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August 29, 2006

Date

GRADUATE SCHOOL

Spanish Intonation in Contact:
The case of Miami Cuban Bilinguals

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA
BY

Scott Mark Alvord

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
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Carol A. Klee, Timothy L. Face
Advisors

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Acknowledgments

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Dedication

to

Kathy, Isa and Marcus

Abstract

The current dissertation provides a preliminary description of the intonation of two utterance types in Miami Cuban Spanish: broad focus declaratives and absolute interrogatives. An experimental phonology approach was taken to collect linguistic data in Miami, Florida. The data was collected and analyzed with the purpose of answering the following three research questions:

1. What are the characteristics of broad focus declarative intonation in Miami Spanish?
2. How do Miami Cubans differentiate between absolute (yes/no) interrogatives and lexically and syntactically identical declarative utterances?
3. Is the intonation system changing through subsequent generations of Miami Cubans? What are the social and linguistic factors motivating the use of the observed intonation patterns?

Miami Cuban intonation for a declarative utterance with two content words was analyzed as L*+H L+H* L-L%. It was revealed that there is a high rate of deaccenting in Miami Cuban declarative utterances. Absolute interrogatives were produced with two distinct intonation patterns, the first with a rising final F0 contour, L*+H L* H-H%, and the second with a falling final contour, L*+H L+H* L-L%.

Miami Cuban interrogatives are differentiated from lexically and syntactically identical declaratives through the use of a rising final contour in the case of rising interrogative pattern and through the use of a higher F0 for both the rising and falling interrogative patterns.

A sociolinguistic study was performed using a variable rule analysis in order to answer research question #3. The dependent variable examined was the final F0 contour for the absolute interrogatives: rising or falling. It was discovered that immigrant generation is a significant factor in the variation and that there is an intonational change occurring in subsequent generations. This variation, however, does not necessarily constitute a change in progress. The first generation favors the use of the Cuban-style falling intonation pattern while the second generation strongly favors the rising pattern for absolute interrogatives. The third generation, however, strongly favors the Cuban-style interrogative. It was also determined that the social networks of individual speakers are a significant factor influencing the absolute interrogative intonation pattern used.

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Chapter 1

Introduction

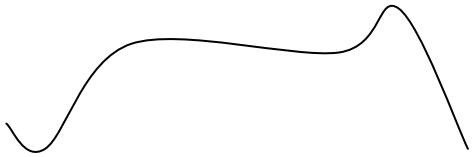
1.1 Introduction

Of the three major varieties of Spanish spoken in the U.S. (Mexican, Puerto Rican, and Cuban), the Spanish spoken by the Cuban population living in Miami is the least studied. Most linguistic studies that have considered this population have focused on the issues related to language maintenance and shift, i.e. either the maintenance of Spanish or the shift towards English. While no consensus has been reached concerning the future maintenance of Spanish in Miami, most studies seem to indicate that the Spanish language is presently alive and well in Miami and that it is, indeed, a bilingual city. As such, Miami presents an ideal setting in which to study the effects of language contact.

In the linguistic studies of Miami-Cuban Spanish, some researchers have pointed out simplifications or changes that have come as a result of bilingualism and contact with English. This interference (Weinreich 1953), or more specifically, borrowing (Thomason and Kaufman 1988) of English elements into the Spanish of the Cuban community has been observed in the lexicon (e.g. Otheguy and García 1988 and Varela 1974), the morphosyntax (e.g. Lynch 2000, Porcel 2002 and Lopez Morales 2003), and the phonology (e.g. Varela 1992 and Lynch and Kraemer 2003). Since Varela's description of Miami Cuban Spanish pronunciation, there has been very little subsequent work on the phonological system of this group and its intonation has gone completely unstudied.

In exploring the intonation of Miami-Cuban Spanish in light of its contact situation with English, one of the most salient intonation patterns of Caribbean Spanish will be investigated. It has been claimed that the only real and systematic intonational feature that differentiates Caribbean Spanish, including Cuban Spanish, from other varieties of Spanish is its unique intonation pattern found in "yes/no" questions, or absolute interrogatives (Sosa 1999:207). In most languages, including English and many dialects of Spanish, absolute interrogatives are marked by a rising tonal contour at the end of the question. Interrogatives in Caribbean Spanish, however, have been shown to have a falling contour, as can be seen in Figure 1.1.

(a) Caribbean Spanish
(adapted from Sosa 1999)



(b) American English
(adapted from Pierrehumbert 1980)

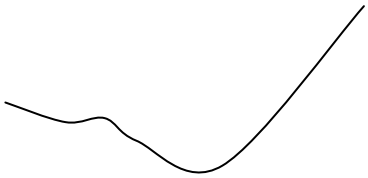


Figure 1.1 – Schematic of Caribbean Spanish and American English absolute interrogative intonation patterns.

This difference in absolute interrogative intonation merits investigation because of the possible misunderstandings it could create between Cubans and other Spanish speakers in Miami who are from non-Caribbean areas and who use a falling tonal contour to communicate declaratives. Alternately, if the pattern typical of Caribbean Spanish is changing among Cuban Spanish speakers it could be an indication of assimilation to the

dominant language of the region (i.e. borrowing English features into their native Spanish).

Another aspect of interest when dealing with absolute interrogatives is determining how Cuban Spanish speakers use intonation in distinguishing between questions and statements. This is especially important since questions and statements in Spanish often contain the same words in the same order, leaving only intonation to distinguish them. This can be seen in examples (1a) and (1b) where the only difference between the meaning of the two sentences is the pragmatic meaning in context, i.e. the first is a statement and the second is a question. In most dialects of Spanish the difference between declarative utterances and absolute interrogative utterances is communicated through very different intonational patterns.

(1)

a. *Juan camina a la tienda.*
John walks to the store

b. *¿Juan camina a la tienda?*
Does John walk to the store?

While the use of intonation to express these different meanings has been investigated in some varieties of Spanish (e.g. Peninsular, Mexican, and some Caribbean dialects), little is known about Cuban Spanish and no research has been carried out on the Spanish intonation of the Cuban population living in the United States. Because of this scarcity of research, it will be necessary to explore some more general characteristics of Miami Cuban Spanish intonation. The current dissertation offers a general description of the intonation patterns in declarative utterances as well as in interrogatives produced by Cubans living in Miami. Specifically, absolute interrogatives and lexically and

syntactically identical declarative utterances are considered. A phonological analysis will be proposed, following the autosegmental-metrical (AM) model of intonational phonology (e.g. Pierrehumbert 1980, Ladd 1996, Face 2002, Hualde 2003). While other variables pertinent to language contact phenomena and sociolinguistic studies are extremely important, the proposed dissertation concentrates specifically on the immigrant generation of the speaker; other social variables, e.g. gender and social class, are controlled in order to limit their influence on the intonation patterns observed.

1.2 Organization of the Dissertation

The current dissertation is organized in the following way. Chapter 2 provides a description of the Miami-Cuban population, an account of its linguistic situation as well as a review of the studies that have examined Miami-Cuban Spanish. Chapter 3 contains an overview of intonation and the Autosegmental Metrical (AM) approach to intonation. Chapter 3 also provides a review of the literature on Spanish intonation, specifically regarding declarative and interrogative intonation as well as studies on intonation in contact. The research questions to be addressed by the current dissertation are found in Chapter 3. Chapter 4 explains the research methodology employed in the current dissertation and describes the subjects who participated in the study. Chapter 5 presents the findings related to the phonological analysis, i.e. research questions #1 and #2 which are posed in chapter 3. The presentation of the sociolinguistic findings, or the discussion regarding research question #3, is offered in Chapter 6. Chapter 7 includes the discussion of the findings in relation to the field and draws conclusions based on this discussion.

Chapter Two

Historical and linguistic background of the Miami-Cuban community

2.1 The Community: Miami-Cubans

Of the Spanish speaking communities in the United States, the Miami-Cubans are the most recent arrivals. While there was a community of Cubans in the U.S. and in Florida before 1959 (Novas 1994), the Cuban population currently living in the U.S. has primarily come from the post-revolutionary *olas*, or waves, of immigration, the first wave arriving between 1959 and 1962 when approximately 248,070 Cubans arrived in Florida fleeing the communist revolution (Lopez Morales 2003). Subsequent waves of Cuban immigrants, or exiles as they call themselves, have come to the U.S. throughout the years. From 1965 to 1973, the *Vuelos de Libertad* or "freedom flights" brought approximately 297,000 more Cubans to the U.S. The years 1973 to 1979 saw approximately 179,000 Cuban exiles arriving through third countries, most notably Spain, Mexico, and Venezuela. The 1980 Mariel boat lift is probably the most famous of the post-revolutionary waves of Cubans coming to the U.S., bringing thousands more exiles in just over 5 months (López Morales 2003). Since the arrival of the *marielitos*, Cubans continue to arrive in the U.S. via third countries as well as in small groups of *balseros* (raft people) who risk their lives crossing the Strait of Florida in anything that will float. Unfortunately, less than half of the *balseros* who leave the island make it to their destination (Ajá Díaz 2000).

The vast majority of Cubans coming to the U.S. have settled in Miami. Part of this is due to the similar climate and geographical proximity to their homeland but it is also due to the "Cuban atmosphere" (López Morales 2000) of the city and the extensive network set up by the first group of political exiles to arrive there. The Cuban community in Miami has traditionally opened its arms to new Cuban arrivals and helped to house, feed, and employ them. This system has created a very unified and homogenous community that has allowed the Cuban culture and language to flourish in Miami.

When compared to other Hispanic groups in the U.S. the Cuban American community is quite different. Otheguy and García (1988) point out that Cuban Americans have the highest number of monolingual Spanish speakers of the Hispanic groups in the U.S. They also have the largest foreign born population of these groups. Otheguy and García also affirm that Cuban Americans are the oldest, the most educated and the most economically successful of these groups. Miami can also be differentiated from other large centers of Hispanic population by the prestige that the Spanish language holds in the community. The Cubans in Miami enjoy a social, political, and economic power that has given their language a prestige not felt by other Spanish-speaking immigrant groups in the United States. Part of this prestige can be traced to the perception commonly held that the Cuban immigrant is fundamentally different than other Hispanic immigrants in the U.S. in that the Cuban immigrant is a political refugee, coming to the U.S. and leaving behind considerable capital in order to escape an oppressive regime. The Cubans in Miami are viewed by many as belonging to the upper class and of being well educated. While this perception may have been true for the first

waves of immigration after the revolution, more recent immigrants can also be considered economic refugees (López Morales 2003)[1]. In any case, the Cuban population in Miami is in a prestigious position that, in turn, gives prestige to their language.

2.2 Miami: A Bilingual City

As part of this cubanization of Miami, the Spanish language has become an integral part of the city; culturally and economically it is a bilingual city (Lynch 1999, 2000 and López Morales 2003). Miami-Dade County, which includes 30 municipalities and a number of unincorporated communities, had a population of 2,253,362 in the year 2000. Of this number, 57.3% were of Hispanic origin. Cubans are not the only Spanish-speaking group in Miami; there are also groups from Puerto Rico, Nicaragua, Venezuela, Colombia, and Mexico among others. Cubans do, however, make up over 50% of the Hispanic population in the county. Miami-Dade has become the county with the highest concentration of Hispanics in the country; the municipality of Miami is now the first city of over 2 million inhabitants to have a Hispanic majority (López Morales 2003).

Miami has become a center for businesses related to Central and South America as well as Spain; it has come to be known as the gateway to Latin America and Brickell Avenue in Miami's downtown financial district has even been called the Wall Street of South America. Businesses targeting Spanish speaking communities have been attracted to Miami due to its highly educated bilingual workforce. Boswell (2000) has shown that the work situation in Miami favors those who are bilingual in Spanish and English. His

[1] López Morales concedes, however, that the economic status of recent Cuban immigrants was caused by the political situation.

research has shown that language proficiency has a direct correlation with average yearly income in Miami; according to the 1990 census data, Hispanics who do not speak English are at a disadvantage in comparison to those who speak English. Boswell's most remarkable finding, however, was that knowing both Spanish and English was an advantage over only knowing English: "Hispanics who speak English very well and speak Spanish have higher incomes, lower poverty rates, higher educational attainment, and better-paying jobs than Hispanics who only speak English" (422). The bilingual nature of Miami is also illustrated in a study by Lambert and Taylor (1996) who surveyed Cuban American mothers, comparing the working class and the middle class. The results reveal that mothers from the working class value English over Spanish as a means to overcome economic hardship while mothers of the middle class value Spanish over English as a means to hold on to their heritage. Lambert and Taylor (1996) show that Miami, as a bilingual community, balances both concerns with a socioeconomic climate that favors both languages; working class children will learn Spanish and middle class children will learn English because of the overwhelming presence of both languages in the community.

The bilingual nature of Miami can also be seen in the presence of Spanish-language media. López Morales (2003) gives a detailed history of the presence of Spanish-language print, radio, and television media in Miami. Currently, there is a large number of newspapers, magazines, and tabloids printed in Spanish which are readily available in the grocery stores and other locations. There are more than 30 radio stations in Florida that broadcast only in Spanish and Miami is home to three major Spanish-language television stations (Univisión, Telemundo, and TeleMiami). The ubiquitous

presence of Spanish language advertisements via billboards and store signage is another indicator of the overwhelming presence of Spanish in the area.

This significant presence of the Spanish language in Miami confirms that Miami is a bilingual city. As a bilingual city, Miami presents a unique atmosphere to study the effects of contact between Spanish and English.

2.3 Miami Cuban Spanish

As mentioned above, linguistic studies of the Spanish in Miami have primarily dealt with issues related to the maintenance or loss of Spanish in the face of intense contact with the dominant language of the United States. This topic has been debated in the literature and, perhaps to the delight of those who argue for maintenance, is still being debated strongly. Those who argue that the Miami Cuban population is experiencing language shift towards English, eventually resulting in the complete loss of Spanish, claim that the prestige of English and the attitudes of Miami Cubans indicate that English is preferred over Spanish and thus will replace it in this community. Most linguistic studies that predict language loss base those results on the use and interpretation of surveys (e.g. Solé 1979, Portes and Schauffler 1996, and Porcel 2002). Both Solé (1976) and Portes and Schauffler (1996) conducted language use and attitudinal surveys with school aged children and found attitudes and usage overwhelmingly favoring English over Spanish. Porcel (2002) used an attitudinal survey with his subjects and found that attitudes also favored English but that there were particularly negative attitudes regarding the Spanish spoken by recent immigrants. He cites the case of a Cuban who arrived in

1995 who was highly critical of newer Cuban immigrants; she expressed a desire to separate herself from these newer arrivals. Whether this separation will lead to language loss in the more established community or simply be manifested in different sociolects of Spanish in the community (see discussion of /r/ deletion below) remains to be seen. Another recent attitudinal study performed by López Morales (2003) completely contradicts Porcel's results. López Morales found attitudes that are extremely positive about Spanish and that favor bilingualism. He concludes that Spanish is alive and well in Miami and that it will most likely be maintained along with English. It is possible that these contradictory results can be attributed to the different speaker samples as well as to the different questionnaire and study designs. In an attitudinal study investigating only Spanish and not English, Alfaraz (2002) showed that Cubans in Miami perceive Peninsular Spanish and Cuban Spanish as being both more correct and more pleasant than other varieties of Spanish.

Another way of looking at the question of language maintenance vs. loss is seen in the approach taken by García and Otheguy (1988) who use Fishman's (1977) five main factors when discussing language maintenance in a minority population. The five considerations are as follows: 1) demographic, 2) sociocultural, 3) economic, 4) philosophical/ideological, and 5) political. According to García and Otheguy's analysis, the only factor listed above that favors the maintenance of Spanish in Miami is that of demographics. This leads them to predict the loss of Spanish in Miami. Roca (1991) and Lynch (1999 and 2000) respond to this study, using the same five criteria, showing that all but the political factors favor the maintenance of Spanish. As the social and political

climate changes in Miami these factors change as well; Porcel (2002) and López Morales (2003) point out that the political climate has changed in favor of Spanish maintenance.

Several authors who have argued about the Spanish maintenance/loss issue in Miami have also described in some detail aspects of the morphosyntax of the Spanish in Miami. Lynch (1999) describes Miami Cuban usage of the subjunctive mood. In his study, modeled after Silva Corvalán's (1996) study of the Chicano population's Spanish as found in Los Angeles, he discovers that the 2nd and 3rd generations are simplifying their usage of the subjunctive in certain contexts. This simplification and reduction of usage, however, is much less evident and happening at a much slower rate in Miami than it is in other Spanish speaking communities in the U.S. Lynch concludes that while the Spanish subjunctive mood is indeed simplifying in the face of intense English contact, Spanish will be maintained in Miami. Porcel (2002) also provides an in-depth look at the morphosyntax of Miami Spanish in an examination of tense, aspect and modality. In his study, Porcel finds that these aspects of the Spanish grammar do not show any signs of language transfer due to contact with English.

Another aspect of the Spanish spoken by the Miami Cubans that has been described is the lexicon. Many lexical innovations have been analyzed by Otheguy and Garcia (1988) and also by Varela (1974 and 1992). They discuss the use of lexical borrowings, which are words taken from English and more or less adapted to the phonological system of Spanish; e.g. part-time, dealer, building (all pronounced using a Spanish pronunciation). Also observed in the Miami Cuban community are semantic calques; a semantic calque is a Spanish word "used in a manner that calques the usage of [English]" (Otheguy and García 1988:213). Calques can be used as isolated words. An

example can be seen in *me registré en la universidad* where the English meaning of "to register" is extended to the Spanish verb *registré*. Another type of calque occurs when Spanish vocabulary is used in a phrase but it is an English phrase translated literally. An example of this can be seen in l*o último que necesito es un catarro*, which is a translation of the English phrase "the last thing I need". These lexical innovations are not unique to the Miami community, however. Similar loanwords and calques have been attributed to the other major Spanish speaking communities in the U.S. and appear to be common where Spanish is in contact with English.

Studies on the phonology of the Miami Cubans have been scarce. Most phonological studies of Miami-Cuban Spanish have been restricted to segmental variation and early phonological studies on Miami Spanish were mostly limited to recent Cuban immigrants who were living in Miami. Hammond (1980a) and Terrell (1979) both examined syllable final /s/ and showed that aspiration is very common and that /s/ before a pause is normally elided entirely, this finding was confirmed more recently by Alfaraz (2000). Also common in Cuban Spanish, as studied in Miami, is the predominance of the velar nasal [ŋ] in absolute final position (Hammond 1979). Other studies have explored liquid neutralization in final position and in preconsonantal position (e.g. Hammond 1980b and Alfaraz 2000). Cuban Spanish liquids exhibit some variation before a consonant, however "simple interchange, /r/ > [l] and /l/ > [r] is the least common possibility" (Lipski 1994: 232). Liquid variation seems to occur in relation to sociolinguistic variables, particularly social class. Lipski (1994) affirms that phrase-final /r/ is a significant variable in Miami, differentiating between the earlier arrivals and those who arrived during the Mariel boat lift in 1980. The presence of phrase-final /r/ is the

prestigious variant and is found in the speech of first arriving Cubans who tended to be highly educated professionals. Those who delete the phrase-final /r/ with more frequency more often come from the working class or rural areas of Cuba; this group made up the majority of immigrants arriving in Mariel boat lift. This finding is supported by Lynch and Kraemer (2003) who affirm that social class is the main factor influencing both /r/ and /s/ variation.

In another study specifically targeting the Cuban population in Miami and possible influence from language contact, Varela (1974 and 1992) gives a description of segmental "mispronunciations" in Cuban American Spanish that can be attributed to borrowing from the English phonological system. The borrowed phonological phenomena mentioned include vowel reduction (e.g. [səgientə] for *siguiente*) and the diphthongization of stressed vowels (e.g. [now] for *no*). Another sound used by Cuban American bilinguals that is a result of English influence, according to Varela, is [æ] (e.g. [æctubre] – *octubre* and [prænto] – *pronto*). While Varela presents some interesting claims about English's influence on the Spanish of Cuban Americans, she gives very little information about who is really using these variants; no information is presented on the distribution by age, sex, social class, or generation. The questions raised by her study need to be addressed with further research.

Although in the past five years there have been an increasing number of studies on Miami Spanish, to date there have been no studies of the intonation patterns of Miami Cubans/Cuban Americans.

Chapter Three

Theoretical approaches to the study of Spanish intonation

3.1 What is intonation?

While almost everyone has an idea of what intonation is, it has been defined and studied in various ways throughout the years. Quilis (1993) and Garrido (1996), for example, give overviews of how definitions of intonation can vary according to the perspective of the researcher. Some of the definitions given throughout the years include:

- Sentence intonation is "the movement of pitch in the process of speech" (Daneš 1960).
- "Intonation is the distinctive use of patterns of pitch or melody" (Crystal 1997: 202).
- "Intonation involves the occurrence of recurring pitch patterns, each of which is used with a set of relatively consistent meanings, either on single words or on groups of words of varying length" (Cruttenden 1997: 7).
- "Intonation is the function of the fundamental frequency that is linguistically meaningful, socially representative, and individually expressive at the level of the sentence" (Quilis 1993: 410; translation mine).
- "Intonation … refers to the use of suprasegmental phonetic features to convey 'post-lexical' or sentence-level pragmatic meanings in a linguistically structured way" (Ladd 1996: 6).

It is fairly universally accepted that movements of fundamental frequency (F0) are mostly responsible for what most consider intonation. The difficulty in studying these movements from a linguistic perspective comes in separating out the meaningful movements. Ladd (1996) explains that pitch communicates many things through "a paralinguistic code: sometimes against our will, it signals or helps to signal information about our sex, our age, and our emotional state" (1). These things are communicated in all human languages, including tone languages like Mandarin Chinese, which uses four tone phonemes that "contrast just like segmental phonemes" (2). While it is not controversial that pitch can convey linguistic and paralinguistic meaning in tone languages, the claim that it can do so in languages like Spanish or English had not previously been accepted by all linguists. Cutler (1977), for example, claimed that intonational meaning is strictly context dependent and that it therefore is not meaningful in and of itself. This claim has been refuted by a number of studies (e.g. Bruce 1977, Pierrehumbert 1980, Ward and Hirschberg 1985, Bartels 1997) and it is now commonly accepted that intonation does communicate linguistic meaning and that it has a phonological structure.

3.2 The Autosegmental-Metrical (AM) Theory of Intonational Phonology

The theoretical framework of the current dissertation is the theory most commonly drawn on in today's analyses of intonation. It was pioneered by Pierrehumbert (1980) in her doctoral thesis and has benefited from Bruce's (1977) work on Swedish word accents and has since been expanded and revised in subsequent work

on Japanese and English (Beckman and Pierrehumbert 1986; Pierrehumbert and Beckman 1988). Ladd (1996) provides a detailed overview of this theoretical framework and names it the autosegmental metrical (AM) model (also see Hualde 2003 for an overview in Spanish). From the time when the pioneering work took place, the intonation of many other languages has been studied using the AM theory. An analysis in AM is, above all, phonological, and not a phonetic description of pitch contours found in human language. It seeks to find contrastive elements in the intonational system of a given language and claims that these elements are combined to produce the contours observed.

The theory, as its name suggests, has its roots in autosegmental phonology (Leben 1973; Goldsmith 1979) as well as in metrical phonology (Liberman 1975). Autosegmental phonology was developed in order to account for tone information present in African languages. It was found that in Yoruba, for example, a phonologically distinctive tone, High (H), Mid (M), or Low (L), occurs in conjunction with each vowel. It was discovered that these tones are independent of the vowel with which they occur. This can be seen in Figure 3.1, adapted from Ladd (1996), which indicates that, in Yoruba, each tone is initially associated with a vowel but that when a vowel is deleted through a segmental process, the tone is not deleted, rather it remains and re-associates to the remaining preceding vowel.

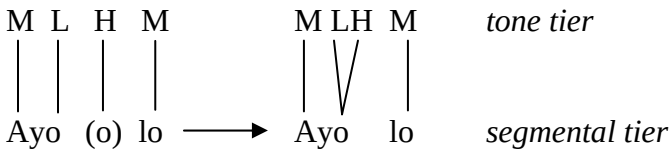


Figure 3.1 – Depiction of Yoruba tones and their association with the text. Adapted from Ladd (1996).

The autosegmental metrical model for intonation assumes a similar relationship between the tune and the text, or tones and segments, for intonation languages such as Spanish and English. Tones are independent of the segmental make up of the utterance but they associate with specific points. The term association refers to the phonological relationship that the tone has with certain points in the segmental string. In a tone language like Yoruba, these associations occur at every syllable; however, this is not the case in languages like Spanish and English. As Hualde (2003) points out, tone in this kind of language has a pragmatic function and provides the melody of utterances, not syllables. Tone associations, therefore, are different in intonation languages than they are in tone languages. These associations between the tune and text happen at certain syllables in an utterance. Liberman (1975), in developing metrical phonology, proposed that these associations depend on the relationships of prominence established independently between both the syllables in a word and the words in a sentence. Therefore, the "metrical" in the AM model is seen in the association of tones with stressed syllables, which, according to metrical phonology, are metrically strong. Figure 3.2 shows this schematically as adapted from Face (2002) (T = tones, S = stressed syllable, s = unstressed syllable).

Figure 3.2 – Schematic, adapted from Face (2002), of tones associating with stressed syllables in an intonation language.

The AM model assumes that tonal contours of an utterance are the result of the interpolation between phonologically specified tonal events associated with anchor points in the text (stressed syllables or phrase boundaries). A major advantage of this model is that the most complex contours observed in language can be adequately accounted for with the use of just two tones. There are two basic units of analysis in the AM model: pitch accents and edge tones (including both 'phrase tones' and 'boundary tones').

A pitch accent is a tone (H or L), or a sequence of tones (H+L or L+H), associated with a stressed syllable. In Spanish, where every word contains a lexically stressed syllable (except for prepositions, articles, and other function words) almost every word contains a pitch accent. It is entirely possible to have two phonologically distinct pitch accents made up of a sequence of the same two tones in the same order (e.g. H*+L and H+L*). This is due to the phonological association of only one of the tones to the stressed syllable. The associated tone is marked with a "star" (*) in the standard notation of the AM model. Consequently, an H tone phonologically associated with the stressed syllable will be written as H*. The possible pitch accent inventory, therefore, includes H*, L*, H*+L, H+L*, L*+H, and L+H*. Figure 3.3 is a schematic representation of the difference between L*+H and L+H*. Pierrehumbert and Beckman (1988) explain that the

associated tone has priority for alignment while the unassociated tone is not phonologically specified for alignment; therefore, its placement is determined phonetically.

Figure 3.3 – Schematic of L*+H and L+H* pitch accents.

Pitch accents can be distinguished as being either nuclear or prenuclear. In traditional intonation studies the nuclear accent has been described as the accent that falls on the most prominent syllable of the utterance. In other models of intonational analysis, e.g. the British school, the nuclear accent can fall on any lexically stressed word in the utterance (in English). In Spanish, however, most researchers label the last accented syllable of the utterance as the one that carries the nuclear accent. In research on many languages, including Spanish, it has been established that the final tonic syllable has a special prominence. Hualde (2002), for example, affirms that the last syllable in a neutral declarative utterance in Spanish is usually perceived to have the "highest level of prominence" (8). For this reason, most researchers in Spanish define the last stressed syllable of an utterance as the one that bears the nuclear accent. This definition has become a convention and applies to all utterances, even those where a non-final word bears extra prominence due to focus. This convention is also used in this dissertation.

An example of how a typical pitch accent works in Spanish can be seen in Figure 3.4 which shows a schematic of an idealized pitch track over the Spanish declarative utterance *Le dábamos el número* "We gave him/her the number". It is well established that prenuclear pitch accents are realized in a certain way in neutral declaratives in most Spanish varieties. The F0 rise begins near the beginning of the stressed syllable and reaches a peak somewhere in the posttonic syllable. Nuclear accents have been observed to have a different intonation pattern, with the F0 rise at the beginning of the stressed syllable and a peak within the tonic syllable. The AM pitch accents posited as they are in Figure 3.4 can account for the pitch movements even if they are currently debated in the literature.

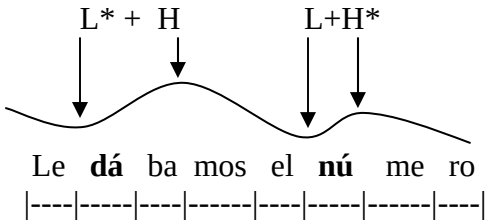


Figure 3.4 – Schematic of pitch contour and corresponding pitch accents.

Pitch accents can have various functions in an utterance. In an intonation language like Spanish, the melody of an utterance can communicate both paralinguistic information (e.g. gender, age, and emotional state of the speaker) as well as linguistic information. While Ladd (1996) claims that the AM model for intonation studies is mostly a tool that can explain complex tonal patterns using phonology, most researchers using the AM model seek to determine what pitch contributes to the meaning of a given utterance. Many studies have shown that pitch can communicate meaning by lending

prominence to a word in an utterance. Face (2002), for example, shows how contrastive focus can be communicated through the use of a distinctive pitch accent in Madrid Spanish. He shows that instead of the standard prenuclear pitch accent as seen in Figure 3.4, a non-final word that is in contrastive focus will carry a L+H* pitch accent, similar to what is seen in Figure 3.3.

The use of the AM model in positing two phonological tones and their autosegmental alignment with the text of an utterance as pitch accents can account for tonal movements around lexically stressed syllables. However, tonal movements throughout an entire utterance are much more complex than what can be explained by pitch accents alone. Because of this, the AM theory incorporates what are known as edge tones. Tones can also be associated with the edge of a phrase. In the original AM analysis of English, Pierrehumbert (1980) showed that English has two different levels of phrasing. Face (2002) describes the function of these phrases as a "way to divide information into chunks" (7). The utterance level phrase is called an intonational phrase; these phrases have been called different things under previous theoretical frameworks; e.g. breath groups, or melodic units. All intonation languages have intonational phrases and some have additional levels of phrasing. Pierrehumbert showed that English has intermediate phrases that function within intonational phrases. A tone can associate with the edges of these phrases. Using the notation of the AM framework, a tone associated with the edge of an intonational phrase is marked with a '%', e.g. H% or L%. Tones associated with intermediate phrases are marked as either H- or L-. In English, an intonational phrase contains one or more intermediate phrases. The end of the last intermediate phrase will always correspond to the end of the intonational phrase, meaning

that the intermediate phrase tone and the intonational phrase tone will be adjacent to one another. Face (2002) provides an illustration of how these phrases fit together to form an utterance; his illustration is reproduced in Figure 3.5:

[[….. T-][….. T-] T%]

Figure 3.5 – Illustration of intermediate phrasing and edge tones.

The combination of these different edge tones, together with pitch accents can account for the most complex tonal movements found in human language. The existence of intermediate phrases, however, is not guaranteed in all languages. For example, it has been claimed that Japanese intonational phrases are divided into "accentual phrases" (Pierrehumbert and Beckman 1988) rather than intermediate phrases. The existence of intermediate phrases in Spanish is currently debated. Sosa (1999) and Beckman, Díaz-Campos, McGory & Morgan (2002), on the one hand, argue that Spanish does not have intermediate phrases. Nibert (2000), on the other hand, claims that the presence of intermediate phrases helps in the disambiguation of utterances like *lilas y lirios amarillos* 'yellow lilies and lilacs' where it is ambiguous whether the adjective describes only *lirios* or both *lilas* and *lirios*. While Sosa argues that these phrases can be disambiguated by the use of two separate intonational phrases, subsequent studies have found support for Nibert's analysis and uphold the idea that there are intermediate phrases in Spanish (e.g. Face 2002; Hualde 2003; Willis 2003; D'Imperio, Elordieta, Frota, Prieto & Vigário 2005).

In the AM model, edge tones can also exist at the beginning of intonational phrases and intermediate phrases. Sosa (1999), for example, proposes the existence of a H% boundary tone at the beginning of the intonational phrase in absolute interrogatives in Spanish to account for the observation that absolute interrogative pitch is higher than the pitch of its lexically and syntactically identical declarative counterparts. The use of this type of accent to account for pitch levels is a somewhat controversial approach; Ladd (1996) calls attention to the fact that the AM theory does not account for distinctive pitch levels well and proposes other methods such as upstep or downstep diacritics to account for similar phenomena.

One of the major strengths of the AM model has been seen in that it can account for F0 contours with the use of only two contrastive tonal units. As Willis (2003) shows, this is a very important accomplishment. Traditional analyses of Spanish intonation (e.g. Navarro Tomás 1944; Quilis 1993) have used the term *entonación circunfleja*, "circumflex intonation", to refer to a tonal rise followed by a fall. Willis states that "the application of this term has not been limited to a specific construct, and has been used to refer to so many things that it has little functional meaning or comparative value" (2003:4). The AM model clarifies this diluted concept used so often in Spanish intonation studies by providing a strictly defined construct of the pitch accent that refers to specific anchor points in the text.

Perhaps most remarkable about the AM model is its applicability to a wide variety of languages. While Pierrehumbert (1980) developed the model with English in mind, it has been applied to the analysis of many, many languages. It has been used to successfully account for the melody in tone languages like Mandarin Chinese (e.g. Yip

1991) and Yoruba (e.g. Connell and Ladd 1999, Laniran 1992); pitch accent languages like Swedish (Bruce 1977), Basque (Elordieta and Hualde 2003), and dialects of Serbo-Croation (Smiljanic 2004); as well as intonation languages like English (e.g. Pierrehumbert 1980), French (e.g. Jun and Fougeron 2002), and Spanish (e.g. Sosa 1999, Face 2002).

3.3 Spanish Intonation

The study of Spanish intonation has a long and distinguished past. Navarro Tomás (1918 and 1944), considered to be the founder of Spanish intonation studies, provides an extensive description of Peninsular Spanish intonation. In the years after Navarro Tomás's influential book *Manual de Entonación Española* until the 1980's, however, a relatively small number of researchers investigated Spanish intonation. Examples of studies that were carried out include Bolinger 1951; Bowen 1956; Kvavik 1974; Kvavik and Olsen 1974; and Stockwell and Bowen 1965. The last decade, conversely, has seen an explosion in intonation studies, in part due to new theoretical approaches to intonation (e.g. the AM model), and also due to the development of technology allowing the unproblematic extraction of F0 contours from recorded speech. Other notable works on Spanish intonation include Quilis (1981 and 1993) who gives detailed descriptions of intonation patterns and their uses, taken primarily from the peninsula but also mentioning some patterns found in Mexico, Puerto Rico, and the Canary Islands. Sosa (1999) provides the most complete overview of dialectal differences in intonation across the Spanish-speaking world using the AM theory in his

account. His influential study gives a starting point for further research using this model. Since the current study focuses on the intonation of Miami-Cuban Spanish, the discussion of the research on Spanish intonation will focus primarily on those studies that have looked at the types of utterances under investigation, i.e. broad focus declaratives and interrogatives, particularly those in the Cuban or Caribbean context.

The most comprehensive study on Cuban Spanish intonation available is García Riverón's (1996a, 1996b and 1998) review. García Riverón endeavors to define 7 different tonal patterns, or tonemes (established by oppositional meanings), and attempts to describe the different meanings associated with each pattern. The following is a basic summary of García Riverón's tonemes and their meaning:

- Toneme 1 – neutral declaratives (*enunciación neutral)*
    - Alternate "a" – warning declarative
    - Alternate "b" – evidential declarative
    - Alternate "c" – pleading declarative
- Toneme 2 – pronominal and adverbial interrogatives
    - Alternate "a" – categorical or emphatic question
- Toneme 3 – absolute interrogatives with a high degree of uncertainty
    - Alternate "a" – surprised absolute interrogatives
    - Alternate "b" – collaborative absolute interrogatives
- Toneme 4 – interrogative introduced by an initial "*y*" (and)
    - Alternate "a" – incomplete question

- Toneme 5 – incomplete declaratives (*enunciación de no conclusión*)
    - Alternate “a” – incomplete declarative that provides an example or a hypothesis
    - Alternate “b” – incomplete declaratives using the word *como*
- Toneme 6 – various functions, e.g. large quantity, but can be replaced with no change in meaning
- Toneme 7 – vocative intonation

While García Riverón’s description gives a good idea of the overall patterns observed in Cuban intonation, it is not clear how these tonemes might relate to other intonation studies. Her data was collected through spontaneous speech without controlling for phonetic environments and has led her to posit phonologically contrastive tonemes that, apparently, do not have distinct meanings in relation to the other tonemes. Her toneme 6, for example, has various functions, it can signal a “large quantity”, but it can also be replaced with another toneme without changing the meaning of the utterance.

Of the most interest for the current study, are her tonemes 1 and 3 which correspond to neutral declaratives and absolute interrogatives, respectively. The intonation patterns of these tonemes will be described briefly in the following sections.

3.3.1 Spanish Declarative Intonation

Probably the most studied and best understood aspect of Spanish intonation is that produced in conjunction with broad focused declaratives. Navarro Tomás (1918) gives the first descriptions of broad focus declarative intonation for Peninsular Spanish. In his

book *Manual de entonación española* (1944) he divides the F0 contour of these utterances into three parts: *inflexión inicial* (initial inflexion), *cuerpo de la unidad enunciativa* (body of the F0 contour), and *fin de la unidad* (end of the utterance). In his description of the body of the F0 contour he describes one of the most basic characteristics observed in broad focus declaratives; one that has also proven to be very important in more recent work. Navarro Tomás points out that, in the body of the contour, the F0 starts rising near the beginning of the stressed syllable and comes to its highest point in the unstressed syllable immediately following the stressed syllable. This is a characteristic of non-final, or prenuclear, F0 contours that has been verified in subsequent research. Sosa (1999), for example, shows pitch tracks from a Cuban speaker which exhibit very similar patterns in the body of the utterance; the F0 begins its rise near the beginning or within the stressed syllables and rises throughout, reaching its peak somewhere in the following unstressed syllable. Figure 3.6, taken from García Riverón (1996b), provides one possible example of this pattern from Cuban Spanish. This very common intonation pattern is found in many Spanish dialects, including Peninsular as well as Cuban, and was described briefly in Section 3.2 of this chapter and illustrated in Figure 3.4. The AM analysis for the prenuclear pitch movement has been somewhat debated in the literature but is most commonly accepted as being the L*+H pitch accent.

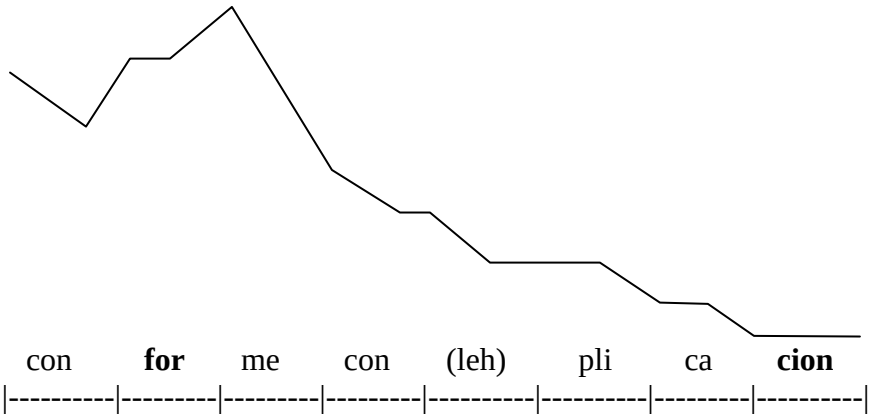


Figure 3.6 – Schematic, reproduced from García Riverón, depicting a Cuban broad focus declarative.

The pitch movement connected to the final lexically stressed syllable has been shown to be fundamentally different from the movement around a non-final stressed syllable; the F0 peak will typically occur within the stressed syllable. This has been described as happening in Peninsular varieties of Spanish (e.g. Prieto van Santen and Hirschberg 1995; Face 2002; Hualde 2002) as well as Caribbean varieties including Venezuelan, Puerto Rican, Dominican, and Cuban (e.g. Quilis 1993, Sosa 1999, and Willis 2003). While a few different AM analyses have been proposed for the final, or nuclear accent, the most commonly accepted analysis is L+H*, indicating that the peak, rather than the valley, is associated with the stressed syllable in the last lexically stressed word of the utterance. This intonation pattern for the nuclear accent is illustrated in Figure 3.4. It is not seen, however, in the schematic provided by García Riverón (1996b) in Figure 3.6. The analysis of the nuclear pitch accent in Miami-Cuban Spanish, therefore, is investigated in the current dissertation.

Another intonational phenomenon that has been observed in broad focus declaratives in some varieties of Spanish is *downstep*. Downstep is the successive lowering of F0 peaks throughout an utterance. It has been described as very common in peninsular varieties of Spanish but has not been discussed extensively for Caribbean varieties. Sosa's (1999) Cuban informant does not produce a down-stepped contour but the utterance described was not in broad focus and García Riverón (1996a, 1996b, and 1998) does not mention downstep in her description of Cuban Spanish intonation.

Finally, there are two other phenomena often cited in the description of Spanish broad focus declaratives that are not explicitly mentioned for Caribbean varieties: (1) *final lowering*, which is the realization of the final F0 peak much lower than can be explained by downstep; and (2) *deaccenting*, which is the absence of any pitch accent associated with a stressed syllable. The F0 schematic shown in Figure 3.6 is a possible example of deaccenting, where the final stressed syllable, *ción*, shows no F0 movement. However, since García Riverón's analysis makes no mention of pitch accents to begin with, she makes no claims regarding deaccenting. These two intonational occurrences have not been examined in detail for Caribbean or Cuban varieties; however, they will likely be useful in the description of the Miami Cuban broad focus declaratives.

3.3.2 Spanish Interrogative Intonation

Spanish interrogative intonation has also been studied since Navarro Tomás (1918). While many different types of interrogatives have been examined by different researchers, the major distinction made between the types of interrogatives is between

absolute interrogatives and pronominal interrogatives. Quilis (1993) stresses that one of the most important functions of intonation is its role in distinguishing between interrogatives and declaratives. This function is crucial in his description and explanation of the two types of Spanish interrogatives. He shows that, in most varieties of Spanish, absolute interrogative intonation is marked by a sharply rising final F0 contour. He also asserts that pronominal interrogative intonation typically behaves similarly to declarative utterance intonation. Sosa (2003) describes the unmarked pronominal interrogative pitch contour, for all Spanish varieties, saying that it is made up of a "slide, with a sharp initial rise associated with the interrogative pronoun, followed by a gradual descent to the bottom of the speaker's range" (230). Quilis (1993) explains this difference in pitch patterns by claiming that the downward trend of the F0 in a declarative is the unmarked pattern and that pronominal interrogatives follow this same unmarked pattern due to the presence of the question word (e.g. quién, qué, dónde, etc.) making a unique intonation pattern redundant and unnecessary. Absolute interrogatives, in peninsular Spanish, use the marked rising F0 pattern because there is no lexical or syntactic cue to signal the interrogativity. This claim has been corroborated for other Spanish varieties but these same patterns have not been observed in Caribbean varieties of Spanish.

Figure 3.7 – Schematic of Caribbean Spanish absolute interrogative intonation patterns (adapted from Sosa 1999).

Sosa (1999) has claimed that Cuban absolute interrogative intonation follows a unique pattern that is the only "real and systematic feature" that differentiates and identifies Caribbean (including Cuban) Spanish (207). A depiction of a Caribbean absolute interrogative pitch contour is illustrated in Figure 3.7 (reproduced from Figure 1.1a); the most salient intonational movement of this pattern is the fall at the end of the interrogative. This is different than absolute interrogatives in other varieties of Spanish as well as English (and in most other languages) where absolute interrogatives are characterized by a final F0 rise. Figures 3.8 and 3.9 are recreations of García Riverón's (1996a and 1996b) schematic representations illustrating the typical pitch patterns associated with pronominal interrogatives (toneme 2) and absolute interrogatives (toneme 3) in Cuban Spanish. These figures show that Cuban Spanish interrogatives have the opposite final F0 patterns from those that were described for most varieties of Spanish; that is, absolute interrogatives have a final fall and pronominal interrogatives have a final rise.

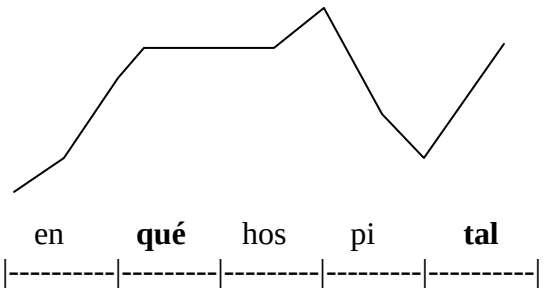


Figure 3.8 – García Riverón's (1996b) toneme 2, depicting Cuban pronominal interrogative intonation with the utterance *¿En qué hospital?*, (In which hospital?).

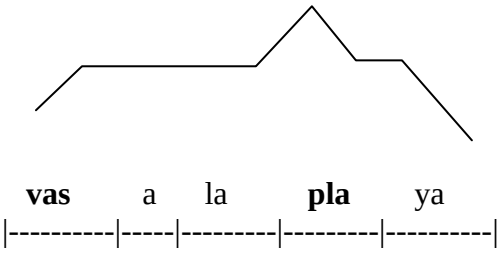


Figure 3.9 – García Riverón's (1996b) toneme 3, depicting Cuban absolute interrogative intonation with the utterance *¿Vas a la playa?* (Are you going to the beach?).

Intonation patterns similar to those presented by García Riverón's toneme 3 have been observed for absolute interrogatives in other Caribbean Spanish varieties (e.g. Quilis 1993, Sosa 1999) but not all Caribbean varieties display this pattern. For example, Willis (2003) shows that Dominican absolute interrogative intonation does not follow this "Caribbean" pattern.

In disambiguating absolute interrogative and lexically identical declarative utterances, most studies describe two major intonational cues: 1) a rising final contour for

interrogatives vs. a falling final contour for declaratives (in most dialects) and 2) F0 peak height: the first peak has been observed to be higher for interrogatives in some varieties than it is for declaratives. Navarro Tomás (1944), for example, mentions that the first peak is higher in questions making it so that "the interrogative or declarative meaning of an utterance becomes perceptible from its first syllables" (136; translation mine). Face (2004 and 2005), Prieto (2004), and Willis (2004) have all investigated the role of peak height in disambiguating declaratives from interrogatives, and both Face (2004 and 2005) and Prieto (2004) corroborate Navarro Tomas's description of Peninsular Spanish intonation, saying that (initial) peak height is consistently different between the two sentence types. In fact, Face (2004) shows that a higher initial peak is one of the main perceptual cues in disambiguating lexically identical interrogatives and declaratives. For Puebla Mexico Spanish (Willis 2004), however, tonal levels of the first pitch accent are not significantly different between interrogatives and declaratives. In this variety, the final fall (declaratives) vs. rise (interrogatives) is what sets apart the two. While it is not completely clear how intonation differentiates absolute interrogatives from lexically identical declaratives in Cuban (and Miami Cuban) Spanish, the difference is not entirely found in the final contour (as is seen in the subsequent chapters). Because both interrogative and declarative intonation have been shown to have falling final contours there must be more to it than simply the final contour. The exact nature of the intonational difference between these two types of utterances is part of what the current dissertation investigates.

3.4 Intonation in Contact

The effects of language contact on the intonation of bilinguals are largely under studied. The common thread found in all such studies is the identification and analysis of a "categorical distinction" between the intonation patterns found in the two languages in contact. For example, Queen (2001) studies the effects of bilingualism on the intonation of German and Turkish speaking children. She shows that there is a categorical difference between German and Turkish final rises; the German rise results from "the interpolation between the final accent tone and the boundary tone" and the Turkish "rise … is 'sharp' and generated primarily from the boundary tones" (66). Queen shows that her bilingual subjects use a combination of these intonation strategies in a way that is not normative to either German or Turkish, a phenomenon that she calls "fusion."

Bilingual intonation in the context of first language acquisition has also been examined by Lleó, Rakow and Kehoe (2004) who explore the intonation produced by monolingual Spanish and German speaking children as well as by children who are bilingual in Spanish and German. They compare the unmarked prenuclear pitch accents produced in broad focused declaratives found in both Spanish (L*+H) and German (H*+L). The main difference between the two pitch accents is described as a difference of alignment where the Spanish high tone aligns with the posttonic syllable and the German high tone aligns with the stressed syllable. They hypothesize that there is some sort of interaction between the two intonational systems for some bilingual children because one child produced native-like intonation patterns while another more often substituted the German pattern for the Spanish one.

Elordieta (2003) and Elordieta and Calleja (2005) investigate the influence of Basque on the Spanish intonation produced in the Basque country of Spain. The intonational contrast between these two languages is a falling pitch accent in Basque vs. a rising pitch accent in Spanish. The bilingual subjects (Spanish/Basque) in the studies are shown to use a (Spanish-like) rising accent in their Spanish. These rises, however, do "not display the same characteristics" (93) as Madrid Spanish in which the F0 usually rises to a peak after the tonic syllable. The peaks observed in the study are aligned much earlier. In fact, they are aligned before the offset of the stressed syllable. Elordieta (2003) points out that the intonational features of the dominant language (Basque), however, do not seem to be transferred to the Spanish of these speakers. Elordieta and Calleja (2005), however, find that the earlier alignment of the Spanish prenuclear peak seems to be due to Basque influence in that the falling accent in Basque has a peak that is aligned earlier in the stressed syllable followed by a fall. They contend that this early peak in Basque has influenced the early peak in the bilingual's Spanish.

O'Rourke (2003) explores the Spanish intonation of bilingual Spanish/Quechua speakers living in Peru. She describes peak alignment differences between Spanish and Quechua, where prenuclear peaks in Spanish typically occur after the stressed syllable (in broad focus utterances) and Quechua F0 peaks, both nuclear and prenuclear, occur within stressed syllables. She finds that, in some cases, Spanish speakers living in Cusco produce peak patterns similar to those produced by speakers in Lima or other parts of the Spanish speaking world. For the majority of speakers who live where Spanish is in constant contact with Quechua (including monolingual Spanish speakers), however, a more Quechua-like peak is produced. For these speakers, their Spanish contains

prenuclear peaks realized closer to the end of the stressed syllable if not entirely within the stressed syllable.

In order to explore the possible influences of English on the Spanish intonation produced by the Cuban population living in Miami, it is important to find a "categorical distinction" between the two languages (e.g. early peak alignment in Basque or Quechua). A candidate for this is the difference between how absolute interrogatives are produced in most varieties of Spanish (as well as in American English), i.e. a rising final tonal contour, versus how they are produced in Cuban Spanish, i.e. a falling final tonal movement. The analysis of the final contour of absolute interrogative intonation produced by Miami-Cubans can shed light on how language contact, either with English or with other varieties of Spanish, can affect intonation.

3.5 Research Questions

The current dissertation investigates the intonation patterns and system of the Spanish of three generations of Cubans/Cuban Americans living in Miami. Since nothing is known about the intonation of this group the first task to undertake will be a description of the general patterns present. The following research questions will guide the study of intonation in this community:

1. What are the characteristics of broad focus declarative intonation in Miami Spanish?
2. How do Miami Cubans differentiate between absolute (yes/no) interrogatives and lexically and syntactically identical declarative utterances?

3. Is the intonation system changing through subsequent generations of Miami Cubans? What are the social and linguistic factors motivating the use of the observed intonation patterns?

Chapter 4

Methodology

4.1 Introduction

As stated in Chapter 3, the goal of the current dissertation is to offer a description of Miami-Cuban intonation patterns as seen in declarative and interrogative utterances as well as to investigate whether the Spanish intonation of successive immigrant groups of Cubans living in Miami has been affected by the intense language contact that has occurred with English. In order to achieve these goals and answer the research questions posed at the end of Chapter 3, an experimental phonology study was designed and carried out. This chapter describes the research methodology utilized in the study. The organization of this chapter is as follows: Section 4.2 provides a description of the subjects whose utterances were recorded for this dissertation. Section 4.3 introduces the corpus of sentences read by the subjects and Section 4.4 discusses the acoustic and sociolinguistic analyses performed.

4.2 Subjects

Subjects for the present study were recruited in Miami by the researcher through his informal social networks there. They include twenty-five Miami Cubans who were divided into three immigrant groups. The subjects who participated in the current study were limited to female speakers. Gender as an independent variable is traditionally not

included in intonational studies; however one study (Chela Flores 1994) has confirmed that, for the Spanish spoken in Maracaibo, Venezuela, male speakers produce significantly different intonational patterns than do female speakers. Given the complexity involved in intonational studies and the unknown nature of Miami Cuban intonation, the presence of this variable would introduce an unacceptable level of complexity. Gender as a sociolinguistic variable, therefore, was controlled for by selecting only female speakers.

4.2.1 Immigrant groups

As explained previously, the main sociolinguistic variable under examination is that of the immigrant group or generation. In her work on Spanish in Los Angeles, Silva-Corvalán (1996) defined the immigrant groups for her study as follows: Group One – those people born abroad (i.e. Mexico in Silva-Corvalán's 1996 study and Cuba for Lynch 1999 as well as for the current dissertation) and who arrived in the U.S. after the age of eleven, Group Two – those who were born in the U.S. or who arrived in the U.S. before the age of 6, and Group Three – those born in the U.S. to at least one parent in group two. These immigrant group definitions were also used by Lynch (1999) for a study on Miami-Cuban Spanish. For the current study these immigrant groups are also used with the addition of a fourth. Perez-Firmat (1994) describes those immigrants who were raised partially in one culture and then immigrated into a new culture before adulthood as the generation 1.5, or the "one-and-a-halfers." For the purposes of this

study, those participants who were born in Cuba and came to the U.S. between the ages of 6 and 11 are included in the generation 1.5, or the 1.5 group.

Eight of the subjects fall into the first immigrant group (speakers 1, 2, 3, 4, 17, 21, 23, 24), ten speakers are categorized within in the second group (speakers 6, 10, 11, 16, 19, 20, 22, 26, 27) and six of the study participants are classified as members of the third group (speakers 8, 12, 14, 15, 18, 25). The two subjects who do not fit neatly into the groups defined by Silva Corvalán are placed in the 1.5 group, i.e. speaker 7 was born in Cuba and arrived in the U.S. at the age of 8 and speaker 9 was born in Cuba and arrived in Miami at the age of 10. These two speakers make up group 1.5 for the current study.

4.2.2 Time of residence

The number of years lived in the U.S. is also taken into consideration as a sociolinguistic variable for those participants who were born in Cuba. Preliminary work on Miami Cuban intonation (Alvord 2004) has suggested that time of residence in the U.S. may have an impact on the intonational patterns produced; i.e. the longer someone has lived in the U.S. the more likely it is that their intonation has been affected by the language contact situation. Therefore, the number of years lived in the U.S. is considered as a variable for those speakers who were born in Cuba and immigrated to the U.S. Table 4.1 provides information on each speaker, their immigrant group, age, age at arrival and time of residence in the U.S. The subjects who were born in the U.S. are categorized in the group “born in U.S.” for this variable.

Subject ID	Group	Age at arrival	Current Age	Years in U.S.
1	1	19	22	3
2	1	33	35	2
3	1	36	42	6
4	1	22	23	1
17	1	18	53	35
23	1	38	54	16
24	1	16	20	4
21	1	12	30	18
7	1.5	8	20	12
9	1.5	10	19	9
6	2	1	21	20
10	2	0	18	--
11	2	0	20	--
16	2	0	19	--
19	2	0	20	--
20	2	0	28	--
22	2	5	22	17
26	2	0	40	--
27	2	1	45	44
8	3	0	20	--
12	3	0	20	--
14	3	0	18	--
15	3	0	34	--
18	3	0	21	--
25	3	0	19	--

Table 4.1 – Participant information on Immigrant Group, Age of arrival, Age, and Years of residence in the U.S.

4.2.3 Socioeconomic Status

While no empirical study has shown that intonation varies according to social class, it is likely that social class is an influential social variable and many researchers claim that social class does affect intonation (e.g. Cruttenden 1997, Quilis 1982). Since this variable has not been treated at all in previous intonational studies, social class was

treated in a way similar to the variable of gender: its influence was controlled as much as possible. Subjects were recruited from the author's informal social networks in Miami and it was the goal to recruit subjects from similar socioeconomic backgrounds. In reality, however, there were some differences in socioeconomic status between the participants. In anticipation of these possible differences, each speaker was asked to answer questions that would provide a measure of their socioeconomic status. These questions, answered in the background questionnaire (see Section 4.2.4 and Appendix A) were adapted to provide information related to the Hollingshead four factor measure of socioeconomic status (SES). The Hollingshead four factor measure has been described as "a simple measure of Social Status based on marital status, retired/employed status (retired individuals used their last occupation), educational attainment, and occupational prestige" (Barratt 2005; 2). The measure used in the current study is an adaptation of the Hollingshead, called the Simple Measure of Social Status (SMSS) (Barratt 2005) which is basically the Hollingshead four factor measure of socioeconomic status "updated to reflect contemporary concepts of occupational prestige" (2). While this measure (as well as most other empirical measures of social status or class) has been discounted as too simplistic, it does provide a picture, albeit imperfect, of the social status of the participants. Each subject was assigned a score on the Hollingshead scale and this quantitative information was translated into three SES categories (High, Mid, Low). The categories were based on the SMSS score, with scores between 0 and 20 corresponding to the Low group, SMSS scores between 21 and 40 being the Mid group, and with scores above 40 on the SMSS scale equaling the High group. The score and SES group of each participant are listed in Table 4.2. Because of the efforts to recruit subjects from similar

SES backgrounds, the grouping was not balanced. However, the logistic regression program (described in Section 4.4.1) used to analyze the sociolinguistic variables is designed to be able to account for such unbalanced samples.

Subject ID	**Category**	**SMSS Score**
3	Low	9.5
23	Low	15.5
21	Low	15.5
10	Low	18.5
2	Low	19
20	Mid	26
1	Mid	31.5
15	Mid	32
4	Mid	34.5
17	Mid	34.5
26	Mid	37
11	High	41.5
22	High	41.5
8	High	42
25	High	44.5
14	High	46
6	High	48
9	High	49.5
12	High	50.5
16	High	53
19	High	54
27	High	54
7	High	54.5
18	High	54.5
24	High	58

Table 4.2 – Participant information on Socioeconomic Status (SES) based on the Simple Measure of Social Status (Barratt 2005).

4.2.4 Background of the participants

The subjects were asked to fill out two questionnaires as part of their participation in the study. The first questionnaire (Appendix A) asked the participants about their general background, including questions about their age, age of arrival to the U.S. (for the participant, parents, and grandparents), place of birth (of participant, parents and grandparents), level of education (of participant and of parents), occupation (of participant as well as of parents), first language (of participant and any siblings), as well as questions about any travel experience or time spent in other Spanish speaking countries. The background questionnaire also included questions relating to the social networks of the participant (see Section 4.2.5). This questionnaire was designed to provide information allowing the accurate placement of each speaker into each generational group as well as to provide important information that facilitated in placing each participant into the other extralinguistic groups used in the sociolinguistic analysis.

4.2.5 Social Networks

Besides the basic background information, the questionnaire also asked each participant to comment on their social networks. Five categories were specifically included in the questionnaire. Each category is considered as factor group with four factors within each group:

1. Spouse/partner

    - none (reported)
    - Cubans
    - Other Spanish Speaker
    - English speaker

2. Friends

    - none (reported)
    - Cubans
    - Other Spanish Speaker
    - English speaker

3. Neighbors

    - none (reported)
    - Cubans
    - Other Spanish Speaker
    - English speaker

4. Co-workers

    - none (reported)
    - Cubans
    - Other Spanish Speaker
    - English speaker

5. Club or organization membership

    - none (reported)
    - Cubans
    - Other Spanish Speaker
    - English speaker

Each subject was asked to comment on the place of origin and language spoken by the people for each of the five categories listed above. For example, the question was

asked: “Are you married/living with a partner? If so, where is your spouse/partner from? Does he/she speak Spanish?”

This social network data is used in the statistical analysis to determine the type of language contact, i.e. with which languages/varieties, experienced by each subject and then the logistic regression was performed to determine if these factors significantly contributed to the variation in the intonation patterns found in the current analysis.

4.2.6 Summary

To summarize, the same definitions of the immigrant groups used by Silva-Corvalán (1996) and Lynch (1999) are used as one of the major extralinguistic variables of interest in the current dissertation. The time of residence in the U.S. (i.e. duration of language contact) is also considered. Gender, as a sociolinguistic variable, was controlled in that only female speakers were chosen and socioeconomic status was controlled as much as possible and an independent measure of socioeconomic status (Simple Measure of Social Status) was used to address the possible differences encountered. Also considered was the social networks of the participants. These sociolinguistic variables were all used in consideration of the intonation patterns observed, the statistical measures used to analyze these factors are described in Section 4.4.1.

4.3 Data Collection and Methodology

4.3.1 Motivation for experimental approach

In order to analyze the intonation of the Miami Cuban participants, a laboratory phonology approach was adopted. While not common in studies of language contact and sociolinguistics, laboratory speech is used extensively in intonation studies. There are several advantages to using laboratory speech rather than a more naturalistic style of speech (e.g. sociolinguistic interview data used in most studies investigating language contact phenomena). The first reason is practical in nature; the number of naturally occurring examples of any one type of utterance, especially interrogatives, is very low. In order to carry out a detailed study of the intonation of the types of utterances under investigation, it is necessary to analyze declaratives and absolute interrogatives that are lexically and syntactically identical. This is necessary in order to control for any other factors that may influence the F0 contour. Both segmental as well as syntactic factors have been shown to exert an influence on the F0. Voiceless consonants, for example, inherently have no pitch while different vowels naturally have different fundamental frequencies: all things being equal, open vowels have a lower F0 than do closed vowels (Cruttenden 1986). Face (2002) has shown that syntactic constituency can affect the intonation of an utterance. In order to control for segmental and syntactic influences, lexically and syntactically equivalent utterances were elicited. This elicitation, i.e. a laboratory approach, was necessary due to the fact that finding a number of lexically and

syntactically identical utterances suitable for analysis in a corpus of naturally occurring speech or in sociolinguistic interviews would be impossible.

Another reason to limit the current study to experimentally controlled speech is the complexity of intonation itself. Intonation can be used to express a wide range of linguistic and extralinguistic factors; the interaction of these factors is very complex and relatively poorly understood. As mentioned previously, intonation is greatly affected by both emotion and attitude. By controlling the context in which each utterance is produced, the emotion and attitude of the speaker while producing each utterance is expected to be relatively equal. In spontaneous speech, however, the emotion expressed by the speaker in conjunction with any given utterance will be quite different from any other utterance. Due to the number of possible confounding influences on the intonation (e.g. emotion, attitude, pragmatic meaning, phonetic factors, etc.) and the unknown nature of their possible effects, it is a necessity to exert a level of control over what is being investigated.

4.3.2 Corpus and data collection

The utterances investigated were designed with several factors in mind. First, in order to answer the research questions, utterances with both declarative and interrogative contexts were elicited, including lexically and syntactically identical utterances that are only differentiated through intonation. In order to perform a reliable analysis using pitch tracks, the segmental make-up of the utterances was controlled, i.e. voiceless and stop

consonants were avoided in the lexically stressed words and the segmental makeup of the words was kept consistent.

The corpus of utterances analyzed in the current study was created and is comprised of eight sets of sentences (four declarative sets and four interrogative sets) designed to meet the segmental, lexical, and syntactic specifications outlined previously. Each set of utterances consists of 6 sentences made up of two lexically stressed words. The same first stressed *syllable* as well as the same second tonic *syllable* is used in each sentence of a given set. This does not mean, however that the first and second stressed word is the same for every sentence in the set. For example, in the sentence sets provided in Table 4.3 the first stressed syllable is "*ió*" and the second is "*na.*" The second stressed syllable is always "*na*" for this set but the second stressed word is either *Nana, nana, or banana*. Each set of Spanish sentences is paired with another set with corresponding sentences that are syntactically and lexically equivalent. The two corresponding Spanish sentences within the two sets differ only in their pragmatic meaning, i.e. interrogative vs. declarative. This is illustrated in Table 4.3 which displays two matching sets of sentences.

Declarative	Absolute Interrogative
Termin*ó Na*na.	¿Termin*ó Na*na?
Termin*ó* la *na*na.	¿Termin*ó* la *na*na?
Termin*ó* la ba*na*na.	¿Termin*ó* la ba*na*na?
Termin*ó* con la ba*na*na.	¿Termin*ó* con la ba*na*na?
Termin*ó* lo de la ba*na*na.	¿Termin*ó* lo de la ba*na*na?
Termin*ó* con lo de la ba*na*na.	¿Termin*ó* con lo de la ba*na*na?

Table 4.3 – Example of two paired sets of sentences read by participants.

Many of the pitch movements relevant to the current study are associated with the stressed syllables. When the tonic syllables are too close together the realization of the pitch movements can be manipulated in different ways because of the need to realize multiple pitch events in a short span of time. In order to investigate these pitch movements, tonal crowding phenomena and pitch accent placement for the interrogative and declarative utterances under investigation, the syllabic makeup of the test sentences was designed with a varying number of unstressed syllables separating the two stressed syllables as well as a varying number of unstressed syllables separating the last stressed syllable and the end of the utterance. Each of the 6 sentences within a set is differentiated by the number of unstressed syllables, from 0 to 5, separating the target stressed syllables. An example of this can be seen in Table 4.3 where the two lexically stressed syllables are "nó", in *terminó,* and "na", in *Nana, nana, or banana*. As can be seen in the first sentences of Table 4.3 the two stressed syllables are adjacent to each other and in each subsequent sentence an unstressed syllable is added until there are 5 unstressed intervening syllables between the two stressed syllables. Due to the importance of the final pitch movement of interrogative utterances, each paired set of sentences was also designed with a varying number of unstressed syllables, from 0 to 3, at the end of the sentence, separating the final stressed syllable from the end of the utterance. This is illustrated in Table 4.4 which shows the first sentences of the four sets.

Declarative	Absolute Interrogative
Salió *mal*.	¿Salió *mal*?
Terminó *Na*na.	¿Terminó *Na*na?
Le da *nú*meros.	¿Le da *nú*meros?
Está *dá*ndomela.	¿Está *dá*ndomela?

Table 4.4 – Example sentences from the four sets, illustrating the varying number of unstressed syllables at the end of the utterance.

The test sentences were prepared with a context that would prompt the desired style of utterance, i.e. absolute interrogative or broad-focus declarative. The sentences and contexts along with a group of distracter sentences and corresponding contexts were randomized and printed on sheets of 8½ x 11 card stock. Examples of a target sentence intended to be produced as a declarative and then as an absolute interrogative with the corresponding contexts are given here.

1)
Pepe te pregunta cómo le fue a Juan en el examen. Tu le dices:

- *Salió mal.*

(Pepe asks you how Juan did on the test. You tell him:)

(It turned out bad.)

2)
Tú y un amigo están hablando de Jorge y quieres saber cómo le fue en un examen. Preguntas:

- *¿Salió mal?*

(You and your friend are talking about Jorge and you want to know how he did on the test. You ask him:)

(Did it turn out bad?)

Subjects were asked to read both the contexts and the target sentences out loud and were asked to read them as they would normally say them. The subjects' productions of the utterances were recorded in a quiet room in the home of the participant or in a library. The utterances were recorded digitally as wave files with a Marantz PMD670 digital recorder with a sampling frequency of 44.1 kHz using an AKG C420 head-mounted micro microphone. Special care was used to avoid the rustling of the papers and other extraneous noise that might taint the quality of the recordings. For example, during the recording the investigator placed each sheet of card stock with the target sentences in front of the participant as the utterances were produced.

Due to various factors, it was necessary to exclude a certain number of utterances from the analysis. Sentences were excluded from the analysis, for example, if they were produced with a pragmatic meaning different than what the context called for, i.e. either broad-focus declaratives or absolute interrogatives. For example, one speaker produced many of the declarative sentences with an exaggerated emphasis, or narrow focus, on the first stressed word. Ten interrogative and nineteen declarative utterances were excluded because the author felt confident that they did not convey the desired pragmatic meaning. Other sentences were excluded if there were pauses or false starts that interfered with the pitch track extraction (44 interrogatives and 33 declaratives). The total number of possible sentences to be analyzed was 1,200 (8 sets X 6 sentences/set X 25 speakers) and there were 106 sentences (54 interrogatives and 52 declaratives) that had to be excluded from the analysis, leaving a total of 1,094 sentences analyzed in the current dissertation.

4.4 Analysis

4.4.1 Analysis of extralinguistic factors (variable rule analysis)

The sociolinguistic factors described in Section 4.2 (as well as some linguistic factors) are analyzed using a logistic regression analysis commonly used in variationist studies. The most widely known statistical package used for variable rule analyses is Goldvarb which is used to determine which factors favor or disfavor the application of a binary dependent variable. The analysis performed in the current dissertation was carried out using GoldVarb 2001 (Robinson, Lawrence, Tagliamonte, 2001). Logistic regression facilitates the analysis of sociolinguistic variables because it is able to deal with the distributional imbalances usually seen in sociolinguistic data. Through an analysis using GoldVarb a probabilistic value can be discovered in order to "predict the probability of incidence of the variables independently of the observed data" (Gomez 2003, 55). An analysis using Goldvarb determines which factors are significant in their contribution to the variation and then it provides a weight which reveals the degree to which an individual factor plays a role in the application of the dependent variable. A factor weight of .500 is considered a neutral result and neither favors or disfavors application of default value of the dependent variable. A value above .500 favors the application of the variable and a value below .500 disfavors its application. A value of 1.0 indicates that the rule is categorical and a value of 0.0 means that the rule never applies. For more information on the logistic regression analysis using VARBRUL, Goldvarb 2001 or Goldvarb X, the reader is referred to Tagliamonte (2006). The dependent variable explored in the variable

rule analysis for the current study (described in Chapter 6) is the final contour of the absolute interrogative intonation: rising vs. falling.

4.4.2 Phonological analysis and description of intonation

In order to carry out the descriptive and comparative analysis of the present data, several measurements were made. The measurements for the current study were performed using Praat, a software package designed for phonetic studies. Using Praat, the following landmarks in the text of the target sentences were identified and used for measurements:

- The beginning of the stressed syllables
- The end of the stressed syllables (beginning of the posttonic)
- The location of the F0 peaks (end of rise)
- The location of the F0 valleys (beginning of rise)

Using these landmarks, many measurements were made to allow for the analysis of the pitch movements in relationship to the stressed syllables. The following measurements were made using Praat:

- The height of each F0 peak and the depth of each F0 valley (in ERB)
- The duration of each tonic syllable
- The time elapsed, in ms, from the onset of each stressed syllable to the beginning of the F0 rise
- The time elapsed, in ms, from the tonic syllable offset to the F0 peak
- The time, in ms, from the beginning of the F0 rise to the F0 peak

A few comments are necessary concerning the measurements and their purpose in the current study. It was decided to use ERB to measure pitch scaling, as opposed to other scales such has Hz or semitones, because it has been found to be a more appropriate scale for standardizing F0 values across speakers (Hermes and van Gestel 1990). The scaling of the tones is used in the description of the intonation of both the broad-focus declaratives and the absolute interrogatives. The role of tonal scaling is also investigated in the differentiation of the declaratives and interrogatives when they are lexically and syntactically identical.

The other measurements are designed to investigate the alignment of tonal events in relationship with the stressed syllables. The phonological analysis of the intonation observed in the current dissertation is based on the alignment of the tonal events with the stressed syllables in combination with syllable duration. Recently there has been some questioning as to whether this is the best approach (e.g. Arvaniti, Ladd and Mennen 2000; Prieto, D'Imperio and Fivela 2005, Face and Prieto In Press). The process of determining phonological associations by examining tonal alignment, however, has been employed extensively in previous research, including research on Spanish (e.g. Beckman et al. 2002; D'Imperio et al. 2005; de la Mota 1997; Elordieta et al. 2005; Face 2002, 2003, 2004a and 2004b; Hualde 2002 and 2003; Lleó et al. 2004, Nibert 2000, O'Rourke 2003; Prieto 2004; Prieto, van Santen and Hirschberg 1995; Prieto, D'Imperio, Gili Fivela 2005; Prieto, Shih and Nibert 1996; Sosa 1999 and 2003; Willis 2003 and 2004) and, notwithstanding the recent questioning, it was decided to approach the current analysis using the methods that have been successfully used in the past and to examine tonal alignment for the determination of the phonological analysis. This approach is considered

to be especially suitable in that it will allow the comparison of the results to the other work that has been carried out on Spanish intonation.

Chapter 5

Findings: Phonological Analysis

5.1 Introduction

The findings related to the research questions 1 and 2 are addressed in this chapter. The current chapter is organized in the following manner. Section 5.2 addresses research question #1 and it contains the description of declarative intonation. It is divided into the following sub-sections: Section 5.2.1 describes the observed prenuclear pitch accents, Section 5.2.2 describes the nuclear pitch accents, and Section 5.2.3 discusses the high amount of deaccenting observed in the declarative data. Section 5.3 addresses the second research question by analyzing the intonation patterns observed in the absolute interrogative utterances and is divided into the following subsections: Section 5.3.1 introduces the study of the absolute interrogatives and the research question, Section 5.3.2 presents the two patterns of absolute interrogatives observed in the data, Section 5.3.3 analyzes the Cuban-style falling interrogative, the rising style interrogatives are analyzed in Section 5.3.4 and the two interrogative patterns are compared in Section 5.3.5. Section 5.4, then, answers research question #2 by comparing the interrogative and declarative utterances in order to describe how these two types of utterances are differentiated in Miami-Cuban Spanish. Finally, Section 5.5 provides the discussion on the phonological analysis presented in Chapter 5.

5.2 Miami-Cuban Declarative Intonation

5.2.1 Introduction

The current section begins with research question #1:

1. *What are the characteristics of broad focus declarative intonation in Miami Spanish?*

While broad focus declarative intonation has been described extensively for some varieties of Spanish, the Spanish spoken in Miami by the Cuban population has been ignored. Sosa's (1999) description of Cuban declarative intonation was of an utterance produced with contrastive focus on one element of the utterance and therefore is not representative of Cuban broad focus intonation. However, the intonational contours for broad focus declaratives have been observed to be very similar across several other varieties of Spanish. Overall, the broad-focus declarative intonation produced by the Miami-Cuban bilinguals is very similar to that observed in many other varieties of Spanish. Figure 5.1 provides a schematic of broad focus declarative intonation for many varieties of Spanish and shows that the prenuclear accent has been analyzed as a L*+H and the nuclear pitch accent is analyzed as a L+H*.

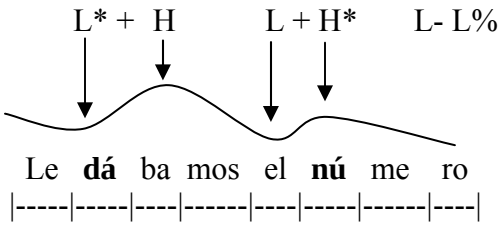


Figure 5.1 – Schematic of broad focus declarative intonation as observed in most varieties of Spanish.

The basic pitch pattern for the Miami-Cuban Spanish declaratives can be seen in Figure 5.2 which plots the F0 values, in ERB, for each tone. Valley 1 refers to the Low tone of the prenuclear accent, Peak 1 is the High tone of the prenuclear accent, Valley 2 is the Low tone of the nuclear accent and Peak 2 is the nuclear accent's High tone. Figure 5.2 provides an idea of the basic pattern of the intonational peaks and valleys of the Miami-Cuban declaratives by plotting each F0 valley and peak, in ERB, in sequential order with the aim of giving an approximate model of the pitch contour and the peak height. This model of the declarative intonation pattern shows that the Miami-Cuban declaratives are very similar to what has been observed in many other varieties of Spanish.

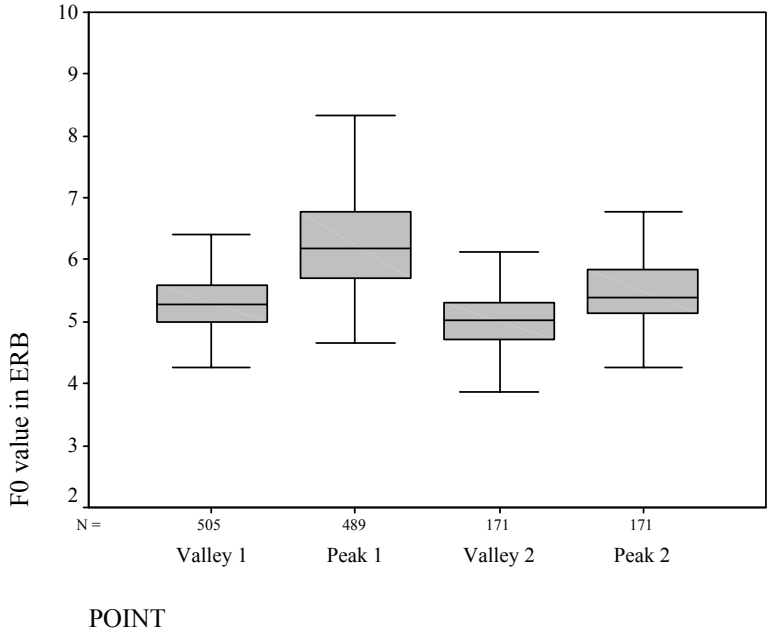


Figure 5.2 – Boxplots of F0 value, in ERB, of each tone for Spanish broad focus declaratives.

The following three sections present the analysis of the pitch contours and alignment data observed for the Miami-Cuban Spanish broad focus declaratives. This analysis provides a detailed description of the declarative intonation observed and provides the basis for the Autosegmental Metrical analysis.

5.2.2 Prenuclear pitch accent

As discussed previously in Chapter 3, the prenuclear pitch accent that occurs with broad focus declarative utterances observed in most varieties of Spanish consists of a rise that begins at or near the beginning of the stressed syllable and that continues toward a peak occurring sometime after the offset of the stressed syllable. This pattern is exactly what was observed in the Miami-Cuban data. Figure 5.3 shows a pitch track that is

representative of the broad focus declarative intonation observed in the broad focus declaratives produced by the Miami-Cuban informants.

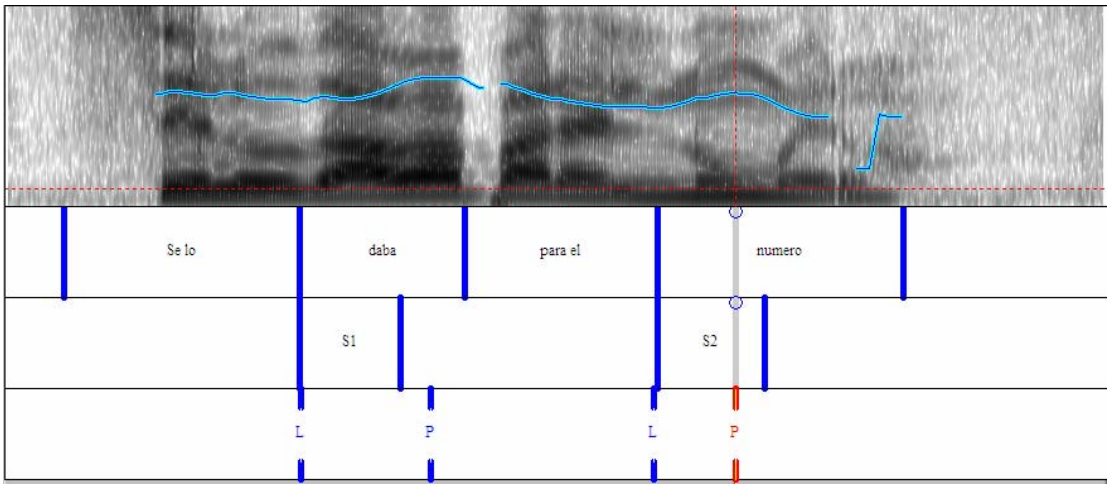


Figure 5.3 – Pitch track of the broad focus declarative utterance: *Se lo daba para el número.*

The first tier of Figure 5.3 shows the words and word boundaries, the second tier shows the boundaries of the first and second stressed syllables, labeled S1 and S2 respectively, and the third tier contains the labels marking the beginning of the rise (marked "L" in the figure) and the peaks (marked "P" in the figure). As can be seen in Figure 5.3, the first L (or Low tone), marking the beginning of the first rise, is aligned just after the onset of the first stressed syllable. Also seen is the H tone (marked "P"), signaling the first peak, and that it is aligned after the offset of the stressed syllable. By measuring the distance, in milliseconds, from the onset of the stressed syllable to the L tone it can be seen that the time from the onset to the beginning of the rise is 16 ms, or that the rise begins 16 ms into the stressed syllable. Measuring the time from the offset of

the stressed syllable to the H tone gives the alignment of the peak which is 49 ms after the stressed syllable.

Given the presence of a L tone and a H tone both affiliated with the first stressed syllable, the prenuclear accent must be a L+H. In order to further develop the AM analysis for the prenuclear pitch accent and determine whether the alignment of L or H (or both) tones is phonologically motivated, the alignment of the L tone and the H tone in relation to the stressed syllable is investigated. Also considered is the time elapsed between the L tone and the H tone, or the rise time for the first accent.

For all of the Miami-Cuban Spanish broad focus declaratives recorded, the average distance from the onset of the first stressed syllable to the beginning of the first rise is 40 ms after the syllable onset. This number is consistent across speakers, immigrant groups, and sentences differing in the number of unstressed syllables separating the two stressed syllables of each utterance, i.e. there was no statistically significant difference observed for these different factors. The L tone is aligned very consistently with the beginning of the stressed syllable. The consistent alignment suggests that the L is phonologically associated to the stressed syllable and should therefore be analyzed as L*.

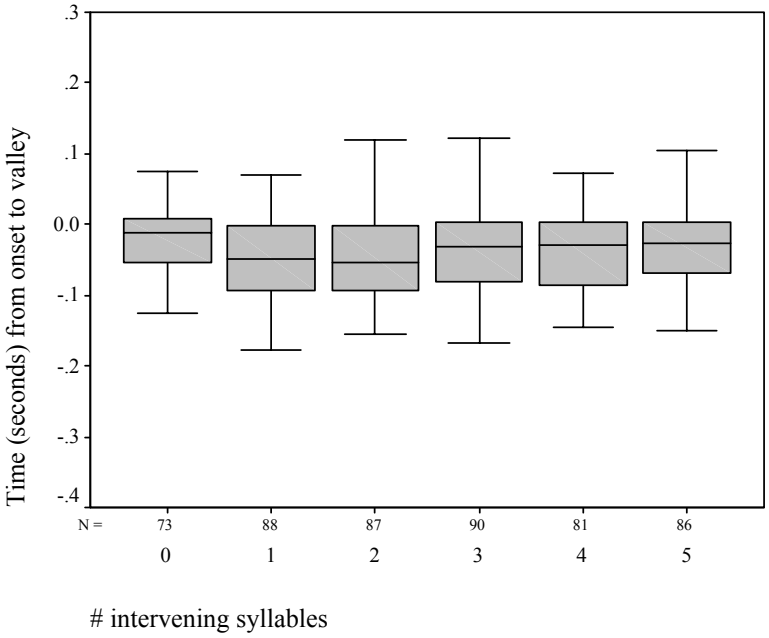


Figure 5.4 – Boxplots of the L tone alignment with the onset of the first stressed syllable.

# intervening unstressed σ	Mean	Standard Deviation
0	-20 ms	51
1	-50 ms	56
2	50 ms	56
3	39 ms	54
4	41 ms	58
5	35 ms	54
F(5,505) = 5.564, N.S.		

Table 5.1 – Alignment of the L tone and the first tonic syllable onset. A negative value corresponds to alignment before the onset and a positive value after the onset.

The H tone, however, is not aligned as regularly with the first stressed syllable as the L tone. In examining the alignment of the H tone careful consideration is given to the number of unstressed syllables separating the two stressed syllables of each utterance. Varying the number of unstressed syllables between the stressed syllables allows the investigation of the role of tonal crowding in the phonetic realization of the H tone. If, for example, the H tone is phonologically associated with the stressed syllable, its position would be expected to be consistently aligned with the stressed syllable. However, if the H tone is not phonologically associated to the stressed syllable it would be expected that its alignment would vary or that its phonetic realization would be influenced by the amount of "room" in-between the two stressed syllables. In fact, this is what is observed in the current data. Table 5.2 provides the alignment data for the first peak and the first stressed syllable. A negative number means that the peak is aligned before the offset and a positive number means that the peak is aligned after the offset. Table 5.2 shows that as the number of unstressed syllables is increased, from 0 to 5, the H tone is aligned farther and farther away from the stressed syllable, from 5 ms inside the stressed syllable to 145 ms after the tonic syllable. The results of an ANOVA show that these differences are statistically significant: $F(5,431) = 36.5$; $p < 0.0001$.

# intervening unstressed σ	Mean (ms)	Standard Deviation
0	-5	50
1	51	47
2	77	48
3	125	99
4	111	84
5	145	94
$F(5,431) = 36.5, p < 0.0001$		

Table 5.2 – Broad focus declarative alignment for the H tone of the prenuclear accent. Time, in milliseconds, from the offset to peak; a negative value means that the peak is aligned before the offset, a positive number corresponds to alignment after the offset.

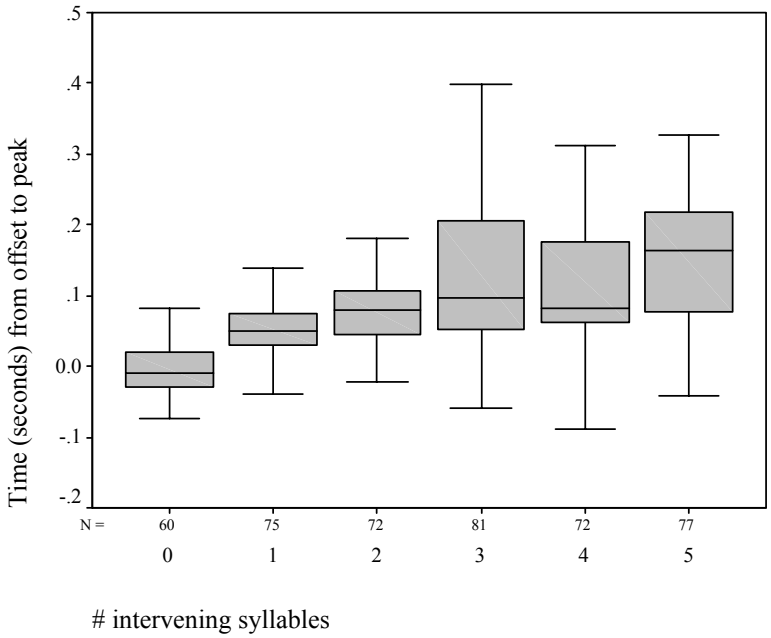


Figure 5.5 – Boxplots of peak alignment of the H tone of the prenuclear accent.

This information is also represented graphically in Figure 5.5, where boxplots of the peak alignment data for the prenuclear accent are shown. As is revealed in Table 5.2

and Figure 5.5, the first peak of the utterance occurs farther away from the offset of the first stressed syllable as the number of unstressed intervening syllables is increased.

The role of tonal crowding is also seen in the examination of the rise time of the first accent, or the time elapsed between the realizations of the L tone and the H tone. Table 5.3 shows the mean rise times, in milliseconds, for the sentences with 0 to 5 intervening unstressed syllables. This information is also illustrated in Figure 5.6, which shows the rise times graphically with boxplots. When the two stressed syllables are adjacent to each other the average amount of time from the L tone to the H tone is 160 ms. The rise times increase as the number of unstressed syllables increases to where the mean rise time with 5 unstressed intervening syllables is 276 ms. An ANOVA test reveals that these differences are statistically different; $F(5,486) = 29.34$, $p < 0.001$.

# intervening unstressed σ	Mean (ms)	Standard Deviation
0	160	74
1	177	74
2	206	68
3	247	74
4	247	74
5	276	82
$F(5,486) = 29.34$, $p < 0.001$		

Table 5.3 – Rise times, in milliseconds, for prenuclear accent.

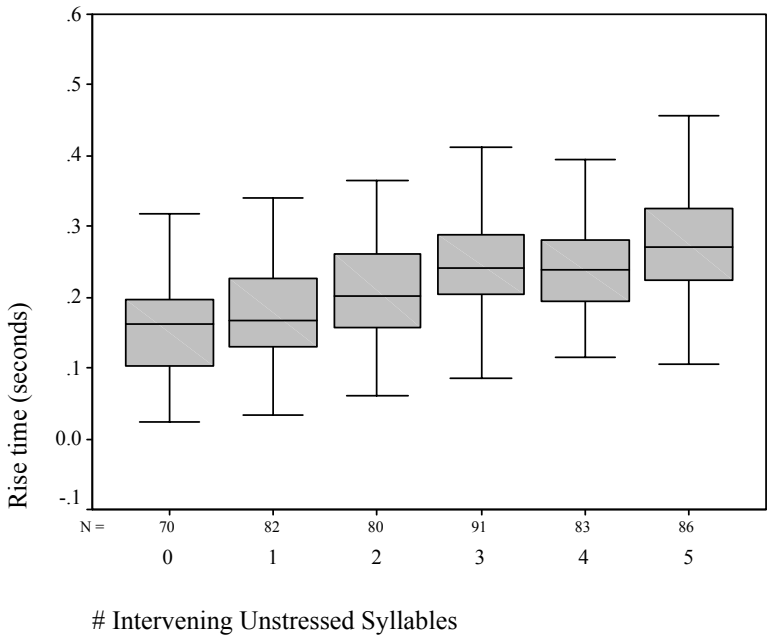


Figure 5.6 – Boxplots with rise times, in milliseconds, for nuclear pitch accents

In order to determine whether or not the rise time data is important to the analysis, it is important to consider the duration of the stressed syllable. If, for example, the stressed syllable increases in duration as there are more unstressed syllables separating it from the next stressed syllable, then the corresponding increased rise times would not necessarily support the analysis that the H tone is not phonologically aligned with the stressed syllable. If, however, the duration of the stressed syllable is consistent, then the rise time data does point towards an analysis of the H tone's alignment being phonetically motivated. Table 5.4 shows the average duration of the first stressed syllable. As can be seen in Table 5.4, the mean duration of the first stressed syllable in the Miami-Cuban Spanish declaratives is 177 ms. Although the number of intervening unstressed syllables

varies, the duration remains consistently between 166 and 184 ms. The differences observed in duration are not statistically significant; F(5,539) = 1.407; N.S.

# intervening unstressed σ	Mean Duration	Standard Deviation
0	184 ms	46
1	173 ms	63
2	170 ms	53
3	166 ms	51
4	184 ms	71
5	178 ms	57
F(5,539) = 1.407; N.S.		

Table 5.4 – Average duration of the stressed syllable affiliated with the prenuclear accent.

The peak alignment data illustrated in Table 5.2 and Figure 5.5 indicates that tonal crowding has an influence on the phonetic realization of the peak, or H tone. The peak is aligned farther away from the stressed syllable as there are more intervening unstressed syllables. This information, along with the rise time and syllable duration data illustrated in Tables 5.3 and 5.4 and Figure 5.6 showing that rise times are significantly longer as the number of intervening unstressed syllables is increased, points to the conclusion that the H tone is not phonologically associated with the stressed syllable. The L tone, on the other hand, is very consistently aligned with the beginning of the stressed syllable and is analyzed as being phonologically associated with the stressed syllable. Therefore, the proposed prenuclear pitch accent for Miami-Cuban Spanish broad focus declaratives is L*+H.

5.2.3 Nuclear pitch accent

Figure 5.1 provides a schematic representation of the prenuclear accent, the nuclear accent and the boundary tones as analyzed in most varieties of Spanish studied by many researchers. The schematic shows the nuclear accent beginning with a L tone occurring before the onset of the final stressed syllable and a rise toward a H tone aligned within the stressed syllable. The AM analysis provided with the schematic in Figure 5.1 is L+H*. The current data revealed two major intonation patterns occurring with the final stressed syllable. The first is an accent very similar to those described for other varieties of Spanish and illustrated in Figure 5.1. The second is the absence of a pitch accent. Of the 451 declarative sentences analyzed, only 139 (31%) were accented and 312 (69%) were deaccented.

The current section introduces the analysis of the nuclear pitch accents that are present, the discussion on deaccenting takes place in Section 5.2.4. This section is organized in the following manner: first the alignment of the valley (Section 5.2.3.1) and the peak (Section 5.2.3.2) affiliated with the final stressed syllable is described then the rise times and syllable duration are discussed and finally an AM analysis for the nuclear pitch accent is proposed.

5.2.3.1 Status of the nuclear accent L tone

The alignment of the valley affiliated with the nuclear accent is shown in Table 5.5 and in Figure 5.7. Table 5.5 provides the time elapsed between the location of the L

tone and the onset of the final stressed syllable, a negative value representing a valley occurring after the onset and a positive value indicating that the valley is aligned before the onset. In cases of extreme tonal crowding, when there are 0 or one unstressed intervening syllables, the alignment of the valley is after the onset of the stressed syllable: averaging 200 ms after the onset when there are 0 intervening syllables and 38 ms when there is one intervening syllable. In cases of moderate to no tonal crowding, i.e. with 2 to 5 intervening unstressed syllables, the L tone is consistently aligned just before the onset of the stressed syllable. An analysis of variance found the differences to be statistically significant, $F(5,143) = 9.62$; $p < 0.0001$. A Tukey post-hoc pairwise comparison revealed that there is a significant difference in valley alignment only in cases of absolute stress clash, i.e. 0 intervening unstressed syllables. In cases of 1 to 5 intervening syllables there is no significant difference in L tone alignment.

# intervening unstressed σ	Mean	Standard Deviation
0	-200 ms	174
1	-38 ms	96
2	11 ms	104
3	5 ms	96
4	12 ms	118
5	33 ms	89
$F(5,143) = 9.62$, $p < 0.0001$		

Table 5.5 – Nuclear pitch accent L tone alignment. Time, in ms, from valley to onset; a negative value represents alignment after the onset and a positive value indicates alignment before the onset.

The boxplots in Figure 5.7 show that when there are 0 unstressed intervening syllables the L tone occurs well after the onset and into the stressed syllable. It also shows that when there is 1 intervening syllable, or a situation of relatively extreme tonal crowding, the majority of the L tones occur after the onset or inside the stressed syllable. It is also seen that with more room to the left of the final stressed syllable the L tone gradually aligns before the tonic syllable. Post hoc pairwise comparisons show that the difference in valley alignment between 1 intervening syllable (aligns inside the syllable) and 2 through 5 intervening syllables (all aligned before the syllable) is not significant, however, it is apparent that tonal crowding plays a role in pushing the L tone toward the end of the utterance to where it is aligned within the stressed syllable. The observation that the L tone alignment is affected so strongly by tonal crowding strongly suggests that the L tone's alignment is phonetically motivated by tonal crowding and not by a phonological association with the final stressed syllable.

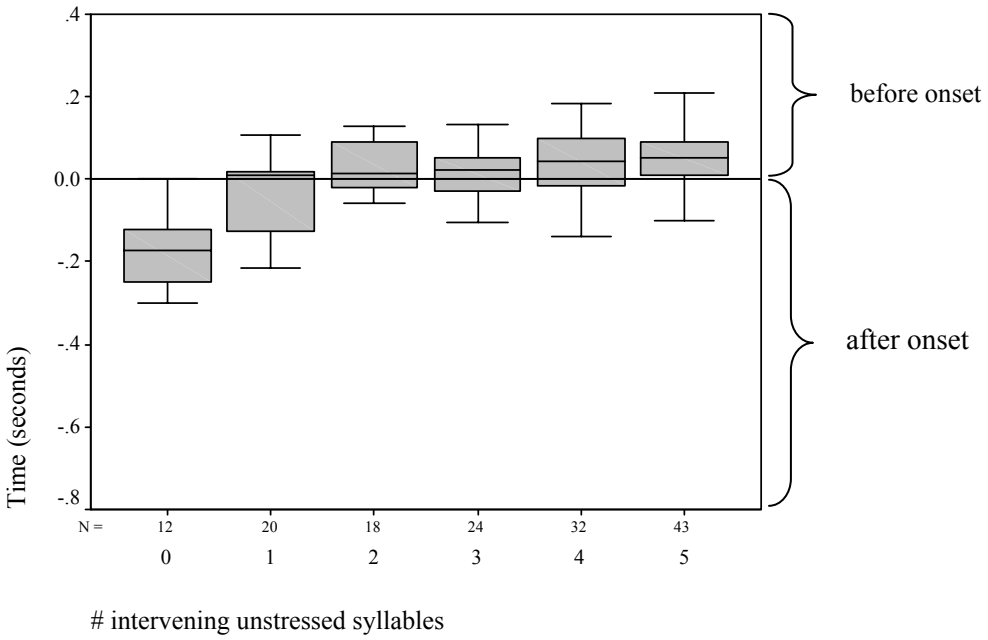


Figure 5.6 –Boxplots of nuclear accent L tone alignment. A negative value is represents alignment after the onset (within the stressed syllable). A positive value represents alignment before the onset.

5.2.3.2 Status of the nuclear accent H tone

In order to analyze the phonological status of the H tone affiliated with the nuclear pitch accent, peak alignment, rise times and syllable duration are all explored. Figure 5.8 and Table 5.6 give the peak alignment data broken up by the number of intervening unstressed syllables. In cases of absolute tonal crowding, 0 intervening syllables, the average peak alignment is 65 ms before the end of the syllable. In all other cases the average peak alignment is between 100 and 133 ms before the stressed syllable offset. The alignment of the H tone later in the stressed syllable in instances when there are 0 intervening syllables points toward the influence of tonal crowding. However, an

analysis of variance showed no statistically significant differences between these groups with the exception being between the two extreme cases: pairwise comparisons revealed that there is a significant difference between cases with 0 intervening syllables (65 ms) and with 3 intervening syllables (133 ms); $p < 0.05$. While there is a difference between these two groups this difference does not seem to be especially relevant to the phonological analysis since the alignment for all groups is within the stressed syllable which suggests a phonological association.

# intervening unstressed σ	Mean	Standard Deviation
0	-65 ms	67
1	-100 ms	66
2	-123 ms	84
3	-133 ms	94
4	-104 ms	72
5	-114 ms	58
F(5,139) = 1.03, N.S.		

Table 5.6 – Nuclear pitch accent peak alignment by # intervening unstressed syllables. Time, in ms, from offset to peak; a negative value represents alignment before the offset.

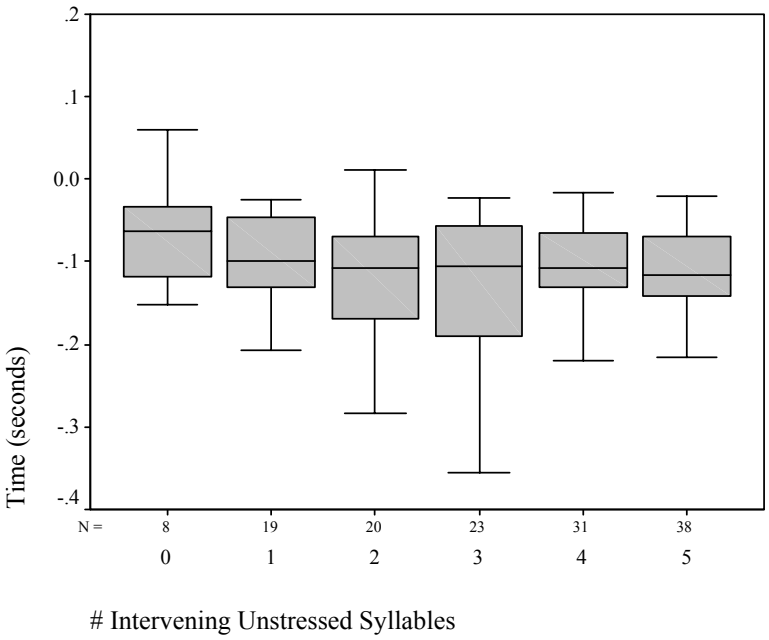


Figure 5.8 – Boxplots of nuclear pitch accent peak alignment by # intervening unstressed syllables.

In order to confirm the phonological association of the H tone for the nuclear pitch accent, the peak alignment is analyzed in relation to the number of unstressed syllables following the last stressed syllable. If a phonological association is present between the H tone and the stressed syllable, the alignment would be expected to remain consistent even as there is more room available after the stressed syllable. On the other hand, if the peak's alignment were to move outside of the tonic syllable and move farther away from the offset, toward the end of the utterance, as there is more room (i.e. more unstressed syllables) between the offset and the end of the sentence, then the analysis would point toward a phonetic motivation for its alignment and not a phonological association. Table 5.7 and Figure 5.9 provide the H tone alignment by the number of unstressed syllables following the final stressed syllables. When the stressed syllable is

the final syllable of the utterance the mean location of the peak is 110 ms before the offset. The peak moves slightly toward the end of the syllable as there is 1 final unstressed syllable (103 ms) and 2 final unstressed syllables (87 ms). Interestingly when there are 3 final unstressed syllables, in compound words such as *dándomela*, the peak is aligned 130 ms before the stressed syllable's offset. The ANOVA shows that these differences are not statistically significant and support the analysis that the H tone is associated with the stressed syllable. This becomes even more obvious when compared to the alignment of the prenuclear H tone and its tonal crowding situation to its right, i.e. the number of unstressed intervening syllables. As is shown in Table 5.2, the peak affiliated with the first tonic syllable is variable in its alignment. As there is more space between the two tonic syllables the prenuclear peak moves away from the stressed syllable. This pattern simply does not hold for the nuclear peak in that its alignment is consistent as there is more room available to the right or after the tonic syllable.

# final unstressed σ	Mean	Standard Deviation
0	-110 ms	107
1	-103 ms	72
2	-87 ms	38
3	-130 ms	69
F(5,139) = 2.77, N.S.		

Table 5.7– Nuclear pitch accent peak alignment by # final unstressed syllables. Time, in ms, from offset to peak; a negative value represents alignment before the offset.

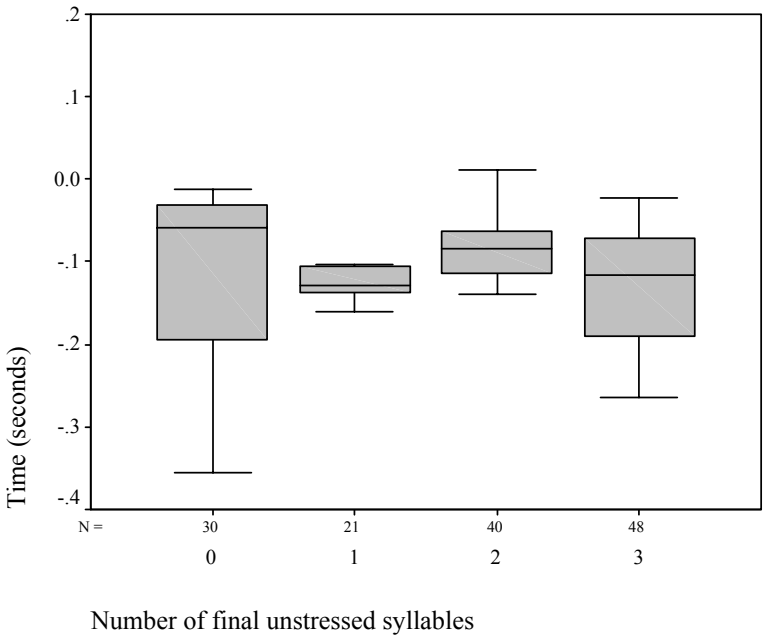


Figure 5.9 – Boxplots of nuclear pitch accent peak alignment by # final unstressed syllables.

The nuclear accent rise time and the final syllable duration by the number of preceding unstressed syllables is provided in Tables 5.8 and 5.10. The rise times gradually increase as there are more unstressed syllables before the final stressed syllable, from 117 ms, with 0 intervening syllables, to 145 ms, when there are 5 preceding unstressed syllables. The shorter rise time in cases of tonal crowding is most likely due to the decreased room available for the pitch movement to be realized. The increase in rise times with more intervening syllables, while not statistically significant, can be attributed to the alignment of the L tone as it is moved to the left or to the beginning of the utterance thus creating a longer time between the L and the H tones. The longer rise times support the analysis of the L tone being an unassociated member of the nuclear pitch accent.

# intervening unstressed σ	Mean	Standard Deviation
0	117 ms	88
1	124 ms	58
2	130 ms	96
3	130 ms	77
4	137 ms	59
5	145 ms	56
F(5,147) = 0.490, N.S.		

Table 5.8 – Nuclear accent rise times, in ms, by number of intervening unstressed syllables.

The average duration of the final syllable (Table 5.9), when compared across the different numbers of preceding unstressed syllables, decreases as there are more intervening unstressed syllables. With no preceding unstressed syllables the mean duration is 263 ms and the mean duration decreases to 198 ms when preceded by 5 unstressed syllables. Tonal crowding appears to influence syllable duration in that when there is less room separating the two stressed syllables, i.e. less room for the accent to be realized, the final stressed syllable is lengthened. The quicker rise time and final stressed syllable lengthening in cases of tonal crowding allows for the H tone to be realized within the stressed syllable and supports the analysis of the H tone alignment with the stressed syllable being phonologically specified.

# intervening unstressed σ	Mean Duration	Standard Deviation
0	263 ms	55
1	242 ms	66
2	223 ms	57
3	236 ms	77
4	225 ms	62
5	198 ms	52
$F(5,139) = 2.42, p < 0.05$		

Table 5.9 – Final stressed syllable duration by # intervening unstressed syllables.

The final piece of evidence regarding the phonological analysis of the H tone is the rise time and syllable duration by the number of final unstressed syllables. Table 5.10 gives the rise times by the number of final unstressed syllables and Table 5.11 and Figure 5.10 show the syllable duration. The average rise time is 114 ms when the stressed syllable is the final syllable of the utterance; the rise time is 122 ms with one unstressed final syllable, 125 ms with 2 and 158 with 3 final unstressed syllables. The increase in rise times corresponds to the tonal crowding situation in that when there is more room after the stressed syllable the rise can take longer to be completed. The differences observed in the data, however, were not statistically significant.

# final unstressed σ	Mean	Standard Deviation
0	114 ms	74
1	122 ms	74
2	125 ms	68
3	158 ms	74
$F(3,149) = 3.94$, N.S.		

Table 5.10 – Nuclear accent rise times, in ms, by number of final unstressed syllables.

The nuclear accent syllable durations in Table 5.11 show that when the stressed syllable is the last syllable of the utterance the mean duration is 320 ms. The analysis of variance shows a significant main effect for the number of final unstressed syllables and a post-hoc pairwise comparison shows that the group with 0 final unstressed syllables is significantly different from the other three groups but that the mean durations for the groups with 1, 2 and 3 final unstressed syllables are not significantly different from each other. This is illustrated more clearly in Figure 5.11 where it can be seen that groups 1, 2 and 3 cluster together and group 0 is quite a bit longer than the others. This difference can be attributed to final lengthening, a phenomenon observed in many cases and in most varieties of Spanish, i.e. the utterance final syllable is lengthened considerably in comparison to the other syllables of the utterance.

# final unstressed σ	Mean	Standard Deviation
0	320 ms	48
1	189 ms	19
2	175 ms	27
3	220 ms	33
$F(3,139) = 5632.08, p < 0.0001.$		

Table 5.11 – Final stressed syllable duration by number of final unstressed syllables.

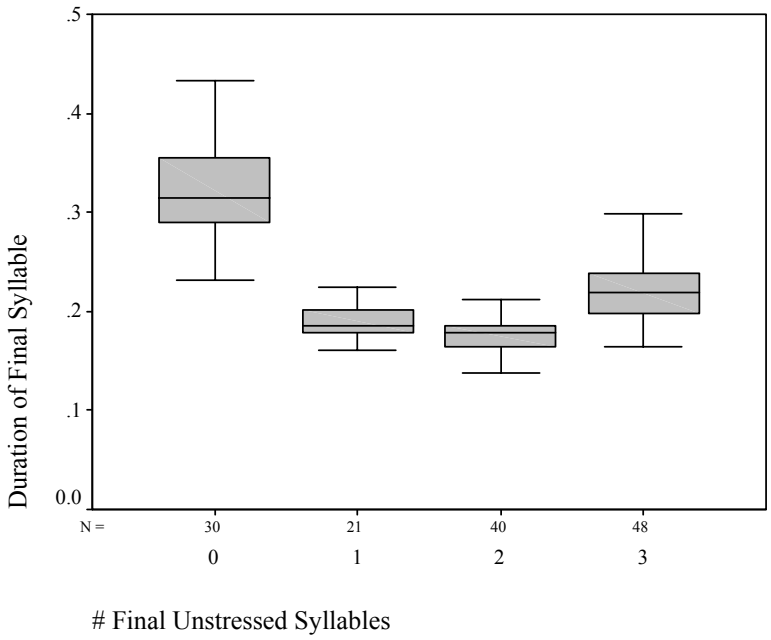


Figure 5.10 – Boxplots of final stressed syllable duration by number of final unstressed syllables.

The tonal crowding situation of the final accent when taking into account the number of following unstressed syllables is similar to that situation when taking into account the number of unstressed preceding syllables. In cases of absolute tonal crowding, i.e. 0 preceding unstressed syllables or 0 following unstressed syllables, the final tonic syllable is lengthened and the rise time is shortened. It is evident that the longer duration of the stressed syllable combined with the shorter rise time allows for both the L and the H tone to be realized within the syllable in situations of tonal crowding. This is illustrated in Table 5.12 which provides the L tone and H tone alignment data along with the rise time and duration data compared by the number of unstressed final syllables. It can be seen in Table 5.12 that the H tone is consistently aligned within the stressed syllable and the L tone is aligned near the beginning or before

the stressed syllable except in instances of extreme tonal crowding when it is observed to be aligned much farther inside the syllable. The evidence presented in this section points to an AM analysis of the H tone being associated phonologically to the stressed syllable and the preceding L tone being an unassociated member of the nuclear pitch accent. The analysis of the nuclear accent, in the AM notation, therefore, is L+H*.

# final unstressed σ	Average valley alignment	Average peak alignment	Mean rise time	Mean syllable duration
0	-106 ms* (after onset)	-110 ms (before offset)	114 ms	320 ms*
1	0 ms	-103 ms (before offset)	122 ms	189 ms
2	27 ms (before onset)	-87 ms (before offset)	125 ms	175 ms
3	33 ms (before onset)	-130 ms (before offset)	158 ms	220 ms
ANOVA	$p < 0.0001$	N.S.	N.S.	$p < 0.0001$
*significantly different than other groups, $p < 0.05$, after pairwise comparison				

Table 5.12 – Nuclear accent alignment, rise time and syllable duration by the number of final unstressed syllables.

The nuclear accent data observed in the current study, while supporting the analysis for a L+H* accent, must be examined with the understanding that only 31%, or 139, of the broad focus declaratives produced were accented. In order to verify the L+H* nuclear accent analysis for this variety of Spanish future studies need to examine more instances of accented declarative utterances.

5.2.4 Deaccenting

As mentioned in section 5.2.3, of the 451 declarative sentences analyzed, only 139 (31%) were accented and 312 (69%) were deaccented. Deaccenting is defined as the absence of a pitch accent affiliated with a stressed syllable. Figure 5.11 provides an example of a broad focus declarative, *Terminó con la banana*, produced with a deaccented final syllable.

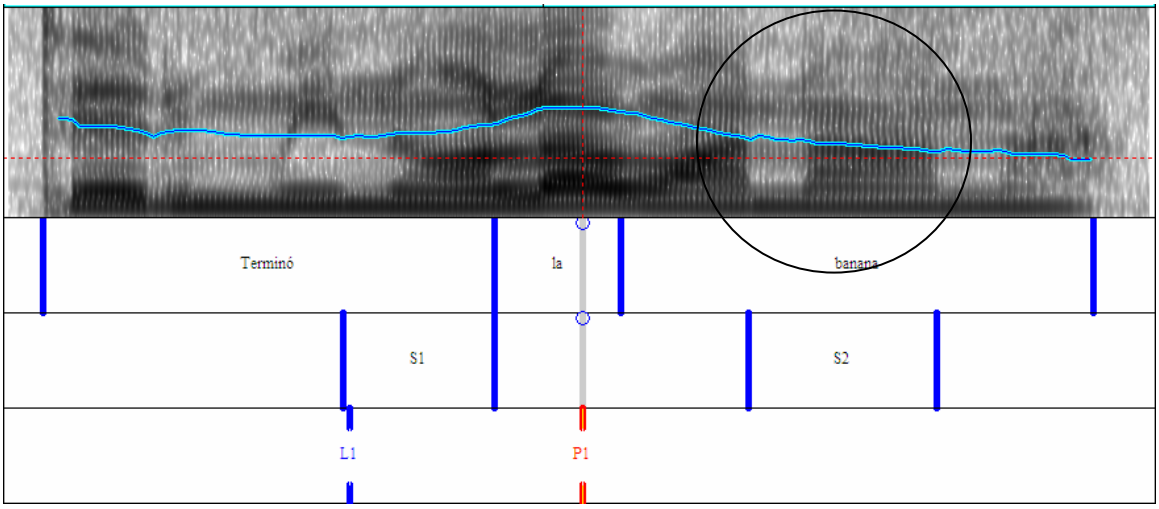


Figure 5.11 – Pitch track of the declarative utterance, "*Terminó la banana*", which illustrates deaccenting where a nuclear accent would be expected.

The prevalence of deaccenting in the Miami-Cuban Spanish declaratives is somewhat surprising because previous research on other varieties of Spanish has shown some deaccenting but at a much smaller rate than what is observed in the current data. For example, Face (2002) observed that 60% of the final stressed syllables in his broad

focus declarative data, from Madrileño Spanish, were accented. Prieto et al. (1996) report that one of their speakers from Mexico also produced declarative utterances with no appreciable F0 rise affiliated with the final stressed syllable. The lack of a final F0 rise in Prieto et al.'s data was claimed to be extreme version of the F0 final lowering observed in many languages.

	Accent Present		No Accent Present		Total	
# intervening unstressed σ	N	%	N	%	N	%
0	8	12.90%	54	87.10%	62	100.00 %
1	19	24.10%	60	75.90%	79	100.00 %
2	20	25.60%	58	74.40%	78	100.00 %
3	23	28.40%	58	71.60%	81	100.00 %
4	31	43.10%	41	56.90%	72	100.00 %
5	38	48.10%	41	51.90%	79	100.00 %
Totals	139	30.82%	312	69.18%	451	100.00 %

Table 5.13 – Accented and deaccented syllables according to the number of intervening unstressed syllables.

In examining the absence of a final F0 rise or pitch accent in the current data, it becomes apparent that tonal crowding influences the presence or absence of the pitch accent. Table 5.13 provides the number of accents present versus the number of accents absent on the final stressed syllable according to the number of preceding unstressed syllables. Of the 62 declarative utterances analyzed where the final stressed syllable is preceded directly by the first stressed syllable (0 intervening), there were only 8 pitch

accents observed (12%) and 54 instances of no appreciable F0 rise affiliated with the final tonic syllable. As the number of unstressed preceding syllables is increased, creating more room before the final stressed syllable, the number of accents observed increases also. With 1 intervening syllable there are 19 accents present and this number increases to 31 accents with 5 preceding unstressed syllables. An analysis of variance shows that the differences presented in Table 5.14 is significant; $F(5,450) = 5.972$, $p > 0.0001$. Pairwise comparisons show that in cases of extreme to moderate tonal crowding (0 to 2 preceding unstressed syllable) the number missing accents is significantly less than when there are 5 intervening unstressed syllables.

While it is evident that tonal crowding before the final syllable plays a role in deaccenting of the nuclear accent, the role of tonal crowding following the final stressed syllable is not as obvious. Table 5.14 shows the number of accented versus deaccented final syllables according to the number of following unstressed syllables. While deaccenting is more common when the final syllable is stressed (90 deaccented tokens; 75%), an ANOVA revealed no significant difference in overall variation. Post hoc pairwise comparisons, as seen in Table 5.15, revealed significant differences, however, between the 0 final unstressed and 3 final unstressed groups as well as between the 1 final unstressed and the 3 final unstressed groups. This means that there are more instances of deaccenting when there are 0 or 1 unstressed final syllables than there are when there are 3 final unstressed syllables. Tonal crowding after the nuclear accent, therefore, influences the deaccenting of the nuclear pitch accent: with less room after the final stressed syllable there is a greater frequency of deaccenting.

	Accent Present		No Accent Present		Total	
# final unstressed σ	N	%	N	%	N	%
0	30	25.0%	90	75.0%	120	100%
1	21	21.2%	78	78.8%	99	100%
2	40	34.2%	77	65.8%	117	100%
3	48	41.7%	67	58.3%	115	100%
Totals	139	30.82%	312	69.18%	451	100%

Table 5.14 – Accented and deaccented syllables according to the number of final unstressed syllables.

# final unstressed σ	# final unstressed σ	Mean Difference	Std. Error	Sig.
0	1	.0379	.05961	.921
	2	-.0919	.05704	.374
	3*	-.1674	.05729	.019
1	0	-.0379	.05961	.921
	2	-.1298	.05995	.135
	3*	-.2053	.06019	.004
2	0	.0919	.05704	.374
	1	.1298	.05995	.135
	3	-.0755	.05765	.557
3	0*	.1674	.05729	.019
	1*	.2053	.06019	.004
	2	.0755	.05765	.557

Table 5.15 – Pairwise comparisons (Tukey HSD) of the number of deaccented final syllables by the number of final unstressed final syllables. The asterisk marks the group that is significantly different, at the $p < 0.05$ level, from the other groups.

5.3 Miami Cuban Absolute Interrogative Intonation

5.3.1 Introduction

According to Quilis (1993), one of the most important functions of Spanish intonation is its use to disambiguate interrogatives from declaratives. As discussed in Chapter 3, Spanish declaratives and interrogatives can be identical, both lexically as well as syntactically (illustrated in examples 1 and 2) leaving intonation as the only cue to the intended meaning.

(1) *Compró pan en el mercado.*
He/she bought bread in the market.

(2) *¿Compró pan en el mercado?*
Did he/she buy bread in the market?

The intonation strategies used to differentiate between interrogatives and declaratives are explored in the current section. In doing so, research question #2 is addressed:

2. How do Miami Cubans differentiate between absolute (yes/no) interrogatives and lexically and syntactically identical declarative utterances?

In descriptions of the intonation strategies for disambiguating Spanish interrogatives from declaratives, two intonational cues have been primarily explored: a rising or falling final pitch contour or the height of the first F0 peak. Quilis (1993), for example, described the situation in Peninsular Spanish by saying "El enunciado declarativo se caracteriza por la terminación descendente…[y]…el enunciado interrogativo absoluto…[s]e caracteriza por un final ascendente del fundamental" (428-

429). Navarro Tomás (1944), on the other hand, said that the first F0 peak of an interrogative utterance is higher in questions making it so that "the interrogative or declarative meaning of an utterance becomes perceptible from its first syllables" (136; translation mine). While these two intonational cues signaling interrogativity (final contour and first peak height) have been the main two factors studied, most of the attention has been focused on the final contour and the height of the first F0 peak has been mostly ignored.

The current section provides a general description of the F0 contour patterns produced for interrogatives and it also gives a phonological analysis of these patterns using the AM model by analyzing the tonal alignment and the peak height of the interrogatives produced by the Miami-Cuban informants.

5.3.2 Description of Interrogative Intonation Patterns

A total of 515 absolute interrogative utterances were analyzed in the current study (Table 5.17). Of these, there were two major interrogative pitch patterns observed. The first pattern observed (N = 164) is very similar to the pattern described by Sosa (1999) who called it one of the distinctive features of Caribbean Spanish. This pattern, illustrated in Figure 5.12, is also representative of the Cuban absolute interrogatives as described by García Riverón (1996b).

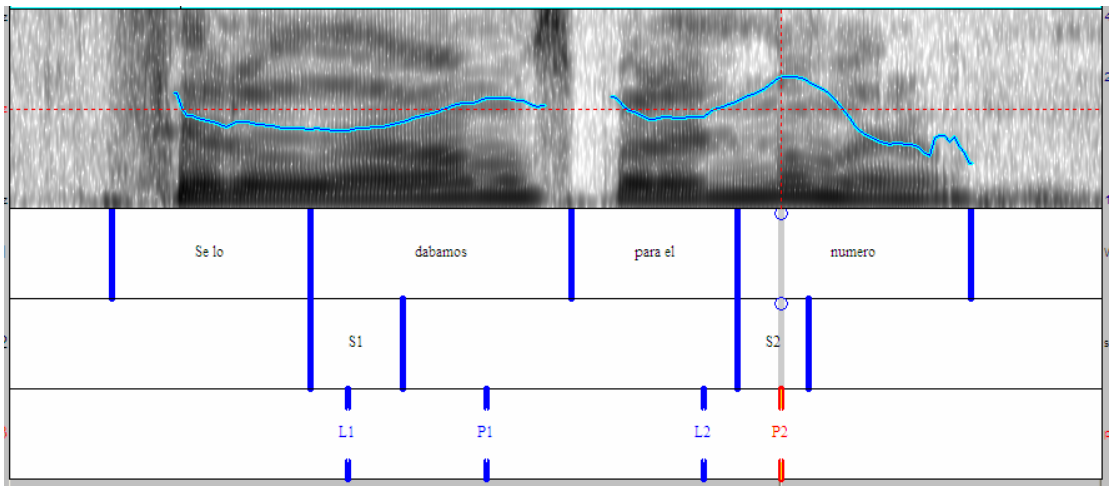


Figure 5.12 – Pitch track of the interrogative utterance "¿Se lo dábamos para el número?," illustrating the Caribbean style interrogative pitch pattern.

The other interrogative intonation pattern (N = 351) observed in the Miami-Cuban data, illustrated in Figure 5.13, is very similar to the patterns reported for many other varieties of Spanish, particularly Peninsular varieties. This intonation pattern with the rising final contour is also similar to absolute interrogative intonation in American English. The most obvious difference between the pitch patterns observed is the final F0 contour where the "Caribbean style" pattern has a descending pitch and the other has a rising pitch.

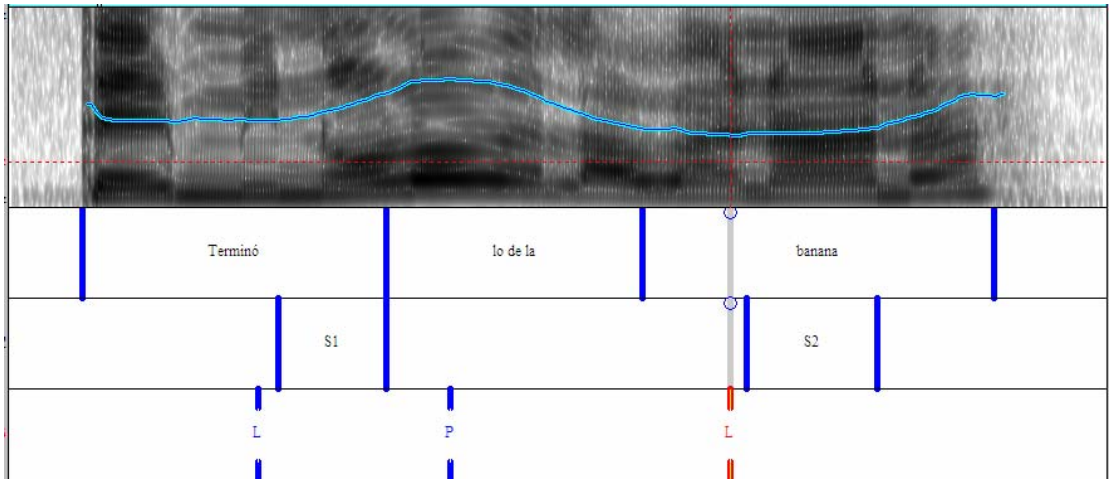


Figure 5.13 – Pitch track of the interrogative utterance "Terminó lo de la banana," illustrating the rising final contour. This pattern is similar to interrogative patterns observed in other Spanish varieties as well as American English.

The pattern illustrated in Figure 5.12 is referred to in the remainder of the dissertation as either the "Cuban style" interrogative or "Falling pattern" interrogative. It is discussed in detail in Section 5.3.2.1 where a phonological analysis is provided. Section 5.3.2.2 provides a detailed look at the second pattern and provides a phonological analysis. This second pattern, illustrated in Figure 5.13, is referred to as the "Rising pattern" interrogative throughout the remainder of the current study. Table 5.16 provides the frequency of each interrogative pattern in the data for the current study and shows that 32 percent of the interrogatives produced have the falling pattern and 68% have the rising pattern.

Interrogative Type	Number	Percentage
Falling or "Cuban" Style	164	32%
Rising Style	351	68%
Total	515	100%

Table 5.16 – Miami-Cuban absolute interrogatives.

5.3.3 Description of the Cuban Style or Falling Interrogative Pattern

Of the 164 Miami-Cuban interrogative utterances produced with a falling final contour, 153 were extracted from the sample and analyzed following the same procedure that was used in the analysis of the declarative utterances. The other 11 utterances obviously followed the falling pattern but were not used for the phonological analysis due to pitch track failure on either the prenuclear or nuclear pitch accents. Tonal alignment with first and last stressed syllables is measured and discussed in relation to syllable length and rise times. Within the group of the "Cuban-style" falling interrogatives there are two basic pitch patterns observed. The first is illustrated in Figure 5.12 and Figure 5.15 and consists of two pitch accents, both a combination of a L and a H tone. The second pattern observed in the falling style interrogatives is illustrated in Figure 5.14 and also has two pitch accents but each accent is apparently made up of a valley aligned with the first tonic syllable and a peak aligned with the final stressed syllable. Of the 153 "Cuban-style" falling interrogatives analyzed in this section, 99 (67%) follow the pattern with two L+H accents (Figure 5.5) and 54 (33%) follow the second pattern (Figure 5.14).

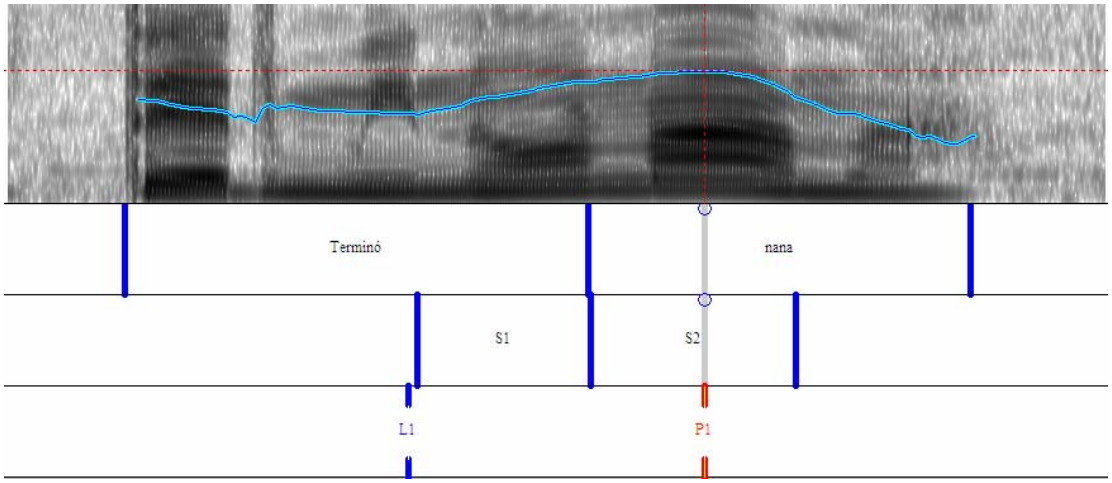


Figure 5.14 – Pitch track of the interrogative *¿Terminó nana?* illustrating the absence of the H tone affiliated with the prenuclear accent.

The first pattern of the Cuban-style interrogatives is illustrated in the boxplots in Figure 5.15 and the second pattern illustrated in Figure 5.16 in which each F0 valley and peak is measured, in ERB, and plotted sequentially in order to give an approximate model of the pitch contour. These models do not illustrate, however, the final boundary tone or the falling final contour which is present in all of the utterances produced with this pattern. The remainder of this section discusses these two patterns and explores whether they are actually two separate patterns with phonologically distinct pitch accents or whether the two different manifestations are conditioned by phonetic factors that merit one phonological analysis with differing phonetic realizations.

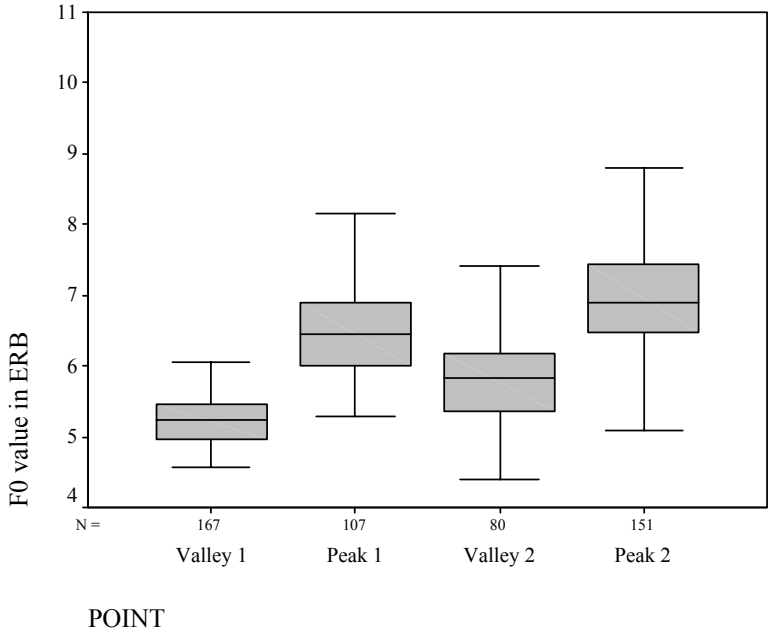


Figure 5.15 – Boxplots of F0 value, in ERB, of each tone for the first pattern Cuban Style Spanish absolute interrogatives.

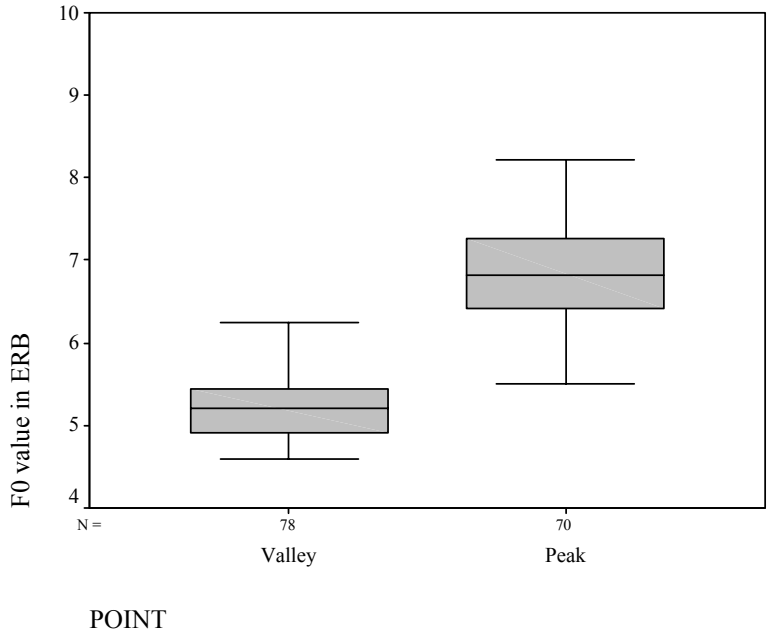


Figure 5.16 – Boxplots of F0 value, in ERB, of each tone for the Cuban Style Spanish absolute interrogative pattern with only one F0 peak.

5.3.3.1 Prenuclear pitch accent: Cuban-style absolute interrogatives

For all of the Miami-Cuban Spanish Cuban-style absolute interrogatives there is an F0 rise that begins near the beginning of the first stressed syllable. The average distance from the onset of the first stressed syllable to the beginning of the first F0 rise, for all Cuban-style interrogatives, is 0 ms; i.e. the average L tone is aligned exactly with the onset. There is no significant difference in valley alignment between the two patterns of Cuban-style interrogatives, i.e. the presence or absence of the F0 peak following the first valley does not affect its alignment. There was also no significant main effect in valley alignment for the different patterns, speaker, immigrant group or number of intervening unstressed syllables, i.e. there was no statistically significant difference observed for these factors. The L tone is aligned very consistently with the beginning of the stressed syllable for both patterns of Cuban-style interrogatives. This consistent alignment suggests that the L tone is phonologically associated to the stressed syllable for all of the Cuban-style interrogatives.

As stated previously, there are two types of prenuclear pitch accents produced in the Cuban-style interrogatives: one consisting of a valley followed by a peak and the other consisting of a valley only. Of the 164 "Cuban-Style" interrogatives analyzed, 99 (67%) were realized with an F0 peak. The distribution of these two patterns in relation to the number of intervening unstressed syllables is illustrated in Table 5.17 where it is shown that with 0 intervening unstressed syllables there are absolutely no cases of an F0 peak in the prenuclear accent. With 1 intervening syllable there is an H tone in 41.7% of the cases and in 70% of the cases there is a peak present when there are 2 intervening

syllables. The presence of the F0 peak increases to 92% when there are 3 following unstressed syllables. The presence of the H tone becomes categorical when there are 4 and 5 intervening unstressed syllables. This data reveals a strong pattern of tonal crowding influencing the phonetic realization of the H tone, making it optional when there is little space between stressed syllables for its realization. Following this analysis, the two different patterns appear to be different phonetic manifestations of the same pitch accent. This possibility and the status of the peak, when present, is discussed in the following paragraphs.

	Peak Present		Peak Absent		Total	
# intervening unstressed σ	N	%	N	%	N	%
0	0	0%	29	100%	29	100%
1	10	41.70%	14	58.30%	24	100%
2	21	70.00%	9	30.00%	30	100%
3	23	92.00%	2	8.00%	25	100%
4	23	100%	0	0%	23	100%
5	22	100%	0	0%	22	100%
Totals	99	67.28%	54	32.72%	153	100%

Table 5.17 – Absence vs. presence of F0 peak affiliated with the prenuclear accent by the number of unstressed syllables separating the two stressed syllables.

For the pattern where there is an H tone present, the mean alignment is 90 ms after the first tonic syllable's offset. Table 5.18 shows the average alignment for the peak according to the number of unstressed following (intervening) syllables. The average distance of the H tone from the syllable offset when there is 1 unstressed following syllable is 64 ms. The average distance is 62 ms after the offset when there are 2 unstressed intervening syllables. This distance jumps to 121 ms with 3 unstressed

intervening syllables. When there are 4 unstressed following syllables the average time is 89 ms and then 95 ms when there are 5 unstressed intervening unstressed syllables. The ANOVA revealed a significant main effect for the number of unstressed intervening syllables but no main effect for speaker or immigrant group. Post hoc comparisons show that the group with 3 intervening syllables is significantly different from the group with 1 or 2 intervening syllables. No significant difference was observed between the groups with 3, 4 and 5 unstressed following syllables. The alignment of the F0 peak suggests that it is not phonologically associated with the first tonic syllable.

# intervening unstressed σ	Mean	Standard Deviation	N
0	-	-	0
1	64 ms	35	10
2	62 ms	31	21
3	121 ms	83	23
4	89 ms	68	23
5	95 ms	59	22
$F(4,99) = 3.069, p < 0.05$			

Table 5.18 – H tone alignment with the offset of the first tonic syllable. Time, in ms, from offset to peak.

The average duration of the first stressed syllable for all utterances with an H tone present is 141 ms. There are no significant differences in syllable duration according to the number of unstressed intervening syllables. The rise time, or time elapsed between the beginning of the F0 rise and the F0 peak, was also measured. The average rise time is 245 ms and there is no significant main effect for speaker, immigrant group or number of unstressed intervening syllables.

The fact that the H tone is aligned outside of the first stressed syllable with a variable location depending on tonal crowding reveals that it is not phonologically associated with this tonic syllable. The H tone affiliated with the prenuclear pitch accent for the Cuban-style interrogatives moves away from the stressed syllable as there is more room available, as shown in Table 5.18. However, the alignment differences are not quite the same as is seen in the declarative prenuclear accent H tone. For the declarative prenuclear pitch accent, the H tone moves progressively farther from the syllable offset with each additional unstressed syllable to the right whereas the Cuban-style interrogative prenuclear H tone moves farther from the offset up to the point of 3 intervening unstressed syllables and then does not move any farther away from the syllable offset with 4 or 5 intervening syllables. This difference in alignment, however, does not seem to be enough to warrant two distinct accents.

As discussed above and illustrated in Table 5.17 the phonetic realization of the H tone is closely related to the amount of "room" available between the two stressed syllables. When there are zero intervening unstressed syllables there are no observed instances of an F0 peak realized in conjunction with the first tonic syllable. As the number of unstressed intervening syllables is increased, the percentage of H tones realized increases to the point that it is categorically realized with 4 or 5 intervening syllables.

On the one hand, the Cuban-style interrogative therefore seems to be affected by tonal crowding in a similar way to the declarative utterances in that the H tone does align farther away from the stressed syllable offset as there is more space between the two stressed syllables. On the other hand, tonal crowding affects the interrogative utterances

in a much different way than it affects the declarative utterances. The deletion of a tone in absolute tonal crowding situations was not observed in the declarative utterances and, to my knowledge, has not been observed in studies of other varieties of Spanish intonation.

Both the variability of the H tone's alignment, when it is present, as well as the phonetically motivated deletion of the H tone in instances of absolute and extreme tonal crowding supports an analysis of the H tone as an unassociated member of the prenuclear pitch accent. Therefore, the proposed phonological analysis of the prenuclear accent for Cuban-style Spanish absolute interrogatives is L*+H.

5.3.3.2 Nuclear pitch accent: Cuban-style absolute interrogatives

As discussed in Section 5.3.2.1, there are two patterns observed for the Cuban-style absolute interrogative intonation and therefore two different patterns observed for the nuclear pitch accent: one with just an F0 peak aligned with the final tonic syllable and another with an F0 valley aligned before or near the onset of the final stressed syllable followed by an F0 peak aligned with the tonic syllable. In cases when there is a H tone present in the prenuclear accent, the F0 descends from the first peak to a point before or near the beginning of the final stressed syllable where it begins another rise. This valley, or L tone, is only realized when the first F0 peak is realized; they are either both present or both absent. This pattern is illustrated in Figure 5.14, reproduced here as Figure 5.17.

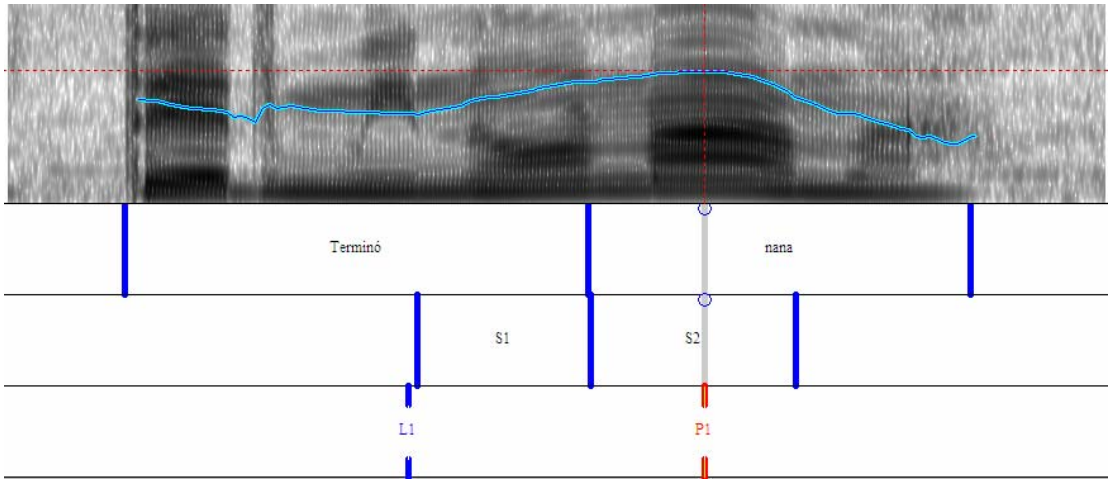


Figure 5.17 – Pitch track of the interrogative *¿Terminó nana?* illustrating the absence of the H tone affiliated with the prenuclear accent as well as the absence of the L tone affiliated with the nuclear accent.

The phonetic realization of the nuclear L tone, like the presence of the peak in the prenuclear accent, appears to be conditioned by tonal crowding. Table 5.19 shows how tonal crowding affects the presence or absence of the valley. It is important to note that the frequencies reported in Table 5.19 are exactly the same as those reported in Table 5.17 where the presence/absence of the prenuclear F0 peak is reported. In cases of absolute tonal crowding from the left there are no valleys observed. The frequency of the presence of the L tone increases as the number of preceding unstressed syllables increases. With 1 preceding unstressed syllable there is a L tone in 41.7% of the cases and in 70% of the cases when there are 2 preceding unstressed syllables. The presence of the F0 valley increases to 92% when there are 3 preceding unstressed syllables. As is the case with the H tone of the prenuclear peak, the L tone of the nuclear peak is always realized in cases of 4 or 5 preceding unstressed syllables.

	Valley Present		Valley Absent		Total	
# intervening unstressed σ	N	%	N	%	N	%
0	0	0%	29	100%	29	100%
1	10	41.70%	14	58.30%	24	100%
2	21	70.00%	9	30.00%	30	100%
3	23	92.00%	2	8.00%	25	100%
4	23	100%	0	0%	23	100%
5	22	100%	0	0%	22	100%
Totals	99	67.28%	54	32.72%	153	100%

Table 5.19 – Absence vs. presence of F0 valley affiliated with the nuclear accent by the number of preceding unstressed syllables.

The categorical nature of the realization or deletion of the nuclear accent L tone and the preceding H tone leaves room for a possible alternate analysis. The presence of the prenuclear H tone is signaled by the F0 change in direction: a descent toward the L tone of the nuclear accent. It is entirely possible that, in the intonation pattern described in Figures 5.14 and 5.17, the H tone is not deleted at all, rather it is realized and the L tone is deleted. The resulting F0 pattern would be the same: the F0 would climb from the prenuclear L tone to the prenuclear H tone and continue to rise to the nuclear H tone. Unfortunately, it is impossible to confirm if this is the case with data available in the current dissertation. This dilemma will have to solved by future studies.

When present, the beginning of the F0 rise occurs at an average of 73 ms before the onset of the final tonic syllable; the L tone is always aligned before the onset of the syllable. No significant main effect was found for speaker or immigrant group but there is a significant main effect for the number of preceding unstressed syllables. The effects of tonal crowding on the alignment of the L tone can be seen in Table 5.20. When there are no unstressed preceding syllables the L tone is never present. With one intervening

syllable the L tone is aligned on average at 24 ms before the stressed syllable onset. The L tone has a mean alignment of 67 ms before the onset with 2 preceding unstressed syllables. The alignment of the L tone is aligned farther away from the syllable onset as the number of intervening unstressed syllables increases: an average of 75 ms before the onset with 3 intervening syllables, 85 ms prior to the onset with 4 preceding and finally the valley occurs on average 92 ms before the second stressed syllable's onset. The analysis of variance showed a significant main effect for number of intervening unstressed syllables, $F(4,99) = 5.451$, $p < 0.01$. Post hoc pairwise comparisons confirmed the alignment differences and showed that the group with one intervening syllable is aligned significantly closer to the onset than all of the other groups. The group with 2 unstressed preceding syllables shows alignment significantly different than the group with 1 and 5 intervening syllables. This continues in that groups 3 and 4 show alignment significantly farther from the onset than the group with 1 intervening syllable. The group with 5 intervening syllables has an L tone alignment significantly farther from the stressed syllable onset than do the groups with 1 and 2 unstressed intervening syllables.

# intervening unstressed σ	Mean	Standard Deviation	N
0	-	-	0
1	24 ms	35	10
2	67 ms	35	21
3	75 ms	43	23
4	85 ms	47	23
5	92 ms	38	22
$F(4,99) = 5.451$, $p < 0.01$			

Table 5.20 – L tone alignment with the onset of the second tonic syllable. Time, in ms, from onset to peak. A positive value means that the valley occurs before the onset.

There are three main pieces of evidence that contribute to the analysis of the nuclear pitch accent L tone as being an unassociated member of the accent. First, the alignment of the L tone before the onset of the final stressed syllable is always before the onset. Second, the alignment of the L tone moves to a position farther before the onset as the number of preceding unstressed syllables is increased. Third, tonal crowding also seems to have a strong influence, not only on the alignment of the valley but also on the phonetic presence or absence of the nuclear accent L tone. It is interesting to note that the L tone is realized categorically if the prenuclear accent is a L*+H – meaning that it is only realized if there is a preceding H tone. While it is impossible to determine, from the current data, whether the presence of the L tone is conditioned by the presence of the preceding H tone or by tonal crowding, it is safe to say that the L tone, when present, is aligned outside of the stressed syllable and is affected by tonal crowding to the extent that it should not be considered to be phonologically associated to the final stressed syllable.

All of the Cuban-style absolute interrogatives have an F0 peak that is aligned with the tonic syllable. The average alignment of the H tone is 102 ms before the syllable offset, well within the stressed syllable. There are no significant main effects for speaker, immigrant group, number of preceding unstressed syllables or number of following unstressed syllables. There is also no significant difference in peak alignment according to the two types of Cuban-style interrogatives, i.e. the peak alignment is not affected by the presence or absence of a preceding valley.

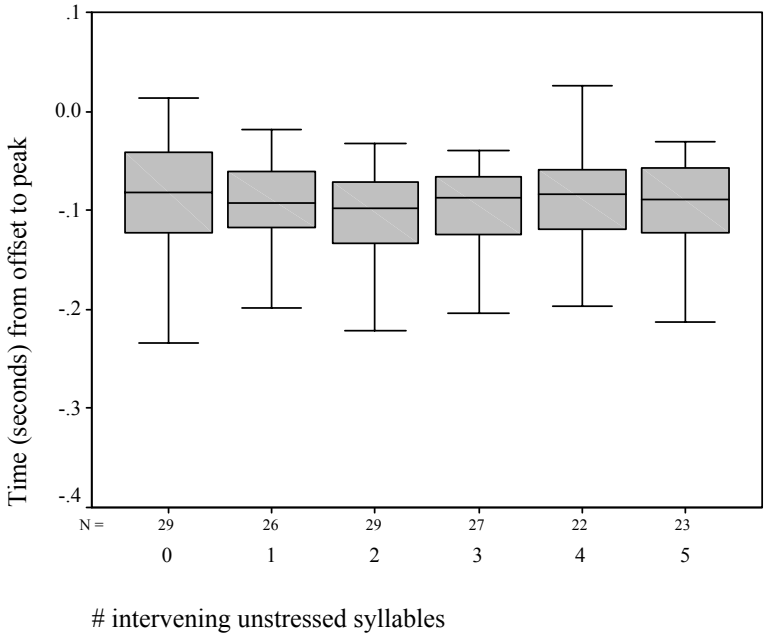


Figure 5.18 – Boxplots illustrating the alignment of the H tone and the final tonic syllable by the number of preceding unstressed syllables. Time is reported in seconds; a negative value represents alignment before the syllable offset.

The average rise time of the nuclear accent, or the time elapsed between the L tone (when present) and the H tone is 182 ms. Regarding rise time, no significant main effects were found for speaker, immigrant group, number of preceding unstressed syllables or number of following unstressed syllables. The average duration of the final tonic syllable is 202 ms and no significant main effects were found for speaker, immigrant group, number of preceding unstressed syllables or number of following unstressed syllables. The H tone is very consistently aligned with the tonic syllable and is not affected by tonal crowding. This alignment is illustrated in Figures 5.18 and 5.19 where the alignment is plotted by the number of preceding unstressed syllables (5.18) and by the number of following unstressed syllables (5.19). This consistent alignment

strongly points to a phonological association between the H tone and the final tonic syllable.

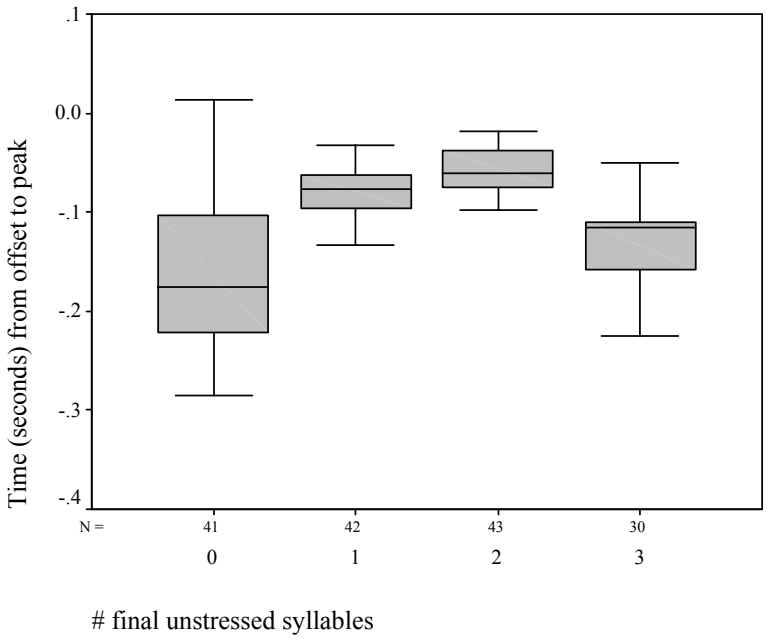


Figure 5.19 – Boxplots illustrating the alignment of the H tone and the final tonic syllable by the number of final unstressed syllables. Time is reported in seconds; a negative value represents alignment before the syllable offset.

The final F0 contour of the Cuban-style absolute interrogative descends through the end of the utterance. The AM analysis of this contour, therefore, is considered to be a L- phrase tone followed by a L% boundary tone in order to account for the downward F0 contour after the peak associated with the final tonic syllable.

The two basic intonation patterns observed in the Cuban-style absolute interrogatives, therefore, are differentiated by the phonetic realization of the F0 peak for the prenuclear accent and the F0 valley for the nuclear accent. The major factor that

motivates the falling interrogative pattern produced seems to be tonal crowding which supports an analysis of the two patterns, one produced with two peaks and the other only produced with one peak, as phonetic realizations of the same pitch accents. The proposed phonological analysis for the Cuban-style yes/no questions, therefore, is the following: the prenuclear accent is L*+H and the nuclear accent is L+H*. With the unassociated members of the two accents being deleted in cases of absolute and extreme tonal crowding. Figure 5.20 provides a schematic representing the Cuban-style pitch contour with its proposed AM analysis.

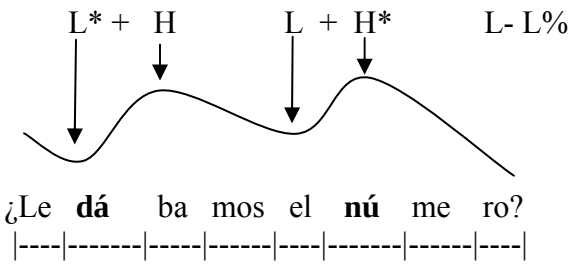


Figure 5.20 – Schematic of the Cuban-style absolute interrogative with the pitch accents, phrase tone and boundary tone labeled using AM notation.

5.3.4 Description of the Rising Style Interrogative Pattern

The other major absolute interrogative intonation pattern produced by the Miami-Cuban informants is very similar to what has been observed in most other varieties of Spanish. It's most salient feature is the rising final F0 contour as opposed to the Cuban-style interrogative's falling final contour. This second pattern is referred to here as the

"rising pattern" interrogative. A pitch track of this pattern is found in Figure 5.13 and reproduced here in Figure 5.21.

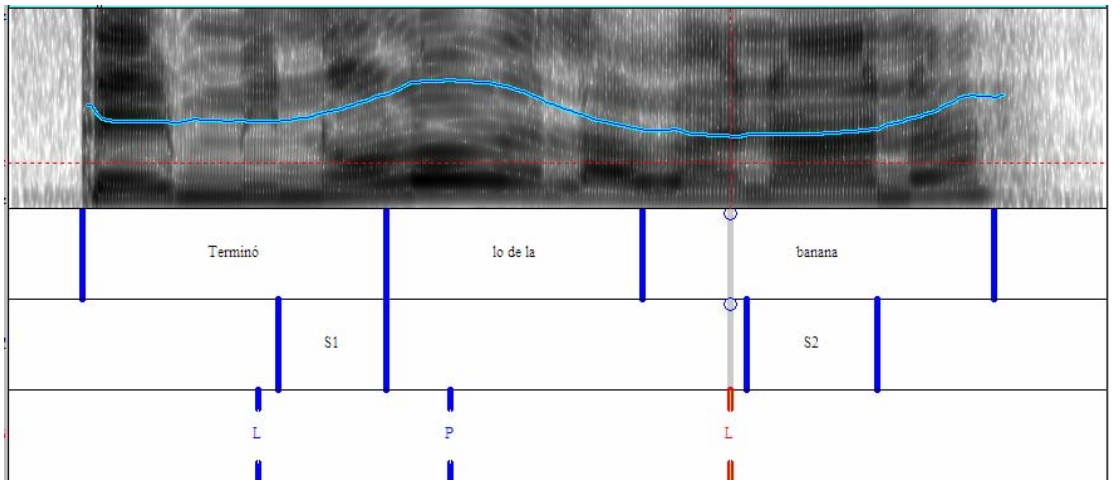


Figure 5.21 – Pitch track of the interrogative utterance "Terminó lo de la banana," illustrating the rising final contour. This pattern is similar to interrogative patterns observed in other Spanish varieties as well as American English.

This pattern is made up of two pitch accents and a final phrase tone and final boundary tone. The tones making up the prenuclear and nuclear accents are plotted in Figure 5.22, which excludes the final rising contour. The prenuclear accent is very similar to the prenuclear accent produced in the broad focus declaratives and is also similar to the Cuban-style interrogative prenuclear accent. Each utterance has an F0 rise that begins near the onset of the first tonic syllable. The rise continues through the stressed syllable and comes to a peak at some point after the tonic syllable. It is made up of both a L tone and a H tone and therefore is analyzed as a complex accent, L+H. After the peak of the prenuclear accent the F0 descends to a valley and then begins its final rise throughout the utterance. The final rise begins in the middle of the final tonic syllable and therefore the

L tone is considered to be part of the nuclear accent. The following sections explore the phonological status of the L and H tones affiliated with the prenuclear accent as well as the phonological status of the L tone affiliated with the final stressed accent.

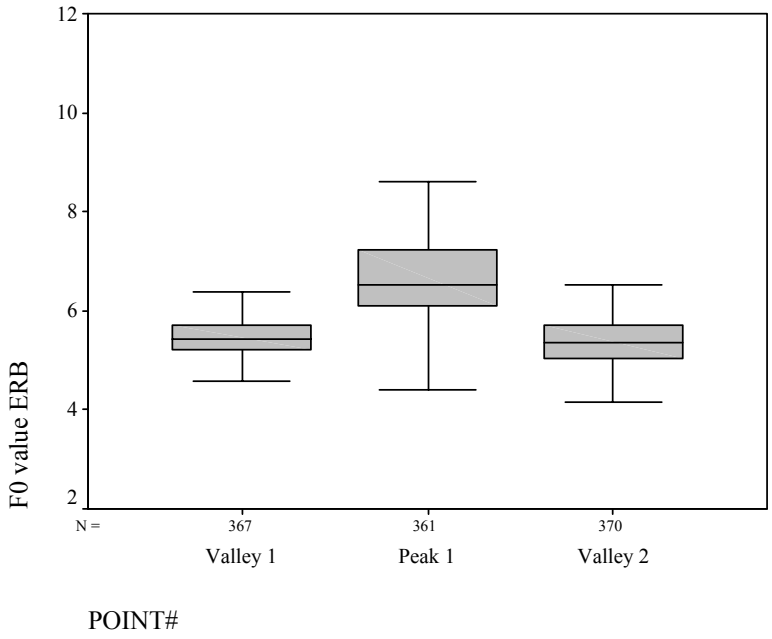


Figure 5.22 – Boxplots of F0 value, in ERB, of each tone for the rising pattern absolute interrogatives.

5.3.4.1 Prenuclear accent

The average distance from the onset of the first stressed syllable to the beginning of the first F0 rise is 41 ms after the syllable onset. The valley alignment is consistent across speakers, immigrant groups, and sentences differing in the number of unstressed syllables separating the two stressed syllables of each utterance, i.e. there was no statistically significant difference observed for these different factors. The L tone is

aligned very consistently with the beginning of the stressed syllable. This valley alignment is essentially identical (no statistical difference was observed) to what was observed for the declarative prenuclear valley alignment (39 ms after onset) which was considered to be phonologically associated to the stressed syllable. The consistent alignment of the first valley to the first stressed syllable strongly points toward the analysis that the L has an autosegmental association to the stressed syllable.

The F0 contour climbs from the first valley near the beginning of the first stressed syllable and forms a peak after the offset of the first tonic syllable. The H tone's alignment, illustrated in Figure 5.23, varies greatly according to the number of unstressed intervening syllables. Table 5.21 gives the mean alignment of the F0 peak in relation to the syllable offset. When the two stressed syllables are contiguous the average peak alignment is 1 ms after the offset. The peak moves farther away from the first stressed syllable's offset when there are more unstressed intervening syllables: 62 ms after the offset with 1 intervening syllable, 94 ms with 2 intervening syllables, 147 ms with 3 intervening syllables, 118 ms with 4 and 138 ms after the syllable offset when there are 5 following unstressed syllables.

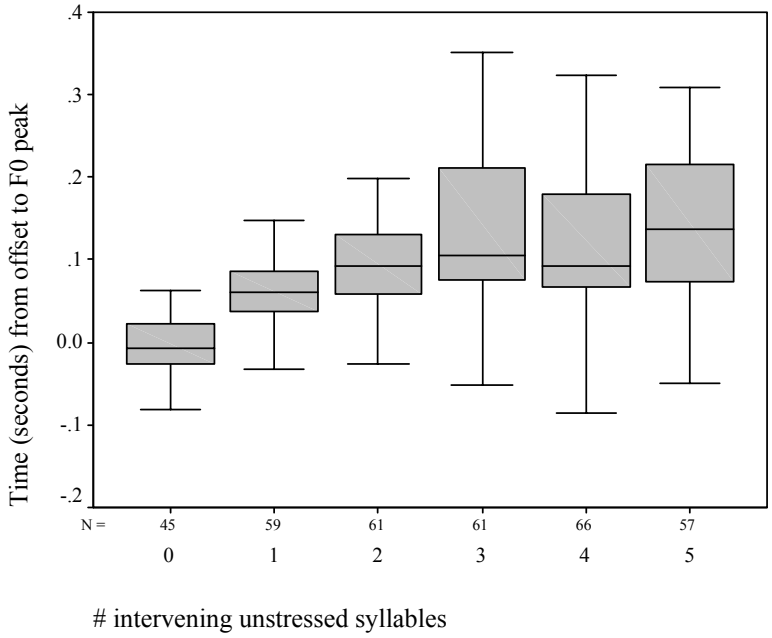


Figure 5.23 – Boxplots illustrating the alignment of the prenuclear peak and the offset of the first stressed syllable for rising pattern absolute interrogative.

# intervening unstressed σ	Mean	Standard Deviation
0	1 ms	37
1	62 ms	57
2	94 ms	50
3	147 ms	90
4	118 ms	84
5	138 ms	90
$F(5,343) = 29.055, p<0.001$		

Table 5.21 – Valley alignment by number of intervening unstressed syllables. A negative value means that the valley occurs after the syllable onset.

The alignment data for the H tone strongly suggests that it is not phonologically associated with the first stressed syllable. This conclusion is also supported by the rise time data calculated for the first F0 rise produced in the rising pattern interrogatives. As

is seen in Figure 5.24 and Table 5.22, the rise times vary significantly according to the number of intervening unstressed syllables in the same way the H tone alignment varies. With 0 intervening syllables the average time separating the L and H tones is 158 ms. The average rise times increase as the number of intervening syllables increases: 185 ms with 1 intervening syllable, 217 ms with 2 intervening syllables, 259 ms with 3 intervening syllables, 245 ms with 4 intervening syllables and 276 ms with 5 intervening unstressed syllables. As the H tone moves farther away from the first tonic syllable, when there is less tonal crowding, the rise times increase correspondingly.

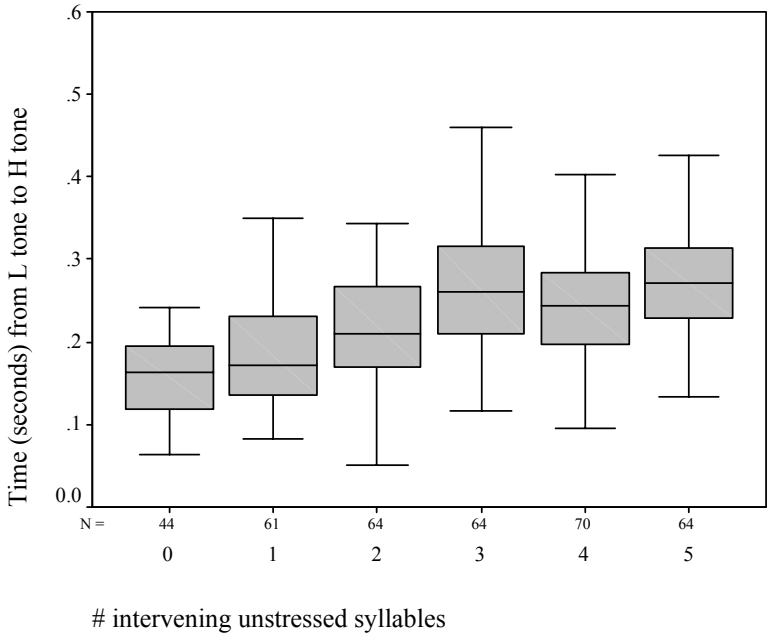


Figure 5.24 – Rise time: Boxplots of time, in seconds, between the valley and peak affiliated with the prenuclear pitch accent for the rising pattern absolute interrogatives.

# intervening unstressed σ	Mean Rise Time	Standard Deviation
0	158 ms	48
1	185 ms	62
2	217 ms	62
3	259 ms	82
4	245 ms	65
5	276 ms	70
$F(5,367) = 25.258, p < 0.001$		

Table 5.22 – Rise time, in ms, for prenuclear F0 rise.

The rise time data and the H tone alignment data provide compelling evidence supporting the analysis of the H tone as an unassociated member of the prenuclear accent. This data becomes even more convincing when considering the duration of the first tonic syllable in relation to the number of intervening unstressed syllables as seen in Table 5.23. The average duration of the first stressed syllable is 168 ms. The analysis of the syllable duration shows no significant main effect for the number of intervening unstressed syllables. The consistent duration is important in supporting the analysis of the H tone as not being associated to the stressed syllable. If the syllables were longer with less tonal crowding the rise time data would not provide any evidence for the effect of tonal crowding on rise time and therefore on the H tone alignment. The data strongly support, therefore, the analysis of the Miami-Cuban rising pattern absolute interrogative prenuclear pitch accent as L*+H.

# intervening unstressed σ	Mean Rise Time	Standard Deviation
0	171 ms	39
1	162 ms	59
2	169 ms	50
3	160 ms	49
4	175 ms	56
5	183 ms	47
F(5,367) = 1.667, N.S.		

Table 5.23 – Mean duration of first stressed syllable.

5.3.4.2 Nuclear accent

The nuclear pitch accent appears to be made up of only one tone. After the H tone of the prenuclear accent, the F0 contour descends to a point near the middle of the final tonic syllable and then begins to climb from that point throughout the rest of the utterance. This turning point is the nuclear pitch accent and is considered to be a L tone.

In order to determine the phonological status of the L tone, its alignment is considered in relation to the tonal crowding situation to the left (i.e. the number of preceding (intervening) unstressed syllables) as well as to the right (i.e. the number of final unstressed syllables) of the final stressed syllable. Its alignment was measured in relationship to the syllable onset as well as to the offset. The duration of the final stressed syllable is also measured and reported with the alignment data. Table 5.24 provides the duration information as well as the alignment of the L tone according to the number of preceding (intervening) unstressed syllables. With 0 preceding unstressed syllables the average duration of the stressed syllable is 240 ms; the mean alignment is 141 ms after

the onset and 100 ms before the offset. With 1 preceding unstressed syllable the mean duration is 223 ms with the L tone aligned 85 ms after the onset and 132 ms before the offset. The average duration of the syllable with 2 preceding unstressed syllables is 214 ms with the L tone aligned 83 ms after the onset and 132 ms before the offset. With 3 intervening unstressed syllables the mean duration is 215 ms and the L tone is aligned 73 ms after the onset and 142 ms before the offset. Four intervening unstressed syllables corresponds to a mean duration of 221 ms and a L tone alignment of 44 ms after the syllable onset and 179 ms before the offset. Finally, the mean syllable duration when there are 5 preceding unstressed syllables is 218 ms and the L tone is aligned 45 ms after the onset and 182 ms before the offset. While the L tone is always aligned within the final stressed syllable, a significant main effect was found for the number of unstressed preceding syllables meaning that the L tone's alignment changes according to the tonal crowding situation. The valley's alignment is pushed toward the end of the utterance with fewer preceding unstressed syllables. This is also accompanied by an increase in syllable duration, as seen in Table 5.24. This is logical and expected given that in cases of absolute tonal crowding (i.e. when the two stressed syllables are adjacent to each other) the H tone of the prenuclear accent is aligned just after the offset of the first stressed syllable and just after the onset of the final stressed syllable. The L tone has to be pushed back in order for there to be room for the preceding prenuclear H tone to be realized as well as the following edge tones to be completed. It is important to note that when there is no tonal crowding the L tone is still aligned well within the stressed syllable. This implies that the L tone should be analyzed as having a phonological association with the final stressed syllable.

# preceding unstressed σ	Mean Time Onset to Valley (S.D)	Mean Time Offset to Valley (S.D.)	Mean Syllable Duration (S.D.)
0	-141 ms (55)	-100 ms (72)	241 ms (67)
1	-85 ms (70)	-132 ms (75)	223 ms (67)
2	-83 ms (59)	-132 ms (78)	216 ms (74)
3	-73 ms (51)	-142 ms (70)	215 ms (71)
4	-44 ms (86)	-179 ms (90)	223 ms (72)
5	-45 ms (80)	-182 ms (80)	223 ms (70)
	$F(5,347) = 18.86$, $p<0.001$	$F(5,332) = 13.44$, $p<0.001$	$F(5,383) = 4.726$, $p<0.001$

Table 5.24 – Alignment of the F0 valley with the final tonic syllable by the number of preceding unstressed syllables. Time, in milliseconds, from the onset to the valley: a negative value means that the valley occurs *after* the onset. Time, in milliseconds, from the offset to the valley: a negative value means that the valley occurs *before* the offset.

A similar situation is seen when analyzing the alignment and duration data according to the number of final unstressed syllables. Table 5.25 provides the valley alignment according to the number of unstressed following syllables. The L tone is aligned, on average, 103 ms after the onset and 222 ms before the offset when the last stressed syllable is also the utterance final syllable. When there is 1 final unstressed syllable the average stressed syllable duration is reduced to 179 ms and the L tone alignment is 88 ms after the onset and 92 ms before the offset. With 2 final unstressed syllables the mean duration of the final tonic syllable is 171 ms and the L tone's alignment is 56 ms after the onset and 114 ms before the onset. The L tone is aligned 59

ms after the onset and 158 ms before the offset of the final tonic syllable which has an average duration of 219 ms when there are 3 following unstressed syllables. As was seen in the data examining tonal crowding from the left, tonal crowding from the left also affects the alignment of the F0 valley. When the final stressed syllable is also utterance final the valley is aligned much further back into the syllable. The valley is aligned closer to the onset when there are more final unstressed syllables.

# following unstressed σ	Mean Time Onset to Valley (S.D)	Mean Time Offset to Valley (S.D.)	Mean Syllable Duration (S.D.)
0	-103 ms (60)	-222 ms (53)	319 ms (49)
1	-88 ms (71)	-92 ms (66)	178 ms (28)
2	-56 ms (82)	-114 ms (72)	172 ms (26)
3	-59 ms (76)	-158 ms (69)	219 ms (42)
	$F(5,347) = 12.89$, $p < 0.001$	$F(5,332) = 76.47$, $p > 0.001$	$F(3,383) = 373.97$, $p < 0.001$

Table 5.25 – Alignment of the F0 valley with the final tonic syllable by the number of final unstressed syllables. Time, in ms, from the onset to the valley: a negative value means that the valley occurs *after* the onset. Time, in milliseconds, from the offset to the valley: a negative value means that the valley occurs *before* the offset.

This difference in alignment of the L tone as seen in tonal crowding situations to both the left and the right, while statistically different, are mitigated by examining the alignment in relation to the entire syllable. By comparing the alignment time from the beginning of the syllable to the time of duration for the entire syllable it is seen that the L tone is consistently aligned about 1/3 of the way through the syllable (with a few

exceptions). This is illustrated in Table 5.26, which shows the average time, in ms, elapsed between the onset to the valley, the mean duration of the syllable, in ms, as well as the ratio of alignment to duration. The ratio is calculated by taking the percentage of syllable duration taken up by the time elapsed between the syllable onset to the valley. For example, with 0 unstressed final syllables the valley is aligned at an average of 103 ms into the syllable which has a duration of 319 ms. The ratio of alignment to duration is 32.29%, in other words, the L tone occurs 32.29% of the way into the stressed syllable. The valley occurs, on average, 49.44% of the way into the final stressed syllable when there is one following unstressed syllable. When there are 2 final unstressed syllables the L tone is aligned 56 ms, or 32.56% of the way into the syllable. Finally, the valley is aligned 26.94% of the way into the final stressed syllable when there are 3 following unstressed syllables. Examining tonal crowding from the left it can be seen that when there are 0 unstressed preceding syllables the valley is aligned 141 ms, or 58.51%, into the stressed syllable. With 1 unstressed intervening syllable the L tone is aligned 38.12% of the way into the stressed syllable and it is aligned 38.43% of the way into the syllable when there are 2 intervening syllables. With 4 and 5 unstressed preceding syllables the L tone is aligned 19.73% and 20.18% of the way into the stressed syllable, respectively.

An analysis of variance of the syllable duration found significant main effects for the number of final unstressed syllables and also for the number of intervening unstressed syllables. There was also found to be a significant interaction between the two independent factors. Pairwise comparisons for both factors showed that the only significant difference is in absolute tonal crowding situations, where the most extreme syllable lengthening is observed, i.e. the final tonic syllable's duration is significantly

longer with 0 preceding unstressed syllables and with 0 final unstressed syllables. This finding is consistent with the more general Spanish phenomenon final lengthening.

# following unstressed σ	Mean Time Onset to Valley	Mean Syllable Duration	Ratio of alignment to duration
0	-103 ms	319 ms	32.29%
1	-88 ms	178 ms	49.44%
2	-56 ms	172 ms	32.56%
3	-59 ms	219 ms	26.94%
# preceding unstressed σ			
0	-141 ms	241 ms	58.51%
1	-85 ms	223 ms	38.12%
2	-83 ms	216 ms	38.43%
3	-73 ms	215 ms	33.95%
4	-44 ms	223 ms	19.73%
5	-45 ms	223 ms	20.18%

Table 5.26 – Alignment of the F0 valley, syllable duration and ratio of the alignment to duration.

The data presented in Tables 5.24, 5.25 and 5.26 clearly show the L tone being aligned within the final tonic syllable. The data support the analysis of a phonological association of the L tone to the final tonic syllable. After the L tone, the F0 contour of the rising style absolute interrogative climbs through the end of the utterance. This presents two possible analyses for the nuclear accent. The first is a simple L* followed by the phrase and boundary tones (H- H%) and the second would be a L*+H, also followed by the H- H% boundary tones.

While it is very difficult to distinguish between these two possible analyses, there is one piece of data that supports the first analysis, i.e. L*. If the nuclear accent were to

be L*+H it would be expected to be very similar to the L*+H pitch accent observed in prenuclear position of the declarative utterances. As seen in Section 5.2.2, the L tone of the L*+H in the declarative utterances has an average alignment of 39 ms after the syllable onset. The L tone is consistently aligned within the stressed syllable. The L tone of the nuclear accent in the rising pattern interrogatives has an average alignment of 77 ms after the syllable onset, also aligned consistently, albeit later, within the stressed syllable. The average alignments are illustrated in the boxplots in Figure 5.25. In order to compare the L tones of the two patterns it is also necessary to analyze the alignment according to the tonal crowding information, i.e. the number of preceding unstressed syllables and the number of following unstressed syllables. While the test sentences were not designed to test a varying number of unstressed syllables preceding the prenuclear accent, the test sentences do vary from 0 to 2 preceding syllables. The tonal crowding information from the left was therefore coded and included in the statistical analysis. An analysis of variance was performed including the tonal crowding information and it was found that the L tone of the rising pattern interrogatives is aligned significantly farther from the onset than is the L tone of the declarative L*+H; $F(1,798) = 122.917$, $p < 0.0001$. This difference in alignment was found to be consistent across all groups of preceding and following unstressed syllables and provides evidence that the rising pattern absolute interrogative nuclear accent and the declarative prenuclear accent are not the same accent. Due to this difference in alignment for the two L tones, the phonological analysis for the nuclear accent for the rising style absolute interrogatives is L*.

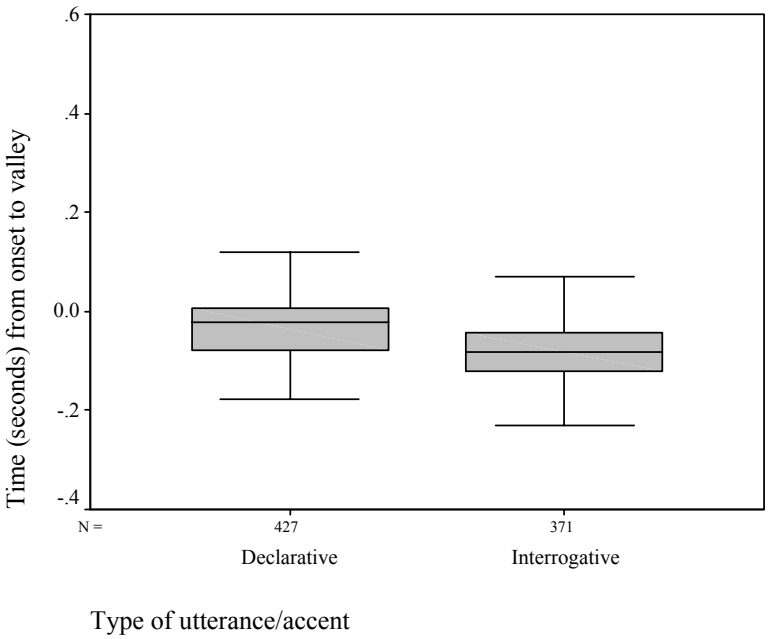


Figure 5.25 – Boxplots of the valley alignment of the L tone of the declarative prenuclear accent and the rising pattern absolute interrogative nuclear accent.

After the L*, the analysis for the final F0 rise through the end of the interrogative is a H- phrase tone followed by a H% boundary tone. The AM analysis of the Miami-Cuban rising pattern absolute interrogative, therefore, is L*+H for the prenuclear pitch accent, L* for the nuclear pitch accent and finally H- and H% constitute the final phrase and boundary tones. This analysis is illustrated in the schematic in Figure 5.26.

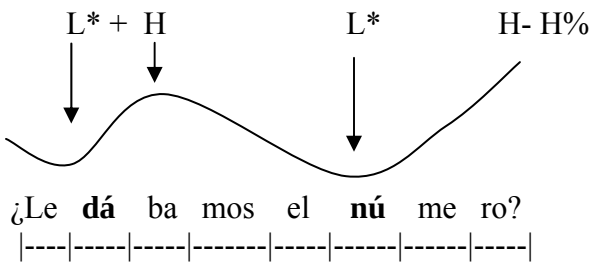


Figure 5.26 – Schematic of the Rising style absolute interrogative with the pitch accents, phrase tone and boundary tone labeled using AM notation.

5.3.5 Comparison of Cuban-style and rising pattern interrogatives

As can be seen from the schematics of the two intonation patterns produced for the Miami-Cuban absolute interrogatives, Figures 5.20 and 5.26, these patterns have both similarities as well as differences. The current section compares the two patterns: Section 5.3.5.1 examines the prenuclear accent and Section 5.3.5.2 looks at the nuclear accent.

5.3.5.1 Prenuclear accent

The prenuclear accent of both the Cuban-style and rising-style interrogatives are analyzed as L*+H. While the prenuclear accents are very similar and analyzed with the same AM pitch accent, there are some differences. The average L tone alignment for the Cuban-style interrogative prenuclear accent is 0 ms while the average L tone for the rising-pattern prenuclear interrogatives aligns 41 ms after the syllable onset. This difference was found to be statistically significant, $F(1, 520)= 43.157$, $p < 0.001$. While

this difference in alignment is significant, there is evidence that points toward both having the same phonological association with the stressed syllable.

In comparing the alignment of the F0 peak affiliated with the prenuclear accent of the two types of interrogatives no difference was found. The Cuban-style interrogative's first F0 peak has an average alignment of 90 ms after the stressed syllable offset. For the rising pattern interrogatives the average alignment of the prenuclear H tone is 97 ms after the offset.

The scaling of the prenuclear F0 peaks is also compared for both patterns. The Cuban-style falling pattern interrogative prenuclear F0 peak has an average value of 6.58 ERB and the rising-style pattern's prenuclear H tone has a mean value of 6.68 ERB. An ANOVA showed that there is no statistical difference between the two patterns, $F(1,468)= 1.498$, n.s. The prenuclear peak height for the two types of interrogatives is illustrated in Figure 5.27.

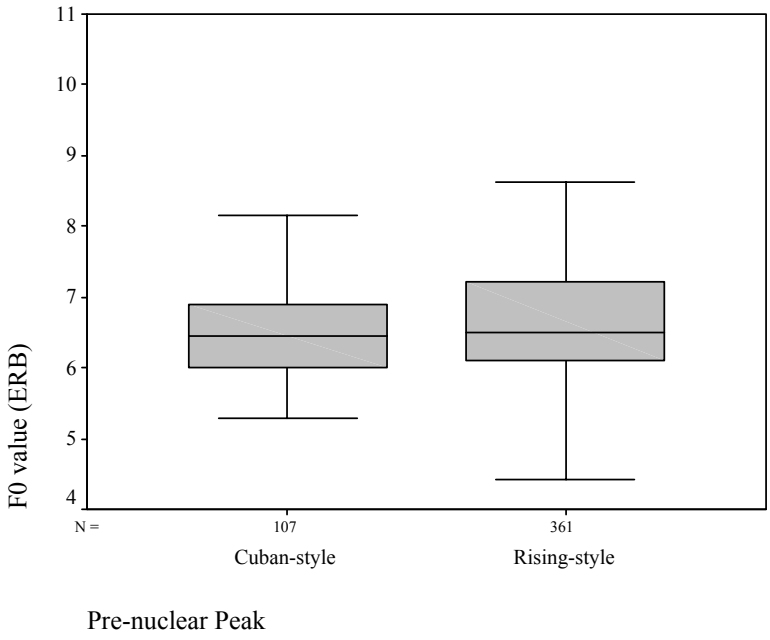


Figure 5.27 – Boxplots of prenuclear F0 peak height comparing the Cuban-style and rising-style interrogative intonation patterns.

5.3.5.2 Nuclear accent

The nuclear pitch accents of the two types of interrogative utterances are very different from each other. The Cuban-style falling pattern's nuclear pitch accent is analyzed as an L+H* while the rising pattern nuclear accent is analyzed as L*. As expected, the alignment of the L tone in each pattern is significantly different; $F(1,443)= 265.447$, $p < 0.001$. This is illustrated in Figure 5.28 which plots the alignment with boxplots, showing that the Cuban-style falling pattern nuclear L tone aligns before the onset and the rising pattern nuclear L tone aligns well inside the stressed syllable.

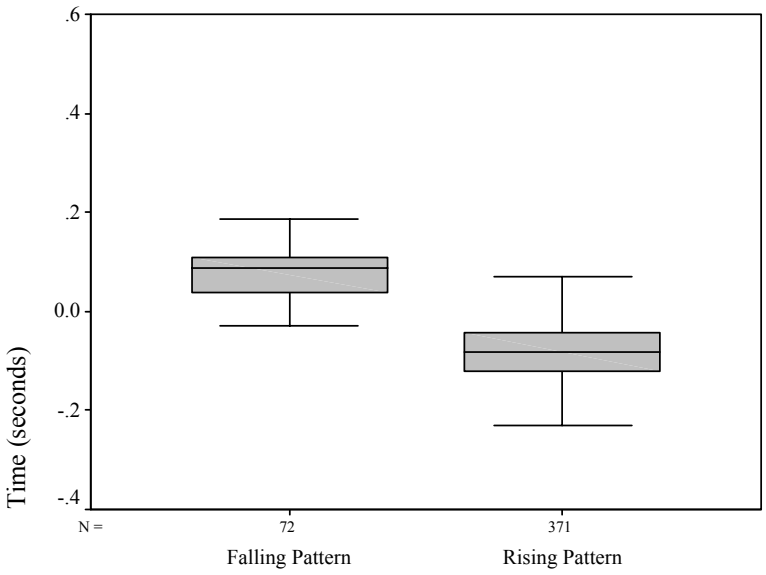


Figure 5.28 – Boxplots of nuclear accent valley alignment comparing the Cuban-style and rising-style interrogatives.

The scaling of the nuclear accent L tones was also compared and it was found that they are significantly different, as illustrated in Figure 5.29. The Cuban-style nuclear valley has an average F0 value of 5.87 ERB and the rising pattern nuclear L tone has an average frequency of 5.39 ERB. This difference was found to be statistically significant; $F(1,450)= 42.292$, $p < 0.0001$. This difference in L tone pitch values suggests that the pitch range may experience an upward shift in the Cuban-style interrogatives. This possibility is explored further in Section 5.4 where the interrogative utterances are compared to the declarative utterances.

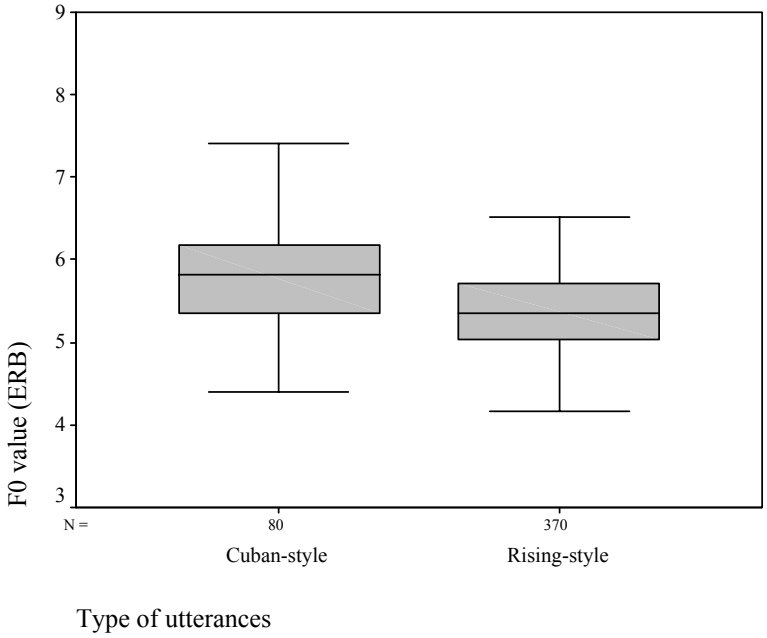


Figure 5.29 – Boxplots of the average F0 value, in ERB, for the nuclear accent valley comparing the Cuban-style and rising-style interrogatives.

Beside the pitch accent differences illustrated, the boundary tones are opposite for the two patterns; the rising pattern has the H- H% which account for the final rise and the falling pattern has the L- L% accounting for the final F0 descent. Figure 5.30 reproduces the schematic representations of each pattern for comparison.

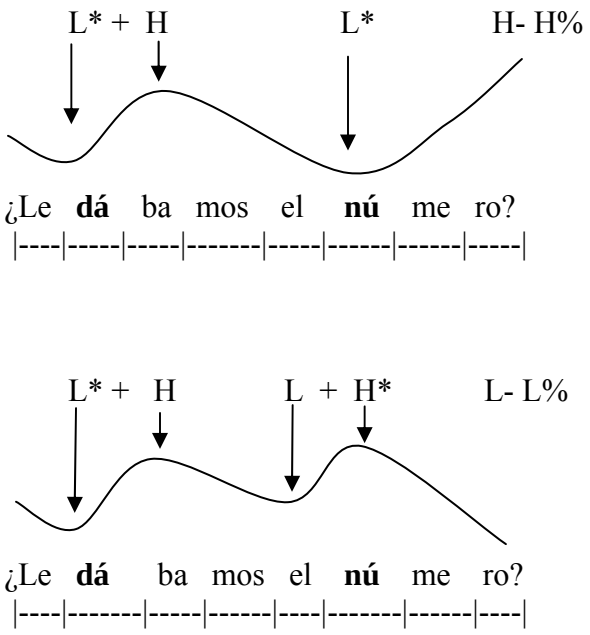


Figure 5.30 – Schematic of the rising style absolute interrogative (above) and the Cuban-style falling interrogative (below) with the pitch accents, phrase tone and boundary tone labeled using AM notation.

5.4 Declarative vs. Interrogative intonation

As stated in Section 5.3.1, one of the most important functions of intonation in Spanish is the differentiation of declarative and absolute interrogative utterances. The differences in intonation patterns explored in the current section will elucidate exactly how intonation functions in the capacity of disambiguating questions and statements. This section is divided into two subsections; Section 5.4.1 explores the differences between the Cuban-style absolute interrogatives and the broad focus declaratives and the differences between the rising pattern interrogatives and the declaratives are examined in

Section 5.4.2. The differences that the two interrogatives have in common in relation to the declarative utterances are discussed in Section 5.4.3.

5.4.1 Cuban-style interrogatives vs. declaratives

The AM analyses for the Cuban-style interrogatives as well as for the broad focus declaratives are identical: L*+H for the prenuclear accent, L+H* for the nuclear accent and L- L% for the final edge tones. While the pitch accents are identical, the intonation patterns are obviously not identical. Figure 5.31 reproduces the schematics representing the two utterance types and it clearly can be seen that they are not the same pattern.

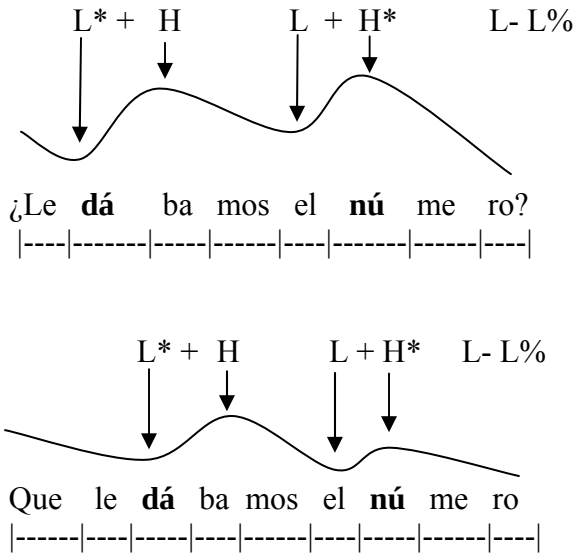


Figure 5.31 – Schematic of the Cuban-style falling interrogative (above) and the broad focus declarative (below) with the pitch accents, phrase tone and boundary tones labeled using AM notation.

Since the AM analyses for the two utterance types are identical and offer no clues to the differentiation between these types of utterances, the F0 scaling of L tones and H tones is also examined. Table 5.27 provides the comparison of the declarative and Cuban-style interrogative F0 scaling by giving the mean ERB value of each tone. The average F0 height of the Cuban-style prenuclear L tone is 5.28 ERB and the average height of the declarative prenuclear L tone is 5.17 ERB. An ANOVA found no significant difference in the prenuclear valley F0 scaling, $F(1,302)= 2.987$, n.s.

In the examination of the F0 scaling of the prenuclear peak, on the other hand, a statistically significant difference between the Cuban-style interrogatives and the declaratives emerges. The average F0 value of the Cuban-style interrogative prenuclear H tone is 6.63 ERB while the average F0 height of the declarative prenuclear peak is 6.17 ERB, $F(1,249)= 16.788$, $p < 0.0001$.

Tone	Declarative		Interrogative (Cuban)		ANOVA
	mean F0 (ERB)	Std. Dev.	mean F0 (ERB)	Std. Dev.	
Prenuclear L	5.168	0.584	5.282	0.570	n.s.
Prenuclear H	6.173	0.889	6.627	0.821	$p < 0.001$
Nuclear L	4.980	0.499	6.075	0.789	$p < 0.001$
Nuclear H	5.615	0.615	6.701	0.856	$p < 0.001$

Table 5.27 – Comparison of Cuban-style interrogative and broad focus declarative F0 values, in ERB.

The difference in tone F0 values observed in the prenuclear peaks, where the interrogative has a higher value than the declarative, continues to the nuclear accent. The nuclear L tone for declarative utterances has an average F0 value of 4.98 ERB while the

interrogative nuclear valley's mean frequency is 6.075 ERB. The final F0 peak of the declarative utterances averages 5.615 ERB and the final peak of the Cuban-style interrogatives has an average value of 6.701 ERB. The differences observed for the valley as well as the peak of the nuclear accent were both found to be significant at the $p < 0.001$ level.

Figure 5.32 plots the F0 value of each peak and valley of the broad focus declaratives and the Cuban-style interrogatives. In this figure and in Table 5.27 it can be seen that, after the initial L tone, the interrogatives have, on average, higher peaks as well as higher valleys. This leads to the conclusion that the intonational cue that leads to the differentiation of declarative and Cuban-style interrogatives is not in the configuration of the pitch accent, rather it is in the scaling of the F0. In Miami Cuban Spanish, as is the case with Madrileño Spanish (Navarro Tomás 1918 and Face 2005), it is a higher F0 value in the initial F0 peak that sets apart the interrogative from the declarative. It is also interesting to note that, for Miami Cuban Spanish, the entire nuclear pitch accent is higher in the interrogative, i.e. both the valley and the peak are significantly higher than they are in the declarative utterances. It appears that not only is it a higher peak that signals interrogativity, it is a shift upward of the entire pitch range.

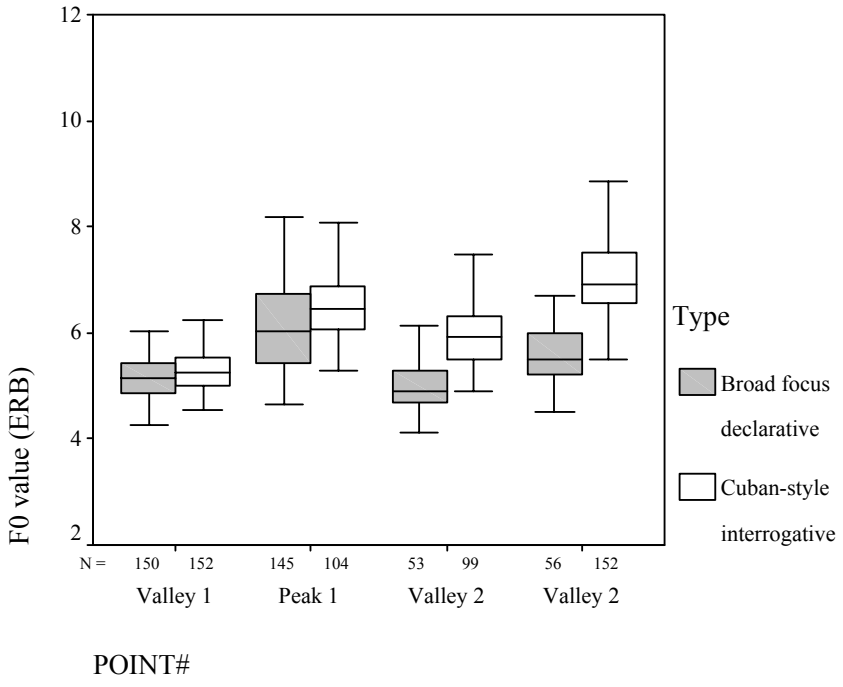


Figure 5.32 – Boxplots showing F0 scaling of the peaks and valleys of both the Cuban-style interrogative and the broad focus declarative utterances.

5.4.2 Rising pattern interrogatives vs. declaratives

Unlike the case of the Cuban-style interrogative utterances, the rising pattern interrogative AM analysis is not identical to the broad focus declarative AM analysis. On the one hand the Miami-Cuban rising pattern interrogative prenuclear pitch accent, however, is the same as the declarative prenuclear accent; both are L*+H. On the other hand, the nuclear pitch accents are different. The declarative nuclear pitch accent is L+H* and the rising pattern interrogative nuclear accent is L*. The most salient difference between the two patterns is the final F0 contour, analyzed as opposite phrase and

boundary tones, H- H% for the interrogatives and L- L% for the declaratives. The two patterns are represented in Figure 5.33 which is the schematic representations of both utterance types.

The nuclear accent and edge tones are not the only difference between the rising pattern interrogative and broad focus declarative intonation. The analysis of the F0 scaling provides significant differences as well. In fact, Table 5.28 shows us that each rising pattern interrogative tone is significantly higher than its declarative counterpart tone. The interrogative prenuclear valley's average F0 value is 5.461 ERB while the first valley of the declaratives has a mean value of 5.309 ERB. This is followed by the first F0 peak which is also significantly higher in the interrogative utterances; 6.684 ERB for interrogatives and 6.394 ERB for declaratives. The average F0 value of the nuclear L tone is also significantly higher in the interrogatives (5.394 ERB) than in declaratives (4.999 ERB).

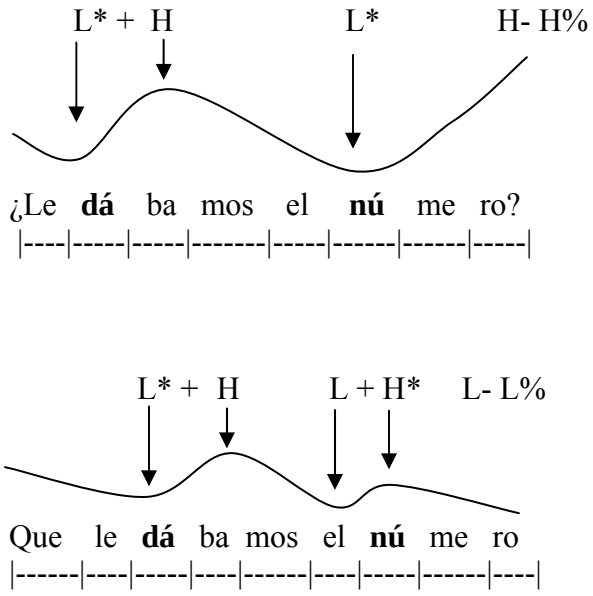


Figure 5.33 – Schematic of the rising pattern interrogative (above) and the broad focus declarative (below) with the pitch accents, phrase tone and boundary tone labeled using AM notation.

Tone	Declarative		Interrogative (Cuban)		ANOVA
	mean F0 (ERB)	Std. Dev.	mean F0 (ERB)	Std. Dev.	
Prenuclear L	5.309	0.512	5.461	0.471	$p < 0.0001$
Prenuclear H	6.394	0.791	6.684	0.802	$p < 0.0001$
Nuclear L	4.999	0.539	5.394	0.542	$p < 0.0001$
Nuclear H	5.602	0.850	-	-	-

Table 5.28 – Comparison of rising pattern interrogative and broad focus declarative F0 values, in ERB.

It is apparent that the rising final contour is not the only intonation cue signaling interrogativity for the rising pattern absolute interrogatives. It is also apparent that it is not only the height of the first F0 peak indicating the pragmatic meaning of the utterance as either a statement or a question. The fact that every tone measured, including the L

tones, was found to be significantly higher in interrogatives than in declaratives points to a shift upward in the entire pitch range of the whole interrogative utterance. This can be seen in Figure 5.34 which sequentially plots each tone of the rising pattern interrogatives with each tone of the broad focus declaratives.

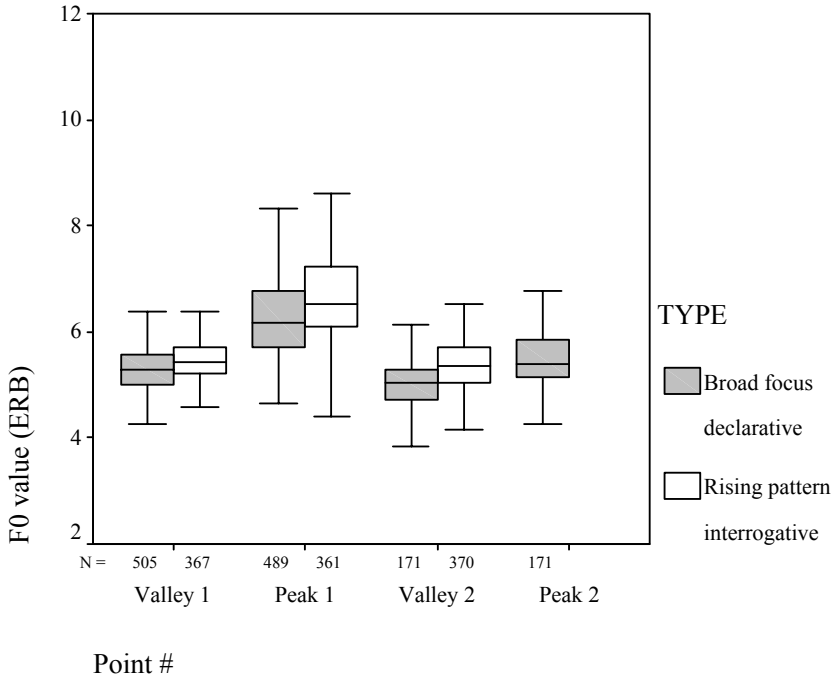


Figure 5.34 – Boxplots showing F0 scaling of the peaks and valleys of both the rising pattern interrogative and the broad focus declarative utterances.

5.5 Discussion

The current section returns to research question #2 and summarizes the finding presented in this chapter:

2. *How do Miami Cubans differentiate between absolute (yes/no) interrogatives and lexically and syntactically identical declarative utterances?*

The seemingly conflicting views expressed by Quilis (1993) and Navarro Tomás (1944) as to the most important intonational cue differentiating interrogative and declarative utterances both prove to be partially correct for the Miami-Cuban data. As Quilis (1993), among others, observed for Peninsular Spanish, a rising final F0 contour can signal interrogative meaning. This is not the case, however, in 32% of the interrogative utterances analyzed in the current dissertation where the final F0 contour descends.

It is also the case that, as Navarro Tomás noted, the first F0 peak of the interrogative utterances is higher than the first declarative peak. This is the situation for both styles of interrogatives produced by the Miami-Cuban participants. The current findings, however, indicate that it is not only the first peak that is significantly higher in interrogatives. For the Cuban-style falling pattern interrogatives, where the pitch accents are identical to the declarative pitch accents, the entire pitch range is shifted upward beginning with the first F0 peak. An upward shift in pitch range is also observed in the rising pattern interrogatives where, even from the beginning of the utterance, the tones are significantly higher than each corresponding tone in the declaratives.

The fact that Miami-Cubans produce interrogative utterances with a falling final contour refutes the possibility that a rising final contour could be the most important intonational factor in differentiating the two types of utterances. This observation combined with the F0 scaling data, showing that for both types of interrogatives the first

F0 peak as well as the pitch range is higher in interrogatives than in declaratives, indicates that F0 scaling is the one major cue differentiating interrogatives from declaratives. Specifically, absolute interrogatives have a higher pitch range than do broad focus declaratives in Miami-Cuban Spanish.

Chapter 6

Findings: Sociolinguistic Analysis

6.1 Introduction

Chapter 6 presents the findings related to research question #3:

3. *Is the intonation system changing through subsequent generations of Miami Cubans? What are the social and linguistic factors motivating the use of the observed intonation patterns?*

The phonological analysis in Chapter 5 does not provide any information as to whether, indeed, there is a change occurring in the intonation patterns through subsequent generations of Miami-Cubans. In fact, the analyses in Chapter 5 showed that the alignment, duration, and F0 scaling for the different types of utterances were very consistent across all speakers as well as for the immigrant groups, i.e. no statistically significant differences in alignment, scaling, and duration were discovered for these extralinguistic variables.

The broad focus declarative intonation patterns observed in the current study show remarkable consistency and are very similar to what has been observed in many other varieties of Spanish. It is evident, however, that there is variation in the intonation patterns observed for the absolute interrogatives. While the Cuban-style falling pattern is similar to what has been described for yes/no questions produced by Cubans on the island, the other intonation pattern, the rising pattern, has not been attested in Cuban

Spanish. The rising pattern described in Chapter 5 has been observed, however, in other varieties of Spanish, e.g. Peninsular Spanish (Face 2004a, 2005 and Sosa 1999), Limeño Spanish, Colombian Spanish, Argentine Spanish (Sosa 1999) and Mexican Spanish (Sosa 1999 and Willis 2006), Cara. The rising contour at the end of this pattern is also similar to the absolute interrogative intonation of American English (e.g. Pierrehumbert 1980).

The current chapter takes up research question #3 by exploring the sociolinguistic motivations for the absolute interrogative intonation pattern used. The dependent variable for the current analysis is the intonation pattern produced for the Miami-Cuban absolute interrogative with the two options being either a rising final contour or a falling final contour (Cuban-style). Since the dependent variable is binary, a variable rule analysis using Goldvarb 2001 (see chapter 4 for a description of variable rule analyses) is appropriate for determining which linguistic and/or extralinguistic factors significantly influence the use of either the rising pattern or the falling Cuban-style pattern.

Chapter 6 is comprised of three main sections. The current introductory section is followed by Section 6.2, which presents the variable rule analysis and is divided into four subsections. Section 6.2.1 introduces the factor groups, both linguistic and extralinguistic, that were coded in the initial analysis. Section 6.2.2 provides the raw application percentages of the dependent variable for each factor group and Section 6.2.3 provides the Goldvarb analysis carried out with the factor groups and discusses how a significant fit was obtained in the logistic regression runs. Section 6.2.4 provides the results of the variable rule analysis including the factors that were found to significantly contribute to the variation observed in the production of either the rising pattern or the falling pattern. Section 6.3 summarizes the sociolinguistic findings.

6.2 Variable Rule Analysis

6.2.1 Factor Groups

The independent variables under investigation in the current dissertation are both linguistic and social factors that have been hypothesized to contribute to the variation of the interrogative intonation patterns produced by the Miami-Cuban informants. Each independent variable is referred to as a factor group and is made up of individual factors. For example, the linguistic variable "number of intervening unstressed syllables" is a factor group and each possible value, from 0 to 5, is a factor within the group. The current section lists each factor group, both linguistic as well as extra-linguistic, that was included in the initial coding. The linguistic factors included in the preliminary analysis are: the number of unstressed syllables between the two stressed syllables, the number of final unstressed syllables and whether or not a prepositional phrase is present in the utterance. The linguistic factor groups, including the code used in the variable rule analysis, a short description of each factor and an example, are found in Table 6.1.

Linguistic Variable	Goldvarb Code	Description	Example
# intervening unstressed syllables			
	0	Zero intervening unstressed syllables	¿Le **da nú**meros?
	1	One intervening unstressed syllable	¿Le **da** el **n**úmero?
	2	Two intervening unstressed syllables	¿Le **da**ba el **nú**mero?
	3	Three intervening unstressed syllables	¿Le **dá**bamos el **nú**mero?
	4	Four intervening unstressed syllables	¿Se lo **da**ba para el **nú**mero?
	5	Five intervening unstressed syllables	¿Se lo **dá**bamos para el **nú**mero?
# unstressed syllables at end of sentence			
	0	Zero unstressed syllables at end	¿Sa**lió mal**?
	1	One unstressed syllable at end	¿Termi**nó Na**na?
	2	Two unstressed syllables at end	¿Le **da nú**meros?
	3	Three unstressed syllables at en	¿Es**tá dá**ndomela?
Prepositional Phrase			
	n	No prepositional phrase	¿Le da números?
	d	De	¿Terminó lo **de** la banana?
	c	Con	¿Terminó **con** la banana?
	p	Para	¿Se lo daba **para** el número?

Table 6.1 – Linguistic Factor groups included in variable rule analysis.

The extralinguistic independent variables, or factor groups, included in the variable rule analysis include (1) age at arrival in the U.S., (2) the number of years living in the U.S., (3) immigrant group (generation), (4) Socioeconomic Status (SES), (5) time spent in another Spanish speaking country and the five factors based on the social networks of the speakers. The social networks factor groups contain information about the participant's (6) spouse/partner, (7) friends, (8) neighbors, (9) co-workers and (10) club or organization membership. Each social network factor group is divided into four factors: none (reported), Cuban (e.g. is the subject's spouse Cuban?), English speaker (e.g. does the participant attend or belong to a club or organization where the members are primarily English speakers?) and Spanish speaker from another Spanish-speaking country, i.e. not from Cuba (e.g. are most of the subject's friends non-Cuban Spanish speakers?). The social, or extra-linguistic, factor groups are listed in Table 6.2 along with the code entered into the variable rule analysis and a short description of each factor.

Goldvarb Code	Description
Age at arrival	
1	12+
2	7-11
3	1-6
4	born in U.S.
Years in U.S.	
1	0-5
2	6-10
3	11+
4	born in U.S.
Immigrant Group	
1	group one
h	group 1.5
2	group two
3	group three

Socioeconomic Status (Hollingshead score)	
1	low SES
2	middle SES
3	high SES
Time spent in other Spanish-speaking countries	
1	none
2	short time, work (1-2 weeks)
3	extensive time, work (up to two years)
4	short time, vacation (1-2 weeks)
5	extensive time, vacation (up to two years)
6	3 or more years
Spouse	
1	none (reported)
2	Cuban
3	Other Spanish speaker
4	English speaker
Friends	
1	none (reported)
2	Cubans
3	Other Spanish Speaker
4	English speaker
Neighbors	
1	none (reported)
2	Cubans
3	Other Spanish Speaker
4	English speaker
Co-workers	
1	none (reported)
2	Cubans
3	Other Spanish Speaker
4	English speaker
Club/Organization Membership	
1	none (reported)
2	Cubans
3	Other Spanish Speaker
4	English speaker

Table 6.2 – Extra-linguistic factor groups included in variable rule analysis.

6.2.2 Frequencies

A total of 548 absolute interrogative utterances were included in the variable rule analysis. Of these interrogatives, 71% (387) were produced with the rising pattern and 29% (161) with the falling pattern. This is shown in Table 6.3. The first Goldvarb run performed was a "no recode" analysis that provided the raw frequencies for each factor. These frequencies are reported in the subsequent tables in this section.

Rising pattern	387 (71%)
Falling pattern	161 (29%)
Total	548

Table 6.3 – Total frequencies of rising and falling pattern.

Table 6.4 provides the frequencies of each pattern by individual speaker. Most of the speakers did not exhibit variation in their individual usage of the patterns. Speakers 2, 4, and 24 used only the falling Cuban-style pattern while speakers 3, 7, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 27 exclusively used the rising pattern intonation pattern for their interrogatives. Speakers that exhibited variation between the two intonation patterns include speakers 1 (91% falling, 9% rising), 6 (55% falling, 45% rising), 8 (86% falling, 14% rising), 12 (5% falling, 95% rising), 14 (71% falling, 29% rising), 25 (96% falling, 4% rising), and 26 (2% falling, 98% rising).

Subject ID	Group	Age of arrival	Falling Pattern	Rising Pattern	Total
1	1	19	21 (91%)	2 (9%)	23
2	1	33	24 (100%)	0 (0%)	24
3	1	36	0 (0%)	23 (100%)	23
4	1	22	22 (100%)	0 (0%)	22
17	1	18	0 (0%)	24 (100%)	24
23	1	38	0 (0%)	18 (100%)	18
24	1	16	24 (100%)	0 (0%)	24
21	1	12	0 (0%)	24 (100%)	24
7	1.5	8	0 (0%)	20 (100%)	20
9	1.5	10	0 (0%)	23 (100%)	23
6	2	1	12 (55%)	10 (45%)	22
10	2	0	0 (0%)	24 (100%)	24
11	2	0	0 (0%)	26 (100%)	26
16	2	0	0 (0%)	24 (100%)	24
19	2	0	0 (0%)	23 (100%)	23
20	2	0	0 (0%)	24 (100%)	24
22	2	5	0 (0%)	24 (100%)	24
26	2	0	2 (14%)	12 (86%)	14
27	2	1	0 (0%)	24 (100%)	24
8	3	0	12 (86%)	2 (14%)	14
12	3	0	5 (31%)	11 (69%)	16
14	3	0	17 (71%)	7 (29%)	24
15	3	0	0 (0%)	19 (100%)	19
18	3	0	0 (0%)	22 (100%)	22
25	3	0	22 (96%)	1 (4%)	23

Table 6.4 – Total frequencies of rising and falling pattern by individual speaker, immigrant group, and age at arrival.

The distribution of the dependent variable according to the linguistic factor groups exhibited very similar patterns to the overall distribution illustrated in Table 6.3. The factor group "number of intervening unstressed syllables" is shown in Table 6.5 where it is reported that for all factors within the group the percentages are consistently around 70% for the rising pattern and 30% for the Cuban-style falling pattern. The same

pattern holds for the factor group "number of final unstressed syllables," as seen in Table 6.6, where across all factors, 0-3, the averages are very close to 70% for the rising pattern and 30% for the Cuban-style pattern. A similar situation, i.e. approximately 70% of the interrogatives are produced with the rising pattern and roughly 30% of the interrogatives are produced with the Cuban-style falling pattern, is seen for the factor group "prepositional phrase" as illustrated in Table 6.7. The raw percentages for the linguistic factor groups are very similar to the overall frequencies of use for the rising pattern vs. the falling pattern. This strongly suggests that the linguistic factors considered in this analysis do not contribute to the variable use of the two intonation patterns.

# intervening unstressed syllables	**rising pattern**	**falling pattern**	**Total**
0	67 (70%)	29 (30%)	96
1	65 (71%)	26 (29%)	91
2	66 (69%)	29 (31%)	95
3	63 (70%)	27 (30%)	90
4	67 (73%)	25 (27%)	92
5	59 (70%)	25 (30%)	84

Table 6.5 – Frequencies of interrogative pattern usage for the factor group "Number of intervening unstressed syllables."

# final unstressed syllables	**rising pattern**	**falling pattern**	**Total**
0	100 (72%)	39 (28%)	139
1	98 (67%)	48 (33%)	146
2	94 (69%)	43 (31%)	137
3	95 (75%)	31 (25%)	126

Table 6.6 – Frequencies of interrogative pattern usage for the factor group "Number of final unstressed syllables."

Prepositional Phrase	**rising pattern**	**falling pattern**	**Total**
"con"	50 (71%)	20 (29%)	70
"de"	16 (67%)	8 (33%)	24
"para"	45 (69%)	20 (31%)	65
none	276 (71%)	113 (29%)	389

Table 6.7 – Frequencies of interrogative pattern usage for the factor group "Prepositional phrase."

Since linguistic factors do not seem to influence which intonation pattern is produced by the Miami-Cuban informants for absolute interrogative utterances, it is with greater interest that the social factors are explored. The first extralinguistic factor group is the "age at arrival" or the age at which each participant arrived in the United States from Cuba or if they were born in the U.S. As seen in Table 6.8, those who were born in the U.S. produced the rising pattern interrogative in 77% (195/253) of the cases and the falling, Cuban-style, pattern in 23% (58/253) of the cases. The group that arrived as infants or young children (1-6) have similar frequencies in that they produced the rising pattern in 74% (34/46) of the cases and the falling pattern in 26% (12/46) of the interrogatives. The group that arrived as school-aged (shaded in Table 6.8) between the ages of 7 and 11 produced all of their interrogatives with the rising pattern. Those who arrived after the age of 11 produced a far higher percentage of the Cuban-style falling pattern interrogatives than the other groups, 58% (91/158), and they produced 42% (67/158) of their interrogatives with the rising pattern. This group of individuals, who immigrated later in their lives, is the only one within the factor group "age at arrival" that

produced a higher frequency of Cuban-style interrogatives than rising pattern interrogatives.

Age at Arrival in U.S.	Number of subjects	rising pattern	falling pattern	Total
after 11	8	67 (42%)	91 (58%)	158
7-11	2	91 (100%)	0 (0%)	91
1-6	3	34 (74%)	12 (26%)	46
Born in U.S.	12	195 (77%)	58 (23%)	253

Table 6.8 – Frequencies of interrogative pattern usage for the factor group "Age at arrival."

The factor group "years living in the U.S." (Table 6.9) was included in order to explore how the amount of contact with the English language influences the Spanish of the Miami-Cubans. It shows some very interesting results. Those who are recent immigrants to the U.S. overwhelmingly use the Cuban-style falling pattern (98%, 91/93) where those who have been in the U.S. for 6 to 10 years (shaded in Table 6.9) categorically use the rising pattern interrogative. The Cuban immigrants who have lived in the U.S. for 11 years or more use the rising pattern interrogative intonation pattern for 91% (124/136) of the tokens analyzed while only using the Cuban-style interrogative for 9% (12/136). Finally, the group of Miami-Cubans born in the U.S. produced 77% (195/253) of their interrogative utterances with the rising pattern and 23% (58/253) with the Cuban-style falling pattern.

Years living in U.S.	Number of subjects	Rising pattern	Falling pattern	Total
0-5	4	2 (2%)	91 (98%)	93
6-10	2	66 (100%)	0 (0%)	66
11+	7	124 (91%)	12 (9%)	136
Born in U.S.	12	195 (77%)	58 (23%)	253

Table 6.9 – Frequencies of interrogative pattern usage for the factor group "Years living in the U.S."

The factor group "immigrant group" (Table 6.10) has four groups. The first group is composed of those people who were born in Cuba and who arrived in the U.S. after the age of 11. The first generation produced an almost identical number of interrogatives with the Cuban-style falling pattern (50%, 91/158) as with the rising pattern (50%, 92/158). The group 1.5, or one-and-a-halfers, comprised of those immigrants who came to the U.S. between the ages of 6 and 11, categorically uses the rising pattern. The second generation is made up of those who arrived in the U.S. before the age of 6 or who were born to first generation parents in the U.S; this group uses the Cuban-style pattern in 7% (14/204) of their interrogatives and they use the rising pattern in 93% (190/204) of the questions produced. The third generation is made up of the Miami-Cubans born in the U.S. to at least one parent in the second generation; surprisingly this group produced only a few more interrogatives with the rising pattern (53%, 62/118) than with the Cuban-style pattern (47%, 56/118) and their production of the falling pattern approaches that of the first generation immigrants.

Immigrant Group (generation)	**Number of subjects**	**Rising pattern**	**Falling pattern**	**Total**
1	8	92 (50%)	91 (50%)	183
1.5	2	43 (100%)	0 (0%)	43
2	9	190 (93%)	14 (7%)	204
3	6	62 (53%)	56 (47%)	118

Table 6.10 – Frequencies of interrogative pattern usage for the factor group "Immigrant group."

The sociolinguistic variable of SES is addressed in the factor group called "socioeconomic status" which is defined by using the Simple Measure of Social Status (SMSS) which was based on the Hollingshead four factor measure as described in Chapter 4. After the groups were assigned an SMSS score, the participants were divided into three groups, Low, Mid, and High. The frequencies of the interrogative intonation pattern used according to the SMSS scores are reported in Table 6.11. The lower group produced 79% (89/113) of their absolute interrogatives with the rising pattern and 21% (24/113) with the falling pattern. The middle group produced 64% (81/126) of the interrogatives with the rising pattern and 36% (45/126) with the falling pattern. Finally the upper group produced 70% (217/309) of their interrogatives with the rising pattern and 30% (92/309) with the falling pattern.

Socio-economic Status (SMSS score)	**Number of subjects**	**Rising pattern**	**Falling pattern**	**Total**
1 (0-20)	5	89 (79%)	24 (21%)	113
2 (21-40)	6	81 (64%)	45 (36%)	126
3 (41+)	14	217 (70%)	92 (30%)	309

Table 6.11 – Frequencies of interrogative pattern usage for the factor group "Socioeconomic status."

Table 6.12 provides the frequencies for the factor group "Time spent in another Spanish speaking country." The majority of the current study's participants have visited a Spanish speaking country, other than Cuba, for a short vacation. This group produced 80% (255/320) of their interrogatives with the rising pattern and 20% (65/320) with the Cuban-style pattern. Those who have not visited another Spanish speaking country produced 60% (108/180) of the absolute interrogatives with the rising pattern and 40% (72/180) with the falling pattern. The individual who worked for 1 to 2 years in another Spanish speaking country (Colombia) produced exclusively the Cuban-style intonation pattern and the one speaker who worked in another country for 3 or more years in Spain only produced the rising pattern.

Time spent in another Spanish Speaking Country	**Number of subjects**	**Rising pattern**	**Falling pattern**	**Total**
none	9	108 (60%)	72 (40%)	180
short time, work	0	0 (0%)	0 (0%)	0
short time, vacation	1	255 (80%)	65 (20%)	320
1-2 years, work	14	0 (0%)	24 (100%)	24
1-2 years, vacation	0	0 (0%)	0 (0%)	0
3 years or more	1	24 (100%)	0 (0%)	24

Table 6.12 – Frequencies of interrogative pattern usage for the factor group "Time spent in another Spanish speaking country."

The final five factor groups are related to the social networks of the study's participants. The first factor group asks the background of the person's spouse or partner (Table 6.13). Most informants (20 of 25), however, did not report having a spouse/partner. Those who reported having a Cuban spouse/partner produced 94%

(30/32) of their interrogatives with the rising pattern and only 6% (2/32) with the falling pattern. Those few informants with a spouse who is either an English speaker or who is a non-Cuban Spanish speaker produced all of their interrogatives with the rising pattern. Because of the low number of participants reporting a spouse or partner, however, this factor group does not provide much useful information.

Spouse/Partner	Number of subjects	Rising pattern	Falling pattern	Total
Cuban	2	30 (94%)	2 (6%)	32
Other Spanish Speaker	1	24 (100%)	0 (0%)	24
English Speaker	2	48 (100%)	0 (0%)	48
None	20	285 (64%)	159 (36%)	444

Table 6.13 – Frequencies of interrogative pattern usage for the factor group "Spouse."

Table 6.14 reports the frequencies of interrogative pattern use for the factor group "friends". Those who claimed that most of their friends are Cuban produced 69% (261/376) of their interrogatives with the rising pattern and 31% (115/376) with the Cuban-style pattern. The speakers whose friends are from Spanish speaking countries other than Cuba overwhelmingly used the rising pattern (97%) over the falling pattern (3%). The Miami-Cuban participants who claim that most of their friends are English speakers used the rising pattern in 60% (66/110) of the interrogatives and they used the falling pattern for 40% (44/110) of them.

Friends	Number of subjects	Rising pattern	Falling pattern	Total
Cuban	17	261 (69%)	115 (31%)	376
Other Spanish Speaker	3	60 (97%)	2 (3%)	62
English Speaker	5	66 (60%)	44 (40%)	110
None	0	0 (0%)	0 (0%)	0

Table 6.14 – Frequencies of interrogative pattern usage for the factor group "Friends."

The factor group reporting the language spoken by the neighbors of each subject (Table 6.15) revealed that the vast majority of the participants claimed to have Spanish speaking neighbors. Those whose neighbors are Cubans produced 65% (165/254) of their interrogative utterances with the rising pattern while using the Cuban-style interrogative pattern with 35% (89/254). Those who claimed that the majority of their neighbors are from Spanish speaking countries other than Cuba used the rising pattern for 68% (153/225) of the interrogative utterances produced and the falling pattern for 32% (72/225) of their interrogatives. The speaker with English speaking neighbors and the two speakers who reported to have no neighbors all produced 100% of their interrogatives with the rising pattern.

Neighbors	Number of subjects	Rising pattern	Falling pattern	Total
Cubans	12	165 (65%)	89 (35%)	254
Other Spanish Speakers	10	153 (68%)	72 (32%)	225
English Speakers	1	24 (100%)	0 (0%)	24
None (reported)	2	45 (100%)	0 (0%)	45

Table 6.15 – Frequencies of interrogative pattern usage for the factor group "Neighbors."

The frequencies for the factor group "co-workers" are provided in Table 6.16. The participants with Cuban co-workers use about half of each interrogative intonation pattern: 51% (82/161) of the rising pattern and 49% (79/161) of the falling pattern. Those with non-Cuban Spanish speaking co-workers produce the majority of their interrogatives with the rising pattern (91%, 147/161). Those with English speaking co-workers produced 73% (104/143) of their interrogatives with the rising pattern and 27% (39/143) with the falling pattern. The group of subjects who didn't report any co-workers produced 65% (54/83) with the rising pattern and 35% (29/83) with the falling pattern.

Co-workers	**Number of subjects**	**Rising pattern**	**Falling pattern**	**Total**
Cubans	7	82 (51%)	79 (49%)	161
Other Spanish Speakers	8	147 (91%)	14 (9%)	161
English Speakers	6	104 (73%)	39 (27%)	143
None (reported)	4	54 (65%)	29 (35%)	83

Table 6.16 – Frequencies of interrogative pattern usage for the factor group "Co-workers."

The final factor group includes the membership of any club or organization that the participant may belong to. The frequencies associated with this factor group are reported in Table 6.17. The participants who belong to a club or organization made up primarily by Cubans or Cuban-Americans produced 61% (27/44) of their interrogatives with the rising pattern and 39% (17/44)with the falling pattern. Those who belong to an organization that is made up mostly of Spanish Speakers that are not Cuban produced 55% (26/47) with the rising pattern and 45% (21/47) with the falling pattern. Those belonging to a group where most members are English speakers use the rising pattern

69% (107/155) of the time and use the falling pattern 31% (48/155) of the time. The largest group is comprised of those reporting to not belong to any club or organization. These participants produced 75% (227/302) of their interrogatives with the rising pattern and they used the Cuban-style pattern with 25% (75/302). The low number of participants claiming to belong to an organization with other Cubans or with non-Cuban Spanish speakers does not allow these percentages to be used with any confidence.

Club/Organization Membership	**Number of subjects**	**Rising pattern**	**Falling pattern**	**Total**
Cubans	2	27 (61%)	17 (39%)	44
Other Spanish Speakers	2	26 (55%)	21 (45%)	47
English Speakers	7	107 (69%)	48 (31%)	155
None (reported)	14	227 (75%)	75 (25%)	302

Table 6.17 – Frequencies of interrogative pattern usage for the factor group "Club or Organization Members."

6.2.3 Variable Rule Analysis

A few general patterns can be gleaned from the frequencies reported in Section 6.2.2. The linguistic factor groups seem to contribute little, if anything, to the variation in question. The extralinguistic factor groups, on the other hand, are not as easily dismissed by glancing at the "no-recode" frequencies. In order to determine which factor groups significantly influence the observed intonation patterns, a variable rule analysis using Goldvarb 2001 was performed. The initial Goldvarb run, a step-up/step-down binomial analysis, confirmed the observation that the linguistic variables are not significant in their contribution to the variation. The other factor groups rejected as not significant through

Goldvarb include "SES," "time in another Spanish speaking country," "spouse," "neighbors," and "club/organization." The factor groups selected as significant were "age at arrival," "years in the U.S.," "immigrant group," "friends," and "co-workers" ($p < 0.05$). When these five factor groups were analyzed in the 1-step binomial Goldvarb run, however, a statistically significant fit was not achieved.

A detailed examination of the frequencies as well as cross-tabulations for the remaining factor groups revealed that the cause of the poor fit was due to the error rate from the data of one subject, Speaker 26. Speaker 26 belongs to the 2nd immigrant group, or generation, and was born in the United States. She was born in California and moved to Miami at the age of 3. She declared that most of her friends are Spanish speakers but not Cuban. She works in the medical field and belongs to a professional organization where English is spoken and her co-workers are English speakers. All of the other participants that fit into those same categories (i.e. 2nd generation, born in the U.S., Other Spanish speaking friends and English speaking co-workers) only produced the rising pattern interrogative. It would be expected, therefore, that someone with these social characteristics would produce the rising pattern interrogative. Speaker 26, however, produced 12 of 14 analyzable interrogatives with the rising pattern. The two interrogatives produced with the Cuban-style falling pattern are more than would be expected of a second generation speaker whose friends are other Spanish speakers and whose co-workers are English speakers. In the Goldvarb analysis the expected number of applications of the dependent variable (rising pattern) for this group was 84.797 and the actual was 83, causing an error of 15.943 and a χ^2 per cell of 2.3579 (n.s.). The lower number of applications (of the rising pattern) for Speaker 26 is, therefore, the cause of the

error rate. While it seems that Speaker 26's social characteristics should correspond to a categorical use of the rising pattern, she is also married to a Cuban. It may be that her professional life and generational status would lead her to use the more common (i.e. rising) interrogative intonation pattern but her Cuban identity is not entirely lost. It very well may be that Speaker 26 produces more Cuban-style falling pattern interrogatives than expected because she is married to a Cuban and her family life keeps her connected to her Cuban identity. Since speaker 26's data does not fit with those her social peers and its presence produced error rates that would not allow a statistically significant fit for the model, her data was removed from the corpus for the variable rule analysis.

After removing speaker 26's data from the corpus, a new model was generated using Goldvarb. In the subsequent model, the factor groups "age at arrival" and "years in the U.S." contained multiple knockouts. Within the factor group "age at arrival" the factors (2) "7-11" and (3) "1-6" were observed to have only the rising pattern. Factors (2) "6-10" and (3) "11+" in the group "years in the U.S." also only had the rising pattern.

After excluding the knockout factors from the analysis, two factor groups were selected as significant in the variable rule analysis: "immigrant group" and "Co-workers." These two factor groups, however, also failed to produce a statistically significant fit. A cross-tabulation of these two factor groups revealed an interaction among the two groups and revealed why the model did produce a fit. The crosstabs are shown in Table 6.18. As can be seen in the table, 1st generation speakers who have primarily Cuban co-workers produce 73% of their interrogatives with the falling Cuban-style pattern with the remaining 27% being produced with the rising pattern. The 1st generation produces no Cuban-style interrogatives when their co-workers are English speakers or non-Cuban

Spanish speakers. Finally, the 1st generation produces all of their interrogatives with the falling pattern when they claim to have no co-workers. The 2nd generation speakers with Cuban co-workers produced 83% of the interrogatives with the rising pattern and 17% with the falling pattern. The 2nd generation produced only rising pattern interrogatives when their co-workers are non-Cuban Spanish speakers or English speakers. There were no 2nd generation speakers that reported no co-workers. There were no 3rd generation speakers with Cuban co-workers but those with non-Cuban Spanish speaking co-workers produced 64% of their interrogative utterances with the rising pattern and 36% with the falling pattern. Third generation speakers with English speaking co-workers produced 43% with the rising pattern and 57% with the falling pattern. When 3rd generation speakers have no co-workers they produce 69% with the rising pattern and 31% with the falling pattern.

		1st generation	2nd generation	3rd generation
Cuban Co-Workers	rising pattern	25 (27%)	57 (83%)	--
	falling pattern	67 (73%)	12 (17%)	--
Other Spanish Speaking Co-Workers	rising pattern	43 (100%)	71 (100%)	21 (64%)
	falling pattern	0 (0%)	0 (0%)	12 (36%)
English Speaking Co-Workers	rising pattern	24 (100%)	50 (100%)	30 (43%)
	falling pattern	0 (0%)	0 (0%)	39 (57%)
No Co-Workers	rising pattern	0 (0%)	--	11 (69%)
	falling pattern	24 (100%)	--	5 (31%)

Table 6.18 – Cross-tabulation: Immigrant group (generation) and Co-workers.

It is evident from the crosstabs presented in Table 6.18 that there is an interaction among the two factor groups. The factor "no co-workers" is the factor producing the observed interaction as seen in Figure 6.1 where the line plotting "no co-workers" crosses the other lines in the interaction plot. This is taken into consideration in the current analysis as well as, perhaps more importantly, the fact that the purpose of the current analysis is to investigate influences from language contact in the production of the intonation pattern. The factor "no co-workers" does not provide any information into the language contact situation of the speakers. Of much more importance to the analysis is whether the speakers have an active interaction with Cuban, English speaking or non-Cuban Spanish speaking co-workers. Therefore, the factor "no co-workers" was eliminated from the analysis. After this factor was eliminated, a statistically significant fit was achieved with the two factor groups "immigrant group" (with generations 1, 2 and 3) and "co-workers" (including 2- Cuban, 3- other Spanish speaking, and 4- English speaking co-workers). This model is presented in the Section 6.2.4.

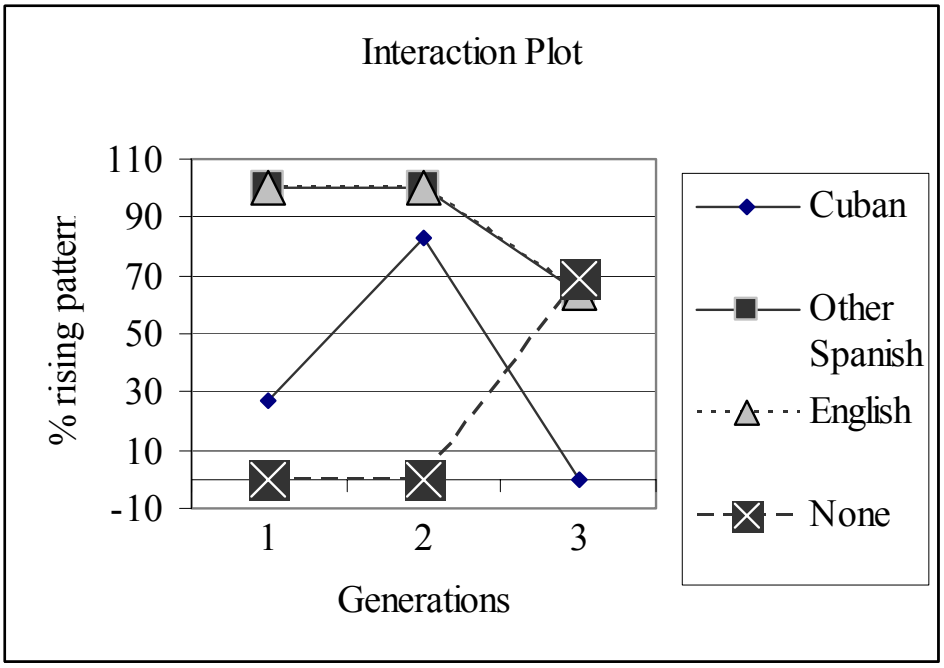


Figure 6.1 – Interaction plot for the factors “immigration group” (generation) and “co-workers”.

6.2.4 Goldvarb Results

Factor	**N**	**%**	**Pattern**	**Factor Weight**	**Interpretation**
Immigrant Group					
1	92	50%	Rising	0.464	**Disfavors Rising pattern**
	91	50%	Falling		
2	178	93%	Rising	0.914	**Favors Rising Pattern**
	12	6%	Falling		
3	62	53%	Rising	0.015	**Disfavors Rising pattern**
	56	47%	Falling		
Co-Workers					
Cuban	82	50%	Rising	0.034	**Disfavors Rising pattern**
	79	49%	Falling		
Other Spanish Speakers	135	91%	Rising	0.906	**Favors Rising Pattern**
	12	8%	Falling		
English Speakers	104	72%	Rising	0.806	**Favors Rising Pattern**
	39	27%	Falling		
Log Likelihood: -155.690				Input: 0.925	
χ^2 per cell = 0.1443				Total χ^2 = 1.1544	
Total N: 548				Significance: $p < 0.001$	

Table 6.19 – Goldvarb results for the distribution of rising and falling intonation patterns for the factor groups “immigrant group” and “co-workers.”

Table 6.19 shows the final Goldvarb results for the two factor groups found to be significant in their contribution to the variation observed in the data. For the factor group "immigrant group" (generation), there are three factors included in the final model. The first generation received a factor weight of 0.464 which disfavors the production of the rising pattern. It would be expected that the first generation, who were all born in Cuba and immigrated to the U.S. after the age of 11, would favor the falling Cuban-style intonation pattern. The second generation's factor weight is 0.914. This strongly favors the rising pattern. The results for the 3rd generation are somewhat surprising. The factor weight is 0.015 which disfavors the production of the rising pattern. This finding is surprising because one would expect that the 3rd generation would behave more similarly to the 2nd generation than to the 1st generation and favor the rising pattern. However, as is seen in Table 6.19, the 3rd generation speakers produce more falling pattern interrogatives than the other groups.

When considering the factor group "co-workers" it can be seen that those Miami-Cuban Spanish speakers who primarily associate with Cuban co-workers, the factor weight is 0.034, highly favoring the falling Cuban-style interrogative pattern. The factor "other Spanish speaking" co-workers received a factor weight of 0.906, robustly favoring the rising pattern. The group "English speaker" co-workers received a factor weight of 0.806 also strongly favoring the rising pattern.

The model created by Goldvarb using the factors listed in Table 6.19 is statistically significant: total Chi-square = 1.1544; $p < 0.001$ and the Chi-square/cell = 0.1443; $p < 0.001$.

6.3 Summary of the Sociolinguistic Analysis

No linguistic factors were found to contribute significantly to the variation of the rising or falling intonation pattern. There are, however, extralinguistic factors that were found to be significant in their contribution to the variation observed. The results of the Goldvarb analysis of these extra-linguistic factors are especially telling when examined in conjunction with the raw frequencies and the knockout factors.

The raw percentages presented in Section 6.1 provide some important clues as to who uses which pattern. Those who arrived in the U.S. between the ages of 7 and 11 categorically use the rising pattern. Another group of participants who always produced the rising pattern is comprised of those who have lived in the U.S. between 6 and 10 years. Those living in the U.S. for even more time, however, produced 91% of their absolute interrogatives with the rising pattern. On the other hand, very recent immigrants, i.e. those who have lived in the U.S. from 0 to 5 years, used the Cuban style falling pattern for 97% of their interrogatives.

The factor "age of arrival" provides an interesting case when viewed in conjunction with the factor "co-workers." This combination of factor groups was not part of the final Goldvarb analysis due to many knockout factors which turn out to be quite interesting. Those who arrived after the age of 11 and who have non-Cuban Spanish speaking co-workers used the rising pattern exclusively while those arriving after the age of 11 with Cuban co-workers overwhelmingly (97%) use the Cuban-style falling intonation pattern. As is seen in the Goldvarb weights, the social network factor "co-workers" is significant. Those who claim that most of their co-workers come from other

Spanish-speaking countries use the rising pattern in 91% of the cases. Another social network factor that seems to be important in considering the use of the rising vs. the falling interrogative pattern is "friends." Those who claim that most of their friends are from other Spanish-speaking countries (i.e. not Cuba) use the rising pattern in 96% of the cases. The social network of the individual and who they are speaking Spanish with is a very important indicator of which pattern is used.

The Goldvarb results coincide with this observation. The analysis shows that the following factors favor the use of the rising pattern interrogative intonation (factor weights in parentheses):

- Belonging to the 2nd immigrant group (0.914)
- Having primarily non-Cuban Spanish speaking co-workers (0.906)
- Having primarily English speaking co-workers (0.806)

The Goldvarb analysis also shows that the following factors favor the use of the Cuban-style falling pattern:

- Belonging to the 1st immigrant group (0.464)
- Belonging to the 3rd immigrant group (0.015)
- Having primarily Cuban co-workers (0.034)

In response to the first part of research question #3 which is repeated at the beginning of the current chapter, it is evident that there is a change in intonation patterns in subsequent generations of Miami-Cuban Spanish speakers. The first generation favors the falling Cuban-style absolute interrogative pattern and the second generation favors the rising pattern. The third generation, however, is shown to favor the falling pattern. This finding suggests that the differences observed are not representative of a change in

progress, rather it seems to be an introduction of a pattern that is already present in Spanish and that is readily available to the Miami Cuban Spanish speakers. If there were a change in progress one would expect the 3rd generation to favor the use of the innovation. The fact that the 3rd generation strongly disfavors the rising pattern is a somewhat unexpected result. An explanation for this result, however, is not readily available. A possible explanation for the favoring of the falling Cuban-style pattern by the 3rd generation could be an issue of identity. It very well may be that one of the ways this bilingual group affirms its Cuban identity and separates itself from the other Spanish speaking groups in Miami is through the use of a very Cuban intonation pattern. While this is a possible explanation, the data to back up such a claim is not available given the scope of the current dissertation. Future research including attitudinal surveys is needed to provide a more definitive explanation for this result.

The second part of research question #3 seeks to discover the linguistic and social motivations for any observed change in intonation patterns. No linguistic factor was found to be a significant contributor to the production of either the falling or the rising intonation pattern. The results presented in Section 6.2 of this chapter strongly indicate, however, that the main factor motivating the presence of the rising pattern vs. the presence of the falling Cuban-style pattern is the social networks of the individual speaker. This observation is confirmed by the selection of the factor "co-worker" in the final Goldvarb analysis. The Miami-Cubans who associate with mostly Cuban co-workers favor the use of the falling Cuban-style pattern while those who work with English speakers and Spanish speakers from countries other than Cuba strongly favor the rising pattern. It is impossible to claim that the introduction of the rising pattern is due to

the English/Spanish language contact situation in Miami because the rising pattern is also common in other varieties of Spanish. It is also impossible, however, to discount the influence of English on the Spanish of these bilingual speakers. It is evident that language contact with both English as well as with other, non-Cuban, varieties of Spanish is motivating the presence of the rising pattern. As stated above, the contact situation is not causing convergence to the rising pattern but a change has occurred. While the second generation has moved toward favoring the more common pattern, the third generation uses both patterns extensively while favoring the falling pattern.

Because the introduction of the rising pattern into Miami Cuban Spanish is due to contact with both English and other varieties of Spanish, it appears that there is a combination of contact induced change/innovation and dialect leveling occurring in Miami Cuban Spanish. In a dialect leveling situation, contact with other varieties of Spanish will cause that a less common or less "standard" variant will become disfavored and the more "standard" variant will become favored. Torres Cacoullos and Ferreira (2000), for example, found that the New Mexican labiodental /v/ becomes disfavored when there is intense contact with Mexican Spanish, which favors the bilabial /b/. While the current data does not show a complete leveling toward the rising intonation pattern the results could show the beginning of a similar leveling process. Likewise, contact induced change has not been shown convincingly but the intense English/Spanish language contact situation could very well have lead to the introduction of the rising pattern into Miami Spanish. Thomason and Kauffman (1988) claim that any linguistic trait can be transferred into another linguistic system if the contact and bilingualism is of sufficient intensity. At this point English and Spanish have been in very intense contact in

Miami for almost 50 years. Miami Cuban Spanish's contact with English combined with the contact with other varieties of Spanish has introduced the rising absolute interrogative intonation pattern into the intonation system of the Miami Cuban Spanish speakers.

Chapter 7

Conclusions

7.1 Introduction

The current chapter concludes the dissertation by reviewing the findings presented in Chapters 5 and 6 in light of current research; it is comprised of five sections. Section 7.2 presents the findings from the first research question which seeks a description of Miami Cuban broad-focus declarative utterance intonation. Section 7.3 recaps the findings from research question #2 and answers how Miami Cubans differentiate absolute interrogatives and broad focus declaratives in their speech production. The findings from the third research question, exploring the social and linguistic factors influencing the use of either the falling or rising interrogative intonation pattern, are reported in Section 7.4. The chapter and dissertation are concluded in Section 7.5.

7.2 Research Question #1

Research question #1 is repeated here:

1. *What are the characteristics of broad focus declarative intonation in Miami Spanish?*

Miami Spanish broad focus declarative intonation was found to be similar to the declarative intonation described for many other varieties of Spanish. Figure 7.1 illustrates

a typical declarative intonation pattern observed in the current data and described extensively in Chapter 5. The AM analysis of the pattern illustrated in Figure 7.1 is L*+H L+H* L- L%. This is the same intonation analysis claimed for Madrileño Spanish declaratives (Face 2002) as well as for other peninsular varieties of Spanish (e.g. Prieto et al. 1995). The prenuclear accent, L*+H, has been described as being the typical Spanish prenuclear accent by Navarro Tomás' (1918) and many other researchers. The current dissertation confirms that the L*+H is also a valid analysis for the prenuclear accent in the variety of Spanish spoken by the Cuban population in Miami, Florida.

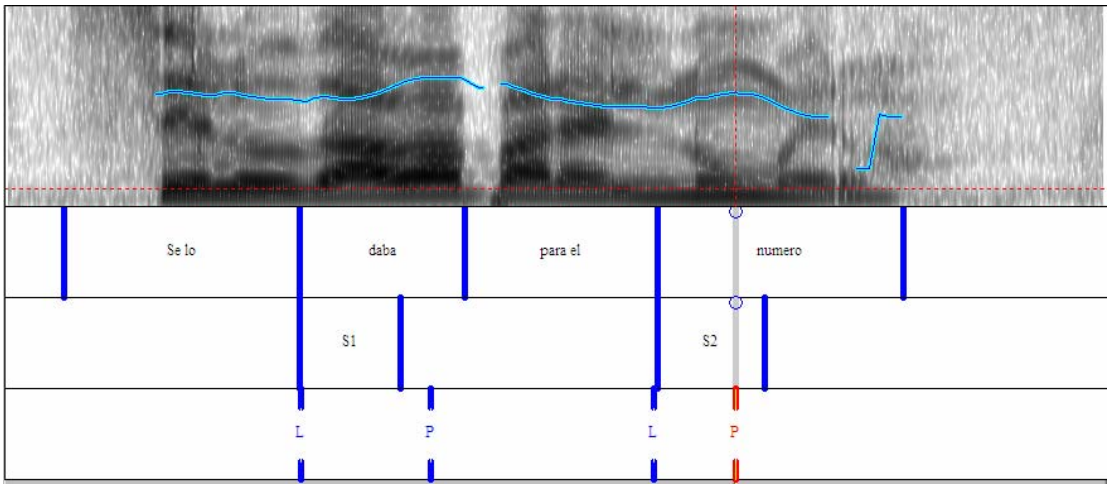


Figure 7.1 – Pitch track of the broad focus declarative utterance: *Se lo daba para el número.*

While the broad focus declarative utterances examined for the current dissertation exhibited a similar pattern to what has been described for many other varieties of Spanish, there was a difference observed. The majority of broad focus declarative utterances from the Miami Cuban Spanish data, 312/451 (69%), were produced with no appreciable F0 rise affiliated with the final stressed syllable. In the instances where there

was an observable F0 movement affiliated with the final tonic syllable, the AM analysis of this nuclear accent for the Miami Cuban broad focus declaratives is L+H*. This is the same nuclear accent observed in Peninsular Spanish.

Intonation Pattern	AM analysis		
	Prenuclear Accent	Nuclear Accent	Boundary Tones
Broad Focus Declarative	L*+H	L+H*	L- L%

Table 7.1 – Phonological analysis of Miami Cuban broad focus declarative intonation.

In Chapter 5 I called the absence of a F0 rise observed in the Miami Cuban data deaccenting. Such a high rate of deaccenting is unattested in the literature on Spanish intonation. Face (2002) observed some deaccenting in his Madrid Spanish data and in his study on spontaneous speech he observed a slightly higher rate of deaccenting (Face 2003). Prieto et al. (1996) also observed one speaker from Mexico who produced some declarative utterances lacking observable F0 rises affiliated with the final tonic syllable. While deaccenting was observed in these studies, it was not nearly as common as what has been observed in the Miami Cuban data. Figure 7.2 provides an example of an utterance produced with deaccenting.

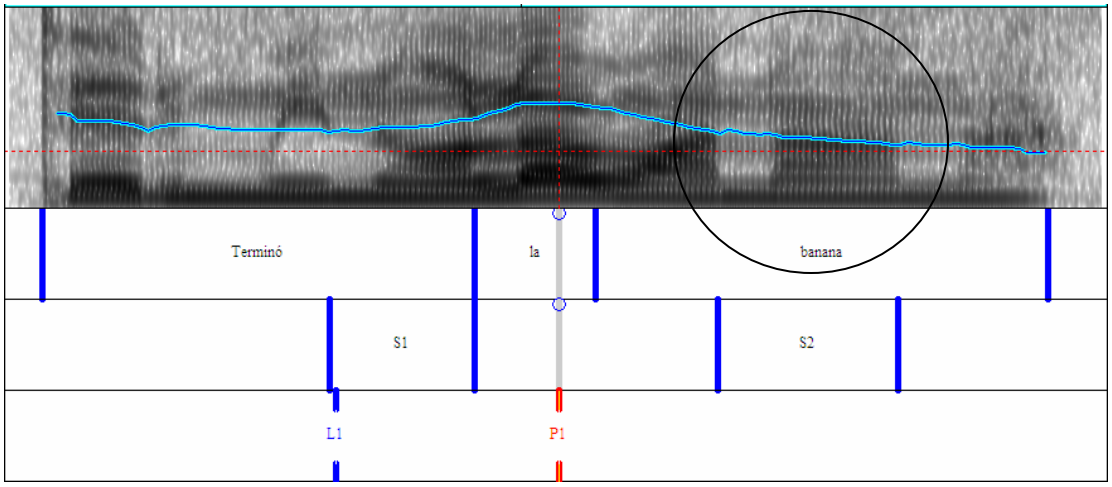


Figure 7.2 – Pitch track of the declarative utterance, "*Terminó la banana*", which illustrates deaccenting where a nuclear accent would be expected.

Prieto et al. (1996) claim that the absence of an F0 rise in their data is not deaccenting, or the absence of a pitch accent affiliated with the stressed syllable, rather it is an extreme version of final lowering. In their assessment, the nuclear accent is actually present and is merely reduced to a point where the rise cannot be measured. The characteristics of downtrend in Miami Cuban Spanish are not clear, however, from the data available in the current study. Future studies, including test utterances with more than two content words, should be carried out in order to better learn how downtrend or downstep work in this variety of Spanish. This line of future study will lead to a better understanding of the intonation patterns affiliated with the final stressed syllable and can help determine if deaccenting is really taking place or if it is an extreme version of final lowering.

Another aspect of declarative intonation that should be investigated in future research is the role of bilingualism in the production of the nuclear accent in broad focus declaratives in Miami Cuban Spanish. This future research should investigate whether the

presence or absence of an F0 rise affiliated with the final tonic syllable is motivated by social or extralinguistic factors such as language contact.

7.3 Research Question #2

2. How do Miami Cubans differentiate between absolute (yes/no) interrogatives and lexically and syntactically identical declarative utterances?

7.3.1 Description of Absolute Interrogative Intonation

Before research question #2 could be answered it was necessary to provide a detailed description of Miami Cuban interrogative intonation as was done for the declarative intonation. It was discovered that there are two intonation patterns produced with absolute interrogative utterances in Miami Cuban Spanish. The first and most common pattern observed in the data, illustrated in Figure 7.3, is similar to the absolute interrogative intonation pattern observed in many varieties of Spanish (e.g. Quilis 1981, Face 2004a and Sosa 1999), with a rising final contour. The second pattern found in the current data, illustrated in Figure 7.4, has a falling final contour and is similar to the intonation pattern reported for Cuban Spanish absolute interrogatives (e.g. Sosa 1999, García Riverón 1998).

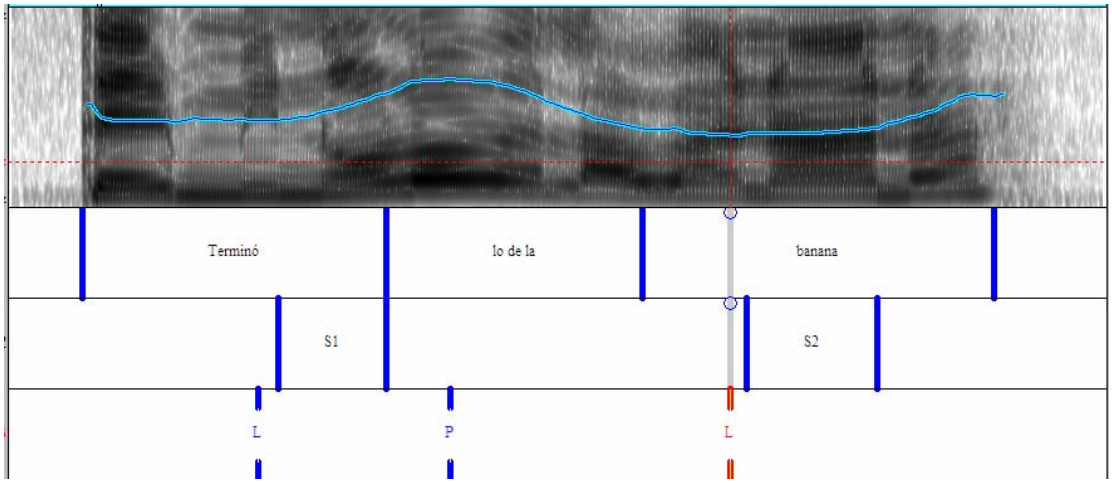


Figure 7.3 – Pitch track of the interrogative utterance "Terminó lo de la banana," illustrating the rising final contour. This pattern is similar to interrogative patterns observed in other Spanish varieties as well as American English.

The phonological analysis for the two interrogative patterns illustrated in Figures 7.3 and 7.4 are given in Table 7.2. The rising pattern has an AM analysis of L*+H L* H- H% and the falling Cuban-style pattern was analyzed as L*+H L+H* L- L%.

Intonation Pattern	AM analysis		
	Prenuclear Accent	Nuclear Accent	Boundary Tones
Rising Pattern	L*+H	L*	H- H%
Falling Pattern	L*+H	L+H*	L- L%

Table 7.2 – Phonological analysis of Miami Cuban absolute interrogative intonation

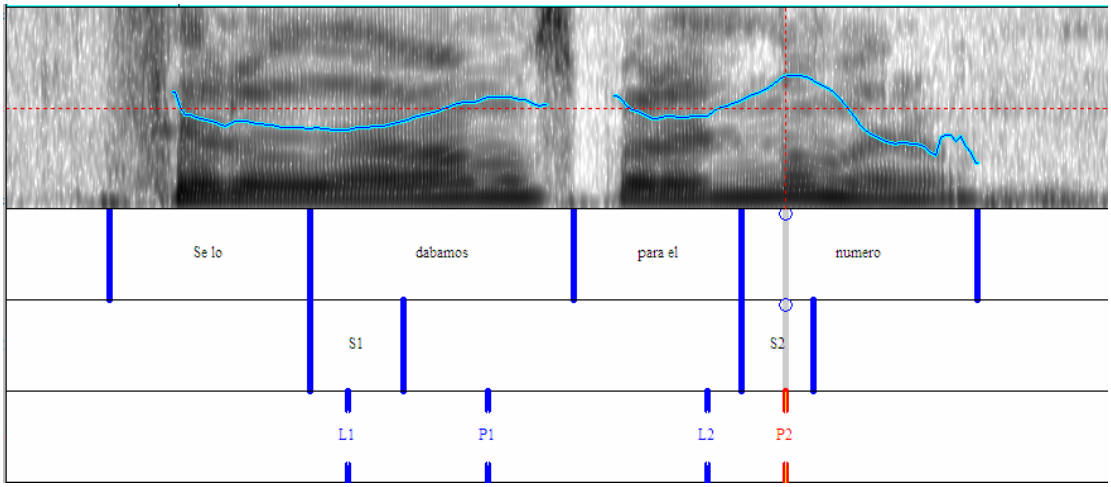


Figure 7.4 – Pitch track of the interrogative utterance "¿Se lo dábamos para el número?," illustrating the Caribbean style interrogative pitch pattern.

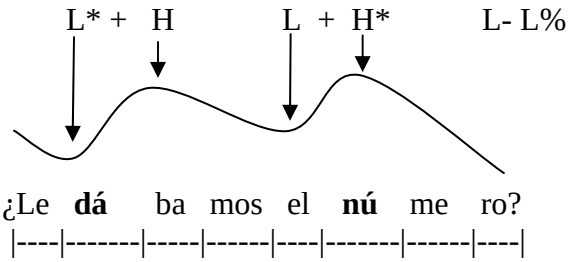
In the description of the absolute interrogative intonation patterns found in the data, some interesting observations were made. The first concerns tonal crowding, or the behavior of tones when there is a limited amount of space for each to be realized. For example, in many varieties of Spanish the prenuclear pitch accent in broad focus declaratives is L*+H. When this accent is followed by another pitch accent associated with a stressed syllable with little to no room separating the two syllables, the H tone of the first accent has been shown to be pushed to the left, aligning within the first stressed syllable (Face 2000). This pattern for tonal crowding was observed in Miami Cuban data for broad focus declaratives as well as in the rising pattern absolute interrogatives, i.e. an unassociated member of a pitch accent would move to the left or to the right as there was more or less room (i.e. a varying number of intervening unstressed syllables) available for the realization of the accent. The Cuban-style falling intonation pattern for absolute

interrogative utterances revealed a different pattern for dealing with tonal crowding situations. The prenuclear pitch accent for this intonation pattern is also L*+H. In tonal crowding situations, instead of being pushed to the left as occurs in declarative and rising pattern interrogative prenuclear accents, the H tone is deleted. The deletion of a tone in situations of tonal crowding has not been observed in research on Spanish intonation to this point. Future studies should investigate tonal crowding in other varieties of Spanish, particularly Caribbean varieties, to see if tone deletion occurs.

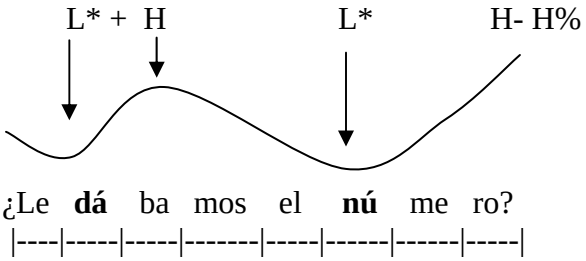
7.3.2 Disambiguating Declaratives and Interrogatives

In comparing the two absolute interrogative intonation patterns to the broad focus declarative intonation pattern (shown in schematic form in Figure 7.5) it was discovered that there is one main intonational cue signaling interrogative meaning that is common to both patterns. This cue is a higher F0 scaling in the first intonational peak of the interrogative utterance. In fact, both patterns of interrogatives in the Miami Cuban data exhibit an upward shift of the entire pitch range in interrogatives as compared to declarative utterances. This higher pitch range is deemed to be more important to the differentiation of interrogative and declarative meaning than the final F0 contour.

(a)



(b)



(c)

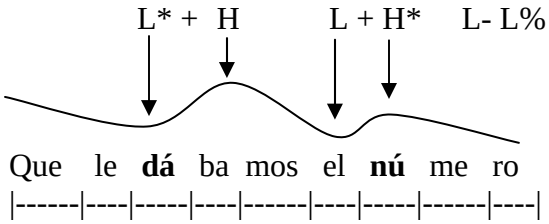


Figure 7.5 – Schematic of the Cuban-style falling interrogative (a), the rising pattern interrogative (b) and the broad focus declarative (c). Pitch accents, phrase tone and boundary tones are labeled using AM notation.

While there are studies that have cited the importance of the final F0 contour in disambiguating interrogatives and declaratives in other varieties of Spanish (e.g. Quilis 1981 for Peninsular Spanish, Willis 2006 for Mexican Spanish), the importance of F0 scaling has recently been shown to be extremely important to the perception of interrogative meaning in Madrileño Spanish. Face (2005) has shown that the interrogative

meaning is perceived very accurately as early as the first post-tonic syllable of a question. Future studies on Miami Cuban Spanish should include perception data in order to determine if a higher pitch range is what listeners actually use to interpret interrogative meaning.

The importance of F0 scaling in providing the interrogative meaning is a significant finding. The height of the F0 peak has been deemed an important intonational cue in conveying interrogativity as early as Navarro Tomás (1918) but its importance had been discounted as many studies concentrated on the final F0 contour (e.g. Quilis 1993). As Face (2005) has shown the importance of F0 scaling in the perception of interrogative meaning in Madrileño speech, the current dissertation has shown its importance in the production of interrogative utterances in Miami Cuban speech. These findings are significant for the Autosegmental Metrical theory of intonation. The AM model does not currently have a way to account for F0 scaling as a phonological phenomenon; F0 scaling is treated as phonetic. The role of the pitch range and peak height in conveying pragmatic meaning, however, indicates that it should have a place in any phonological theory dealing with intonation. Unfortunately, it is beyond the scope of the dissertation to provide a modification to the AM theory or to suggest a new theoretical approach to the analysis of intonation. This task will take place in future research.

7.4 Research Question #3

3. Is the intonation system changing through subsequent generations of Miami Cubans? What are the social and linguistic factors motivating the use of the observed intonation patterns?

The observed change in intonation explored in order to answer research question #3 is the variable production of the two absolute interrogative intonation patterns that are described in detail in Chapter 5. Chapter 6 describes how the variation between these two patterns was analyzed. It was discovered, through a variable rule analysis, that immigrant generation indeed is a significant factor in the variation and that there is an intonational change occurring in subsequent generations. However this variation does not necessarily constitute a change in progress. The first generation favors the use of the Cuban-style falling intonation pattern while the second generation strongly favors the rising pattern for absolute interrogatives. The third generation, however, strongly favors the Cuban-style interrogative. This finding is surprising because one would expect that if there is a change from the first generation to the second generation that the trend would continue to the third, indicating a change in progress. It appears that, instead of a change in progress, that there has been an introduction of another linguistic variable into the intonational repertoire of the Miami Cuban Spanish speakers.

It was also determined that the social networks of individual speakers are a significant factor influencing the absolute interrogative intonation pattern used. The social network factor that was selected as significant in the variable rule analysis was "co-workers." It was determined that having Cuban co-workers strongly favors the use of

the Cuban-style pattern while having English speaking co-workers or non-Cuban Spanish speaking co-workers strongly favors the use of the falling pattern interrogative. This result powerfully indicates that language contact with both English and non-Cuban varieties of Spanish are influencing the use of the rising pattern which is found in American English as well as many other varieties of Spanish.

7.5 Limitations

The current dissertation provides a glimpse at the intonational system of Miami-Cuban Spanish but there is much left to investigate. The intonation of this variety of Spanish has only been described partially. Other utterances such as pronominal interrogatives and imperatives need to be investigated and described. Also the intonational effects of contrastive focus should be investigated in order to have a more complete description of Miami Cuban Spanish. The description of Miami Cuban intonation used primarily tonal alignment to motivate the phonological AM analysis. While this approach has been shown to be valid, there are recent studies showing that there may be a better way to analyze Spanish rising accents (e.g. Face and Prieto in press).

By design, important social variables that could possibly contribute to the variation under investigation, such as gender and socioeconomic status, were ignored in the current study. Also not addressed in the current dissertation is the role of race in the use of either the rising or falling absolute interrogative intonation patterns in Miami Cuban Spanish. While these exclusions were important for the purposes of the current

dissertation, these social variables are most likely important in their contributions to the variation present in this variety of Spanish. These social factors need to be addressed in future analyses of Miami Cuban intonation. Also, the current study did not include an attitudinal survey which could have provided important insights into why the second generation strongly favors the use of the rising pattern while the first and third generations favor the falling Cuban-style pattern.

Another limitation of the current study is the type of speech analyzed. Face (2003) has shown that there are important intonational differences between read and spontaneous speech in Madrileño Spanish and Toledo (2004) presents similar findings for Cuban Spanish. Again, it was important that experimental, or read, speech be used for this initial description but it is also important to discover the characteristics of Miami Cuban Spanish in spontaneous speech. The differences between these two speech styles need to be studied in the future.

7.6 Conclusion

The current dissertation has provided a description of broad focus and absolute interrogative intonation patterns for Miami Cuban Spanish. This description adds to our knowledge of Spanish intonation by providing information on a variety of Spanish that had previously been unstudied in regards to intonation. Also provided in this dissertation is an examination of how Miami Cuban Spanish speakers differentiate between declarative utterances and syntactically and lexically identical absolute interrogatives. This information adds to a growing body of research on Spanish interrogative intonation

and confirms for Miami Cuban Spanish what has recently been observed in Madrileño Spanish: i.e. F0 scaling is one of the most important intonation strategies used to convey interrogative meaning.

This dissertation has also contributed to our knowledge of Miami Cuban Spanish by providing the aforementioned description of its intonation. It has also provided a picture of how the language contact situation, i.e. Cuban Spanish in contact with English and with other varieties of Spanish, is affecting the intonation of the Spanish spoken by the Miami Cuban population. This dissertation adds to the small but growing field of intonation studies in language contact situations and provides a starting point for future investigations of Miami Cuban Spanish intonation and the study of the intonation of other varieties of Spanish that are spoken in the United States.

Appendix A

Test Sentences

Absolute Interrogatives:

# unstressed syllables at end of utterance		# intervening syllables
0	¿Salió mal?	0
	¿Salió normal?	1
	¿Salió lo normal?	2
	¿Salió el animal?	3
	¿Salió con el animal?	4
	¿Salió para el animal?	5
1	¿Terminó Nana?	0
	¿Terminó la nana?	1
	¿Terminó la banana?	2
	¿Terminó con la banana?	3
	¿Terminó lo de la banana?	4
	¿Terminó con lo de la banana?	5
2	¿Le da números?	0
	¿Le da el número?	1
	¿Le daba el número?	2
	¿Le dábamos el número?	3
	¿Se lo daba para el número?	4
	¿Se lo dábamos para el número?	5
3	¿Está dándomela?	0
	¿Está mandándomela?	1
	¿Estaba mandándomela?	2
	¿Estábamos mandándomela?	3
	¿Estábamos re-mandándomela?	4
	¿Estábamos auto-mandándomela?	5

Broad Focus Declaratives:

# unstressed syllables at end of utterance		# intervening syllables
0	Salió mal.	0
	Salió normal.	1
	Salió lo normal.	2
	Salió el animal.	3
	Salió con el animal.	4
	Salió para el animal.	5
1	Terminó Nana.	0
	Terminó la nana.	1
	Terminó la banana.	2
	Terminó con la banana.	3
	Terminó lo de la banana.	4
	Terminó con lo de la banana.	5
2	Le da números.	0
	Le da el número.	1
	Le daba el número.	2
	Le dábamos el número.	3
	Se lo daba para el número.	4
	Se lo dábamos para el número.	5
3	Está dándomela.	0
	Está mandándomela.	1
	Estaba mandándomela.	2
	Estábamos mandándomela.	3
	Estábamos re-mandándomela.	4
	Estábamos auto-mandándomela.	5

Appendix B

Background Questionnaire

ID code: _____

Sex: M___ F___

Age: _____

Where were you born?

If you were born outside the US, at what age did you come to the US?

Where did you attend primary school (city, state, country)?

Where did you attend high school (city, state, country)?

What level of formal education have you completed?

What level of formal education did your mother complete?

What is your mother's occupation?

What level of formal education did your father complete?

What is your father's occupation?

Is most of your family in Miami, or somewhere else?

How old were your parents when they came to Miami?

Where were your parents born (city, country)?

Where were your grandparents born (city, country)?

At what age did you begin to learn and use English?

At what age did you begin to learn and use Spanish?

First language of your older siblings:

First language of your younger siblings:

Have you traveled to a Spanish-speaking country?

If so… why? (e.g. work, vacation, visit family, etc.)

Which country/countries?

How many times?

For how long?

Are you married/living with a partner? If so, where is your spouse/partner from? Does he/she speak Spanish?

Are all of your friends Cuban? If not, where are most of your friends from?

Do you speak Spanish at work? Where are the people that you work with from?

Do you speak Spanish with your neighbors/friends? Where are they from?

Do you belong to an association, club, or church group?

How often do you meet with this group?

Are the majority of the group members Cuban? If not, where are they from?

Bibliography

Ajá Díaz, Antonio. 2000. La emigración cubana en los años noventa. Cuban Studies/Estudios Cubanos 30: 1-25.

Alfaraz, Gabriela G. 2000. Sound Change in a Regional Variety of Cuban Spanish. Doctoral Dissertation. Michigan State University.

Alfaraz, Gabriela G. 2002. Miami Cuban Perceptions of Varieties of Spanish. Handbook of Perceptual Dialectology, ed. by Daniel Long, Dennis R. Preston and Ronald R. Butters, Volume 2, 1-11. Amsterdam, Netherlands: Benjamins.

Alvord, Scott M. 2004. Spanish intonation in contact: The case of Miami-Cuban bilinguals. Paper presented at the 34th Linguistic Symposium on Romance Languages, University of Utah, 12-14 March.

Arvaniti, Amalia, Robert Ladd and Ineke Mennen. 2000. What is a starred tone? Evidence from Greek. Papers in Laboratory Phonology V, ed. by Janet B. Pierrehumbert and Michael B. Broe, 119-131. Cambridge University Press.

Barratt, Will. 2005. Social Class: The Inequitable Campus. Paper presented at Indiana State University. URL: http://wbarratt.indstate.edu/acpa2005/Barratt_Social_Class_Handout_ACPA_2005.pdf

Beckman, Mary E. and Janet B. Pierrehumbert. 1986. Intonational structure in Japanese and English. Phonology Yearbook 3: 255-309.

Beckman, M.; Díaz-Campos, M.; McGory, J.T. & Morgan, T.A. 2002. Intonation across Spanish, in the Tones and Break Indices framework, Probus 14.9-36.

Bolinger, Dwight L. 1951. Intonation: Levels vs. configurations. Word 7.199-210.

Bowen, J. Donald. 1956. A comparison of the intonation patterns of English and Spanish. Hispania 39.30-35.

Boswell, Thomas. 2000. Demographic changes in Florida and their importance for effective educational policies and practices. Research on Spanish in the United States, ed. by Ana Roca, 406-431. Somerville, ME: Cascadilla.

Bruce, Gösta. 1977. Swedish word accents in sentence perspective. Lund: Gleerup.

Chela-Flores, Bertha. 1994. Entonación dialectal del enunciado declarativo de una región de Venezuela. Lexis 18:2. 55-68.

Connel Bruce and D. Robert Ladd. 1990. Aspects of pitch realisation in Yoruba. Phonology 7.1-29.

Cruttenden, Alan. 1986. Intonation. Cambridge: Cambridge University Press.

Crystal, David. 1997. A dictionary of linguistics and phonetics. Fourth edition. Oxford: Blackwell Publishers.

Daneš, Frantisek. 1960. Sentence intonation from a functional point of view. Word 16.34-54.

de la Mota, Carme. 1997. Prosody of sentences with contrastive new information in Spanish. Intonation: Theory, Models and Applications. ed. by Antonis Botinis, Georgios Kouroupetroglou and George Carayiannis, 75-78. Proceedings of an ESCA Workshop,.

D'Imperio, M, Gorka Elordieta, Sonia Frota, Pilar Prieto and Marina Vigário. 2005. Intonational phrasing in Romance: the role of syntactic and prosodic structure. Prosodies, ed. by Sonia Frota, Marina Vigário & M. Joao Freitas, 59-98. Berlin: Mouton de Gruyter.

Elordieta, Gorka. 2003. The Spanish intonation of speakers of a Basque pitch-accent dialect. Catalan Journal of Linguistics 2.67-95.

Elordieta, Gorka, and Nagore Calleja. 2005. Microvariation in accentual alignment in Basque Spanish. Language and Speech 48.359-396.

Face, Timothy L. 2002. Intonational marking of contrastive focus in Madrid Spanish. Munich: Lincom Europa.

Face, Timothy L. 2003. Intonation in Spanish declaratives: differences between lab speech and spontaneous speech. Catalan Journal of Linguistics 2.115-131.

Face, Timothy L. 2004a. The intonation of absolute interrogatives in Castilian Spanish. Southwest Journal of Linguistics, 23:2.65-79.

Face, Timothy L. 2004b. Laboratory Approaches to Spanish Phonology. The Hague: Mouton.

Face, Timothy L. 2005. F0 Peak Height and the Perception of Sentence Type in Castilian Spanish. Revista Internacional de Lingüística Iberoamericana 2:6.49-65.

Face, Timothy L. and Pilar Prieto. In Press. Rising Accents in Castilian Spanish: A Revision of Sp_ToBI. Journal of Portuguese Linguistics.

Fishman, Joshua A. 1977. The spread of English as a new perspective for the study of language maintenance and language shift. The Spread of English, ed. by Joshua A. Fishman, Robert L. Cooper, and Andrew W. Conrad, 108-133. Rowley, MA: Newbury House.

García, Ofelia and Ricardo Otheguy. 1988. The language situation of Cuban-Americans. Language Diversity: Problem or Resource?, ed. by Sandra McKay and Sau-ling Wong, 166-192. Rowley, MA: Newbury House.

García Riverón, Raquel. 1996a. Aspectos de la entonación hispánica: I metodología. Anejos del anuario de estudios filológicos, N.º 19. Cáceres: Universidad de Extremadura, Servicio de Publicaciones.

García Riverón, Raquel. 1996b. Aspectos de la entonación hispánica: II análisis acústico de muestras del español de Cuba. Anejos del anuario de estudios filológicos, N.º 21. Cáceres: Universidad de Extremadura, Servicio de Publicaciones.

García Riverón, Raquel. 1998. Aspectos de la entonación hispánica: III las funciones de la entonación en el español de Cuba. Anejos del anuario de estudios filológicos, N.º 22. Cáceres: Universidad de Extremadura, Servicio de Publicaciones.

Goldsmith, John. 1979. Autosegmental phonology. New York: Garland Press.

Gómez, Rosario. 2003. Sociolinguistic Correlations in the Spanish Spoken in the Andean Region of Ecuador in the Speech of the Younger Generation. PhD Dissertation. University of Toronto.

Hammond, Robert M. 1979. The velar nasal in rapid Cuban Spanish. Colloquium on Spanish and Luso-Brazilian Linguistics, ed. by James P. Lantolf, Francine Wattman Frank and Jorge M. Guitart, 19-36. Washington, D.C.: Georgetown University Press.

Hammond, Robert M. 1980a. Las realizaciones fonéticas del fonema /s/ en el español cubano rápido de Miami. Dialectología hispanoamericana, estudios actuales, ed. by Gary Scavnicky, pp. 8-15. Washington D.C.: Georgetown University Press.

Hammond, Robert M. 1980b. The phonology of the liquids /r/ and /l/ in unaffected Cuban Spanish speech. The SECOL Bulletin 4.107-116.

Hermes, Dik J. and Joost van Gestel. 1990. The frequency scale of speech intonation. Journal of Acoustical Society of America 90.97-102.

Hualde, José Ignacio. 2002. Intonation in Spanish and the other Ibero-Romance languages: overview and status quaestionis. Romance Philology and Variation ed. by Caroline Wiltshire and Joaquim Camps, 101-115. Philadelphia: John Benjamins.

Hualde, José Ignacio. 2003. El modelo métrico y autosegmental. Teorías de la entonación, ed. by Pilar Prieto. Barcelona: Ariel.

Jun, Sun-Ah. and Cécile Fougeron. 2002. Realizations of accentual phrase in French intonation. Probus 14.147-172.

Kvavik, Karen H. 1974. An analysis of sentence-initial and final intonational data in two Spanish dialects. Journal of Phonetics 2.351-361.

Kvavik, Karen H. and Carroll L. Olsen. 1974. Theories and methods in Spanish intonational studies. Phonetica 30.65-100.

Ladd, D. Robert. 1996. Intonational phonology. Cambridge: Cambridge University Press.

Lambert, Wallace and Donald M. Taylor. 1996. Language in the lives of ethnic minorities: Cuban American families in Miami. Applied Linguistics 17.477-500.

Laniran, Yetunde. 1992. Intonation in Tone Languages: The Phonetic Implementation of Tones in Yoruba. Ph.D dissertation, Cornell University.

Leben, William. 1973. Suprasegmental phonology. Cambridge: Cambridge University Press.

Liberman, Mark. 1975. The intonational system of English. Doctoral dissertation, MIT.

Lipski, John M. 1994. Latin American Spanish. London: Longmans.

Lleó, Conxita, Martin Rakow and Margaret Kehoe. 2004. Acquisition of language-specific pitch accent by Spanish and German monolingual and bilingual children. Laboratory Approaches to Spanish Phonology, ed. by Timothy L. Face, 3-27. The Hague: Mouton.

López Morales, Humberto. 2003a. Los cubanos de Miami. Miami, FL: Ediciones Universal.

López Morales, Humberto. 2003b. La comunidad cubana del Gran Miami: elección idiomática y medios de comunicación pública. [Electronic Version] Retrieved September 21, 2004 from El Centro Virtual Cervantes Web site: http://cvc.cervantes.es/obref/espanol_eeuu/comunicacion/lmorales.htm

López Morales, Humberto. 2000. El español el la Florida: los cubanos de Miami. [Electronic Version] Retrieved September 21, 2004 from El Centro Virtual Cervantes Web site: http://cvc.cervantes.es/obref/anuario/anuario_00/morales/

Lynch, Andrew. 1999. The Subjunctive in Miami Cuban Spanish: Bilingualism, Contact, and Language Variability. PhD Dissertation. University of Minnesota.

Lynch, Andrew. 2000. Spanish-speaking Miami in sociolinguistic perspective: bilingualism, recontact, and language maintenance among the Cuban-origin population. Research on Spanish in the United States, ed. by Ana Roca, 406 – 431. Somerville, ME: Cascadilla.

Lynch, Andrew and Sarah Kraemer. 2003. The evolution of Miami Cuban Spanish: a phonological analysis of three generations. Paper presented in the 7th Hispanic Linguistics Symposium. Albuquerque, NM. October 16-18.

Navarro Tomás, Tomás. 1918. Manual de pronunciación española. Madrid: Centro de Estudios Históricos.

Navarro Tomás, Tomás. 1944. Manual de entonación española. New York: Hispanic Institute in the United States.

Nibert, Holly J. 2000. Phonetic and Phonological Evidence for Intermediate Phrasing in Spanish Intonation. PhD Dissertation. University of Illinois at Urbana-Champaign.

Novas, Himilce. 1994. Everything you need to know about Latino history. New York: Plume.

Otheguy, Ricardo and Ofelia García. 1988. Diffusion of lexical innovations in the Spanish of Cuban Americans. Research Issues and Problems in United States Spanish. ed. by Jacob L. Ornstein-Galicia, George K. Green and Dennis J. Bixler-Marquez, 203-242. Rio Grande Series in Language and Linguistics No. 2. Bronsville: Pan American University,.

Otheguy, Ricardo, Ofelia García and Ana Roca. 2000. Speaking in Cuban. The language of Cuban Americans. New Immigrants in the United States, ed. by Sandra McKay and Sau-ling Wong, 165-188. Cambridge: Cambridge University Press.

O'Rourke, Erin. 2003. Peak alignment in Peru: Spanish intonation in contact with Quechua. Paper presented in the 33rd Linguistic Symposium on Romance Languages. Indiana University, Bloomington. April 24-27.

Pérez Firmat, Gustavo. 1994. Life on the hyphen: The Cuban-American way. Austin: University of Texas Press.

Pierrehumbert, Janet B. 1980. The phonetics and phonology of English intonation. PhD dissertation, MIT.

Pierrehumbert, Janet and Mary E. Beckman. 1988. Japanese tone structure. Cambridge, MA: MIT Press.

Porcel, Jorge. 2002. Tiempo, modalidad, y aspecto en el verbo español (una descripción del uso del presente progresivo, el futuro morfológico y perifrástico y el pretérito y el imperfecto del indicativo en la comunidad cubana de Miami). PhD dissertation. University of Pittsburg.

Portes, Alejandro and Richard Schauffler. 1996. Language and the second generation: Bilingualism yesterday and today. The New Second Generation, ed. by Alejandro Portes, 8-29. New York: Russell Sage Foundation.

Prieto, Pilar. 2004. The search for phonological targets in the tonal space: H1 scaling and alignment in five sentence-types in Peninsular Spanish. Laboratory Approaches to Spanish Phonology, ed. by Timothy L. Face, 29-60. The Hague: Mouton.

Prieto, Pilar, Jan van Santen and Julia Hirschberg. 1995. Tonal alignment patterns in Spanish. Journal of Phonetics 24.445-473.

Prieto, Pilar, Mariapaola D'Imperio, Barbara Gili Fivela. 2005. Pitch Accent Alignment in Romance: Primary and Secondary Associations with Metrical Structure. Language and Speech 48.359-396.

Prieto, Pilar, Chilin Shih and Holly Nibert. 1996. Pitch downtrend in Spanish. Journal of Phonetics 24.445-473.

Queen, Robin M. 2001. Bilingual intonation patterns: Evidence of language change from Turkish-German bilingual children. Language in Society 30.55-80.

Quilis, Antonio. 1981. Fonética acústica de la lengua española. Madrid: Gredos.

Quilis, Antonio. 1993. Tratado de fonología y fonética españolas. Madrid: Gredos.

Resnick, Melvyn. 1988. Beyond the ethnic community: Spanish language roles and maintenance in Miami. International Journal of the Sociology of Language 69.89-104.

Robinson, John, Helen Lawrence, and Sali Tagliamonte. 2001. Goldvarb 2001. Department of Language and linguistic Science. University of York. http://www.york.ac.uk/depts/lang/webstuff/goldvarb/.

Roca, Ana. 1991. Language maintenance and language shift in the Cuban American community of Miami: The 1990s and beyond. Language Planning, ed. by David F. Marshall, 245-257. Amsterdam/Philadelphia: John Benjamins.

Silva-Corvalán, Carmen. 1996. Language contact and change; Spanish in Los Angeles. New York: Oxford University Press.

Solé, Carlos. 1979. Selección idiomática entre la nueva generación de cubano-americanos. The Bilingual Review/La Revista Bilingüe 6.1-10.

Solé, Carlos. 1982. Language loyalty and language attitudes among Cuban-Americans. Bilingual Education for Hispanic Students in the United States, ed. by Joshua A. Fishman and Gary D. Keller, 254-268. New York: Teachers College Press.

Sosa, Juan Manuel. 1999. La entonación del español: su estructura fónica, variabilidad y dialectología. Catedra. Madrid.

Sosa, Juan Manuel. 2003. Wh-questions in Spanish: meanings and configuration variability. Catalan Journal of Linguistics 2.229-247.

Stockwell, Robert P. and J. Donald Bowen. 1965. The sounds of English and Spanish. Chicago: University of Chicago Press.

Tagliamonte, Sali. 2006. Analyzing sociolinguistic variation. New York: Cambridge University Press.

Terrell, Tracy D. 1979. Final /s/ in Cuban Spanish. Hispania 62.599-612.

Thomason, Sarah Grey, and Terrence Kaufman. 1988. Language contact, creolization, and genetic linguistics. Berkley, CA: University of California Press.

Toledo, Guillermo A. 2006. Prominencia H*: una muestra de Español de Cuba. Estudios de Fonética Experimental XIII, Barcelona. 183-202.

Torres Cacoullos, Rena and Fernanda Ferreira. 2000. Lexical frequency and voiced labiodental-bilabial variation in New Mexican Spanish. Southwest Journal of Linguistics. 19:2. 1-17.

Varela, Beatriz. 1992. El español cubano-americano. New York: Senda Nueva de Ediciones.

Varela, Beatriz. 1974. La influencia del inglés en los cubanos de Miami y New Orleans. Español Actual 26.16-25.

Weinreich, Uriel. 1953. Languages in contact. NY: Mouton.

Willis, Erik W. 2003. The intonational system of Dominican Spanish: Findings and analysis. Ph.D. diss., University of Illinois at Urbana-Champaign.

Willis, Erik W. 2006. Tonal levels in Puebla Mexico Spanish Declaratives and Absolute Interrogatives. Theoretical and Experimental Approaches to Romance Linguistics; Selected papers from the 34th Linguistic Symposium on Romance Languages (LSRL), ed. by Randall S Gess, and Edward J. Rubin, 351-363. Philadelphia: John Benjamins.

Yip, M., 1991. The Tonal Phonology of Chinese. Garland Publishing, New York.