bengali and Diego was looking at the hummingbird.'

Subordinated declarative – nuclear stress variation

Antepenultimate	*El niño miraba la **BRÚ**jula mientras la víbora devoraba al **Á**rabe.*
	'The boy was looking at the compass while the snake devoured the Arab.'
Penultimate	*Dora leía la no**VE**la mientras Manuel mordía la ca**NE**la.*
	'Dora was reading the novel while Manuel bit the cinnamon stick.'
Ultimate	*Mariana agarraba al jaba**LÍ** mientras Ramón miraba al guara**NÍ**.*
	'Mariana was grabbing the wild boar while Ramon was looking at the Guarani.' (an aboriginal)

Group 2 – yes/no questions

Eliciting context

-*Vos (pidiéndole información a un amigo):*
  *"**Target question**"*

-You (asking a friend for information):
  "Target question"

Simple question – nuclear stress variation

Antepenultimate	*¿La novia regalaba la **LÁ**mina?*
	'Was the bride giving away the print out?'
Penultimate	*¿Lalo ganó el re**GA**lo?*
	'Did Lalo win the gift?'
Ultimate	*¿Mariana olvidó la guara**NÁ**?*
	'Did Mariana forget the guarana?' (type of soda)

Coordinated question – nuclear stress variation

Antepenultimate *¿Guido vive en el **LÍ**bano y Bruna vive en **MÁ**laga?*
'Does Guido live in Lebanon and Bruna live in Malaga?'

Penultimate *¿Ramírez ganó el re**GA**lo y María ganó el di**NE**ro?*
'Did Ramirez win the gift and Maria won the cash?'

Ultimate *¿Dani vende un jaba**LÍ** y María vende guara**NÁ**?*
'Is Dani selling a wild boar and Maria is selling guarana?' (type of soda)

Subordinated question – nuclear stress variation

Antepenultimate *¿Lorena admiraba al **Á**rabe mientras Rodrigo limpiaba la **GÁR**gola?*
'Was Lorena admiring the Arab while Rodrigo cleaned the gargoyle?'

Penultimate *¿El mago miraba al men**DI**go mientras el criminal negaba ao de**LI**to?*
'Was the magician looking at the beggar while the criminal denied the offense?'

Ultimate *¿Manolo firmaba el paga**RÉ** mientras Elías le robaba al soma**Lí**?*
'Was Manolo signing the promissory note while Elias stole from the Somalian?'