



The Role of Duration as a Correlate of Accent in Lekeitio Basque

Gorka Elordieta & José Ignacio Hualde

Department of Spanish Philology & Department of Spanish, Italian and Portuguese
University of the Basque Country & University of Illinois

fepelalg@vh.ehu.es & j-hualde@uiuc.edu

Abstract

Northern Bizkaian Basque shares important prosodic features with Tokyo Japanese, including the existence of a lexical distinction between accented and unaccented content words, the presence of phrase-initial rises and the consistent realization of accents as tonal falls. In this paper we investigate whether NB Basque is also like Japanese in not making use of syllable duration as a correlate of accent, as has been suggested in recent work. The analysis of experimental data from 6 native speakers of the variety spoken in the Bizkaian town of Lekeitio confirms the hypothesis that the presence of an accent on a given syllable is not manifested in an increase of its duration in this language. Other things being equal, accented and unaccented syllables do not have significantly different durations in neutral declarative sentences. More tentatively, the same results are also established for two other sentential conditions: under narrow focus and in postfocus position.

1. Introduction

The purpose of this paper is to examine the role of duration as an accentual correlate in the Basque dialect spoken in Lekeitio. In an important book, Beckman [1] concludes that a crucial difference between stress-accent languages such as English and non-stress-accent (=pitch-accent) languages such as Tokyo Japanese, is that in stress-accent languages prominence is conveyed by a number of correlates, including, besides pitch, duration and intensity. In non-stress accent languages, such as Japanese, on the other hand, the only correlate of accent is pitch. In particular, duration is not used as an accentual correlate in Tokyo Japanese. However, in Japanese segmental length is a phonologically contrastive feature, which serves to distinguish single from geminate consonants and short from long vowels. This may lead us to suspect that perhaps the reason why Japanese does not make use of duration to signal the presence of syllables with prosodic prominence is the avoidance of phonetic neutralizations regarding durational features. It would thus be interesting to test Beckman's typological hypothesis against data from a language with similar accentual features as Japanese, but without phonologically contrastive length. Some western Basque dialects, such as the one spoken in Lekeitio, appear to present precisely the combination of features that we need to test the hypothesis. These dialects, which do not have either a single/geminate consonant contrast or a short/long vowel contrast, share a number of prosodic features with Japanese, including the following: (a) lexically some words may be either unaccented (the larger group) or accented, (b) accents are realized as a fall in pitch on the

posttonic (H*L), and (c) there is a tonal rise at the beginning of phrases, giving rise to high-pitch stretches extending from the second syllable of the phrase to the accented syllable [2], [3], [4], [5]. In [6] durational measurements of accented and unaccented syllables are presented for two Basque speakers. Although the authors conclude that duration is not used as a correlate of accent, the results are not completely conclusive for one of the two subjects. For this reason, in this paper we undertake a more detailed investigation with a greater number of subjects.

2. Methodology

The subjects for this study were 6 native speakers of the Basque dialect of Lekeitio, 5 female and 1 male, between 26 and 61 years of age. All speakers are bilingual in Spanish. The recording took place in Lekeitio, in the home environment of the speakers and under quiet conditions. We used a Marantz PMD tape recorder with an ATR20 unidirectional microphone.

To elicit the data we employed a set of sentences written in Spanish on index cards (one sentence per card). There was a total of 55 cards, of which 50 constituted the test materials for the experiments reported here. Subjects were asked to translate the Spanish sentences orally into Lekeitio Basque, a task that they found easy to perform. The reason for using this translation procedure is that Lekeitio Basque is a local variety which is not normally used in writing. Standard Basque, on the other hand, lacks the accentual contrasts which are the focus of this investigation and would have introduced a clear risk of interdialectal interference. Writing the stimuli in Spanish was clearly the best option. Each sentence was repeated three times. Cards were presented in an arbitrary order and were reshuffled between repetitions. The interaction between subjects and researcher before and during the recording was all in Lekeitio Basque. The data were transferred to a PC and analyzed with PitchWorks by Sciconrd.

The 50 sentences used in this study form 25 near-minimal or minimal pairs in Lekeitio Basque, where the syllable to be measured bears an accent in one member of the pair and does not in the other, but is segmentally identical in both sentences. Thus, although a variety of syllables were used, the syllables in the two groups to be compared (accented vs. unaccented) are segmentally matched.

Some sentences are neutral declarative sentences and some others are intended to bear narrow contradictory focus on a specific item. By narrow contradictory or correctional focus we mean contexts in which a speaker utters a sentence correcting one of the words or syntactic phrases that her interlocutor has stated incorrectly. For instance:

Speaker A: - Mikélek andráko andixà artun dau.
 ‘Mikel took the big doll’

Speaker B: - Es, andráko TXIKIÑÀ artun dau.
 ‘No, he took the BIG doll’

All sentences are included in the appendix in section 5. Measured syllables are bolded; syllables with lexical accent are marked with an acute accent and syllables bearing a ‘derived’ accent, because of their position in the sentence at the end of certain phrases, are indicated with a grave accent. Narrow focus is indicated by capitalization. Odd-numbered sentences form the unaccented set (the syllable that is measured does not bear an accent) and even sentences constitute the accented set.

3. Results

We will present the results for neutral declarative sentences and for sentences with narrow, contradictory focus separately.

3.1. Neutral sentences

The materials for this comparison are the first 30 sentences in the list in the appendix. For each of the 6 subjects we obtained 90 tokens (30 x 3 repetitions), which form 45 pairs depending on whether the measured syllable bears an accent or does not. Duration measurements were performed from soundwaves and spectrograms, using both visual and auditory information. An example is shown in figures 1 and 2, corresponding to sentences 17-18 respectively, where measured syllables are capitalized. In several cases, it was impossible to obtain reliable measurements. In such cases we eliminated both that token and the corresponding matching token. For instance, if in the second repetition of sentence 11, which contains the word *lagunen* ‘of the friend’, the syllable **gu** could not be reliably measured, we eliminated both that token and also the second repetition of sentence 12, containing *lagúnen* ‘of the friends’, so that the accented and the unaccented groups would always be balanced for each subject.

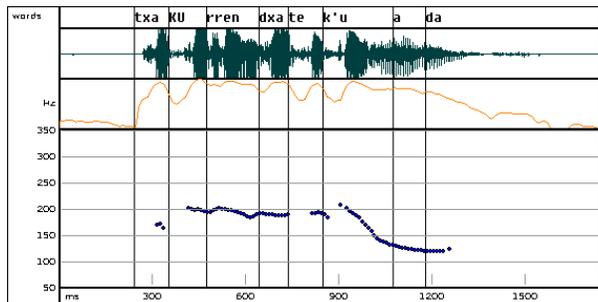


Figure 1: *txakurren dxatekúa da* ‘it’s the dog’s (sg.) food’

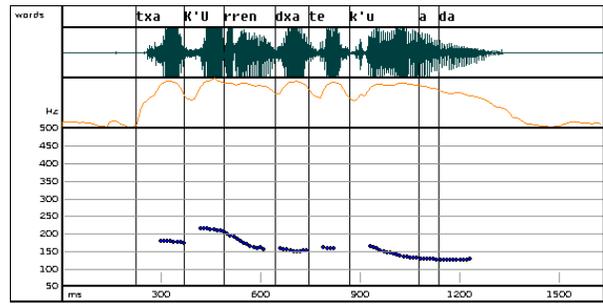


Figure 2: *txakúrren dxatekúa da* ‘it’s the dogs’ (pl.) food’

Table I shows means and standard deviations (in ms.) of unaccented syllables (extracted from odd-numbered sentences) and corresponding accented syllables (from even-numbered sentences).

Table I: Neutral sentences. Durations in ms. (sentences 1-30)

Sub-ject	Unaccented Mean(StDev)	N	Accented Mean(StDe)	N	t-test
MA	140.22(35.8)	43	141.48(32.2)	43	p=.88
AE	116.39(20.57)	44	120.1(19.44)	44	p=.38
EdE	118.88(21.14)	41	121.6(20.72)	41	p=.55
EuE	127.78(27.44)	44	120.71(20.3)	44	p=.17
IE	121.24(26.24)	44	117.87(25.1)	44	p=.54
UC	126.16(23.55)	44	121.46(21.35)	44	p=.32

The last column shows the results of a two-tailed t-test comparing the duration of unaccented and accented syllables for each subject individually. In no case was this difference statistically significant.

3.2. Narrow focus sentences: target word under narrow focus

In many languages narrow focus causes lengthening of accented syllables (cf. [7], for Spanish). We hypothesized that in words bearing narrow, contradictory focus a durational difference between accented and unaccented syllables may emerge in Lekeitio Basque, even if duration is not used as an accentual correlate in neutral declarative sentences. To test this hypothesis we included sentences 31-40 in the list in the appendix. In these sentences the target word is intended to bear contradictory focus, indicated by capitalization. Again, the syllable whose duration is measured is unaccented in odd-numbered sentences and accented in even-numbered sentences.

The results are shown in Table II. Given the small number of tokens, t-test results are to be interpreted with caution. The difference between the means is significant for one speaker out of 6 (AE). We tentatively conclude that duration is not employed as a correlate of accent in Lekeitio Basque, even under narrow focus. On the other hand, for all speakers, durations of both accented and unaccented syllables are greater than in neutral sentences (Table I). Thus, it appears that in Lekeitio Basque the effect of narrow contradictory focus is to increase the duration of the whole focalized word, not only of the accented syllable. Another

effect is the increased absolute F0 value of the peak, giving rise to blocking of downstep and intermediate phrase boundary insertion (cf. [4]). As an illustration, see figures 3-4, corresponding to sentences 33-34, respectively.

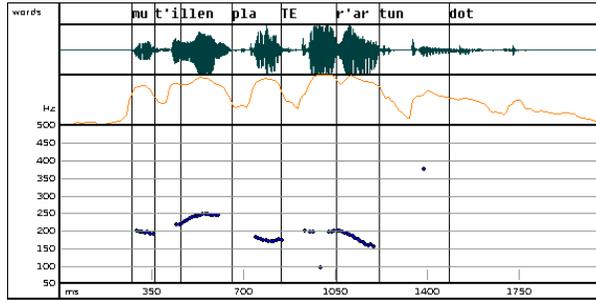


Figure 3: *mutillen platerà artun dot* ‘I took the boys’ plate’

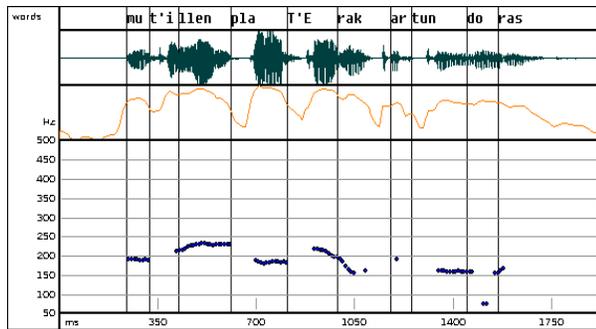


Figure 4: *mutillen platerak artun doras* ‘I took the boys’ plates’

Table II: Duration under narrow focus (sentences 31-40)

Sub -ject	Unaccented Mean(StDev)	N	Accented Mean(StDev)	N	t-test
MA	164.57(30.64)	15	170.88(28.83)	15	p = .5
AE	138.18(11.7)	15	153.48(15.18)	15	p < .005
EdE	173.34(27.32)	15	170.48(24)	15	p = .76
EuE	167.12(22.78)	15	159.68(14.43)	15	p = .29
IE	146.03(22.45)	15	139.81(19.42)	15	p = .44
UC	182.42(28.38)	15	191.51(33.17)	15	p = .38

3.3. Target word in post-focus position

After a word bearing narrow focus, pitch range is greatly reduced, an effect that has also been observed in other languages. See for instance figure 5, corresponding to sentence 48, where the (correctly) focalized word *PERTZÓNEN* is followed by the accented word *bidxótzak*. We hypothesized that the flattening of the pitch in postfocal position might lead speakers to use other acoustic cues to signal the presence of an accent in this environment, especially given the fact that important lexical contrasts (including the distinction between singular and plural in several morphological cases) rely on the presence of accents

on particular syllables. We thus wanted to test the hypothesis that as the reliability of the main accentual cue (pitch in our case) becomes compromised, other acoustic features such as duration may be recruited to express lexical accentual contrasts.

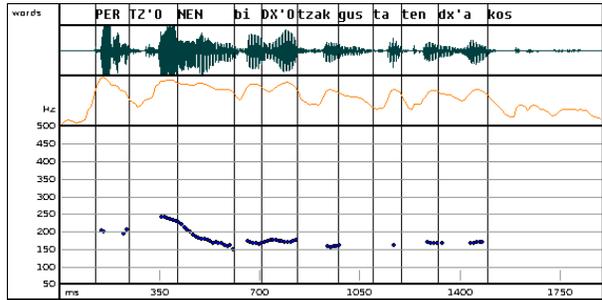


Figure 5: *PERTZÓNEN bidxótzak gustaten dxákos* ‘he likes people’s hearts’

We tested this hypothesis with sentences 41-50 in the appendix. That is, we compared the relative duration of accented syllables after focus, such as *dxó* in Figure 5, with that of unaccented syllables, such as *dxo* in Figure 6 (corresponding to sentence 47). The results are presented in Table III.

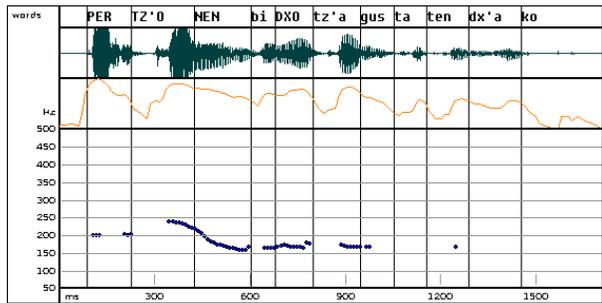


Figure 6: *PERTZÓNEN bidxotzà gustaten dxáko* ‘he likes people’s heart’

Table III: Target word in postfocus position (sentences 41-50)

Sub -ject	Unaccented Mean(StDe)	N	Accented Mean(StDev)	N	t-test
MA	136.9(18.92)	15	137.1(24.76)	15	.p=.98
AE	120.16(15.85)	15	124.95(16.98)	15	.p=.43
EdE	130.16(22)	15	133.74(19.38)	15	.p=.64
EuE	138.32(25.89)	15	133.39(26)	15	p=.61
IE	120.95(25.26)	15	112.18(21.64)	15	.p=.31
UC	137.56(22.11)	15	134.44(30.72)	15	.p=.75

Again, although the small number of tokens forces us to interpret these data with some precaution, we must conclude that, contrary to our hypothesis, duration does not play a role in Lekeitio Basque as a correlate of accent, even in postfocal position, where pitch contours are very reduced in range.

4. Conclusion

The results of this study confirm the hypothesis that duration is not used as a correlate of accentual prominence in Northern Bizkaian Basque. Accented syllables are not significantly longer than unaccented syllables with the same segmental make-up. We have obtained these results not only in neutral declarative sentences, confirming the conclusions of [6], but also in two other environments where lengthening of accented syllables would be expected: under narrow correctional focus and following a word with narrow correctional focus. These results support the typological distinction between stress-accent and non-stress-accent proposed by Beckman [1]. Northern Bizkaian Basque (including the dialect of Bermeo) is a non-stress-accent language. Like in Japanese, duration appears not to be used to convey accentual prominence in Northern Bizkaian Basque, in spite of the fact that durational contrasts do not play any role in establishing phonological oppositions in this language and thus there is no pressure to avoid phonetic neutralizations.

A matter that we must leave for further research is the extent to which accentual contrasts are perceptually preserved in postfocal position, where the role of pitch variations is necessarily very reduced given the reduction in pitch range.

5. Appendix: Test sentences

Syllables for which durational measurements were taken are bolded.

A. Neutral declarative sentences

1. **lagunà** ikusi dot ‘I saw the friend’
2. **lagúnak** ikusi doras ‘I saw the friends’
3. **potiñà** erosi dau ‘he bought the boat’
4. **potiñak** erosi ditzus ‘he bought the boats’
5. **gixonà** etorri da ‘the man arrived’
6. **gixonak** etorri diras ‘the men arrived’
7. **papelà** biar dot ‘I need the paper’
8. **papelak** biar doras ‘I need the papers’
9. **mutillà** dxun da ‘the boy left’
10. **mutillak** dxun diras ‘the boys left’
11. **lagunen** amúma ikusi dot ‘I saw the friend’s (sg) grandmother’
12. **lagúnen** amúma ikusi dot ‘I saw the friends’ (pl) grandmother’
13. **Fidelen** liburúa ekarri dot ‘I brought Fidel’s book’
14. **Fidélan** liburúa ekarri dot ‘I brought Fidela’s book’
15. **gixonen** prákak ikusi doras ‘I saw the man’s pants’
16. **gixonen** prákak ikusi doras ‘I saw the men’s pants’
17. **txakurren** dxatekúa da ‘it’s the dog’s (sg) food’
18. **txakúrreren** dxatekúa da ‘it’s the dogs’ (pl) food’
19. **txarriádxen** lekúa da ‘it’s the pig’s (sg) place’
20. **txarriádxen** lekúa da ‘it’s the pigs’ (pl) place’
21. Amáien **txakurrà** ikusi dot ‘I saw Amaia’s dog’
22. Amáien **txakúrrak** ikusi doras ‘I saw Amaia’s dogs’
23. mutíllen **platerà** artun dot ‘I took the boys’ plate’
24. mutíllen **platerak** artun doras ‘I took the boys’ plates’
25. Mirénen **lagunà** ikusi dot ‘I saw Miren’s friend’
26. Mirénen **lagúnak** ikusi doras ‘I saw Miren’s friends’

27. pertzónen **bidxotzà** gustaten dxáko ‘he likes people’s heart’
28. pertzónen **bidxótzak** gustaten dxákos ‘he likes people’s hearts’
29. andráko **txikiñà** artun dau ‘I took the small doll’
30. andráko **txikiñak** artun ditzus ‘I took the small dolls’

B. Target word under narrow focus (same glosses as 21-30)

31. Amáien **TXAKURRÀ** ikusi dot
32. Amáien **TXAKÚRRAK** ikusi doras
33. mutíllen **PLATERÀ** artun dot
34. mutíllen **PLATÉRAK** artun doras
35. Mirénen **LAGUNÀ** ikusi dot
36. Mirénen **LAGÚNAK** ikusi doras
37. pertzónen **BIDXOTZÀ** gustaten dxáko
38. pertzónen **BIDXÓTZAK** gustaten dxákos
39. andráko **TXIKIÑÀ** artun dau
40. andráko **TXIKIÑAK** artun ditzus

C. Target word in postfocus position (same glosses as 21-30)

41. **AMÁIEN** txakurrà ikusi dot
42. **AMÁIEN** txakúrrak ikusi doras
43. **MUTÍLLEN** platerà artun dot
44. **MUTÍLLEN** platerak artun doras
45. **MIRÉNEN** lagunà ikusi dot
46. **MIRÉNEN** lagúnak ikusi doras
47. **PERTZÓNEN** bidxotzà gustaten dxáko
48. **PERTZÓNEN** bidxótzak gustaten dxákos
49. **ANDRÁKO** txikiñà artun dau
50. **ANDRÁKO** txikiñak artun ditzus

6. References

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