

Secondary Association of Tones in Castilian Spanish

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Abstract

This paper explores the role of secondary association of tones in the analysis of Castilian Spanish intonation patterns. It is argued that the secondary association of pitch accent tones can account for a three-way contrast in bitonal rising pitch accents, and that the secondary association of edge tones can account for two pitch range effects – post-focal pitch range reduction and final lowering.

1. Introduction

In recent intonational studies of Castilian Spanish, it has been reported that there are three contrasting rising pitch accents that, within Autosegmental-Metrical (AM) theory, must be analyzed as bitonal L+H pitch accents (i.e. L*+H or L+H*). A three-way contrast among rising accents poses a challenge to the AM theory, whose standard notation allows only for a distinction between L*+H and L+H*, with no clear way of representing a third bitonal rising pitch accent. Prieto and Face [5, 10], following an analysis of a similar situation in Catalan [9], have proposed that this three-way contrast can be accounted for through the secondary association of certain pitch accent tones to specific points in the metrical structure. In this paper I consider the notion of secondary association of tones, argue that an analysis including secondary associations provides a principled account of the three-way alignment contrast among rising pitch accents in Castilian Spanish, and show that secondary associations can provide an explanation for pitch range effects in Castilian Spanish as well.

2. Three rising L+H pitch accents

Face [2] presented evidence that in Castilian Spanish declaratives there are two contrasting rising pitch accents, which he analyzed as L*+H and L+H*, that occur in pre-nuclear (i.e. non-final) position. Both pitch accents are characterized by an F0 valley occurring at or very near the onset of the stressed syllable, and there is no significant difference between the two pitch accents with respect to the alignment of this F0 valley. The difference between the two pitch accents is the alignment of the F0 peak in relation to the stressed syllable. In the pitch accent analyzed as L*+H, the F0 reaches its peak in a post-tonic syllable, while in the pitch accent analyzed as L+H*, the F0 reaches its peak within the stressed syllable. Since there is a clear distinction in meaning, this difference cannot be analyzed as the result of a gradient difference in the temporal alignment of the F0 peak of one phonological L+H pitch accent. An example of the broad focus (i.e. L*+H) pitch accent is shown in Figure 1 on the first two stressed words. In this and following figures, the shading indicates the relevant stressed syllables. An example of the

narrow focus (i.e. L+H*) pitch accent is shown in Figure 2 on the stressed syllable of the first stressed word.

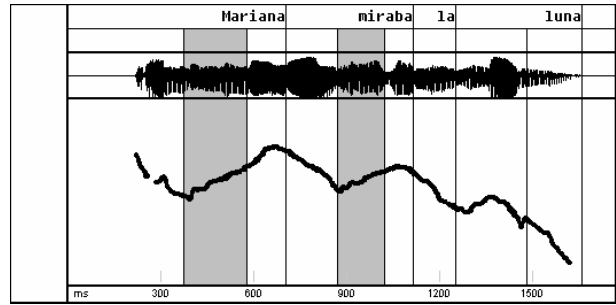


Figure 1: *Broad focus declarative in Castilian Spanish, with L*+H pitch accents on 'Mariana' and 'miraba' (adapted from [4]).*

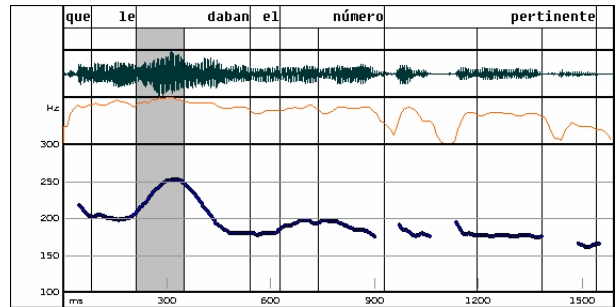


Figure 2: *Castilian Spanish declarative with the narrow focus L+H* pitch accent on 'daban' (adapted from [2]).*

While a third rising F0 contour has been noted in pre-nuclear position in Dominican Spanish [11], this third rising F0 contour does not clearly contrast with the two patterns described above. Face [5] demonstrated that the third rising F0 pattern found for Dominican Spanish is also found in pre-nuclear position in Castilian Spanish when a word in an absolute interrogative is in narrow focus. This pattern is distinct from the two pitch accents described above, as the F0 is low throughout the stressed syllable and begins to rise at or near the offset of the stressed syllable, resulting in a rise in F0 that takes place (almost) entirely in the post-tonic syllable. An example of this rising pitch accent is shown on the second stressed word of the utterance in Figure 3, where the stressed syllable is shaded. Given that this third rising pitch accent occurs in the same position as the other two rising pitch accents but communicates a different meaning, it must be analyzed as phonologically distinct from the other two.

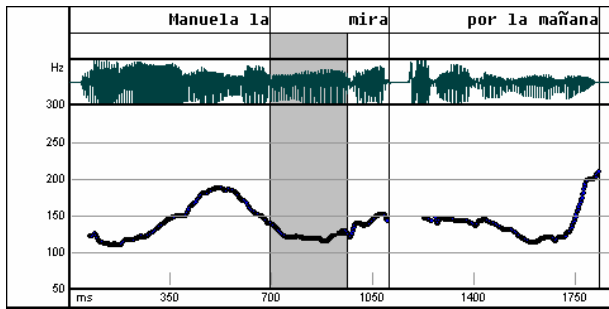


Figure 3: *Castilian Spanish absolute interrogative with narrow focus on the word 'mira' [5].*

3. Difficulties for an AM analysis

Standard AM theory allows for only two possible L+H pitch accents: L*+H and L+H*. In Spanish, as in many other languages, the suffixed * which was originally intended to indicate the metrically stronger tone [6], has come to be understood as marking the tone of pitch accent that is phonetically aligned with the stressed syllable. Thus for Castilian Spanish, L+H* represents the narrow focus accent in declaratives since the F0 peak is aligned with the stressed syllable. In broad focus accents in declaratives, the F0 peak is realized in a post-tonic syllable, and the L*+H analysis is used, representing the lack of alignment of the F0 peak, but the fact that the F0 valley is aligned at or near the onset of the stressed syllable.

One problem is that the F0 patterns represented by L*+H and L+H* would be expected to be mirror images of each other. This, however, is not the case. Rather the pattern typically analyzed as L+H* has an F0 valley that is aligned near the onset of the stressed syllable, just as it is in the pattern commonly analyzed as L*+H, although the peak alignment is different between the two accents. Thus the phonetic alignment of L is identical regardless of whether it bears the suffixed * or not. Furthermore, there are cases in Greek where neither tone is phonetically aligned with the stressed syllable [1]. If the * is meant to mark alignment with the stressed syllable, then this is clearly problematic. If, on the other hand, the * is meant to indicate the metrically stronger tone of the two tones in a bitonal pitch accent (i.e. its head), a different problem arises with the standard Spanish analysis.

The original meaning of the suffixed * was to indicate the strong tone of the pitch accent that associates autosegmentally with the stressed syllable. From this point of view the * does not necessarily indicate anything about the phonetic alignment of the pitch contour with the stressed syllable, but rather has a more abstract phonological meaning. In the case of the standard Spanish L*+H and L+H* analyses in declaratives, this viewpoint would indicate that in L*+H the L is the strong tone while in L+H* the H is the strong tone. Yet when speakers of Castilian Spanish hear these accents, they perceive both of them as primarily high. This corresponds to what Prieto, D'Imperio and Gili Fivela [9] report when they state that "in order for a syllable to be perceived as high, the pitch level needs to stay high or rise for a good portion of the accented syllable; conversely, in order for a syllable to be perceived as low the pitch level must stay low or fall during the accented syllable." Thus following the viewpoint that the * indicates the strong tone of the pitch accent that is associated with the stressed syllable, and given that both of the

declarative pitch accents in Spanish are perceived as high, it seems that both of these accents should be analyzed as L+H*. There is no way, then, to distinguish these two accents.

If the * is taken to indicate phonetic alignment, then the difficulty is enhanced when the interrogative focal pitch accent is considered. Not only does the L have nearly identical alignment between the L*+H and L+H* accents as currently used, but the addition of the interrogative focal accent also seems to require a L*+H analysis since it is the L that is aligned with the stressed syllable. This would result in a L* indicating two different phonetic alignments (an F0 valley at the beginning of the stressed syllable and a low F0 throughout the stressed syllable), in addition to one of the L* alignments (the F0 valley at the beginning of the stressed syllable) being identical to the alignment of the L in the L+H* pitch accent. These facts make it difficult to maintain that the * is an indicator of phonetic alignment with the stressed syllable.

If the * is taken to indicate the strong tone (or the head) of the pitch accent, we have seen that the two Castilian Spanish accents commonly analyzed as L*+H and L+H* should both be analyzed as L+H* since the stressed syllables bearing these accents are perceived as being high. The interrogative focal pitch accent with its low F0 throughout the stressed syllable seems quite clearly to merit a L*+H analysis. The low F0 throughout the stressed syllable leads syllables bearing this accent to be perceived as low, indicating that the L is the strong tone of the accent. In spite of the common use of L*+H in analyses of Spanish intonation, the L*+H label is used in other languages (e.g. English) for precisely the intonation pattern found in the Castilian Spanish interrogative focal accent. When the * is taken in its original sense of indicating the metrically strong tone of the pitch accent, the interrogative focal accent is quite easily incorporated into the analysis as L*+H as it is the only one of the three rising pitch accents in Castilian Spanish where the L is the strong tone of the accent. This is an advantage over the other viewpoint, where the * indicates phonetic alignment, since the addition of the interrogative focal accent makes that analysis even more complicated and inconsistent. Nonetheless, assuming the * indicates the metrically strong tone of the pitch accent, there is still an issue to be resolved. While the interrogative focal pitch accent seem to clearly require a L*+H analysis, the broad focus declarative accent (typically analyzed as L*+H) and the narrow focus declarative accent (typically analyzed as L+H*) both seem to merit a L+H* analysis. Given that these are clearly two distinct accents, occurring in the same pre-nuclear positions but communicating different meanings, an analysis must distinguish them phonologically and not analyze them both as identical L+H* pitch accents.

The question that arises, then, is how to mark both the broad focus and narrow focus declarative pitch accents as rising accents with a strong H, yet also mark them as phonologically distinct pitch accents. If languages have three or more contrasting rising (or falling) bitonal pitch accents, then the AM theory of intonational phonology must be able to account for such three-way contrasts. It would be easy to include a diacritic or other notational mechanism to account for such contrasts, but below I argue that secondary association allows for a principled analysis that not only accounts for the data, but that also explains why such a contrast should exist. Furthermore, since the analysis involves association to metrical units it makes testable predictions about the types of patterns that should be found in the language, or other languages that employ similar mechanisms.

4. Secondary association of pitch accent tones

Prieto, D’Imperio and Gili Fivela [9] have proposed that the AM theory can account for the three rising accents in Catalan by incorporating secondary associations of tones into the theory. Secondary associations of edge tones (i.e. phrase accents and boundary tones) were a part of Pierrehumbert and Beckman’s [7] analysis of the Japanese intonational system and have been proposed for a number of other languages. According to these studies, edge tones are linked phonologically to the edge of a metrical phrase (e.g. intermediate phrase, intonation phrase), but may also acquire additional links (or “secondary associations”) to a specific site in the metrical tree. Edge tones have been proposed to have secondary associations to stressed syllables, moras, and word edges. An AM representation of a secondary association of an edge tone is shown in Figure 4, based on Pierrehumbert and Beckman’s [7] analysis of Japanese. The H phrase accent has a primary association to the edge of the accentual phrase and a secondary association to the second mora.

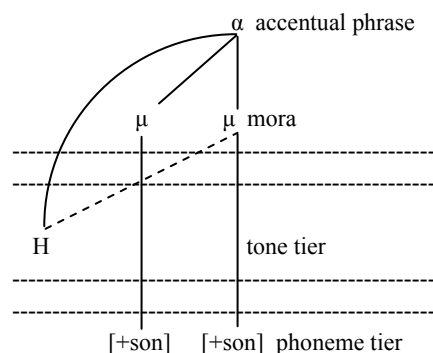


Figure 4: Primary association of the H phrasal tone to the accentual phrase and its secondary association to the second mora in Japanese (following [7]).

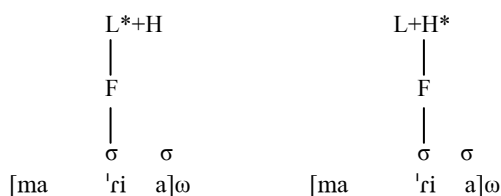
Prieto, D’Imperio and Gili Fivela [9] propose that secondary associations may occur not only for edge tones, but also for pitch accents. The strong tone of the pitch accent is associated with the stressed syllable (perhaps indirectly through a foot), but as has already been mentioned, this association does not necessarily indicate a specific phonetic alignment of the tone to the stressed syllable. In fact, I have claimed here that the broad focus and narrow focus declarative pitch accents must both be analyzed as L+H*, yet the alignment of the H is contrastive in these two cases, occurring in a post-tonic syllable in the case of the broad focus pitch accent and within the stressed syllable in the case of the narrow focus pitch accent. Prieto, D’Imperio and Gili Fivela propose that some strong tones have a secondary association as well as their primary association, and that “these secondary associations will play a primary role in determining the phonetic timing of tones by overriding the standard mapping procedure applied to pitch accents with only primary associations of tones.” This is identical to the way that a secondary association of an edge tone may result in the phonetic realization of the edge tone occurring other than at the edge of the metrical phrase, but rather at a specific mora, syllable, or word edge.

Adapting the analysis of Prieto, D’Imperio and Gili Fivela to Spanish, we can say that there is only one L*+H accent known at this point (i.e. the interrogative focal accent),

and that there is no evidence for a secondary association of the L in this pitch accent since there is no contrast among L*+H accents.

With respect to the two L+H* accents, I propose that a secondary association of the H of one of these accents distinguishes them. The narrow focus declarative accent has an F0 peak that is aligned with the stressed syllable, and I propose that this accent has a secondary association of the H to the stressed syllable. The broad focus declarative accent, on the other hand, has an F0 peak realized in a post-tonic syllable, and does not seem to be aligned with any particular metrical unit. Therefore the H appears to have only a primary association. The difference between the two L+H* accents, then, is that the broad focus declarative accent has only a primary association (i.e. L+H*), leaving phonetic alignment of the H unspecified phonologically, while the narrow focus declarative accent has both a primary association and a secondary association to the stressed syllable (i.e. L+H*]σ), with the secondary association being responsible for the alignment of the H within the stressed syllable. The AM representation of the three rising pitch accents in Castilian Spanish is given in Figure 5, following Prieto, D’Imperio and Gili Fivela’s representation for Catalan.

(a) post-tonic rise (b) rise with post-tonic peak



(c) rise with peak aligned to stressed syllable

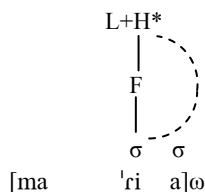


Figure 5: AM representation of three contrastive rising pitch accents in Castilian Spanish.

5. Secondary association of edge tones

Positing the secondary association of pitch accent tones raises the question of whether the secondary association of edge tones might also play a role in Castilian Spanish as it does in other languages. I believe that secondary association of edge tones can explain two pitch range effects that exist in Castilian Spanish. Words in narrow focus are often placed at the end of an intermediate phrase, and the post-focal portion of the utterance is produced in a reduced pitch range (i.e. low in declaratives, high in absolute interrogatives). There is evidence that there are pitch accents in the post-focal portion of the utterance [2], so deaccenting cannot account for the relatively flat post-focal F0 pattern. I propose that in these

cases, the boundary tone (i.e. L% or H%) has a secondary association to the right edge of the intermediate phrase containing the word in narrow focus. This intermediate phrase can be seen as the strong phrase (or head) in metrical terms, and therefore this phrase, rather than others, attracts the realization of the boundary tone. With the boundary tone associated with the end of the intonation phrase (often the utterance), but having a secondary association earlier in the intonation phrase, the spreading of its H or L specification to the left explains the reduced high or low pitch range, respectively. An example of a declarative is shown in Figure 6, with the secondary association of the L% represented in Figure 7.

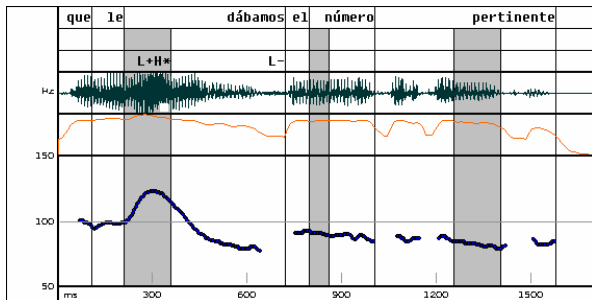


Figure 6: Post-focal pitch range reduction (adapted from [2]).

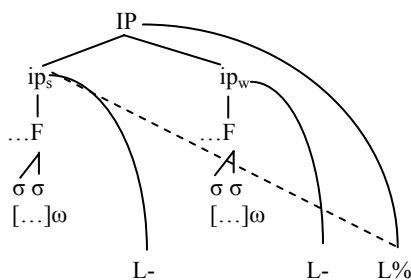


Figure 7: Representation of secondary association of boundary tone to strong intermediate phrase.

Another pitch range effect is final lowering [2, 8]. While there is downstepping of F0 peaks throughout the utterance, final lowering results in the final F0 peak being realized lower than can be accounted for by downstepping, in some cases with little visible F0 rise in the pitch track. I propose that the secondary association of the boundary tone to the edge of the final intermediate phrase can account for this process. This secondary association is represented in Figure 8. One might question why the secondary association to an earlier intermediate phrase does not result in the same effect, and this can be explained as the result of focus preventing such a lowering process. In fact, in final position as well, final lowering does not always apply. Specifically, a high peak (even upstepped) is present when the speaker places some sort of emphasis (e.g. focus) on the final word of the utterance [3]. In this analysis, then, a boundary tone always has a secondary association to the strong intermediate phrase, which is typically the last one unless there is earlier narrow focus.

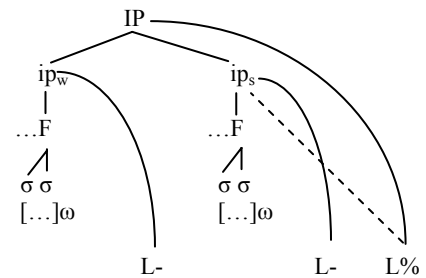


Figure 8: Representation of secondary association of boundary tone to final intermediate phrase.

6. Conclusion

I have proposed here that Castilian Spanish has secondary association of tones. The secondary association of pitch accent tones accounts for a phonological distinction between two L+H* accents, while the secondary association of edge tones accounts for two pitch range effects, namely post-focal pitch range reduction and final lowering.

7. References

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