The Spanish intonation of speakers of a Basque pitch-accent dialect*

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Abstract

In this paper the main aspects of the intonation of broad focus declaratives in Lekeitio Spanish are described and analyzed. In this variety, accents are realized as pitch rises rather than falls, similarly to Standard Peninsular Spanish and unlike in Lekeitio Basque, the other native language of these speakers. Accentual valleys are aligned before the onset of the stressed syllable, except in final position in the utterance. Accentual peaks are aligned before the offset of the accented syllable, with an earlier alignment in accents in the object phrase. At the end of the subject phrase, peaks display later alignment. The number of unstressed syllables intervening between accents seems to affect F0 valley and peak alignment for certain positions. For non-object positions, F0 valleys align earlier as more unstressed syllables intervene between accents, and for the final position in the subject, F0 peaks align later as more unstressed syllables intervene between accents.

Key words: Spanish intonation, bitonal accents, peak alignment.

1. Introduction

In this preliminary study we will describe and analyze the main characteristics of the Spanish intonation of native speakers of a pitch-accent dialect of Basque, more specifically of the type called Northern Bizkaian Basque (NBB). The speakers we chose for this study are native speakers of the variety spoken in Lekeitio, whose intonational properties have been described and analyzed in Elordieta (1997, 1998). The speakers are all bilingual in Basque and Castilian Spanish, or to be more exact, the variety of Castilian Spanish spoken in the Basque Country. We compare the main patterns of the intonation of this dialect of Spanish (henceforth LS) with those of the dialect of Spanish that has been studied most in detail: Madrid Spanish

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(henceforth MS), analyzed by Face (2002) (cf. also Hualde 2002). For this paper, we concentrate on broad focus utterances, and leave for a further study utterances with narrow focus constituents.

In order to achieve the highest possible degree of comparability in our data, our database was identical to part of the database used by Face (2002) in his study. The most important findings of our study are the following:

(a) accents in LS are phonetically realized as pitch rises rather than pitch falls, unlike in NBB (cf. Hualde 1999, Elordieta 1997, 1998);
(b) prenuclear accentual peaks and rises in LS have a substantially earlier alignment than in MS;
(c) the location of accentual valleys and peaks vary with respect to certain positions in the sentence: F0 valleys are aligned later in object position than in other positions, significantly if the accent is final in the utterance (i.e., second word in the object in our corpus), and F0 peaks have a later alignment when the accent is final in the subject phrase and an earlier alignment when the accents are in the object phrase;
(d) the number of unstressed syllables intervening between accented syllables has an effect on F0 valley and peak location. An increase in the number of unstressed syllables leads to an earlier alignment of valleys in all positions except in the final one in the utterance (i.e., they are located further to the left from the onset of the accented syllable). There are no clear effects for peaks except in final position in subjects, where there is later alignment as more unstressed syllables intervene.
(e) the fact that accents are realized as pitch rises and that peaks are aligned within the boundaries of the accented syllable suggest that the type of autosegmental accent that could correspond in a closest way to accents in LS is L+H*.

2. Background on NBB intonation

The most salient features of the intonation of NBB are found at the Accentual Phrase (AP) level. APs are composed of one or more words, and are marked on their left edge by an initial αL boundary tone and on their right edge by a H*+L pitch accent.[1] The pitch accent is present in all lexically accented words, as well as in lexically unaccented words preceding the verb or pronounced in isolation. As already described in Hualde (1991, 1997, 1999) and Hualde, Elordieta and Elordieta (1994), lexically accented words are those that contain an accented root and/or one or more accented affixes. Accented roots have prominence on a given syllable, and in most NBB varieties it is the leftmost accented affix that determines

1. The notation αL is inspired by Gussenhoven (in prep.), where α stands for 'Accentual Phrase', in order to distinguish tones phonologically associated to Accentual Phrases from those associated to Intonational Phrases, for which the notation % is used in the literature. The reader should bear in mind, however, that in all former studies on NBB intonation Accentual Phrase boundary tones are labeled as %L.

the location of prominence in the word, as it falls on the syllable preceding the leftmost accented affix. Some examples are given in (1), with accented morphemes marked by an apostrophe; (1c) contains an accented root, and we have indicated directly the syllable carrying the accent, which is also lexically specified:[2]

(1) a. /lagun – a – ‘gas/ -> la.gu.ná.gas
friend-det.sg.-comit.
‘with the friend’

b. /sagar – ‘eta – ‘tik/ -> sa.gá.rre.ta.tik
apple-loc.pl.-abl.
‘from the apples’

c. /léku – ‘eta – ra/ -> lé.ku.e.ta.ra
place-loc.pl.-all.
‘to the places’

In a few varieties, accented words simply bear penultimate prominence. Thus, in Lekeitio (1a-c) would be *la.gu.ná.gas, sa.ga.rre.tá.tik, le.ku.e.tá.ra*.

Unaccented words do not contain any accented morpheme, and they are only assigned prominence when they are pronounced in isolation or immediately before the verb. In these two contexts, in most varieties of NBB unaccented words surface with prominence on their final syllables, although in a few varieties they surface with prominence on the penultimate syllable. In all other contexts, unaccented words do not present any kind of prosodic prominence on any syllable. The following examples illustrate this contrast. The sentences only differ in informational structure, that is, in theme-rheme or topic-focus structures, and they contain the same words, one accented (*umiágas* ‘with the child’) and one unaccented (*laguna*). As can be seen, the accented word displays an accent regardless of its position in the sentence, whereas the unaccented word only displays an accent immediately preceding the verb (cf. the ill-formedness of (2e, f)):

(2) a. umiágas laguná etorri da
child-com friend-abs come aux
‘It is the friend that has come with the child’

b. laguná etorri da umiágas
friend-abs come aux child-com
‘It is the friend that has come with the child’

c. laguna umiágas etorri da
friend-abs child-com come aux
‘The friend has come with the child’

2. The following abbreviations will be used: abl = ablative, abs = absolutive, all = allative, aux = auxiliary, com = comitative, dat = dative, erg = ergative, gen = genitive, ines = inessive, loc = locative, pl = plural, sg = singular.

d. umiágas etorri da laguna
child-com come aux friend-abs
'It is with the child that the friend has come'

e. *laguná umiágas etorri da

f. *umiágas etorri da laguná

As already shown in Elordieta (1997, 1998) and Jun and Elordieta (1997), utterances in NBB are organized in a prosodic structure very similar to the one described and analyzed for Tokyo Japanese by Pierrehumbert and Beckman (1988) and others. The lowest level in the intonational structure hierarchy is the Accentual Phrase (AP), which, as already stated above, has a αL boundary tone on its left edge and a H*+L pitch accent, present in all accented words and in all preverbal unaccented words. The syllables between the first syllable and the accented syllable present a high tone plateau, attributed to an AP phrasal H tone (αH)[3] associated to the second syllable of the AP (much like a αH is associated to the second mora of an AP in Tokyo Japanese, cf. Pierrehumbert and Beckman 1988) and a phonological process of rightward spreading of this αH onto the syllables before the accented one (cf. Elordieta (1998), improving on a previous analysis in Elordieta (1997), and Jun and Elordieta (1997)). This pattern is illustrated in Figures 1-2, corresponding to sentences (3)-(4), respectively.[4] In (3) there are two APs, composed of one accented word each (*mariñerúen* 'the sailors (gen.pl.)' and *lagunéna* 'the one of the friends'). In each AP, there is a tonal rise from the first to the second syllable, indicating the presence of the phrasal H tone. The pitch level continues rising until the penultimate syllable (*rú*), where a sharp fall in pitch occurs. This type of HL contour has been attributed to a H*+L pitch accent in the existing literature on NBB (Elordieta 1997, 1998, Jun and Elordieta 1997, Hualde, Elordieta, Gaminde and Smiljanić 2002). The second AP presents a much lower peak than the first one, due to downstep, a pervasive phenomenon applying to all APs within an Intermediate Phrase (cf. Elordieta 1997, 1998), and as a consequence the rise from the initial syllable to the second syllable is also smaller but still perceivable. The fall in pitch at the end of the accented syllable of this word (i.e., *né*) can also be observed.

Example (4) contains only one AP, composed of two unaccented words, *mariñeruen* 'the sailor (gen.sg.)' and *lagunena* 'the one of the friend'. They are the unaccented counterparts of the words in (3), i.e., the ones in (3) are in the plural and the ones in (4) are in the singular. The second word surfaces with main prominence on the final syllable by virtue of its preverbal position, and the same pattern of a sharp fall as in accented words is observed, in this case on the syllable */ná/*. As the contour in Figure 2 shows, the high tone plateau in the first unaccented word extends onto the next word, until the pitch accent on the syllable */ná/* is met. This

3. Following the criteria used for αL, αH stands for a phrasal H tone of an AP, which in previous studies of NBB is notated as H-.
4. In the figures in this paper, words are segmented in syllables, for ease of illustration of the association of tones to syllables.

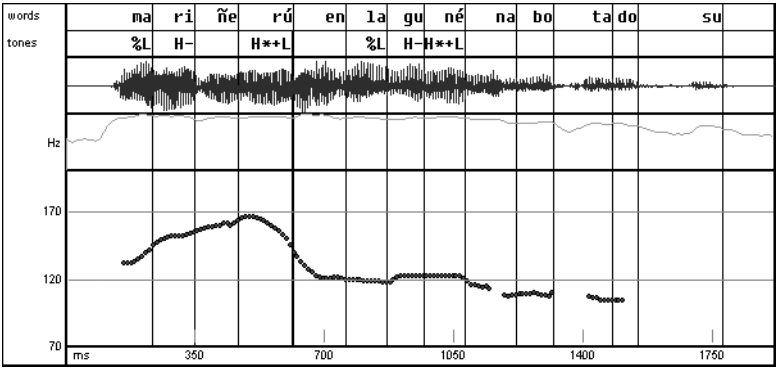


Figure 1. mariñerúen lagunéna bota dosu.
'You have thrown the one of the sailors' friends.'

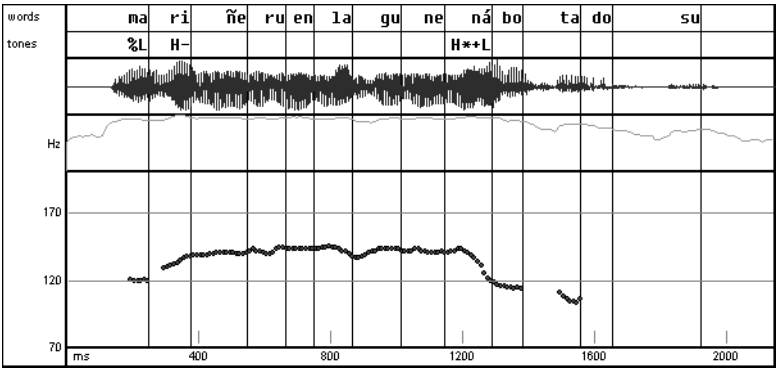


Figure 2. mariñeruen lagunená bota dosu.
'You have thrown the one of the sailor's friend.'

is the result of the above mentioned process of phonological spreading of αH of the second syllable. The AP ends when the pitch accent is met. This is perhaps the feature that most clearly identifies NBB intonation:[5]

(3) mariñerúen lagunéna bota dosu.
sailor-gen.pl. friend-gen.pl.-abs.sg. throw aux
'You have thrown the one of the sailors' friends.'

5. In the figures in this paper %L and H- will be used for αL and αH, as the symbol α cannot be inserted in the tiers.

(4) mariñeruen lagunená bota dosu.
sailor-gen.sg. friend-gen.pl.-abs.sg. throw aux
'You have thrown the one of the sailor's friend.'

The spreading of αH also takes place across syntactic constituents, that is, the H tone plateau on an unaccented word or sequences of unaccented words in a syntactic phrase continues onto the following syntactic phrase, until a H*+L accent is met. That is, an AP would contain all those unaccented words between the αL on the left edge and the H*+L accent on the right edge. This can be observed in Figure 3, corresponding to (5), where the H plateau in the subject (the unaccented word *negarra* 'the crying') continues onto the following syntactic phrase, *alabiak* 'the daughter'):

(5) negarra alabiák egin dau
crying daughter-erg.sg. do aux
'The daughter has done the crying' (i.e., 'the daughter has cried')

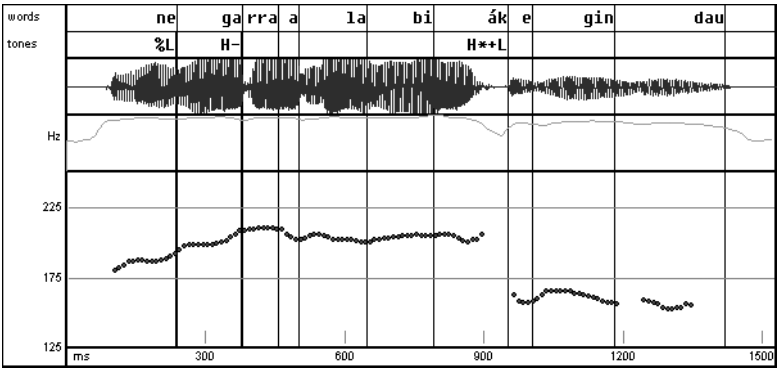


Figure 3. negarra alabiák egin dau.
'The daughter has done the crying' (i.e., 'the daughter has cried').

No tonal movement is observed associated to the right edge of the first syntactic phrase, i.e., at the boundary of the two phrases. If the first phrase were composed of one or more accented words, no other tonal movement apart from the fall in pitch on the accented syllable would be observed, either. This is illustrated in Figure 4, corresponding to (6):

(6) amúma ewenían allaga san
grandmother-abs.sg. Thursday-on arrive aux
'The grandmother arrived on Thursday'

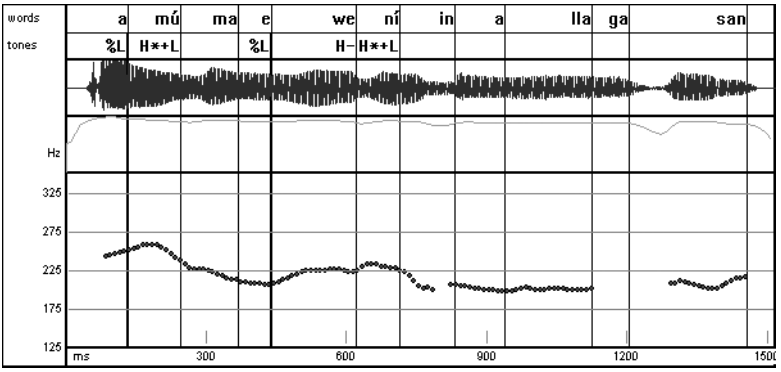


Figure 4. amúma ewenían allaga san.
'The grandmother arrived on Thursday'.

3. Background on MS intonation

In broad focus utterances in MS, Face (2002) showed that there were two kinds of pitch accents, one appearing in non-final position, that is, in words not bearing the nuclear accent, and another one appearing in nuclear position, i.e., the last accent in the utterance. The accent in non-final position was L*+H, that is, it was realized as a rise in pitch, with a L tone aligned in a relatively stable way with the left edge of the accented syllable and the H tone aligned in a less stable or fixed way with respect to the right edge of the syllable. The F0 valley was usually realized within the accented syllable, and only when there were four or five unaccented syllables between accents could the valley be realized 6 or 8 ms before the left edge of the accented syllable. On the other hand, the H tone or peak was usually realized on the posttonic syllable, except in cases of extreme tonal crowding (no unstressed syllables between accents), in which the peak was realized 5 ms before the right edge of the accented syllable (see a more detailed presentation in section 6). Face's claim differs from the ones by Prieto, van Santen and Hirschberg (1995) and Nibert (2000), who claim that the non-final pitch accent in Spanish is H*, and Hualde (2002), who opted for analyzing the rising accent in Spanish as (L+H)*. However, Face's experimental and quantitative evidence is strong, based on detailed measurements of the realizations of valleys and peaks as well as of the duration of rises in relation to the number of unstressed syllables occurring between accents (i.e., the effect of tonal crowding on accent realization). Sosa (1999) and Beckman, Díaz-Campos, McGory and Morgan (2002) also propose L*+H accents in non-final position in Spanish, but their studies are not presented with quantitative and statistical evidence. Other scholars who had already established that accents in Spanish are realized as pitch rises include Navarro Tomás (1944), Fant (1984), de la Mota (1995), Garrido, Llisterri, de la Mota and Ríos (1993), and Garrido, Llisterri, de la Mota, Marín and Ríos (1995).

The accent in final or nuclear position was analyzed by Face as L+H*, that is, as a rising accent in which the peak is realized within the boundaries of the accented syllable and the valley is realized closer to the left edge of the accented syllable than the peak in non-final L*+H accents is to the right edge of the accented syllable. That is, the leading L tone of final accents is less loosely associated to the accented syllable than the trailing H tone of non-final accents. But this difference does not prevent Face (2002) from stating the systematic distribution of L*+H and L+H* accents in non-final and final positions, respectively. The two types of accents are illustrated in the F0 contour in Figure 5, corresponding to *La madre de María examina la nave morada* ('María's mother examines the purple boat').[6]

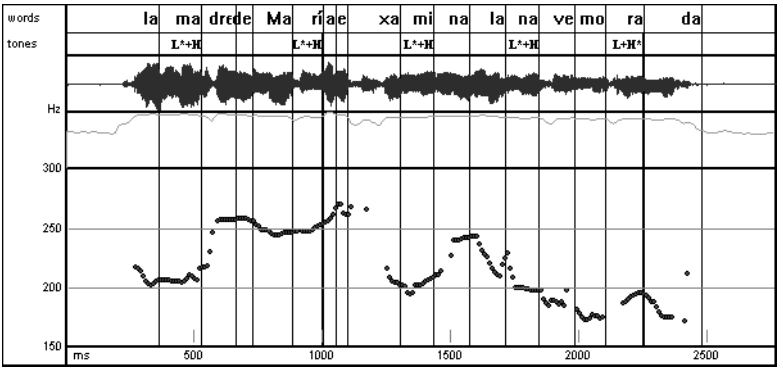


Figure 5. La madre de María examina la nave morada.
'María's grandmother examines the purple boat'.

In the first word, the accented syllable is realized as a low tone, and only at the very end the pitch starts to rise. The rise continues onto the following syllable, and the peak is reached there. The same pattern occurs in the following non-final accents (except for the last one, in the word *nave*, where the rise is not apparent and a downdrifting pattern is observed), hence the categorization of this accent as L*+H. In the last lexical word, however, the accent is realized as a rise, but the peak is reached within the limits of the accented syllable. This is what makes the nuclear accent in Spanish analyzable as L+H*.

In Castilian Spanish, tonal movements indicating intonational boundaries can be found in broad focus contexts, but the data are not conclusive as to the syntactic constituents after or between which these boundaries may be found. Thus, Nibert (2000:161-166) observed that in some instances H- could appear signaling an intonational break between the verb and the object in neutral sentences, i.e., without

6. The figures that illustrate intonational patterns of MS are a courtesy of Tim Face, to whom I am grateful. The actual contours were not included as figures in his book (Face 2002), and hence are published for the first time in this article.

a narrow focus constituent, so that if a subject was present it was grouped intonationally together with the verb. For MS, Face (2002) reports 15% occurrence of H- after a word in initial position (a verb in his corpus) and 9% after a word in medial position (a head noun, before its prepositional complement). Elordieta, Frota, Prieto and Vigário (in press) observed pitch rises at the right edge of subjects in Peninsular Spanish, but only very few times after the verb, or between a head noun and its complement. In any case, pitch rises were not as frequent as pitch reset or final lengthening as indicators of intonational breaks between a subject and the rest of the sentence (cf. also Garrido, Llisterri, Marín, de la Mota and Ríos 1995, Garrido 1996).[7] In this paper the possible realization of intonational boundaries between phrases in LS will also be discussed.

4. Methodology

In our study of the main features of the intonation patterns of LS two kinds of stimuli were used, one designed a priori and the other a posteriori. On the one hand, we used the same sentences of Corpus #2 of Face (2002) in broad focus contexts, composed of a subject, a verb and an object, in that order (cf. (7)-(9) below). We chose these sentences because they contain three constituents in a canonical word order in Spanish, which would allow us to detect any patterns of intonational realization which could be specifically associated to certain constituents. Also, in future work we also intend to compare the main aspects of narrow focus realization in the Spanish of NBB speakers, and Face uses the sentences in Corpus #2 in his study of narrow focus in MS. Hence, for the sake of data comparability we decided to use this set of examples. Narrow focus readings were recorded and digitized, but they are not analyzed for this article. The target sentences were uttered by the speakers as a response to a broad question asked by the interviewer (the author himself), such as *¿Qué pasa?* (‘¿What’s happening?’):

(7) A: ¿Qué pasa?
‘What’s happening?’

B: El hermano de Manolo le daba el número de vuelo.
‘Manolo’s brother was giving him the flight number’

(8) A: ¿Qué pasa?
‘What’s happening?’

B: El niño gallego admira a la niña de Málaga.
‘The Galician boy admires the girl from Málaga’

7. What all these authors agree on is that pitch rises and F0 reset occur much more commonly at the right edge of topicalized or theme constituents, regardless of syntactic categories. De la Mota (1995) found no evidence of pitch rises at the boundaries between subjects and verb phrases in broad focus sentences.

(9) A: ¿Qué pasa?
'What's happening?'

B: La madre de María examina la nave morada.
'María's mother examines the purple boat'

On the other hand, in order to compare the similarities or differences between the pitch accents in LS and MS, we decided to include in our experiment sentences with longer words, so that there were more unstressed syllables between accents. In this way, if bitonal accents were really involved, we would be able to see more clearly the association of bitonal accents to trailing or leading tones, without the effect of tonal crowding. And if monotonal accents were involved, interpolation transitions would surface distinctly. Hence, we decided to set up target sentences with words of five syllables, including monosyllabic determiners and prepositions, so that there were four syllables intervening between the lexically stressed syllables in each word. In that way possible effects of tonal crowding would be avoided, and realization points of F0 valleys and peaks would be easier to measure with respect to the left and right edges of accented syllables. The target sentences designed for this purpose are included in (10). Like for (7)-(9), the sentences were preceded by the triggering question *¿Qué pasa?* ('What's happening?'):

(10) a. La boliviana de Badalona rememoraba la mermelada de Magdalena.
'The Bolivian from Badalona remembered Magdalena's marmalade'

b. La boliviana rememoraba la mermelada de Magdalena.
'The Bolivian remembered Magdalena's marmalade'

Four female speakers between 30 and 41 years of age were recorded for sentences (7)-(9), and three for the sentences in (10)[8]. The speakers are perfectly bilingual in Basque and Spanish, more specifically the variety of NBB spoken in Lekeitio and the variety of Castilian Spanish spoken in the Basque Country. The target sentences were presented in a card each, after the triggering question *¿Qué pasa?* 'What's happening?' was asked by the interviewer (the author himself). The sentences were repeated three times, so a total of 54 utterances were obtained and analyzed (from (7)-(9), 3 sentences x 3 repetitions x 4 speakers = 36 utterances; from (10), 2 sentences x 3 repetitions x 3 speakers = 18 utterances). The utterances were digitized onto a computer and their F0 contours were analyzed using *PitchWorks* (version 6.0), the software for pitch track extraction developed by Scicon R&D. The analysis needed an exact segmentation of words in syllables, which was done through the speech wave signals and spectrograms. For each accented syllable, two measurements were taken: a) the start of the rise, measured in ms from the left edge or onset of the accented syllable, and b) the location of the peak, taken as the highest point in F0 value and measured in ms from the right

8. Speaker 2 was not available for the reading part of the sentences in (10).

edge or offset of the accented syllable. The reference points for calculating these measurements (i.e., the onset of the accented syllable for starts of rises and the offset of the accented syllable for peaks) are the same as the ones used by Face (2002). The data obtained for the readings of sentences in (7)-(9) and the ones in (10) were analyzed separately and then compared. Average values for each of the two variables (start of rise and peak) were extracted, for all the speakers and for each speaker. After a preliminary observation that the values for the two variables seemed to vary depending on the syntactic position occupied by each accent in the sentence (i.e., the word containing the accent in each case), a statistical analysis was performed in order to detect possible correlations between these values and position in the sentence.

5. Main features of LS intonation

The first point to mention is that NBB speakers do not display the same type of pitch accent in their variety of Spanish. The accented syllables are not characterized by a local peak and a fall in the same syllable (i.e., H*+L), but mainly by a local rise. The pitch starts to rise from a local valley or low point near the left edge or onset of the lexically accented syllable, and the peak is reached within the boundaries of the accented syllable. For each accented syllable, we measured the distance in ms from the F0 valley to the onset of the accented syllable, and the distance in ms from the F0 peak to the offset or right edge of the accented syllable. Thus, for the case of F0 valleys, the onset of the accented syllable was reference point 0, and negative values indicate that the F0 valley has occurred before the onset of the accented syllable, and positive values indicate that it has occurred after the onset. For F0 peaks, negative values indicate that the F0 peak has been reached before the offset of the accented syllable, and positive values indicate that it has been reached after the offset. Table 1 shows the mean values for start of the rise or location of F0 valley and location of the F0 peak, measured in ms. Number of valid tokens (N), standard deviation (SD) and standard error (SE) values are included in parenthesis.

Table 1. Location of F0 valleys and peaks in broad focus declaratives.

Location of F0 Valley	Location of F0 Peak
-12 ms (N=231; SD=28.04; SE=1.84)	-26.70 ms (N=238; SD=52.28; SE=3.38)

However, there seems to be a difference among speakers as to the location of F0 valleys. As Table 2 shows, Speaker 1 has later rises than Speakers 3-4.[9] A one-way ANOVA comparison with a post hoc Tukey test of the averages for Location of F0

9. Speaker 2 was left out of this calculation because she did not produce utterances corresponding to the sentences in (10). However, for the sake of curiosity, we can point out that the average values for F0 valley location for this speaker was -9.94 ms, and an ANOVA test showed that this value was not significantly different from the other speakers.

Valleys and Peaks per Speaker shows that this difference between speakers is significant ($F(2, 189)=9.58$, $p<0.000$). Cf. Table 3 for the differences and their significance level.

Table 2. Location of F0 Valleys by Speaker.

Speaker	Location of F0 Valley
1	+1.10 ms (N=66; SD=28.96; SE=3.56)
3	-14.80 ms (N=64; SD=23.27; SE=2.90)
4	-18.44 ms (N=62; SD=28.40; SE=3.60)

Table 3. Differences between Means of Location of F0 Valley by Speaker and Relative Significance.

Speakers with Significant Differences	Mean Difference and Significance
1 and 3	15.90 ms (SE=4.73; p=0.003)
1 and 4	19.55 ms (SE=4.77; p<0.000)

As for F0 Peaks, Table 4 shows that Speaker 1 produces earlier peaks than Speakers 3-4. However, the only significant differences are obtained between Speaker 1 and Speaker 4 (difference of -29.85 ms, SE=8.86, $F(2, 196)=6.09$, $p= 0.003$).

Table 4. Location of F0 Peaks by Speaker.

Speaker	Location of F0 Peak
1	-40.53 ms (N=64; SD=42.87; SE=5.35)
3	-29.97 ms (N=65; SD=60.53; SE=7.50)
4	-10.68 ms (N=70; SD=46.14; SE=5.51)

Locations of F0 valleys and peaks vary depending on the position of the accent in the utterance. In the sentences that constituted our corpus, there were five syntactic positions: first word in the subject phrase (first word in the utterance), second word in the subject phrase (final word in the subject phrase), verb, first word in the object phrase, and second word in the object phrase (last word in the utterance).[10] As can be seen in Table 5, which includes location values of F0 valleys for all speakers, valleys are aligned before the onset of the accented syllable in all positions except the last word in the object phrase, i.e., the last word in the utterance,

10. In (10b) there was only one word in the subject phrase, which for the purposes of Location of F0 Valley was coded as first word in the subject phrase (as it is the first word in the utterance) and for the purposes of Location of F0 Peak was coded as second word in the subject phrase, i.e., final word in the subject phrase.

Table 5. Location of F0 Valleys by Position.

Position	Location of F0 Valley
First Word in Subject	-19.17 ms (N=53; SD=24.66; SE=3.38)
Second Word in Subject	-12.00 ms (N=45; SD=31.37; SE=4.67)
Verb	-16.12 ms (N=49; SD=25.46; SE=3.63)
First Word in Object	-4.73 ms (N=50; SD=23.84; SE=3.37)
Second Word in Object	+5.22 ms (N=34; SD=30.78; SE=5.28)

where F0 valleys are located within the accented syllable. A one-way ANOVA was run on the data, with Location of F0 Valley as the dependent variable and Position of Word in Sentence as the independent variable, with the five groups mentioned above: first word in the subject phrase, second word in the subject phrase, verb, first word in the object phrase, and second word in the object phrase. A post hoc Tukey test revealed that the only significant differences in means with respect to Position were between the last accent in the object phrase and the rest. The five groups in Position were then reduced to these two groups, that is, the last or nuclear accent in the utterance and the rest of the accents, and a one-way ANOVA returned a significant difference between the two groups ($F(1, 229)=13.04$, $p<0.000$).[11]

As for peaks, a clear pattern can be observed as well: peaks are aligned within the boundaries of the accented syllable in all positions except when the accent is final in the subject phrase, where it is located in the posttonic syllable (cf. Table 6). It can also be observed that peaks are reached earlier within the accented syllable in the object phrase than in the other positions. Thus, words in the object phrase have the latest F0 rises (especially for the second word, i.e., the final word in the utterance) and the earliest F0 peaks.

Table 6. Location of F0 Peaks by Position.

Position	Location of F0 Peak
First Word in Subject	-13.51 ms (N=43; SD=41.02; SE=6.25)
Second Word in Subject	+11.56 ms (N=53; SD=52.87; SE=7.26)
Verb	-16.63 ms (N=52; SD=47.55; SE=6.59)
First Word in Object	-61.03 ms (N=52; SD=39.61; SE=5.49)
Second Word in Object	-61.80 ms (N=38; SD=32.01; SE=5.19)

11. Unfortunately, separate calculations per speaker could not be carried out due to the low number of tokens in the second position (object phrase) for each speaker (between 11 and 12 tokens in this position). We faced the same problem for all subsequent calculation discussed in the article, and thus all calculations with fixed factors are made without taking Speaker as a factor. We leave for future work a consideration of this factor as a possible source of significant differences, with a sufficient number of tokens per speaker.

A one-way ANOVA test with Location of F0 Peak as the dependent variable and Position as the independent variable (with the five original groups mentioned above) was performed, revealing the existence of significant differences ($F(4, 233)=25.73$, $p<0.000$). A post hoc Tukey test revealed that there were significant differences between the means for all positions except between the first word in the subject phrase and the verb or between the two accents in the object phrase. That is, the average F0 peak value for the final accent in subjects or the two accents in the object phrase were significantly different from the other positions. The significant differences between means are summarized in Table 7.

Table 7. Differences between Means of Location of F0 Peaks by Position and Relative Significance.

Positions with Significant Differences	Mean Difference and Significance
First Word in Subject and Second Word in Subject	-25.07 ms (SE=90.01; p = 0.01)
First Word in Subject and First Word in Object	47.52 ms (SE=9.05; p < 0.000)
First Word in Subject and Second Word in Object	48.29 ms (SE=9.77; p < 0.000)
Second word in Subject and Verb	28.19 ms (SE=8.57; p = 0.01)
Second word in Subject and First Word in Object	72.60 ms (SE=8.57; p < 0.000)
Second word in Subject and Second Word in Object	73.37 ms (SE=9.33; p < 0.000)
Verb and First Word in Object	44.40 ms (SE=8.61; p < 0.000)
Verb and Second Word in Object	45.17 ms (SE=9.37; p < 0.000)

An example of an F0 contour for sentence (7), *El hermano de Manolo le daba el número de vuelo* ('Manolo's brother gave him/her the flight number'), produced by Speaker 1, serves to illustrate the most common patterns of alignment. Words are segmented in syllables for ease of identification of accented syllables, and the autosegmental labels for the pitch accents are left as '*?' until the discussion in section 6 settles this issue of the autosegmental label for accents in LS. Figure 7 contains an F0 contour for the same sentence, uttered by Speaker 4.

It must be pointed out, however, that there was substantial variation in the alignment of peaks in the subject phrase and in the verb, as the rather high Standard Deviation values indicate. That is, although peaks are aligned before the offset of the accented syllable for the first accent in the subject phrase and the verb, there are several tokens in these positions with peaks in the syllable following the accented one (i.e., in the posttonic), especially in cases of accents in the first word in the subject phrase or the verb, up to 17.29% of the cases. Nevertheless, the peak is

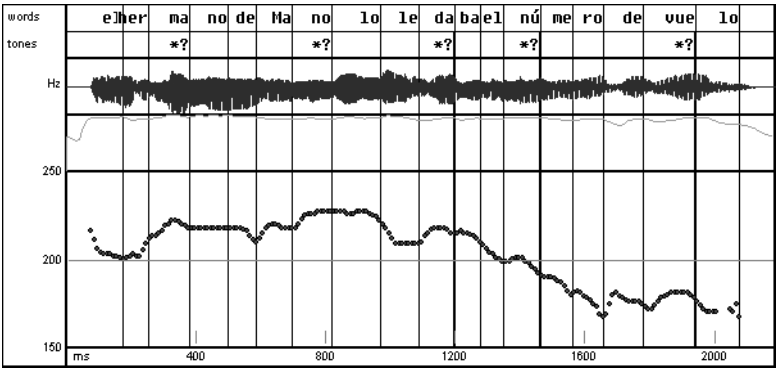


Figure 6. El hermano de Manolo le daba el número de vuelo.
'Manolo's brother gave him/her the flight number'.

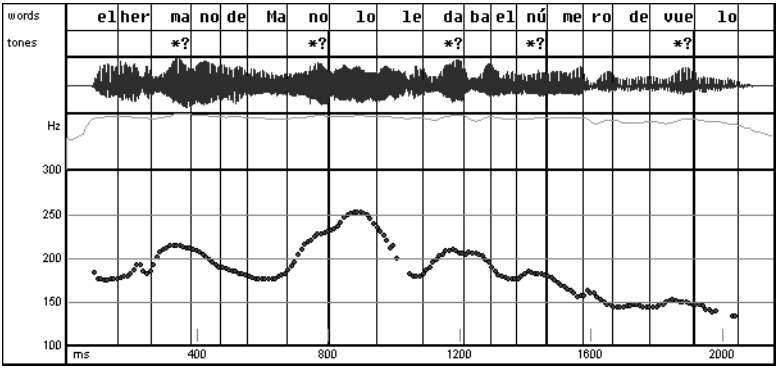


Figure 7. El hermano de Manolo le daba el número de vuelo.
'Manolo's brother gave him/her the flight number'.

never found beyond the end of the onset consonant of the posttonic syllable. On the other hand, in the object phrase there were almost no cases with posttonic peaks (2.70%). The F0 contour in Figure 8, corresponding to sentence (8) *El niño gallego admira a la niña de Málaga* ('The Galician boy admires the girl from Málaga'), pronounced by Speaker 4, serves to illustrate a case of a peak reached on the accented syllable of the verb and the two words in the object phrase but a posttonic peak for the first word in the subject phrase.

Another calculation was made for the Location of F0 Valleys and Peaks in each Position in the Sentence by Number of Preceding Unstressed Syllables and Number of Following Unstressed Syllables, respectively, to see whether there were any significant differences in means according to the number of intervening unstressed

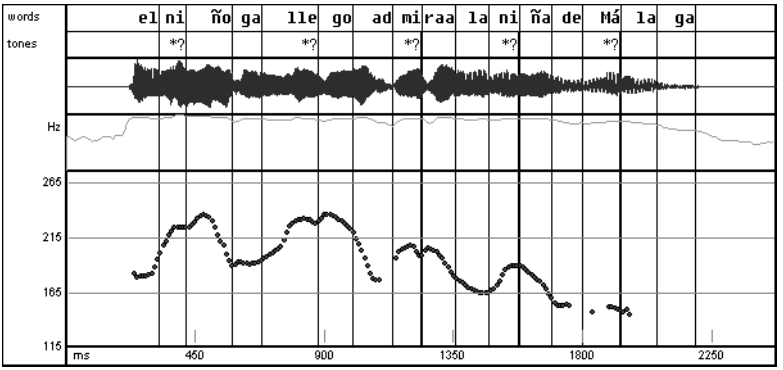


Figure 8. El niño gallego admira a la niña de Málaga.
'The Galician boy admires the girl from Málaga'.

syllables between accents. For F0 valleys there seems to be a tendency to be aligned earlier as the number of preceding unstressed syllables increases. However, given the scarcity of our data, there are combinations of positions and number of unstressed syllables that do not have any tokens, which makes it difficult to make any reliable statistical comparisons. However, the results presented above for variance of F0 valleys by Position (cf. Table 6) showed that there were two distinct position groups differing in F0 valley alignment: the second accent in the object phrase (i.e., final accent in the utterance) and the rest. Thus, we clustered all positions except the last word in the object in one group, leaving the second accent in the object in another group (cf. Table 8).[12] An ANOVA analysis for each position shows that for all positions except final in the utterance (i.e., the first group), there is a significant difference for F0 valley location depending on whether there are two or four syllables preceding. F0 valleys have an earlier alignment as more unstressed syllables intervene, i.e., they are aligned further from the onset of the accented syllable (16.22 ms

Table 8. Location of F0 Valley by Number of Preceding Unstressed Syllables for two Positions (Non-final and Final in the utterance)

Position	**Number of Preceding Unstressed Syllables**		
	2	**3**	**4**
All accents except final in the utterance	-6.95 ms N=87;SD=25.42; SE=2.72	-13.65 ms N=42;SD=29.10; SE=4.49	-23.17 ms N=45;SD=24.79; SE=3.69
Final accent in utterance (second in Obj.)	+11.11 ms N=11;SD=40.60; SE=12.24	+10.43 ms N=8;SD=7.66; SE=2.71	-1.88 ms N=15;SD=30.49; SE=7.87

12. We only considered cases with 2-4 unstressed syllables, as only the first word in the subject phrase presented cases with one preceding unstressed syllable.

of difference, SE=4.79, p=0.05). As for the final position in the utterance (second word in the object), no significant interactions with number of intervening syllables were found, although there is a difference of 12.99 ms between cases with two unstressed syllables preceding the accented syllable and cases with four unstressed syllables preceding the accented syllable. This might be caused by the small number of tokens per cell for this position. Moreover, in this position decreased pitch ranges and/or creaky voices left some tokens invalid for measurement.

For F0 peaks, no clear pattern emerges if all positions are computed (cf. Table 9 below). In some positions peaks seem to align later going from two to four intervening unstressed syllables (the second or final accent in the subject) whereas for others it is the other way around (the verb and the first accent in the object). In other positions, peaks seem to align earlier going from two to three intervening unstressed syllables, but later going from three to four intervening unstressed syllables, as in the first word in the subject. In the second accent in the object phrase (i.e., the final accent in the utterance) there does not seem to exist any virtual significant difference. However, any statistical analysis would be hampered by the existence of empty cells or cells with few tokens, like for F0 valleys. Thus, we clustered together the positions for which there was no significant difference in F0 peak alignment (cf. Table 7). Those were the first word in the subject and the verb on the one hand and the two object positions on the other. The second accent in subject position was left as one group, given its significant differences with all the other positions. The results are presented in Table 10.[13]

Table 9. Location of F0 Peak by Number of Following Unstressed Syllables for all Positions.

Posit.	**Number of following unstressed syllables**			
	1	**2**	**3**	**4**
First accent in Subj.		-10.23 ms N=12;SD=41.03; SE=11.84	-17.57 ms N=22;SD=44.94; SE=9.58	-7.94 ms N=9;SD=33.51; SE=11.17
Second accent in Subj.		-2.12 ms N=35;SD=55.36; SE=9.35		+38.20 ms N=18;SD=35.82; SE=8.44
Accent in Verb		-5.44 ms N=23;SD=47.26; SE=9.85		-15.38 ms N=18;SD=49.42; SE=11.64
First accent in Obj.		-70.22 ms N=24;SD=36.50; SE=7.45	-69.35 ms N=10;SD=21.67; SE=6.85	-44.17 ms N=18;SD=46.84; SE=11.04
Second accent in Obj.	-57.25 ms N=15;SD=48.36; SE=12.48	-65.55 ms N=6;SD=10.62; SE=4.33		-64.49 ms N=17;SD=15.97; SE=3.87

13. We only considered cases with 2-4 unstressed syllables, as in the clustered groups only one of the members had cases with one following unstressed syllable, and the second word in the subject phrase had no cases with one following unstressed syllable.

Table 10. Location of F0 Peak by Number of Following Unstressed Syllables for three Position Groups (First accent in Subject and Verb, Second accent in Subject and Accents in Object)

Position	**Number of Following Unstressed Syllables**		
	2	**3**	**4**
First accent in Subj. and Verb	-7.08 ms N=35;SD=44.67; SE=7.55	-17.57 ms N=22;SD=44.94; SE=9.58	-12.90 ms N=27;SD=44.22; SE=8.51
Second accent in Subject	-2.12 ms N=35;SD=55.36; SE=9.35		+38.20 ms N=18;SD=35.82; SE=8.44
Accents in Object	-69.29 ms N=30;SD=32.86; SE=6.00	-69.35 ms N=10;SD=21.67; SE=6.85	-54.04 ms N=15;SD=36.38; SE=6.14

ANOVA tests showed that only for the second (i.e., final) accent in the subject phrase there seems to be a significant difference between having two or four unstressed syllables following the accent ($F(1, 51)=7.823$, $p=0.007$), that is, peaks are aligned substantially later when four unstressed syllables follow the accented syllable than when two syllables intervene between the accented syllables. In fact, in the former case peaks are reached on the posttonic syllable, whereas in the latter case they are reached slightly before the offset of the accented syllable.

To sum, the main results of our study of F0 valley and peak alignment in broad focus declaratives in LS are the following: (a) accentual F0 valleys are aligned before the onset of the stressed syllable, except in final position in the utterance, that is, when the accent is carried by the second word in the object in our corpus, where F0 valleys are aligned within the accented syllable; (b) accentual F0 peaks are aligned before the offset of the accented syllable, and an earlier alignment is observed in peaks in the object phrase (i.e., both accents in the object phrase). At the end of the subject phrase, however, peaks display later alignment; (c) the number of unstressed syllables intervening between accents seems to affect F0 valley and peak alignment for certain positions. For non-object positions, F0 valleys align earlier as more unstressed syllables intervene between accents, and for the final position in the subject, F0 peaks align later as more unstressed syllables intervene between accents.

In the next section we compare the results obtained for LS with those of MS, and we discuss the phonological treatment of accentual tones in LS.

6. Comparison with MS and discussion

In the first place, Face (2002) presents results for the alignment of F0 valleys and peaks in broad focus declaratives in MS per position. However, in the sentences he bases his analysis on there are only three positions rather than five as in our study. This is because, as already mentioned in section 4, the sentences in Face's cor-

pus have a different form from the ones in our study. The sentences contain two or three content words, where the first word is always a verb and is followed by one or two words in object position. However, in sentences with two words in an object the first word was identical to the single word in object position in the other sentences. The second word in the object phrase was not considered. Thus, there were instances of the same word occurring in medial and final position (i.e., in sentences with three content words and sentences with two content words, respectively). The verb was always considered as the word in initial position. The sentences contained from zero to five unstressed syllables intervening between the target syllables, in order to check the effect of the distance between accents in tone alignment. The results obtained by Face for accentual F0 valley and peak alignment are provided in Table 11, for initial, medial and final position, respectively (no values for standard deviation are provided). In order to compare these results with the ones obtained for LS, we repeat in Table 12 the values for the location of F0 valleys and peaks by position in LS presented in Tables 5-6 above. The initial position in the MS data could correspond in our corpus to either the first position in the subject (i.e., the first accent in the sentence) or the verb itself. The medial position in Face's data corresponds to the first word in the object phrase in our corpus, and the final position in MS corresponds to the second word in the object phrase in our corpus:

Table 11. Location of F0 valleys and peaks in broad focus declaratives in MS.

Position	Location of F0 Valley	Location of F0 Peak
Initial	-4 ms (N=713; SE=0.6)	+60 ms (N=607; SE=2.5)
Medial	+16 ms (N=317; SE=2.1)	+52 ms (N=290; SE=3.5)
Final	+13 ms (N=233; SE=12.5)	-60 ms (N=224; SE=5.1)

Table 12. Location of F0 Valleys and Peaks by Position in LS.

Position	Location of F0 Valley	Location of F0 Peak
First Word in Subject	-19.17 ms (N=53; SD=24.66; SE=3.38)	-13.51 ms (N=43; SD=41.02; SE=6.25)
Second Word in Subject	-12.00 ms (N=45; SD=31.37; SE=4.67)	+11.56 ms (N=53; SD=52.87; SE=7.26)
Verb	-16.12 ms (N=49; SD=25.46; SE=3.63)	-16.63 ms (N=52; SD=47.55; SE=6.59)
First Word in Object	-4.73 ms (N=50; SD=23.84; SE=3.37)	-61.03 ms (N=52; SD=39.61; SE=5.49)
Second Word in Object	+5.22 ms (N=34; SD=30.78; SE=5.28)	-61.80 ms (N=38; SD=32.01; SE=5.19)

It is clear from the comparison of the average values in Tables 11 and 12 that valleys and peaks are aligned earlier in LS than in MS. Only for the second word in object position we find similarities in alignment for valleys and peaks (remember that we compare it with the Final position of Table 11). This is the final accent in the utterance, i.e., the nuclear position. For an illustrative comparison, we repeat below as Figure 9 the F0 contour presented in section 3 as an example of a typical contour for a neutral or broad focus declarative in MS (Figure 5), and compare it with Figure 10, corresponding to the same sentence pronounced by Speaker 2 of LS.

Let us turn now to a discussion of the autosegmental label that would correspond most appropriately to the type of pitch accent encountered in LS. First, it is

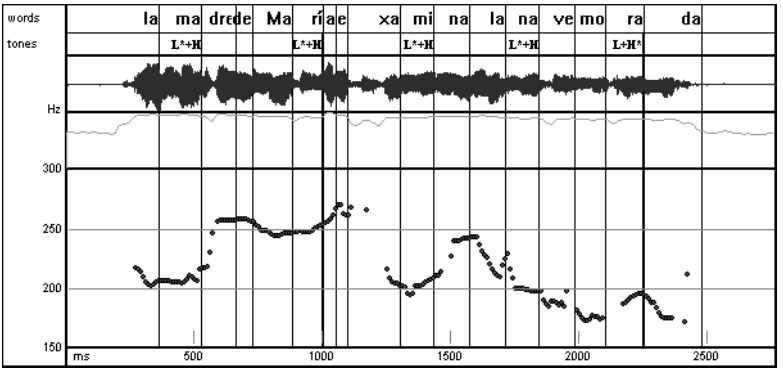


Figure 9. La madre de María examina la nave morada.
'María's mother examines the purple boat'.

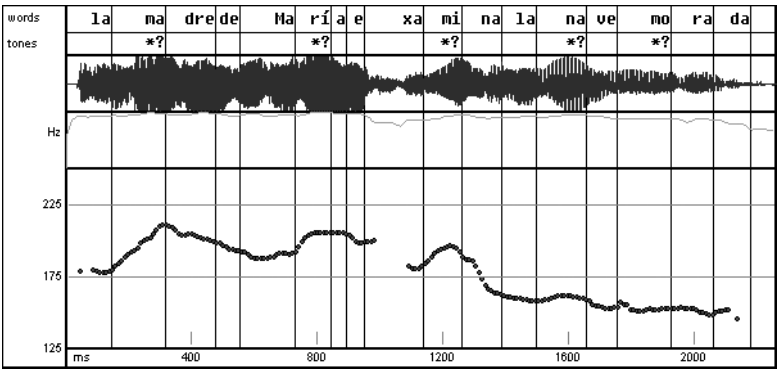


Figure 10. La madre de María examina la nave morada.
'María's mother examines the purple boat'.

clear that native speakers of Lekeitio Basque do not use the pitch accent in NBB (i.e., H*+L) when speaking Spanish. In all cases, the intonational contour in the accented syllable is characterized by a local rise in pitch, and although the peak is reached on the accented syllable on average (except for final accents in the subject), the pitch does not fall abruptly by the end of the accented syllable as in NBB (cf. Figures 1-4). When there is a fall in pitch after the peak is reached in the accented syllable, it is not a steep fall that starts before the vowel onset in the accented syllable and ends at the end of the accented syllable. Rather, the fall starts in the second half of the vowel in the lexically accented syllable at the earliest, oftentimes starting at the end of the vowel, and the fall may end either at the end of the posttonic syllable or at the end of the first segment in the following word. Figures 6-7 illustrate this kind of falls. Thus, it seems clear that H*+L is not the pitch accent that is involved in the Spanish variety spoken by NBB speakers, as this pitch accent is characterized by a local peak with an immediate fall in the accented syllable which ends on the posttonic syllable. Rather, the pitch accent must be either H* or one of the two rising accents, L*+H or L+H* (L* and H+L* are also straightforwardly eliminated).

Even in the object phrase, where a peak and a fall are found in the accented syllable almost categorically, there are arguments for rejecting H*+L as a possible pitch accent. First, if H* or L+H accents are the only possibilities in the verb (as in the subject phrase), an interpolation between the two H tones would be expected, and we do not see that. Moreover, in one of the two words in the corpus with antepenultimate accent, i.e., *número* ('number'), the valley or end of the fall is not reached until the end of the last syllable in the word, that is, two syllables after the accented syllable. This precludes the postulation of a H*+L pitch accent, if such an accent is meant to indicate a contour with a relatively early peak on the accented syllable with an immediate fall starting on the accented syllable itself, reaching the bottom within the next syllable. Figures 6-7 illustrate this pattern, for the sentence *El hermano de Manolo le daba el número de vuelo* ('Manolo's brother gave him/her the flight number').[14]

In fact, the end of the fall is particularly revealing for identifying the type of accent involved in LS. If H*+L, L* and H+L* are eliminated, H* and L*+H or L+H* remain as options. It must be pointed out against H* that in Figures 6-8 and Figure 10 the valleys between peaks seem rather deep for them to be an effect of «sagging» transitions between H* accents. And of the rising accents, if we concentrate on all positions except the final accent in the subject phrase, it also seems clear that L*+H can be easily rejected as well, as the peak is reached in the accented syllable in all occasions. Clearly, this type of alignment is very different from the one shown by L*+H accents in MS, where the peak is almost never reached on the tonic syllable in prefinal position (cf. Figures 5 and 9 and all the contours in Sosa

14. There is another proparoxytonic word in the corpus, *Málaga*, but this word occurs in final position in the utterance, where pitch level is lowest, and in many occasions creaky voice occurred in final words. This is why we did not consider it to illustrate this issue, and used *número*, which is not final in the object phrase and in the utterance.

1999, Hualde 2002, Beckman, Díaz-Campos, McGory and Morgan 2002 and Face 2002, among others). As already pointed out in the previous section, the means obtained for F0 peak location should not be taken literally to mean that no peaks are reached after the offset of the accented syllable in LS. Indeed, as shown in Figure 8, there are cases in which peaks may be found after the offset of the accented syllable and before the end of the onset consonant of the posttonic syllable, especially in accents in the first word in the subject and the verb (17.29 % of the cases). However, the mean values clearly show that peaks are aligned before the offset of the accented syllable in LS. If we guide our analysis by trusting mean values, L+H* would seem to be the type of label in the autosegmental-metrical framework that would correspond most closely to the type of pitch accent found in LS (cf. Pierrehumbert 1980, Beckman and Pierrehumbert 1986, Beckman and Ayers 1994, Ladd 1996, among others, and references therein).

A common test that scholars turn to in order to determine which of two tones associated locally to an accented syllable is the leading or the trailing tone is variance of alignment with respect to the number of intervening unstressed syllables between accents. That is, if one of the tonal targets is more loosely aligned with respect to one of the edges of the accented syllable, that tone is taken to be not the starred tone but the leading or trailing tone (cf. the discussion in Arvaniti, Ladd and Mennen 1998, Ladd and Schepman 2003, among others, and references therein[15]). Although the low number of tokens prevent us from making any strong claims supported by statistical significance, from the data presented in Tables 8-9 it seems apparent that F0 valleys in all positions except in final position in the utterance tend to align earlier (further to the left from the onset of the accented syllable) as the number of intervening syllables between accented syllables increase. Thus, the results in Table 8 show that there is a difference of 16.22 ms in F0 valley alignment between the cases in which two syllables precede the accented syllable and the cases in which four syllables do so (-6.95 ms and -23.17 ms on average, respectively). For accents in final position in the utterance (i.e., in the second word in the object), no significant differences were obtained, although there is a difference of 12.99 ms between cases with two unstressed syllables and four unstressed syllables preceding the accented syllable.

For peaks, however, no trend was found, leaving out for the discussion for now final accents in the subject phrase (cf. Tables 9-10). Although peaks seemed to align later when the number of following unstressed syllables increased, there were contradictory patterns in different positions, even within the same position. Thus, the variance of the start of rises with respect to the number of unstressed syllables between accented syllables, opposed to the stability that H targets show regardless of number of syllables intervening between accents confirms in fact our preliminary analysis that the accent is L+H* rather than L*+H, as more variance in alignment is a cue of leading or trailing tones.

15. But see Arvaniti, Ladd and Mennen (2000) for a discussion of difficulties with this test for Greek prenuclear accents.

In MS the situation is different, as reported by Face (2002). Although no results from ANOVA calculations are provided, it is clear from the data presented by Face that in MS the differences in F0 valley alignment depending on the number of intervening unstressed syllables are smaller than the differences in F0 peak alignment depending on the number of intervening unstressed syllables. These differences are presented in Tables 13 and 14, respectively. Whereas the difference between the average locations of F0 valleys is 23 ms (from +15 ms in cases of two syllables preceding the accented syllable to -8 ms in cases of five syllables preceding the accented syllable), the difference between the average locations of F0 peaks when two and four unstressed syllables follow the accented syllable is 48 ms (from +61 ms in cases of two syllables following the accented syllable to +109 ms in cases of five syllables preceding the accented syllable). Thus, Face concludes that this evidence supports the claim that the L target is more fixedly aligned with the accented syllable than the H target, and hence that a L*+H bitonal pitch accent is the most appropriate label for the pitch accent in nonfinal positions in MS.[16]

However, turning to peak location in accents in final position in the subject phrase, the mean values obtained differ significantly depending on whether two or four unstressed syllables follow the accented syllable (cf. Table 10 above). When two

Table 13. Location of F0 valley by the number of unstressed syllables preceding the accented syllable.

Preceding Unstressed Syllables	Location of F0 Valley in Relation to the Beginning of the Stressed Syllable
2	+15 ms (N=92; SE=3.4)
3	+8 ms (N=94; SE=3.2)
4	-6 ms (N=103; SE=3.0)
5	-8 ms (N=103; SE=3.0)

Table 14. Location of F0 peaks by the number of unstressed syllables following the accented syllable.

Following Unstressed Syllables	Location of F0 Peak in Relation to the End of the Stressed Syllable
2	+61 ms (N=112; SE=4.6)
3	+86 ms (N=97; SE=5.0)
4	+94 ms (N=97; SE=5.0)
5	+109 ms (N=81; SE=5.4)

16. For a more exact comparison with our data, only cases with two, three or four unstressed syllables intervening between accents should be considered, but including the case of five intervening syllables serves to illustrate in a clearer way the exponential tendency of peaks to align later as the number of following unstressed syllables increase.

syllables intervene between accents, peaks align an average of 2.12 ms before the offset of the accented syllable, and when four unstressed syllables intervene, an average of 38.20 ms after the offset of the accented syllable, i.e., in the posttonic syllable. Thus, accents in the subject phrase show the latest alignment in LS. This poses a problem for claiming L+H* as the type of pitch accent in LS. However, the alternative of positing L*+H for this position seems inappropriate. First, the distance from the offset of the accented syllable when four unstressed syllables follow the accented syllable is substantially shorter in LS than in MS (+38.20 ms vs. +94 ms, respectively). Second, the type of contour observed in final position in the subject in LS is different from the one in prenuclear accents in MS. Figure 11-12 show F0 contours for sentence (10a), *La boliviana de Badalona rememoraba la mermelada de Magdalena* ('The Bolivian from Badalona remembered Magdalena's marmalade'), uttered by a speaker of LS and a speaker of MS, respectively.[17] In Figure 11 the rise in the accented syllable for the final word in the subject phrase (*Badalona*) looks different from the one in the final word in the subject phrase in Figure 12. In Figure 11, the main part of the rise takes place in the accented syllable, *lo*, although the peak is reached on the posttonic, whereas in the MS contour in Figure 12 the rise is not as steep during the accented syllable. In fact, the curve in Figure 11 looks convex, and the curve in Figure 12 looks concave.

One possibility is that the late location of peaks in final position in the subject phrase is due to a kind of boundary tone aligned with the right edge of subjects, or more generally with the right edge of syntactic maximal projections, even in broad focus declaratives. At least for MS this seems to be the case, as the high con-

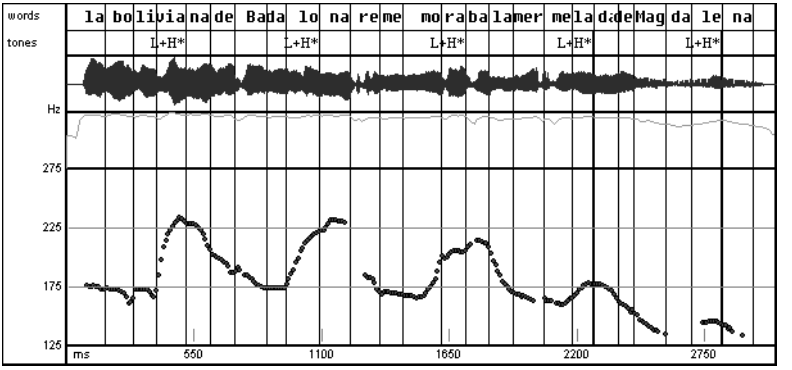


Figure 11. La boliviana de Badalona rememoraba la mermelada de Magdalena. 'The Bolivian from Badalona remembered Magdalena's marmalade'.

17. The MS contour is extracted from the corpus in Elordieta, Frota, Prieto and Vigário (in press). The LS contour corresponds to Speaker 4. We chose this speaker because she is the one with latest peaks, and thus the comparison with MS would be fairer.

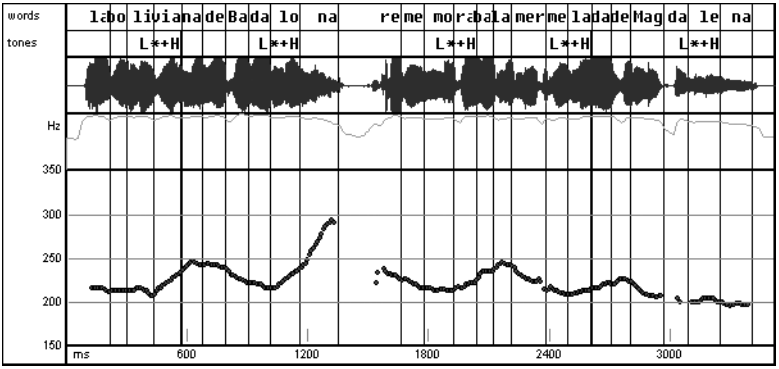


Figure 12. La boliviana de Badalona rememoraba la mermelada de Magdalena. 'The Bolivian from Badalona remembered Magdalena's marmalade'.

tinuation rise at the end of the subject shows (cf. also Elordieta, Frota, Prieto and Vigário in press). For LS this continuation rise is not so apparent, although we found such cases in our data. At this point, we cannot conclude whether this late alignment of peaks occurs at the end of all nonfinal syntactic phrases, in the absence of additional data that might reveal this. Thus, the issue has to be left open for further work.

The last point to discuss is that the earliest peaks are found for both accents in the object phrase (-61.03 ms for the first accent and -61.80 ms for the second). In MS earlier peak alignment is found in nuclear position, i.e., in the last accent in the utterance, and in fact the different pattern has been argued to arise from a L+H* accent in final position versus L*+H found in prefinal positions (Face 2002). However, if L+H* are involved in all positions in LS, how can the difference with respect to accents in the object phrase be accounted for? Pressure from the final L% boundary tone of the utterance could be argued for the second accent in the object, but not for the first word. So are we in the presence of a prenuclear/nuclear asymmetry but in terms of syntactic phrases rather than content words or accents? This would certainly be a novel feature that LS would have. Still, how would we account in terms of different pitch accent labels for such an asymmetry, if we have concluded that L+H* is involved in non-object positions as well? Notice that we cannot conclude that the difference is phonetic either, as it is not a gradient but a regular and systematic difference which hints at a categorical difference. This is another issue that has to await further research, a study with more data than the one in the present preliminary study.

7. Summary and conclusion

In this paper we have presented a description and an analysis of the basic intonational features of neutral declaratives in the variety of Spanish spoken by native

speakers of the NBB dialect of Lekeitio. The accented syllable presents a rise in pitch which starts at the end of the preceding syllable and the peak is usually reached within the limits of the accented syllable, except in the final accent in the subject phrase, where peaks display the latest alignment of all positions, especially when the number of unstressed syllables following the accent increases. In those cases, peaks are reached in the posttonic syllable. Accents in the object phrase display earlier peaks than accents in other positions, and the second accent in the object (i.e., the final accent in the utterance) presents the latest rises or F0 valleys. Thus, the final accent in the utterance has the latest valleys and the earliest peaks, and hence presents the fastest rises, which is not so difficult to imagine bearing in mind that the pitch range in that part of the utterance is very much reduced.

With the quantitative data in hand, we have concluded that the most appropriate autosegmental label for the pitch accent encountered in LS seems to be L+H*, contrasting with the usual L*+H claimed for Peninsular Spanish (Madrid Spanish) in most recent research (Face 2002, Beckman, Díaz-Campos, McGory and Morgan 2002, among others).

A couple of issues had to be left unconcluded. The first one was the later alignment of peaks in the final accent in the subject phrase. A possible relation or similarity could be established with the pitch rise found at the end of subjects in broad focus sentences uttered by monolingual speakers of Peninsular Spanish (cf. Elordieta, Frota, Prieto and Vigário in press), and could be analyzed as an effect of the interface between syntax and intonation which inserts an intonational boundary between the subject phrase and the verb phrase. This boundary is much more frequent at the right edge of topicalized phrases or phrases that convey known information, but apparently such a boundary can be observed in broad focus sentences as well. Whether this boundary is also found at the end of other syntactic phrases or whether it is as frequent in the variety of Spanish spoken by NBB speakers as in Peninsular Spanish must await further study. But in any case, what remains clear is that it is not a feature that is borrowed from NBB, which does not present such late peak alignments at the end of subjects or other phrases (cf. section 2).

The second issue that must await further research is the fact that in the two accents in the object phrase the peaks display a significantly earlier alignment than in other positions. This difference might point at a possible asymmetry among accents with regard to whether they occur in non-final or final phrases. This asymmetry is reminiscent of the non-nuclear/nuclear or prefinal/final distinction among accents that is found in Peninsular Spanish and other Romance languages such as Catalan, European Portuguese or Italian (cf. Face 2002, Beckman, Díaz-Campos, McGory and Morgan 2002, Prieto 2002, Frota 2000, 2002, D'Imperio 2000, 2001), but the asymmetry in these languages refers to accents in words rather than in phrases. In any case, this asymmetry does not arise in NBB and thus is not an imported feature into LS.

Further research with more data would be necessary to settle the two issues left open. Indeed, although we believe that the results of our study are rather solid and reflect the intonational properties of LS quite closely, the main conclusions have to be confirmed by a further study with more data, and new questions have

to be addressed, such as the intonational aspects of narrow focus, which we could not treat in this article.

Finally, the fact that bilingual speakers of NBB and Spanish such as the four speakers in our study do not use the H*+L pitch accent or the phrasal H- tone of NBB is worth discussing. All four subjects in the experiment are native speakers of the variety of NBB spoken in Lekeitio is worth discussing, who did not receive proper instruction in Spanish until the age of 4, when school instruction began. Given the early age of access to Spanish and that instruction in Basque was not officially permitted until high school education in the subjects' lives, the subjects in this experiment can be considered bilingual speakers with native proficiency in Lekeitio Basque and Spanish. However, in their daily lives the subjects use Lekeitio Basque more frequently than Spanish. In principle, one would think their dominant language is NBB and that thus they might be using the intonational features of their dominant language, including pitch-accent type, but the results of this preliminary study seem to indicate otherwise. The pitch rises in accented syllables that are observed in the Spanish sentences uttered by these speakers are not a feature of NBB.[18] However, the Spanish intonation of these speakers does not display the same characteristics of Standard Peninsular Spanish intonation either, or at least MS intonation, as discussed in more detail by Face (2002).[19] An interesting future research project would be to see whether these intonational aspects are part of the intonation of the Spanish variety spoken in the Basque Country in Northern Spain. That is, perhaps monolingual Spanish speakers of the Basque Country present the same intonational features as NBB speakers do in their Spanish, different from the features described for Peninsular Spanish in the literature. To my knowledge, the dialectal varieties taken in the descriptions and analyses of Peninsular Spanish are from Madrid and Barcelona most often. This future work would help settle some of the open questions posed by our preliminary study.

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18. Ito, Elordieta and Hualde (in press) find posttonic peaks in Lekeitio Basque when the word carrying the accent is given information and the following word is narrowly focalized, and so does Ito (2002) for Bermeo Basque, another NBB variety. No cases of posttonic peaks are found in broad focus declaratives in NBB, however.
19. Interestingly, a similar situation arises in Cuzco Spanish, according to O'Rourke (2003). In the speech of bilingual speakers of Quechua and Spanish, accentual peaks display an earlier alignment than in the speech of monolingual speakers of Spanish.

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