THE EXTENT OF TONAL EVENTS: INTONATIONAL HAT PATTERNS IN CHILEAN SPANISH

EL ALCANCE DE LOS EVENTOS TONALES: LOS CONTORNOS ENTONACIONALES TIPO *SOMBRERO* EN EL ESPAÑOL CHILENO

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ABSTRACT

Within the past 15 years there has been a dramatic increase in the popularity of studies of Spanish intonation. Despite this surge, relatively little attention has been given to the variety of Spanish spoken in Chile. As a result, there is still much that is not known about the prosodic properties and patterns of Chilean Spanish intonation. The current study examines a previously undocumented plateau, or *hat*, pattern that does not appear in any of the known literature regarding Chilean or general Spanish intonation. The pattern was determined to consist of four different portions: an initial valley or dip to a lower F0 level in which all internal material was maintained at the same low tonal level, a sharp rise to a high tonal level, a high plateau in which all plateau internal material was maintained at the same high tonal level and finally an utterance final fall. The current investigation is the first known phonetic documentation of the Chilean hat pattern and likewise is a preliminary attempt at a phonological analysis within the current Autosegmental Metrical (AM) theoretical framework. Finally, the hat pattern highlights potential shortcomings and limitations of the AM approach to intonational phonology, namely how tonal events are defined.

Keywords: *intonational plateau, intonational valley, tonal events, Chilean intonation*.

RESUMEN

Durante los últimos 15 años, el estudio de la entonación del español ha aumentado en su popularidad de manera dramática. Pese a ello, relativamente poco se ha hecho con respecto a la variedad del español que se habla en Chile. Como consecuencia, aún no se sabe mucho sobre las propiedades prosódicas y los patrones de la entonación del español chileno. El presente estudio analiza un contorno entonacional tipo *sombrero* que no se ha documentado en ningún estudio previo sobre la entonación chilena ni en los estudios que tratan la entonación del español de manera más general. Se determinó que el contorno consiste en 4 porciones diferentes: un valle inicial o pequeño descenso de tono en el cual toda la materia fonética se mantiene al mismo nivel tonal, una subida abrupta a un nivel tonal más elevado, una *meseta* de tono alto en la cual toda la materia fonética se mantiene al mismo nivel tonal, y al final, una bajada que cierra el enunciado. La presente investigación es el primer análisis fonético del contorno *sombrero* chileno del que se sepa y asimismo intenta analizarlo por primera vez dentro del marco teórico del modelo autosegmental-métrico (AM). Por último, el contorno estudiado

hace destacar posibles deficiencias y limitaciones del mismo modelo AM y su descripción de la fonología entonacional, en específico, cómo define los eventos tonales.

Palabras clave: *meseta entonacional, valle entonacional, eventos tonales, entonación del español chileno.*

1. INTRODUCTION

In recent years a growing amount of attention and research has focused on various aspects of the intonation of the Spanish language (Silva-Corvalán, 1983; Prieto,van Santen and Hirschberg, 1995; Prieto, Shih and Nibert, 1996; Prieto, 1998; Willis, 2002; Hualde, 2003; Face, 2005; Rao, 2006; Face, 2007; Estebas and Prieto, 2008; Rao, 2009; Alvord, 2006 among numerous others). However, despite there being numerous studies on Spanish intonation, studies regarding specific varieties of Spanish vary greatly with some varieties being heavily studied when compared to others.

Chilean Spanish is one of these understudied varieties especially when compared to other varieties such as Castilian and Mexican. Cepeda (1997, 2001) looked specifically at intonational patterns of speakers from the southern city of Valdivia, Chile based on age and social related factors. Cid and Ortiz (1998), using more spontaneous speech, examined the prosodic properties and behavior of vocatives. Ortiz (1999) and Cid, Ortiz, Poblete, Pons and Samaniego (2000) looked into the specifics of ToBI and the Autosegmental Metrical (AM) frameworks and how they can be used to describe Chilean intonation. Ortiz and Saavedra (1999) analyzed the intonation and prosodic properties of non-information seeking questions in more spontaneous Santiago speech. Roldán (2000) examined various phonetic properties of attenuated speech. Véliz (2001) compared English and Chilean Spanish post-nuclear patterns. Román, Cofré and Rosas (2008) examined attenuated feminine speech in Santiago. Atria (2009) examined how native Chilean speakers resolve instances of tonal clash. Fuentes (2012) compared the phonetic properties of requests and orders of speakers of Santiago, Chile. Ortiz (2003) analyzed semi-spontaneous and spontaneous speech of educated speakers from Santiago.

The most extensive work done on Chilean intonation to date is that of Ortiz, Fuentes and Astruc (2010) which examined Chilean Spanish intonation in the SP-ToBI and AM frameworks as outlined by Estebas and Prieto (2008). In it they state

that two monotonal and three bitonal pitch accents exist in Chilean Spanish: L*, H*, L+H*, L+>H*and H+L*. Their results concluded that of the main pitch accents, L+H* and L+>H* are the two most common and that, depending on the utterance type, the former has three different levels of prominence namely L+!H*, L+H*and L+¡H*. The advantage of this study is that it was done as part of a larger project examining the intonational patterns of various varieties of Spanish. As a result, the basic methodology was the same as the other studies that made up the project thus facilitating more dependable cross-dialectal comparisons of different varieties with Chilean Spanish.

There still is much that is not known about the prosodic properties and patterns of Chilean Spanish. The current study examines a previously undocumented plateau or *hat* pattern that does not appear in any of the known literature regarding Chilean or overall Spanish intonation. This pattern manifested itself principally towards the end of utterances. However, it varied greatly in length and showed evidence that it can at times extend for the entire length of an utterance. As a consequence of there being no previous documentation of this intonational phenomenon, the current analysis is strictly a preliminary documentation that presents the new pattern, seeks to explain it within the current AM framework and finally discusses its potential implications within Chilean Spanish and SP_ToBI.

2. METHODOLOGY

Before discussing the methodology, it must be noted that the data used in the current study came from a larger project that looked at intonational variation across three different speech styles. The plateau pattern was observed in all three speech styles and because it had never been documented or seen in previous Spanish intonational studies, the need for the current study emerged. It was determined that the plateau pattern needed to be documented and discussed from within the framework of current intonational theory before carrying out any other studies related to the phenomenon. Thus, any discussion regarding variation across speakers and speech type is reserved for future studies.

Six native Chilean speakers living in the United States, 4 female and 2 male, were recorded using a Marantz PMD660 digital recorder with a head mounted microphone in either a quiet room of their residence or a quiet media room at a large Midwestern university. Four of the participants were from Santiago, one was from Rancagua but studied in Santiago and another was born and raised just

outside of Concepción in San Pedro de la Paz. Each participant filled out a brief survey eliciting basic sociolinguistic data and then was recorded doing three different speech tasks that ranged in formality.

Each of the six speakers did the least formal of the tasks first, which was a sociolinguistic interview. The length of each sociolinguistic interview varied from speaker to speaker from 10 minutes to just under 22 minutes. The sociolinguistic interview was guided by a set of questions, but those questions served as more of a basic guide for the interviewer. Many times, in an effort to make the interview as informal as possible, the investigator would ask follow-up questions to different topics that either the participants or the interviewer brought up during the course of the interviews.

The final two speech tasks were administered using a Power Point presentation that guided the participants through each step. The most formal of tasks was administered first after the interview and consisted of a series of situations with pre-prepared broad focus statements at the end. Participants were asked to silently read each situation and then read each pre-prepared statement at the end out loud. The instructions also indicated that they were to read each statement as if they were actually involved in each particular scenario. Participants were also told that they could repeat any of the statements as many times as they wanted or felt necessary, however, only two instances of each statement were chosen for analysis. The prepared statements were not controlled for stress nor for segments such as sibilants, stops and nasals, which have traditionally been controlled for due to their potential phonetic impact on the intonational contour. The longest statement was five words and the shortest consisted of three words. The total number of prepared statements was seven. Each participant produced each statement two times, as all seven statements were presented in one order and then in another, randomized order yielding a total of 84 statements. In accordance with Ortiz, Fuentes and Astruc (2010), each statement and situation was prepared lexically and idiomatically to reflect the usage of Spanish in Chile.

The final speech task was designed to elicit semi-spontaneous speech and was designed based on the methodology of Rao (2006). In his study, Rao elicited semi-spontaneous speech by having his participants give short responses to prompts that asked their opinions on issues such as the US war in Iraq. After finishing the controlled response tasks, participants arrived at a slide that indicated that they had finished part one of the Power Point and that they could take a break before moving on to the second part. The second part consisted of seven questions that asked for short responses, 2-3 sentences, from each participant. However, most

participants produced much longer responses for certain questions. The information elicited in the questions ranged from how they celebrated Chilean Independence Day in the United States, to what they thought about United States foreign policy or the role that the United States played in helping implement the Pinochet dictatorship. After each participant finished, the recordings were all saved as Wave files and analyzed acoustically with Praat (Boersma and Weenink, 2012). Of the six speakers recorded in the United States, only three were observed producing the plateau pattern. All three were 31-45 years of age, from either Rancagua or Santiago and had been in the United States for just over a year.

As more instances of the plateau or hat contour were discovered in the data, additional spontaneous data was gathered from the Sociolinguistic Corpus of Spoken Chilean Spanish, or COSACH (Sadowsky, 2011), in order to facilitate further study of the pattern. Data from 4 females recorded in the corpus ranging from ages 16-19 was used and analyzed in Praat. Each segment ranged from 257 to 332 seconds in length. The spontaneous speech of COSACH was elicited in sociolinguistic interviews much like the interviews conducted with the 6 Chilean speakers residing in the US.

3. RESULTS

Instances of the hat pattern were found in all three of the speech styles elicited. Figure 1 shows an instance as produced by speaker 5, a female, in the controlled data.

In the case of figure 1, the hat pattern extends through most of the utterance. The contour stays low throughout the first word *necesito* and then rises on the stressed syllable of the following word *medio* beginning the plateau. From there, the contour is maintained at the same high intonational level for two more words, one prosodic and one non-prosodic, before falling on the stressed syllable of the final prosodic word *comino*. The contour then levels off at near the same low level that it began on at the beginning of the utterance.

Figure 2, also taken from the controlled data was produced by speaker 6, a male and illustrates an instance where the hat pattern extended the entire length of the utterance.

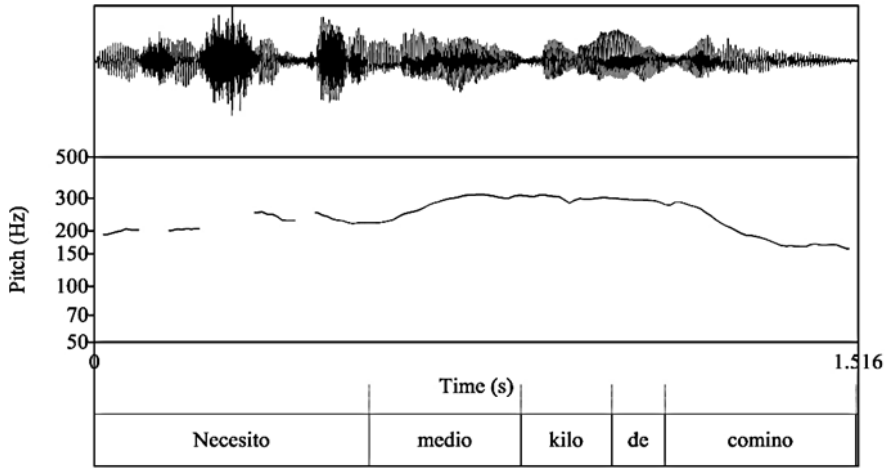

Figure 1. *Hat pattern produced by speaker 5. (I need half a kilo of cumin).*

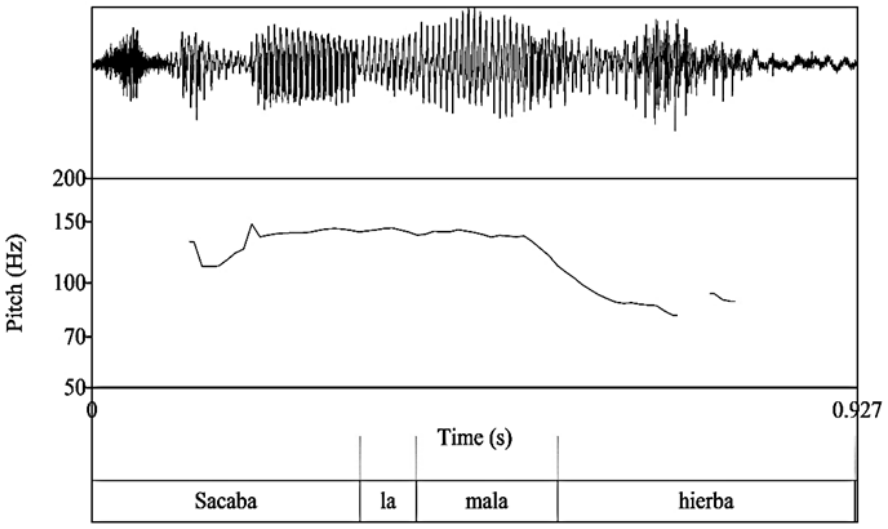

Figure 2. *Hat contour that extends for the entirety of the utterance as produced by speaker 6. (S/he was pulling the weeds).*

In figure 2 the hat pattern begins almost immediately at the onset of the utterance with the pitch appearing to rise in the stressed syllable of the first word *sacaba*. From this point, as in figure 1, the contour maintains itself at the same high level for two more words, one prosodic and one non-prosodic, before falling on the stressed syllable of the utterance final prosodic word.

Figure 3 shows a semi-spontaneous hat contour from the data of speaker 5. Speaker 5, a female, was responding to a question regarding her opinion of the war in Iraq. The entire utterance was too long to include in its totality in the Praat window, but with the hat pattern she makes the point that she believes that the war in Iraq was the result of the United States' own economic self-interests.

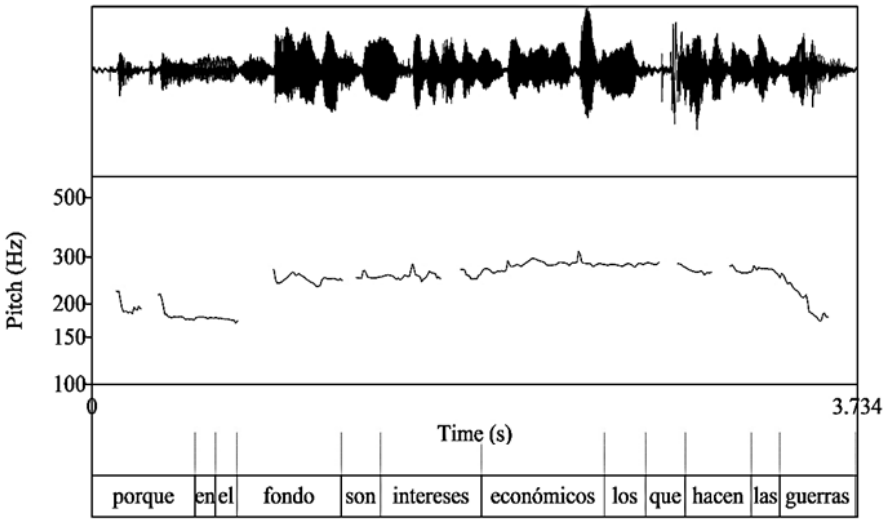

Figure 3. *Semi-spontaneous plateau as produced by speaker 5. (... when you get down to it, economic self-interests are what cause wars).*

While the plateau in figure 3 is much more extended than the patterns in figures 1 and 2, it has similar properties. Firstly, the plateau begins with a rise in the pitch contour on the stressed syllable of the first prosodic word and falls sharply on the stressed syllable of the final prosodic word. Where figure 3 differs from the first

two examples is in overall length. In figure 3, after the initial rise on the plateau-initial word, the contour maintains itself at a high level for seven words, four prosodic and three non-prosodic. Also of note in figure 3, is a fall to the lower F0 level just prior to the plateau. This fall, or pre-plateau valley, was also seen in many of the other examples.

Figure 4 was produced by speaker 4, a female, in response to the question in the semi-spontaneous elicitation device that asked for her opinion regarding the role the United States played in helping Augusto Pinochet take control of Chile. Among other things, speaker 4 mentions that as a result the United States model of education was implemented in Chile. Figure 4 only represents a portion of the entire utterance, because, as with most of the semi-spontaneous and spontaneous data, the entire utterance would not fit into the allotted space.

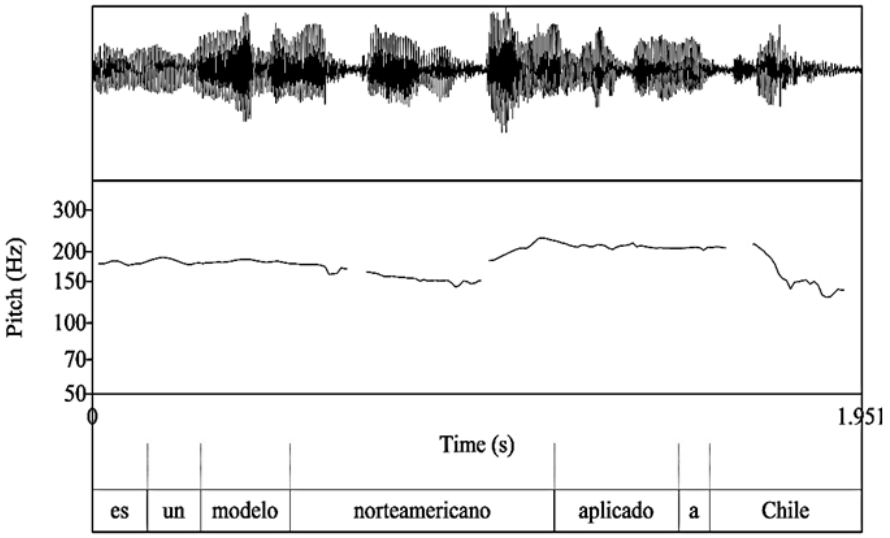

Figure 4. *Semi-spontaneous hat contour as produced by speaker 4. (... it's a North American model applied to Chile).*

Similar to the other plateaus already discussed, the contour in figure 4 rises on the stressed syllable of the plateau-initial word, maintains itself at a higher tonal level

and then falls on the stressed syllable of the plateau-final prosodic word. The plateau in figure 4 only maintains itself for one prosodic and one non-prosodic word. What is more apparent in this example than the previous examples is the preceding intonational valley. Before the rise in *norteamericano* the three previous words seem to be maintained at more or less the same low tonal level. Once the speaker begins to say *norteamericano* the contour dips noticeably before rising on the stressed syllable and initiating the "hat" portion.

Figure 5 shows a spontaneous plateau produced by speaker 5 and shows some similarities and differences when compared to the previous examples.

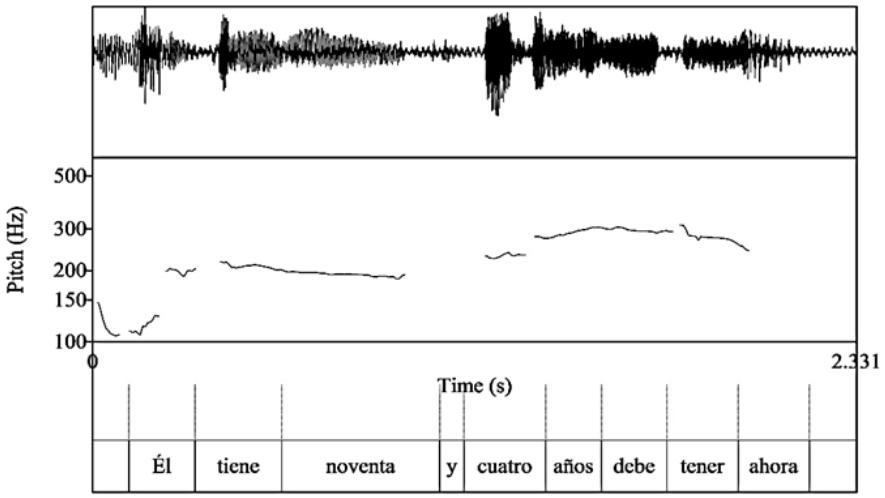

Figure 5. *Spontaneous hat pattern produced by speaker 5. (He's should be about 94 now).*

With regards to similarities, the plateau falls on the final stressed syllable. It must be noted that the speaker exhibited *creaky voice* on the final word, which is why the contour disappears shortly after the onset of the word. However, before disappearing it follows a clear downward trajectory. Also, the middle portion is maintained for a pair of prosodic words. The onset of the hat portion differs slightly. Instead of rising on the stressed syllable of one word, it rises on the stressed syllable of "cuatro" and continues to rise before peaking just before the

offset of the stressed syllable of *años*. Once again, an intonational valley that extends for four words, three prosodic and one non-prosodic, precedes the plateau.

Figure 6 was produced in the spontaneous data by speaker 5 as well.

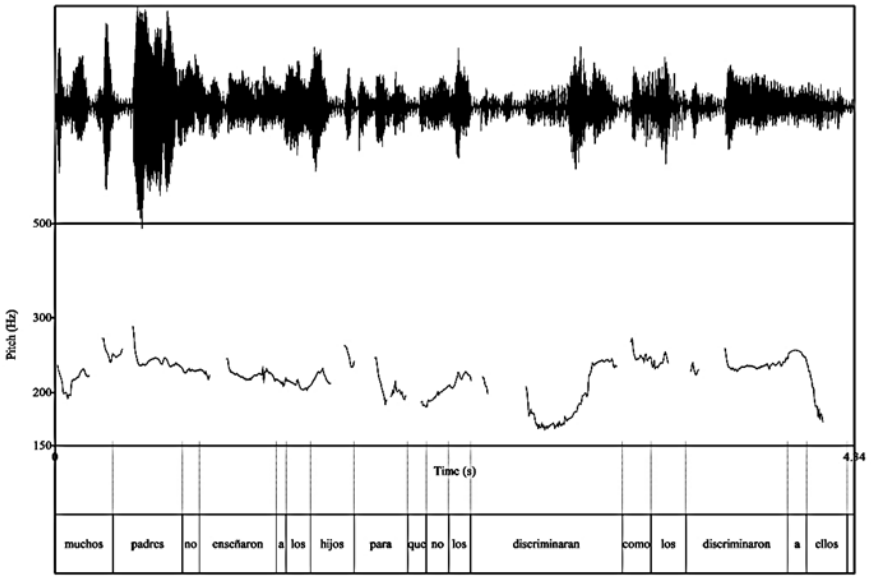

Figure 6. *Spontaneous hat contour produced by speaker 5. (Many parents haven't taught their children not to discriminate as they themselves have been discriminated).*

While not as apparent as the previous examples that show clear valleys preceding the plateau, there is a notable dip in the first two syllables of *discriminaran* right before the rise at the beginning of the plateau. The plateau portion maintains itself at the higher intonational level for four words, two prosodic and two non-prosodicand then, as in all of the previous examples, falls on the stressed syllable of the final word.

Figure 7 shows a spontaneous plateau taken from speaker 9, one of the COSACH speakers.

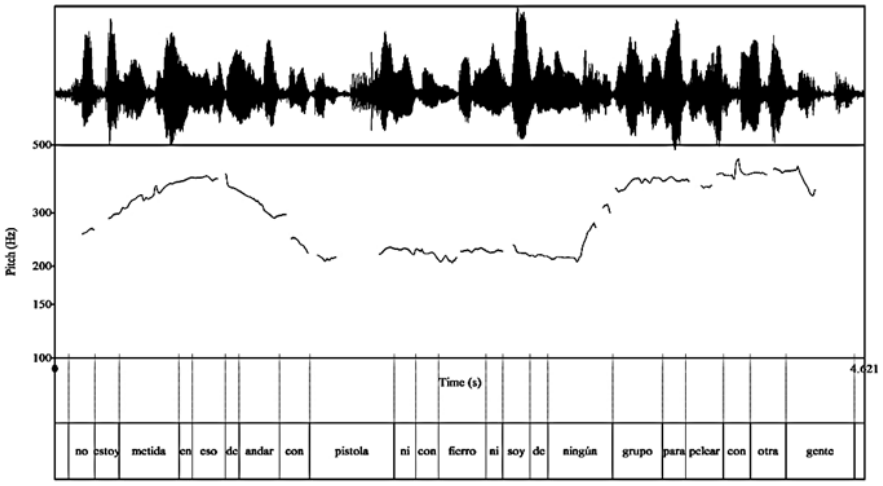

Figure 7. *Spontaneous hat contour as produced by speaker 9. (I'm not into that whole thing of walking around with a pistol or a gun, nor am I a member of any group that goes around picking fights).*

Of particular interest in figure 7 is not only the deaccented valley preceding the rise into the plateau, but the apparent effort of the speaker to create that valley before the plateau. At the beginning of the frame, the speaker's intonational contour rises, only to fall into a pre-plateau valley that extends for a total of seven words, three prosodic and four non prosodic. The initial portion of the hat contour is made up of two prosodic words that are in direct tonal clash. The rise begins on the last syllable of *ningún* and continues to rise until peaking on the stressed syllable of the next word *grupo*. Once the speaker peaks at the beginning of the plateau, the plateau portion maintains itself at a high tonal level for four words, two prosodic and two non-prosodic, before falling on the stressed syllable of the final word *gente*.

4. DISCUSSION AND ANALYSIS

Intonational plateaus in general have not been observed or studied much in Spanish. One such instance is mentioned in Gabriel, Feldhausenand and Peskova

(2011) in Porteño Spanish. In their study they observed high intonational plateaus in controlled declarative statements. However, the plateaus they observed only maintained themselves for the duration of the same prosodic word they rose on. In one example they show a hat pattern that begins in one prosodic word and extends halfway through the following word, but they do not label the pitch accents. Likewise, all instances that their study shows are utterance internal and not utterance final. Additionally, the Porteño examples fall after the final prosodic syllable of the pattern, not during it. No other known studies on Spanish intonation mention plateau patterns like the ones observed in the current study.

The results of the current study appear to indicate that the hat pattern consists of four smaller parts: a plateau-initial valley or dip to a lower tonal level, then a sharp rise to a high tonal level out of the valley, a high plateau and finally an utterance final fall. The pairing of a fall to a low F0 followed by a sharp rise to a tonally high level appears to be deliberate. The resulting contrast of both high and low tonal levels serves to make each part more salient when compared to one another.

The length of both the preceding low portion and the plateau itself varied. With regards to the preceding low portion, in some patterns it was only a dip in the middle of the word from which the plateau initial rise arose (see figure 6) and in some patterns it was extended for multiple prosodic and non-prosodic words. The high plateau portion was shown to extend anywhere from two words, to multiple prosodic and non-prosodic words as well. In one case (see figure 2), the plateau extended the entire length of the utterance.

The varying length of both the low and high portions makes an analysis within the current Autosegmental Metrical framework (Pierrehumbert, 1980) potentially difficult. The theory views each accent that makes up an intonational contour as an independent phonological event or unit that joins with other tones to make up the whole contour. Each accent associates itself with the metrically strong phonological units, which in Spanish are stressed syllables. Therefore, within this framework one possible analysis proposes that each prosodic word within both the low and high portions of the hat pattern has its own independently associated pitch accent that corresponds to the respective tonal levels. Likewise, the beginning and final portions of the high plateau are proposed to have rising and falling pitch accents respectively. Figure 8, taken from the COSACH data, illustrates this possible analysis of the pre-plateau valley pattern and the beginning and end of the plateau within the AM framework.

Figure 8 shows a contour where the valley preceding the plateau is considerably longer than the plateau itself. The valley extends for seven words, three prosodic

and four non-prosodic. This first proposed AM based analysis postulates that the pitch accents within the valley are all monotonal L tones. The speaker maintains herself at a low tonal level until the stressed syllable of the word *comida*. The proposed pitch accent for *comida* is a bitonal L+>H* based on Estebas and Prieto (2008). The F0 rises through the word "comida" and peaks in the following word. The F0 briefly maintains itself at the newly achieved high tonal level, until it falls on the proposed H+L* pitch accent of the utterance final word. Finally, the utterance ends on a L% boundary tone. Within the portion of the high plateau that falls between the initial L+>H* pitch accent and the final H+L*, there are no more prosodic words, only the non-prosodic contraction *al*, therefore no plateau-internal pitch accents need be used for this example. However, as previously shown, the high plateau can contain a variety of prosodic words. Figure 9 shows just the high plateau portion of a larger contour which contains several prosodic words. Figure 10 shows a phonological transcription of a complete pattern with both valley and plateau within the current analysis.

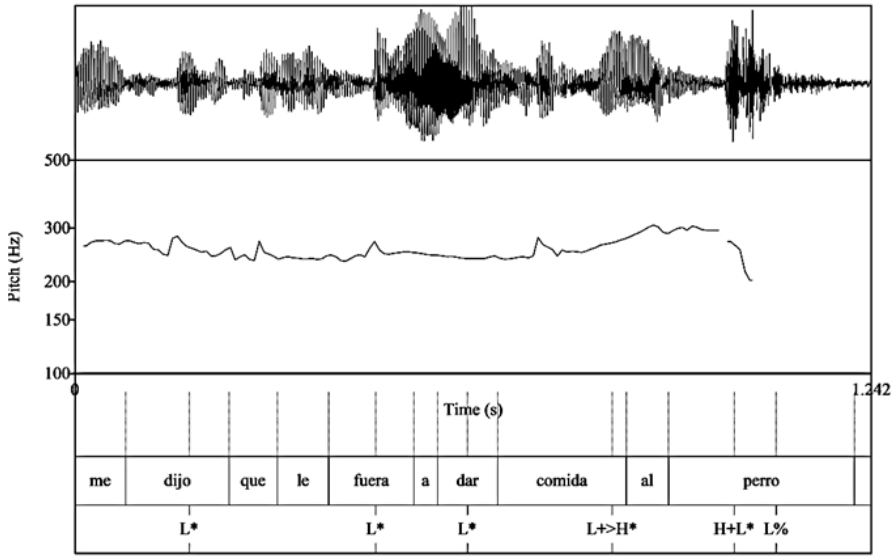

Figure 8. *Valley and plateau as produced by speaker 8. (... she told me to go feed the dog).*

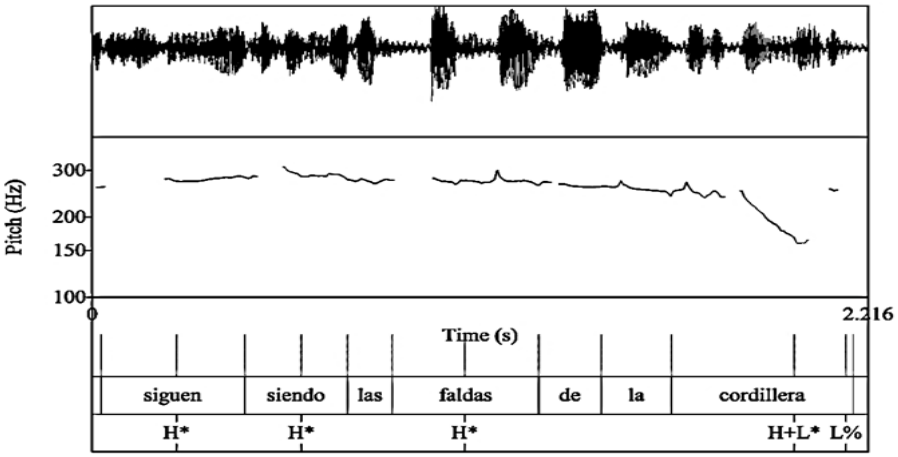

Figure 9. *Plateau portion of spontaneous contour produced by speaker 5. (... they are still the foothills).*

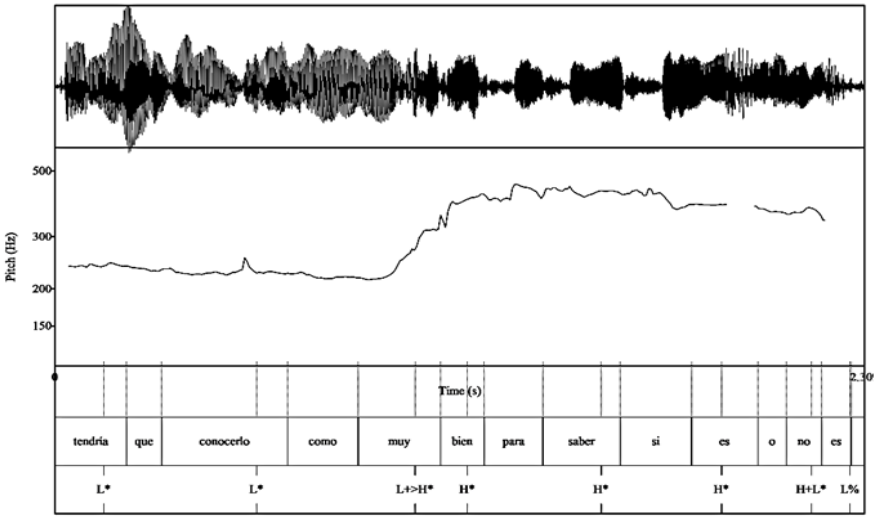

Figure 10. *Spontaneous hat contour as produced by speaker 8. (I would have to get to know him/her real well to determine if he/she was or wasn't).*

Figure 9 shows a high plateau that contains three prosodic words that are maintained at the same high F0 level with no downward tonal movement; therefore just as the current analysis proposes monotonal L* pitch accents for the prosodic words in the pre-plateau valley, it would also propose that multiple plateau-internal prosodic words should be marked with monotonal H* pitch accents.

In figure 10 the contour has both an extended valley and an extended plateau. The valley contains two prosodic words, to which L* pitch accents are associated. The final L tone of the valley occurs in the bitonal L+>H* of the word *muy*. In this case the plateau begins on an instance of tonal clash. The rise starts with *muy* and continues to rise until it peaks at the end of *bien*. The upstep in figure 10 starts on *muy* and continues until peaking at the offset of *bien*. The proposed pitch accent for *bien* is H*. Once the pitch peaks, the plateau maintains the same high F0 level for six words, two more of which are prosodic. It must be noted that while it appears that the pitch falls on the third prosodic word *es*, this drop in the pitch contour is most likely due to the fact that the speaker's voice became creaky toward the end of the utterance. Thus, with both prosodic words at the same high intonational level, the current analysis asserts that monotonal H* pitch accents associate with both prosodic words at the same tonal level as the other plateau-internal prosodic words. The pitch finally drops on the final word *es* to which a bitonal H+L* pitch accent is assigned. The utterance ends on an L% boundary tone. As was previously noted, the speaker's voice became creaky at the end of the utterance, thus causing the contour to disappear before reaching the low level of the L% tone. However, previous examples show that the plateaus indeed drop to a L% boundary tone at the end.

Another potential analysis that fits within the AM framework would be that of deaccenting relative to pitch level in both the valley and the plateau. This approach postulates that the only actual pitch accents would be the valley initial L tone, the upstepped L+H variant at the beginning of the plateau and the H+L at the end. Thus, instead of assigning monotonal pitch accents to each prosodic syllable within the valley and the plateau, this analysis asserts that all prosodic words between the initial and final tones of both the valley and the plateau portions are interpolated and phonologically unspecified, thus serving merely as middle ground from one target to the next relative to the respective pitch levels of the portions they occur within.

A third potential approach postulates that if so many prosodic units are maintained at the same high or low intonational levels, it could be argued that it is not the individual units that give the valleys or the plateaus their meaning, rather the

entirety of each respective portion. Instead of obligating each prosodic word within the valley and the plateau to have an individual pitch accent, or to be deaccented relative to their pitch level, it is possible that both portions are respectively produced as single high and low phonologically specified intonational events. The prosodic words within each portion are simply not independent of one another prosodically. By falling within the confines of either portion, they become part of the respective larger low and high tonal events. In other words, both valley and plateau become extended, metrically strong units along the contour.

This third approach steps outside the current AM theory. At present, the AM framework cannot account for extended tonal events since it posits that a *tonal structure consists of a string of local events with certain points in the segmental string* (Ladd 2008, p.44). However, in the data presented in the current study on the Chilean hat pattern, the valley and especially the plateau, present potential extended tonal events that show the ability to spread and associate to a varying amount of prosodic content, rather than associating with a single stressed syllable. The AM model does not allow for an extended portion of the intonational string to be a single metrically strong event. If in fact it can be proven that the valley and plateau portions of the Chilean hat pattern are single, at times extended, tonal events, then at the very least the AM theory would have to reconsider how it defines these events.

5. CONCLUSIONS

It is still unclear why speakers produced the pattern and if the current pattern is an instance of a specific type of utterance. What the current data do indicate is that the pattern appears to be produced near the end of an utterance, but can be extended for the length of an entire, albeit shorter, utterance. All instances of the contour were made up of four smaller parts: a low valley or a dip, a rise, a high plateauand a final fall. Likewise, all instances ended with the sequence H+L* L% and most plateaus began with a variant of a bitonal L+H pitch accent. In situations of tonal clash at the beginning of the plateau, the rise started on the first stressed syllable as an upstepped L+H variant and continued through the following stressed syllable as a monotonal H pitch accent peaking shortly thereafter.

One shortcoming of the current study is the use of speakers from different regions of Chile and from different age groups. It is entirely possible that the frequency of the hat patterns along with how they are produced vary from region to region and

among different age groups. While this falls outside the scope of the current study, it is a promising avenue for future analyses of the Chilean hat pattern.

There very well could be pragmatic factors that motivate the production Chilean hat pattern that have yet to be determined. What the current data do indicate is that the speaker can include as much or as little as s/he deems necessary in both portions, thus the length of both is dependent on the speaker. Therefore, each portion can, in theory, increase or decrease in size independent of one another. One possibility is that the pattern is a type of extended narrow focus in which old or information that the speaker deems as less important makes up the valley and then new or more important information makes up the plateau. If this were the case, then the effort of the speaker to hit both high and low pitch levels could more easily be explained. Likewise, the varying length of both parts could be explained and would be dependent on what the speaker deemed as important and less important information. However, with the current data set, such a determination cannot be made at this time.

The Chilean hat pattern described in the current study is the first known phonetic documentation of such a pattern within the field of Spanish intonation. Likewise, it is a preliminary attempt at an analysis the current AM framework. Much more data is needed to understand the possible phonologic, pragmatic and social motivations that coincide with the production of this intonational pattern.

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