THE EMERGENT PROSODIC SYSTEM(S) OF BILBAO-AREA STANDARD BASQUE

by

Airica Thomas

A Thesis
Submitted in Partial Fulfillment of the Requirements for the
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AN ABSTRACT ON THE THESIS OF

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The aim of this study is to contribute to the larger body of research concerned with the prosodic systems of the Basque dialects currently spoken in Southern Basque country. More specifically, the author focuses on Standard Basque from the Bilbao area and its potential prosodic system(s). Standard Basque was phonologically codified by the Basque Academy, but there was no prosodic system provided by the Basque Academy. Although initial investigations have been undertaken by Hualde, more current research has shown that the standard spoken outside of the classroom is different from that which is taught (Lantto, 2019; Rodríguez-Ordóñez, 2016). Given that prosody is rarely taught within the classroom, it would not be surprising for differences to be found. The most obvious difference between Standard Basque and some of the traditional dialects is that Standard has no word-level contrastive stress; functions such as singular/plural distinctions and case are marked by postpositions. What has been determined is that the prosodic system of Standard Basque, or Batua, patterns closely to that of Gipuzkoan Basque. However, as noted by Hualde & Elordieta (2014), there is little knowledge regarding the variation of the functioning of Standard Basque's acoustic correlates.

As stated by Elordieta & Hualde (2001), it is only after a comparison of the intonational characteristics of the currently spoken dialects has been conducted that a typological categorization of Basque prosodic systems can be made. As Standard Basque was not codified

with a prosodic system, it ultimately comes down to what individual speakers and speaker groups have done to account for this in their standard dialect productions. It cannot be presumed that the prosody of SB (Standard Basque) found in one region will exactly line up with prosody found in other regions; these too would need to be documented and analyzed as prosodic sub-systems.

One major gap in current research is the analysis of intonation at the phrasal level; Gaminde et al. (2011) look at acoustic correlates and their respective force, but only at the word level. While Hualde looks at intonation, the study uses Gipuzkoan Basque used as a substratum, which constricts the findings to that particular dialectal region. For this reason, the dialect of Batua spoken in the Bilbao area proves to be worth investigating. The local dialect of the area was long ago lost, such that Batua could be said to be the Bilbao dialect. The revitalization movement of the 1960s brought about a significant number of new speakers, who learned the standard variety in school. To add to this, Bilbao's presence as a major commercial hub has made it so that there is a vast number of regional vernaculars circulating throughout the area, all in contact with one another.

For this study, data was taken from 6 Basque-Spanish bilinguals whose primary dialect of Basque is the standard, that participated in two experimental tasks: eliciting words in isolation in one task and eliciting neutral declaratives and yes-no questions in the other. These tasks were a means of gathering raw data on the intonation of both word and phrasal level productions. Results supports the previous findings of Gaminde et al. (2015) as well as those of Aurrekoetxea et al. (2015), in terms of how stress is realized in Standard Basque when taking into account factors such as syllable weight and syllable count. What's more, findings also support the proposition of Hualde & Beristain (to appear) that inter-speaker variation will be heavily affected by the contact speakers have with other dialects of Basque.

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INTRODUCTION

1.1 Goal & Significance

The aim of this study is to contribute to the larger body of research concerned with the prosodic systems of the dialects currently spoken in the Basque country. More specifically, the author focuses on Standard Basque from the Bilbao area and its potential prosodic system(s).

The majority of the current body of research on Basque prosody has been focused on traditional dialects and their respective dialectal areas: Northern Bizkaian (Elordieta & Hualde 2006) and Western dialects (Elordieta 1998), including Lekeitio (Elordieta 2015, Elordieta & Hualde 2001, Elordieta & Hualde 2003), Bermeo (Elordieta et al. 2002), and Gernika (Hualde 1991, Rodríguez-Ordóñez & Gillig 2018, Rodríguez-Ordóñez 2019) with much less focus, if any, on Standard Basque (Gaminde et al. 2017, Gaminde et al. 2015, Aurrekoetxea et al. 2015, Hualde & Beristain to appear). The major prosodic systems of Basque dialects are pitch-accent and stress-accent, with many of the local dialects falling into the former category. While there are differences in terms of how accentual prominence displays on the surface level (Ito 2002), local Basque dialects with pitch-accent systems pattern as H*+L types, with fundamental frequency as the main, most forceful—and potentially, the only statistically significant—acoustic correlate (Elordieta & Hualde 2001, 2003).

The work done specifically on Standard Basque is much less robust due to the fact that it is almost entirely unlike the local dialects. Standard Basque—or Euskara Batua—is a stress-accent system, rather than a pitch-accent system, and as such does not signal lexical contrast by means of change in pitch. Aurrekoetxea et al. (2015) found that the three main factors that effect stress placement in Batua are as follows:

1) syllable weight
2) the number of syllables in the word
3) lexical stress

Gaminde et al's (2015) study on acoustic correlates of Standard Basque looks into the vowel quality of stressed syllables. They found that fundamental frequency, intensity and duration are all correlates, but they do not all carry the same force; i.e., there is a hierarchy wherein some correlates have more prominence, acting as larger indicators of stress. The ultimate conclusion drawn is that F0 is more prominent than intensity, which is in turn more prominent than duration. Thus, it could be that pitch-accent dialects also employ acoustic correlates beyond F0, but the difference in force makes other correlates minimally significant as the majority of interlocutor perception hinges on F0. The location of the vowel also plays a factor in pitch-accent systems: post-accent vowels have longer durations, but lower F0 and intensity as a byproduct of downstep[1]. As noted in their survey of all Basque dialects, Aurrekoetxea et al. (2015) note that in Standard Basque, accentual prominence typically only falls on the second syllable from the left. The unaccented 1st syllable always displays a preceding accent, where all other syllables bear post-accents, again the work of downstep.

Later studies looked into whether and how traditional dialects have maintained their accented/unaccented distinction at the word and sentence level. Rodríguez-Ordóñez & Gillig (2018), looked at Gernika Basque—a Northern Bizkaian Basque variety with a traditional pitch-accent system wherein words are primarily classified as accented or unaccented—and found that between lexical accent (where accentuation distinguishes between two different lexemes) and

[1] In the context of this thesis, downstep is used here to refer to a progressive lowering of peak F0.

grammatical accent (where accentuation distinguishes between singular/plural or between cases), the lexical accent is more vulnerable to loss at the sentential level. The degree of loss is dependent upon the speaker's social network and the dominant language therein. Following this thread, Rodríguez-Ordóñez (2019) then investigated to what extent the Accented/Unaccented distinction is being lost in Gernika Basque and whether or not duration is being used as a compensatory correlate. In the same vein as the 2018 study, it was found that speakers with more intense contact with Spanish are less likely to maintain the A/U distinction, and that loss is more likely to occur in lexical minimal pairs. Younger speakers exhibit more variation in how they maintain the lexical A/U distinction; duration isn't a correlate, but is employed by speakers who have lost the A/U distinction as a means of conveying the intended accentual prominence. Tying back to Elordieta & Hualde's (2006) article, the dominant language of the speaker plays a role in how tonal rises are reinterpreted as accentual prominence. This is further supported by Rodríguez-Ordóñez & Gillig (2018), who found that the dominant language of the speakers' social circle also plays a key role in retention; speakers that come from Spanish-speaking households and that are ingrained in Spanish-speaking social networks are more likely to lose the distinction.

The consequence of prolonged language and dialect contact is also covered by Hualde & Beristain (to appear), which specifically looks into the effects of local dialects on Standard Basque production and vice versa. Speakers who have maintained the A/U distinction in their local dialects don't produce said distinction when speaking in Standard Basque. As a result, Standard Basque likely has different regional rhythmic patterns, even if speakers are using the same rules for accent placement, which is a key factor to trying to typologize the prosodic system(s) of Standard Basque. Hualde (2014) puts this into practice by analyzing how local dialects and Standard Basque are merging in the spoken usage of the younger generation. Hualde uses Gipuzkoan Basque as a substratum for the standard, which did give valid results in regards to different types of phrases from declaratives to parentheticals, but those results could only be said to be descriptive of the prosody of the standard used in the Gipuzkoa area. As Hualde himself proposed, the existence of regional rhythmic patterns being produced under the same prosodic rules is likely.

Traditional studies of dialectology tend to characterize Basque as a group of dialects undivorceable from their respective territories. However, the current situation of Basque presents a more nuanced understanding of dialectal variation, especially after the emergence of *Euskara Batua*, or, 'Standard Basque'. The process of standardizing the Basque language was complete by 1968 and headed by the Basque Academy. Although Basque has been co-official with Spanish since 1979, Standard Basque did not see widespread usage until the 1982 Law of Normalization, which led to the implementation of Batua in educational settings, as a language of both study and instruction. Consequently, there was a rapid increase in the number of Basque-Spanish bilinguals, many of whom are considered to be 'new speakers', individuals who learn Basque by means other than that of family or community transmission (O'Rourke et al. 2015). Today, these speakers constitute the majority of the Basque speaking population within the Basque Autonomous Community (Instituto Vasco de Estadistica, 2016). These findings suggest that Batua lacks not only a prosodic system, but might also be missing key functions for an informal pragmatics system compatible with the other dialects of Basque. The issue then becomes a question of what speakers are doing to compensate for these missing features; borrowing from local dialects? Borrowing from dominant, unmarked Spanish? Or something else entirely? If we are to name Batua a dialect in its own right, then it must be more formally typologized with regards to prosody.

1.2 Research Questions

As stated by Elordieta et al. (2002), it is only after a comparison of the intonational characteristics of the currently spoken dialects has been conducted that r a typological categorization of Basque prosodic systems can be made. As Standard Basque was not codified with a prosodic system, it ultimately comes down to what individual speakers and speaker groups have done to compensate for this lack in their productions. It cannot be presumed that the prosody of SB found in one region will match the prosody found in other regions; these too would need to be documented and analyzed as dialectal variations.

For this reason, the Batua spoken in the Bilbao area proves to be worth investigating. The vernacular dialect of the area was long ago lost, such that Batua could be said to be the Bilbao dialect, given the number of new speakers (Lantto 2015). To add to this, Bilbao's presence as a major commercial hub has made it so that there is a vast number of regional vernaculars circulating throughout the area, all in contact with one another. Thus, the research goal of the present study is the following: to analyze the variation behind the prosodic system of Standard Basque, as it is spoken in the greater Bilbao area.

In order to achieve these goals, the present study is guided by the following questions:

- What are the acoustic correlates of accentual prominence in Bilbao Area Batua?
- What factors, if any, affect said correlates?

As previously mentioned, the linguistic makeup of Batua in Bilbao is unique for the area's lack of a traditional vernacular as well as the mixing of multiple vernaculars—and therefore multiple prosodic systems—of those who live in and move through the area. These goals were achieved through the means of three experimental tasks, one for single word elicitations and two for phrasal level intonations.

1.3 Organizational Structure

The remainder of this thesis will be broken up into four remaining chapters. Chapter 2 will cover the sociolinguistic background of the Basque Autonomous Community, including the status of Basque and its dialects, the contact between Basque and Spanish and the codification of the standard dialect. Chapter 3 will address Basque production and prosody, working through the prior research done on both the pitch-accent and stress-accent systems that have been identified. The chapter will close by once again highlighting research gaps that the experiments conducted herein will hopefully lessen. Chapters 4 will cover the experiments themselves, meant to provide quantitative data about the nature of intonation in Standard Basque at both the word and phrasal level. Discussions will be given and conclusions drawn in Chapter 5, focusing on major findings, remaining gaps and directions for future research.

CHAPTER 2

SOCIOLINGUISTIC BACKGROUND

2.1 INTRODUCTION

This chapter covers the sociolinguistic background of the Basque language within the Basque Autonomous Community (hereafter referred to as the BAC). The BAC is comprised of 7 provinces, divided within 3 administrative territories and spread across two nation states, as can be seen in the map shown in Figure 2.1 below:

Figure 2.1 The Basque Country (taken from Hualde & Zuazo 2007:144)

The provinces of Bizkaia, Araba and Gipuzkoa are part of the BAC, located in northern Spain.

The province of Navarre is part of the autonomous community of Navarre and the three "northern" territories (Lapurdi, Low Navarre and Zuberoa) are part of the Département des Pyrenées Altantiques in southwest France. The six primary dialects currently spoken in the Basque Country are Bizkaian, Gipuzkoan, Navarrense, French Lapurdian, Low Navarrense and Zuberoan. For the purposes of this study, we will focus solely on varieties spoken in Bizkaia and Gipuzkoa, where the majority of current Basque speakers reside.

2.2 The Current Status of the Basque language

Historically speaking, as a consequence of the geopolitical history of Spain and France, Basque as a language has been subordinated by Spanish and French, on top of being further divided into kingdoms within territories, leading to strongly defined dialects (Zuazo 1995, Hualde & Ortiz de Urbina 2003). There was no truly socially dominant dialect, as all of them were suborned by the Romance languages that were the languages of administration, education, and other formal domains. Though diglossic, Basque was largely confined to informal usage within the home and community. Standard Basque began as a means of standardizing orthography, but over the course of time became an oral dialect as it was implemented in the same public domains as Spanish and French. It is important to note that the major goal of standardized dialects is for them to be used for the maximum number of linguistic functions. In the case of Basque, every linguistic function not covered by local dialects was already covered by the dominant Romance language of the area. That Standard Basque shares functions with Spanish means that it also takes functions away from the local dialects (Hualde & Zuazo 2007).

The initial acceptance of Standard Basque was largely tied to moves to revitalize the language, in addition to a sense of nationalism and activism. It must be clearly stated, however, that this only holds true for some speakers (Urla et al. 2018). Just as there was those who felt strongly about the need for standardization as a means of sociopolitical force, there were those who held the same pride in identity without the want for any kind of standardization process, largely borne of concern as to what effects standardization would have on the older, more traditional dialects (Hualde & Zuazo 2007). Standard Basque is only officially—that is, legislatively—a standard in Biscay, Gipuzkoa, Araba and in the north of Navarre.

2.3 Revitalization & Standardization

Spanish and Basque have historically been diglossic with one another; before the establishment of the Basque Academy, local dialects were mainly used in informal contexts, with Spanish fulfilling all other linguistic functions and domains. The Basque Academy, Euskaltzaindia, is the institution that handled the standardization process, which itself spanned several decades, in numerous periods. The process of standardization can be mapped to Haugen's 1972 four-stage model of language acquisition, as cited by Hualde & Zuazo, the steps of which are as follows:

a) the selection of norm
b) the codification of form
c) the elaboration of function
d) acceptance by the community (Hualde & Zuazo 2007:145)

Prior to the foundation of the Basque Academy, the Basque language was still subordinated by both Spanish and French. The first period of standardization took place from 1918 until 1936. It must be emphasized that there was no truly socially dominant Basque dialect; the urban middle class's preferred mode of expression within the Basque Country was the dominant Romance language of the area. As such, the original aim of a standard dialect was to be used for written communication, with the implicit caveat that pronunciation would vary by region, but spelling and orthography would be uniform throughout.

However, even at this early stage, the very need for a single standardized orthography was not universally accepted. Philologists and many other academics believed that the Basque Academy's focus would be better served in focusing on the preservation of the local dialects. By the advent of the second stage (1945 - 1968), the situation had become such that the only manner of creating a valid and accepted written standard was to develop a modern variety that had strong ties to Classical Lapurdian, the dialect most used in classical Basque literature. The process can be framed within Haugen's (1972:109) three proposed procedures for structuring new standardized dialects of a language. The three methods are the comparative method, which applies principles of linguistic reconstruction in order to create a hypothetical ancestral tongue; the archaizing method wherein an actual 'classic' dialect is used, taken from older, more traditional writing; and the statistical method, which combines the dialectal forms with the widest usage. The academy employed the latter two methods, the archaizing and the statistical, drawing from Classical Lapurdian and using more widespread lexical forms to ensure as much mutual intelligibility as was feasible in an artificial process. It must once again be mentioned, however, that the elite class of the Basque Country did not speak Basque in most settings. Thus, even in its conception, Batua was not anyone's true mother tongue.

As far as the elaboration of function is concerned, Euskaltzaindia's goal was for the new standard to be used in the maximum number of linguistic functions as was possible, while simultaneously servings as a nation-building project (Urla, 2012). Unfortunately, in the case of Basque, all functions that were not assigned to local dialects were already occupied by Spanish; the argument thus became that the only way to save the Basque language in and of itself was to develop a standard—written and oral—that would be used for all linguistic functions. While ambitious, this goal was in reality a double-edged sword; Batua would share domains with Spanish and French, but many policy makers shared the fear that Standard Basque would jeopardize the status of the varieties already spoken.

Ultimately, the introduction of the new standard was successful because it coincided with a profound generational change; the rapid acceptance of the once reviled Batua is directly related to the strength of Basque nationalistic sentiments in the post-Franco era of the 1950s and 1960s. Per the new constitution in 1979, Basque became an official language of the BAC. Shortly thereafter, the Law of Normalization was passed in 1982, which implemented Batua as a language of study and instruction within formal educational settings. The gradual acceptance and social implementation of Batua made it possible for speakers to discuss any topic entirely in Basque; whereas with local dialects, there was an unavoidable reliance on Spanish when talking about the sciences or any subject-specific technical terminology. In some cases, the newly established standard was also able to help speakers overcome the obstacle of mutual unintelligibility between different regions.

In their 2015 thesis, Lantto posits that colloquial Basque spoken in the Greater Bilbao Area should be considered a bilingual variety in and of itself. Lantto observed that speakers code-switch from Basque to Spanish—the dominant, unmarked language—as a means of signaling that Basque will be maintained as the language of conversation. There is a clear difference in the distribution of linguistic power; the 'artificial' Batua is disfavored, for its perceived lack of authenticity, where Spanish reflects the surrounding sociocultural reality without condemnation. What this results in is a double standard: euskaldun zaharrak (the speakers of local dialects) that code-switch remain authentic, the code-switching considered a natural process in informal speech. However, the code-switching of L2 speakers—euskaldunberri, lit. 'new speakers'—is perceived as a sign of linguistic incompetence. New speakers are unable to master the registers and pragmatics needed in order to function in a Basque-speaking community outside the context of formal education. Lantto ultimately asserts that while Batua is fine for formal usage—and that it should be maintained for that use—there is no reason for it to steal (or, at best, share) the linguistic functions of the vernacular varieties, much as was argued during the codification process.

Lantto (2019) later returns to this matter, looking at how the informal productions of L2 speakers differs from the Basque these speakers were taught in the classroom, as a result of language and dialect contact. It was found that all informants used Spanish discourse markers, a sign that this phenomena has been conventionalized among L2 Basque speakers in Bilbao; leaning on the dominant language, rather than attempting to imitate vernacular could be a means of L2 speakers ensuring a minimal risk of pragmatic miscommunication. It should be noted that L2 speakers are in some ways less constrained that euskaldun zaharrak, given that they can cherry-pick features from multiple local dialects. The dialectal features that L2 speakers do employ, while high in frequency, are low in terms of meta-pragmatic salience (Lantto 2019), as they are largely functional. Copula verbs, auxiliary verbs and particles are commonly borrowed by L2 speakers, but very rarely are the more salient content words.

For the purposes of this study, the largest obstacle in the path towards a better understanding of Batua is that the majority of the current research is more focused on morphosyntactic variation and other non-suprasegmental phenomena. At this point in time, little is known about the intonation patterns and other prosodic features used by Batua speakers. It is for this reason that the Greater Bilbao Area, where the majority of Batua speakers both reside and have regular contact with a various number of the pitch-accent dialects, is the locale of interest.

CHAPTER 3

BASQUE PROSODY

3.1 Introduction

Typologically, Basque is a language isolate with a head-final ergative-absolutive marking, and SOV word order. In terms of prosodic typology, Basque is categorized as having both pitch-accent systems and stress systems. Hualde et al. (2002) describe this variation as continuum between the two. Pitch-accent systems are characterized by changes in fundamental frequency being the only correlate of accentual prominence, where stress-accent systems have multiple correlates in F0, intensity and duration. Pitch-accent systems are also known for having classes of lexically accented and lexically unaccented words (Hualde 2002, Beckman 1986).

Following the tradition of autosegmental phonology, this study will be approaching the concept of ‘accent’ and ‘stress’ in accordance with the definition from Beckman (1986):

> In the statement of the hypothesis, 'accent' means a system of syntagmatic contrasts used to construct prosodic patterns which divide an utterance into a succession of shorter phrases and to specify relationships among these patterns which organize them into larger phrasal groupings. And 'stress' means a phonologically delimitable type of accent in which the pitch shape of the accentual pattern cannot be specified in the lexicon but rather is chosen for a specific utterance from an inventory of shapes provided by the intonation system. (Beckman 1986:1)

As such, any dialect of Basque mentioned in conjunction with ‘pitch-accent’ is claiming that pitch is the sole indicator of accentual prominence and in differentiating between lexically contrasted words. ‘Stress-accent’ then refers to a system wherein other correlates, in addition to pitch, are employed to signal accentual prominence. There have been numerous analyses of the prosodic systems of the more ‘traditional’ dialects of Basque. However, as expounded upon in Chapter 2, Standard Basque was codified by the Basque Academy without a prosodic system in place and current research suggests that even within the monolithic 'standard dialect', there will be large degrees of variation. As a result, there is very little data on what speakers are currently, actually doing in their production to compensate for this lack.

As detailed by Hualde & Elordieta (2014), there are three different prosodic systems of Basque: that of Northern Bizkaian, that of Southern Bizkaian (not covered in this study), and the other varieties spoken in Bizkaia and Gipuzkoa. Example pitch contours for each variety group are given in Figure 3.1-1.

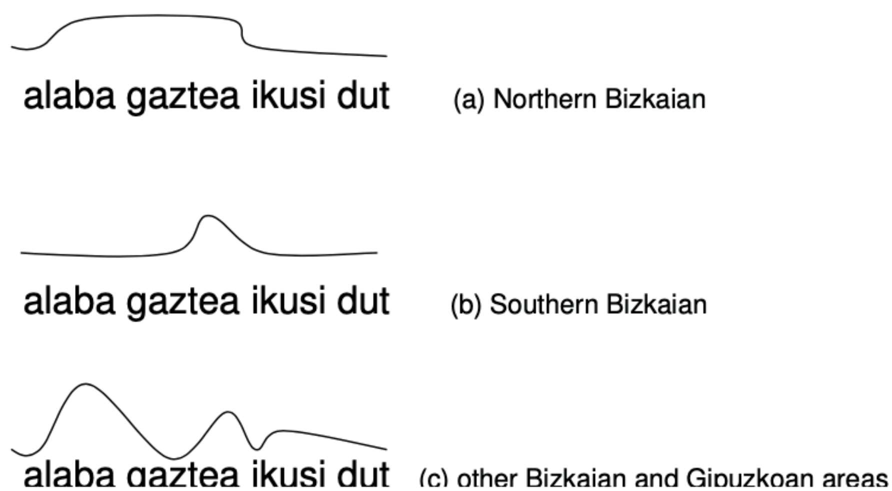

Figure 3.1-1. The Intonation Contours Of The Three Defined Prosodic Systems Of Basque (Hualde & Elordieta 2014:408)

A closer look at Figure 3.1-1 reveals that there are three distinct contour patterns. Declarative neutral sentences in Northern Bizkaian Basque (NBB) start with a low boundary tone (%L), which then rises to (H-)[2]. This high tone is sustained until the pitch accent on *gaztea* 'young', (H*+L), after which it immediately falls. The phrase is again closed by a low boundary

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[2] If the first syllable of the phrase is the one that bears the accent, then the phrase itself does not begin with the low boundary tone (Hualde 2014:408).

tone (L%).

Southern Bizkaian Basque (SBB), in contrast, begins with a low boundary tone (%L), that does not rise until the first lexically accented syllable is reached. Southern Bizkaian presumably displays the same pitch accent pattern of H*L+, but this cannot be definitively stated due to the lack of empirical data about the prosody of these dialects. After the point of accentual prominence, the tone again lowers. It should be noted that because the pitch in SBB does not rise until the first *lexically* accented syllable, the initial low tone can be sustained over a number of words. The category of "other Bizkaian and Gipuzkoan areas" Basque are not pitch-accent varieties at all, but rather stress-accent. There is no class of lexically unaccented words, but it nonetheless matches the contours of NBB productions that display downstep. Each accentual peak is lower than the one preceding it.

If we consider the survey done by Aurrekoetxea et al. (2015), we can cement our understanding of the phonological system of Basque by geographical divisions; the survey serves as a dialectological account of the Basque varieties, dependent upon each variety's prosodic system. The survey covered the entirety of the Basque-speaking territories, and focused on a number of factors, including but not limited to clitics, syntagmas, and focus position. The study was part of a much larger collaborative project concerned with Basque dialectology and classifying the prosodic systems of the various dialects. The participants of the survey can be summarized thusly: L1 speakers of a local Basque variety that live in the town where that variety is spoken; L1 speakers of a local variety that live in a Spanish-dominant region; Batua L1 speakers; L2 Basque speakers that live in Basque-speaking environments but only speak Basque in school; and L2 Basque speakers that live in a Basque-speaking environment and use Basque in formal and informal contexts. Aurrekoetxea et al. (2015) found that Standard Basque patterns more closely to those varieties spoken in Gipuzkoa, a finding which corresponds to those of Hualde & Elordieta (2014).

3.2 Northern Bizkaian Basque

Northern Bizkaian Basque (hereafter referred to as NBB) is a pitch-accent dialect that has been noted to pattern similar to that of Tokyo Japanese (Hualde 1991, Elordieta & Hualde 2001, Hualde et al. 2002, Ito 2002), as the two share the same four following features:

1) accented/unaccented lexical distinctions
2) the invariable realization of accents as H*L
3) phrase-initial rise, as &LH-
4) the lack of duration as a correlate of accentual prominence.

For those dialects that are classified as pitch-accent, prosodic features have been analyzed at both the word level and the phrasal level. With the classes of accented and unaccented words, there is a word-level contrastive pitch for lexical distinction, as can be seen in Table 3.2-1. There are words which carry inherent lexical stress, as well as words which gain derived accent to distinguish between grammatical features such as singular/plural. This can be seen in Table 3.2-1, which shows the Gernika variety of Basque, part of the larger group of NBB.

Table 3.2-1.
Lexically Accented Amúma, 'Grandmother' Contrasted With The Unaccented Lagún, 'Friend'.

	Accented	Gloss	Unaccented	Gloss
Absolutive Singular	amúma	*grandmother*	lagune	*friend*
Absolutive Plural	amúma-k	*grandmothers*	lagún-ek	*friends*
Genitive Singular	amúma-n	*grandmother*	lagun-en	*friend*
Genitive Plural	amúm-en	*grandmothers*	lagún-en	*friends*

Lexically accented words like *amúma* ‘grandmother’ always have an accent. On the other hand, unaccented words such as *lagun* ‘friend’ only gain derived accents when attached to plural postpositions or when undergoing similar morphological processes. Hualde et al. (2002), in discussing the spectrum along which Basque varieties run—from pitch-accent to stress-accent—consider the presence of a lexical accented/unaccented distinction in a pitch-accent language to be a key feature in working towards a pitch-accent prototype system. In fact, in the introduction of Prosodic Typology II, Tokyo Japanese and pitch-accent varieties of Basque are classified as typologically similar in terms of prominence, and in some cases, even in terms of prosodic unit (Jun 2014). This can be seen in Table 3.2-2 below.

Table 3.2-2.
Prosodic Typology Based On Prominence And Rhythmic Unit. (Adapted From Jun 2014:444)

	Prominence					**Rhythmic/Prosodic Unit**					
	Lexical			*Postlexical*		*Lexical*			*Postlexical*		
	Tone	Stress	Lpa	Head	Edge	Mora	Syll	Foot	Ap	Ip	Ip
English		x		x				x		x	x
Spanish		x		x			x			(x)	x
Japanese			x	x	x	x			x	(x)	x
Basque			x	x	x		x		x	x	x
Korean					x		x		x		x
Mandarin	x	x		(x)			x			x	x
Kinande	x				x		x		x		x

As shown above, Jun categorizes Basque as sharing nearly all the same typological features as Japanese, excepting that the former’s prosodic unit is syllabic where the latter’s is moraic. For the lexical pitch-accent systems—Swedish, Serbo-Croatian, Chickasaw, Japanese and Basque[3]—

[3] The full chart taken from Jun (2014) can be found in Appendix A.

it seems that the key defining feature between them is the existence of lexically accented word distinctions.

The most important feature at the phrasal level is the distinction between lexically accented and unaccented words. The other two features are that the lexical pitch accents always pattern as H*+L (as do the phrase-final accentual prominence) and the phenomena of tone spreading and tone insertion. Tone spreading involves the high tone of a segment spreading to surrounding syllable(s). In Basque, this surfaces as a leftward expansion of the accented high tone (H), such that the initial syllable is L%, the high tone sustaining until the accented tone (Elordieta 1998).

Approaching the current literature chronologically, some of the earliest analyses of Basque dialects were undertaken by Gorka Elordieta. For example, his 1998 work on Western Basque dialects started laying the groundwork for classifying, grouping and contrasting dialects. Western Basque dialects (including Bermeo and Lekeitio) were found to only show one type of pitch accent, that of type H*+L. Elordieta found three components that characterized the intonation of these dialects, which were the grammar of allowable phrasal tunes, the metrical representations of the text and the rules for lining tunes up with the text (1998:512). Pitch accents generated by the grammar—in other words, derived accentuation—are assigned to metrically strong syllables. The accents can differ not only in the tones that make them up, but also in the feature that controls the alignment of tune and text (1998:520). One point of interest is that the boundary tones of western dialects don't tend to line up with those syllables that are metrically strong.

The early 2000s saw more focus on individual dialects rather than treating the provinces as dialectal monoliths. Elordieta et al. (2002) first began with the Bermeo dialect. The overarching goal of this more narrow analysis was to contribute to a more complete model of the Basque language. The general features that are common to most dialects as well as the main differences between dialects could only be framed once the intonational characteristics of the many dialects had been compared. Elordieta argues that a more complete model of the language would be useful in helping to complete the standardization process given its missing prosodic and pragmatic functions and systems.

Looking again at Elordieta (1998), the Basque pitch-accent dialects were typologized as the aforementioned H*+L, meaning that accentual prominence is marked by a high tone followed by a low tone, as can be found in dialects such as Bermeo (Elordieta et al. 2002) and Lekeitio (Elordieta & Hualde 2001, 2003). Elordieta & Hualde (2001) test whether or not duration is a correlate in Lekeitio; there are pitch-accent systems with multiple correlates, as well as those with only a single correlate. They found that duration plays a very minimal, if any, role. In a follow-up study, they tested whether or not the *type* of elicitation had any bearing on correlates. Neutral declaratives have the fundamental frequency as their primary, if not sole, correlate, with accented peaks being systematically downstepped. The question then becomes, in cases of reduced pitch excursion, were other methods employed to compensate for the reduction in pitch? It is ultimately found that F0 is a correlate of both accentual contrast and focus type; narrow focus is conveyed by a higher F0 (i.e., less downstep). In NBB dialects, downstep occurs but there is no neutralization of pitch accentual contrasts (there is visible reduction, but not a complete elimination). F0 is salient enough to convey lexical contrasts in accentuation by itself, but some speakers of Lekeitio *do* make use of duration in addition to pitch (Elordieta & Hualde

2003).

This segues neatly into their 2006 study, wherein they find that the post-initial accents of Northern Bizkaian dialects developed through the reinterpretation of phrase-initial boundary rises being perceived as accentuation; this likely being due to contact with Spanish, a stress-system language wherein accentual prominence has correlates of F0, duration and intensity (Elordieta & Hualde 2006). Speakers of other Basque dialects and L2 Basque speakers have a strong tendency to perceive the primary accentual prominence in NBB as falling on the post-initial syllable, regardless of where the accent actually falls. This helps fill in the blanks as to the changing typology of Basque dialects, where dialects described as pitch-accent seem to pattern more like stress systems; if constant contact with stress languages causes a perceptual reinterpretation, then it is not that the pitch-accent has been lost, but that interlocutors are no longer able to interpret accentual prominence by F0 alone (Elordieta & Hualde 2006).

Continuing to build the scaffolding of Lekeitio prosody, Elordieta (2015) looks at downstep and pitch reset through the lens of Match Theory, mapping syntactic phrases to phonological phrases so that syntactic structure is directly reflected by prosodic structure; the magnitude of a pitch reset is derived from the depth of embedding of branching constituents on the right(-side) branch. There is also a cumulative effect of the number of non-minimal phonological phrases on pitch reset, which manifests as the degree of reset seen in the F0 contour. It is possible, even likely, that this kind of structure applies to other pitch-accent dialects, allowing for analysis at the phrasal level. Pitch reset—again from Elordieta (1998)—is a phenomenon that occurs between prosodic units. Over the course of an utterance, the pitch steadily declines; if the speaker plans to continue talking, it must 'reset' to a higher value. An example of pitch reset can be found in Figure 3.2-1.

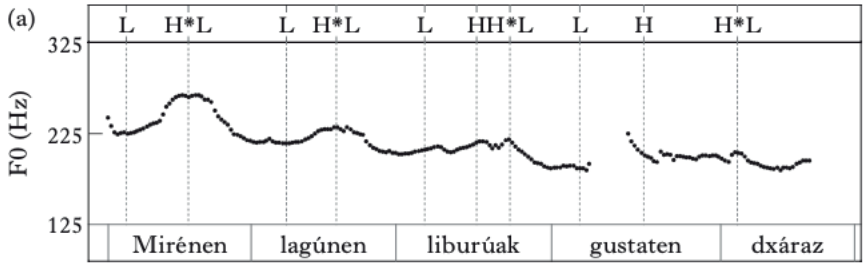

Figure 3.2-1. *Mirénen Lagúnen Liburúak Gustaten Dxáraz*, 'I Like Miren's Friends' Book' (Elordieta 2015:54)

As can be seen[4], there is a progressive downstepping of pitch peaks as the utterance continues, with each peak being lower than the one preceding it. The pitch reset can be seen in the penultimate word *gustaten*, 'like'; it begins low (L) and then resets to a high pitch (H). Elordieta explains that this reset occurs in this specific case because of NBB's default pitch pattern of H*L. If there is one or more syllables between the L tone of the initial syllable of a word and the accented syllable, a high tone gets associated to the second syllable of the word and can spread rightward (presumably covering the number of intervening syllables until the accented H*L) (2015:55).

Lekeitio Basque, spoken in a municipality of the same name along the northern coast of the Bizkaian province, patterns very similarly to Gernika Basque, except that the location of the stress is variable, even with lexically accented words. Elordieta & Hualde (2001) look at duration as a potential acoustic correlate in Lekeitio Basque. It must be stated again that all Basque dialects within the BAC are in contact with Spanish, a stress language, and it would not be out of the realm of possibility for that to affect the pitch-accent system. All other things being equal, the

[4] The asterisk accent mark (*) indicates the accented syllable (and thus the accented word), as in *Mirénen*. In unaccented words (like *gustaten*), there no asterisk on the prosody line nor an accent mark in the lexical representation.

ultimate findings were that lexically accented and unaccented syllables don't have statistically significant differences in duration in neutral declarative statements. It was noted that durational differences might emerge as a consequence of narrow contradictory focus, but that pitch remained the only acoustic correlate of accentuation in the Lekeitio dialect. However, a follow-up study in 2003 gave slightly different results. In neutral declarative statements, F0 remained the sole accentual correlate, with accented peaks systemically downstepping throughout the utterance. It was then tested whether or not reduced pitch excursion—through the use of narrow focus—would be enough to still robustly convey lexical contrasts, or if other acoustic properties were employed to compensate. They found that while pitch remained a correlate, some speakers did lengthen the duration of their accented syllables; F0, even when reduced, remained salient enough to convey lexical contrasts by itself, but there are speakers who make use of duration in addition to pitch, which the authors conclude to be a potentially idiolectal feature among Lekeitio speakers (Elordieta & Hualde 2003).

Bermeo Basque, spoken along the same northern coast as Lekeitio, is characterized by Elordieta et al. (2002) as a Getxo-Gernika dialect. Like other NBB dialects, lexically accented words always surface with accentual prominence. Lexically unaccented words, on the other hand, are handled in a manner similar to that of Lekeitio. Unaccented words only receive accentual prominence on the final syllable when immediately preceding the verb, which differs from Lekeitio's more flexible stress placement. Bermeo does, however, share accentual, intermediate and intonation phrase tonal cues with Lekeitio: the accentual left edge is marked with %L, with a phrasal H- on the second syllable, which spreads until the H* pitch-accent. Bermeo Basque also shows downstep, with each subsequent H* being lower than the one before it, regardless of whether or not the accent is derived or present in the underlying representation. The intermediate phrase blocks downstep, with its left edge corresponding to the left edge of the initial accentual phrase of the entire syntactic phrase. The larger intonation phrases are distinguished by the type of utterance: declaratives have L% on the right edge; list-type and interrogatives are signaled by H%, coupled with a lengthening of the final vowel. The tone spreading can be seen in Figure 3.2-2, where the phrasal H- spreads until the realization of the pitch accent H*—forming a plateau. These factors combined indicate a common intonational structure for NBB as a whole.

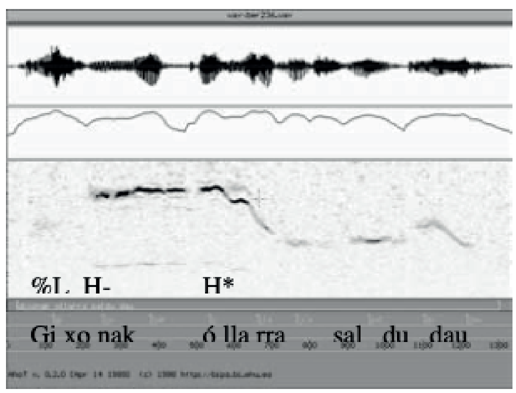

Figure 3.2-2. Bermeo Basque, Rightward Spreading Of An H- Up To An H*
(Elordieta Et Al. 2001:5)

A reminder that Northern Bizkaian dialects display post-initial accents that likely developed through the reinterpretation of phrase-initial boundary rises as accentuation, almost certainly as a consequence of influence from and contact with Spanish (Elordieta & Hualde 2006).

3.2.1 Observed Changes In Local Dialects

An integral step in typologizing Basque dialects comes from observing any changes within previously studied dialects as a byproduct of language contact or dialect loss. Certain dialects that have been historically described as bearing a pitch-accent system are now patterning more similarly to stress-accent systems (Hualde et al. 2002, Irurtzun & Elordieta 2003, Irurtzun 2010, Hualde & Gaminde 2014). More specifically, Irurtzun (2003) finds that there has been a diachronic shift in the realization of accentuation in Errenteria Basque, spoken in Gipuzkoa. In this particular dialect, all words are lexically accented and thus receive stress in any production. Irurtzun is able to use the preserved works of Koldo Mitxelena[5] as a model for Errenteria Basque as it was spoken earlier within the last century (Irurtzun 2003). Mitxelena's descriptions would make early 20th century Errenteria Basque very similar to NBB, as it too had sustained tone contours.

This work is continued by Rodríguez-Ordóñez & Gillig (2018), who find that the vulnerability of a distinction—such as the accented-unaccented distinction—is dependent upon the dominant language of the speakers' social networks. Looking specifically at speakers of Gernika Basque, they found that those who have more intense contact with Spanish are less likely to maintain the distinction, but that the loss is more likely to occur with lexical minimal pairs rather than grammatical ones. Downstep proves itself to be a reliable hint to the A/U distinction, as a downstep in the second word indicates the presence of an accent in the first, if both words are accented. Young speakers exhibit more variation in how they maintain distinction: duration, while not a "true", or perhaps "significant", acoustic correlate, may be used by some speakers to indicate accentual prominence, although its use is not necessarily contingent on a lack in pitch change.

Rodríguez-Ordóñez (2019) later continues looking at Gernika Basque—a variety that falls under NBB, and therefore a pitch-accent variety—and the extent to which the A/U

[5] Koldo Mitxelena was the Basque linguist heavily involved in the creation of the Standard Basque dialect.

distinction is being lost amongst younger speakers, and whether or not any other acoustic correlates were used to compensate, much in the way that Elordieta and Hualde previously investigated Lekeitio. The post-initial accent system in Gipuzkoan Basque, as observed by Elordieta & Hualde, likely developed as phrase-initial rises being reinterpreted as indicative of accent position, undoubtedly a consequence of prolonged contact with Spanish.

3.3 Standard Basque (Batua)

Unlike the pitch-accent systems of the more local varieties, Batua can be typologically classified as stress system. Returning to Beckman's distinction between stress and non-stress accent, the key difference is that in stress systems every word bears stress, indicated by means of acoustic correlates beyond changes in pitch. It is worth mentioning that Batua has been noted as having a stress-accent because it was codified without an established prosodic system when catalyzed by the Basque Academy. The sole codified system is that described by Elordieta & Hualde (2014), as there was never any such system provided by the aforementioned Basque Academy (Hualde & Zuazo 2007). In having acoustic correlates beyond changes in F0, Standard Basque is notably lacking the word-level contrastive accentuation seen in varieties of NBB. Unlike other varieties of Basque, Standard Basque does not use pitch to distinguish between singular/plural distinctions; there are instead marked with postpositions.

Consequently, the current prosodic system of Standard Basque is mainly thought to draw from stress-accent varieties spoken in Gipuzkoa (Hualde & Elordieta 2014). Different varieties of Batua are emerging as a result of shrinking isogloss bundles of local dialects, and a consequence of prolonged and continuous contact with Spanish, which is itself a stress accent language. As reported by Aurrekoetxea et al. (2015), there are three key characteristics tied to accentual prominence at the word-level in Batua: syllable weight, the number of syllables, and lexical stress. Of vital importance is that in Standard Basque, the second syllable from the left is the one that receives the stress, barring any other mitigating factors, such as syllable weight.

In bisyllabic and trisyllabic words, if the final syllable is heavy, then it receives stress. In all other cases, the final syllable is considered extrametrical and stress cannot be anchored there. Examples of both heavy and extrametrical syllables can be seen in Table 3.3-1[6].

Table 3.3-1. Syllable Weight And Extrametricality In Standard Basque

HEAVY FINAL SYLLABLE	li.mói	bal.kói	e.sán
FINAL SYLLABLE CONSIDERED EXTRAMETRICAL	é.rre	i.kú.si	e.txé.a

Being a stress-accent system, Standard Basque doesn't have a singular/plural distinction through F0 movement alone. Any variation in production precludes no lexical distinction. Further evidence is shown in the examples below:

Table 3.3-2. A Brief Comparison Of Standard And Gernika Basque Singular/Plural Distinctions.

Standard Basque	Gernika Basque	Gloss
lagún	lagun	*'friend'*
lagúna	lagunè	*'the friend'*
lagúnak	lagúnek	*'the friends'*

Batua also displays downstep at the phrasal-level, with the pitch contour rising for each peak stress anchor; in this way Batua contours pattern very similarly to the contours of plural derived accents in Northern Bizkaian Basque dialects. In Batua, whole words count as accentual units, rather than just the word roots, as can be observed in other dialects. Otherwise, the accent tends

6 *limói*, 'lemon'; *balkói*, 'balcony'; *esán*, 'said'; *érre*, 'burn'; *ikúsi*, 'see'; *etxéa*, 'house'

to fall on the 2nd syllable counting from the left: counting leftward patterns with some Gizpukoan dialects, and penultimate stress is a trait shared with dialects to the east, including those of the French Pyrenees. An example of Batua downstep and plural derived accents in NBB are shown in Figures 3.3-1 and 3.3-2.

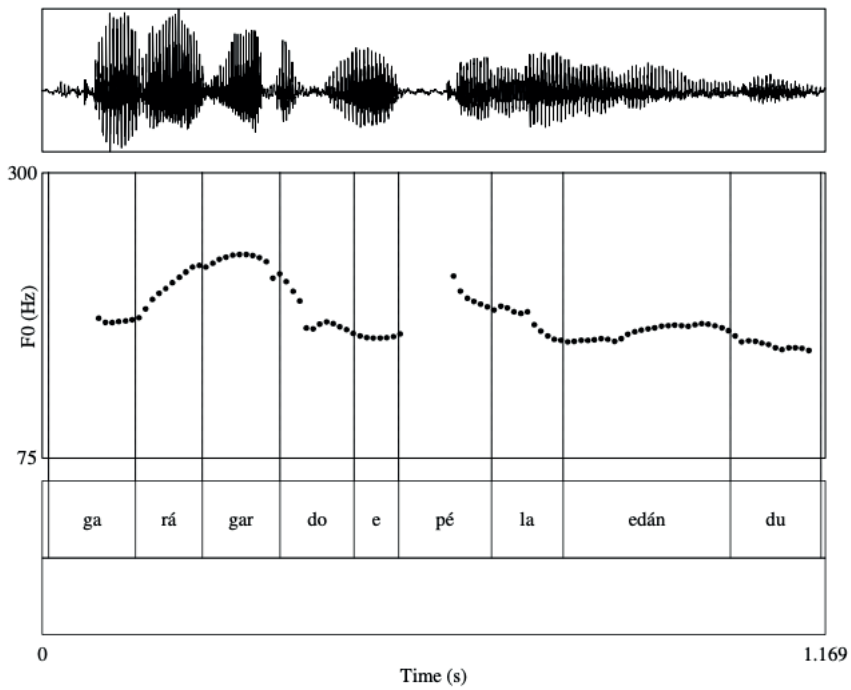

Figure 3.3-1. Batua *Garágardo Epéla Edán Du*, ‘She Drank Lukewarm Beer’
(Hualde & Elordieta 2014:440)

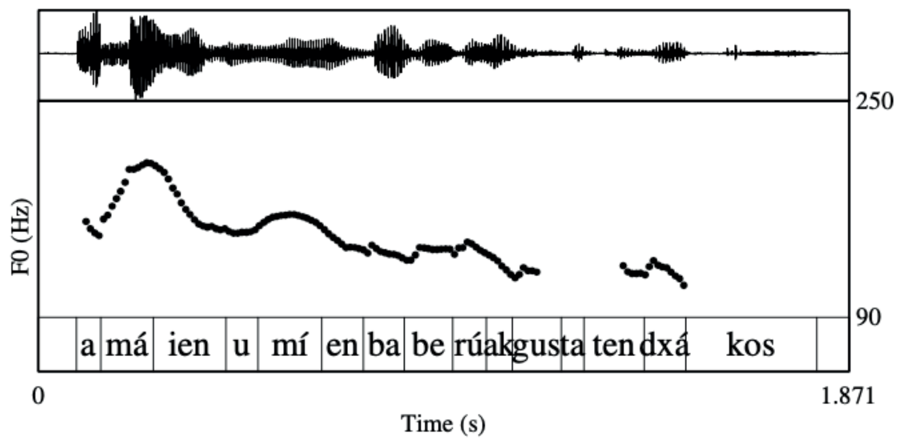

Figure 3.3-2: NBB *Amáien Umíen Baberúak Gustaten Dxákos*, 'She Likes Amaia's Children's Bibs' (Hualde & Elordieta 2014:413)

In comparing Figures 3.3-1 and 3.3-2, downstep can be observed in both utterances. Looking specifically at 3.3-2, the accents do in fact fall on the roots of the word, rather than any of the postpositions; for example, *baberúak* 'bibs'[7] would be realized in Batua with the stress on the second syllable from the left, rather than the penultimate syllable that it's anchored to in the NBB token.

Gaminde et al. (2015) report their findings on the acoustic correlates of Standard Basque; the study takes a more general approach by analyzing the correlates of other languages, such that a prosodic typological framework could be constructed in future research. They find that accented vowels have greater F0, intensity and duration, so these acoustic correlates clearly help distinguish between stressed and unstressed items. Gaminde cites Hualde's 1997 criteria for the features of accented syllables: a) tone, or fluctuation that aligns with the accented syllable; b) intensity, such that the syllable is pronounced more strongly and loudly; c) duration, in that accented syllables tend to be longer; and d) hyper-articulation, such that accentually prominent

[7] In the word *baberuák*, there is a morpheme boundary *baberu-ak*, where *-ak* is a postposition.

syllables are pronounced more precisely and clearly. However, it is emphasized that not every correlate carries the same force. In Standard Basque there is a hierarchy wherein F0 carries the most prosodic force, followed by intensity and then duration. The location of the vowel in a word (pre- or post-accent) can also affect correlational force. The unaccented first syllable vowel is pre-accent, where all others are post-accent, which have much lower F0 and intensity measurements than those of pre-accent vowels. This is expected, considering downstep: since each accentual peak is of a lower measurement than the one that came before it, it is unsurprising to find that post-accent vowels have lower measurements, especially in comparison to pre-accent vowels. It should be noted that duration, if it is indeed the weakest correlate, was found to be minimally useful in determining the position of a vowel relative to accentuation.

Hualde and Beristain (to appear) look at three dialects from three different provinces of the BAC: Azpeitia, from Gipuzkoa; Goizueta, from Navarrese; and Arratia, from Southern Bizkaia. All three were contrasted against the Standard Basque variety. The three dialects were analyzed for any notable influence that these local dialects have on SB and the potential effects of SB on local dialects. They found that speakers who have the singular/plural accentual contrast in their local dialect don't display this feature when speaking Standard Basque. Morphological distance with respect to Batua doesn't seem to be an accurate predictor of convergence in accentuation. Contrast this with southern Bizkaian Basque, where pen-initial accentuation is the general rule, without any contrast. This indicates that Batua as a whole likely has different regional rhythmic patterns, even if speakers are using the same rules for stress placement.

Hualde & Beristain have also noted that local varieties and Batua are merging in the spoken usage of younger generations in Gipuzkoa, displaying unique features. Stress still most commonly falls on the second syllable from the left, with few exceptions in some contexts, such as heavy syllables, but word length is also factor. Suffixed words can be treated as part of the same accentual phrase or as part of two separate phrases; this grouping affects the stress placement in adhering to the normal rules of accentuation. The same word can anchor its accentuation on different syllables—even productions by the same speaker—with no contrast in meaning. The final syllable of a word also tends to carry either edge-accent or edge-tone. Syntactic phrases can be merged into a single larger accentual phrase, where the second (or last) word receives edge-accent rather than pitch-accent. Hualde also looks at multiple types of utterances, to observe any changes that might occur. Focalizing a constituent makes it ineligible to occur before the preverbal position, much as is seen in Northern Bizkaian Basque. Parentheticals are separated by a raise in pitch at the phrasal boundary, and complemented with vowel lengthening; words within parentheticals are often realized without any pitch-accent at all.

Again looking outside of neutral declaratives, Eguskiza et al. (2019) specifically set out to examine the variation in Basque prosody with regards to yes-no questions, while also looking at how the L1 of the speaker factors in. The study employed the use of a 160 sentence corpus and 40 women (ages 20-23). 20 of the speakers had Basque as their L1, and the other 20 had Spanish. In the analysis, they examine the last three syllables of the utterance (the main and auxiliary verbs). 56% of speakers had rising intonation in the first syllable; 65% had falling intonation in the second syllable, especially if their L1 was Spanish; and the third syllable—the auxiliary verb—displayed 4 distinctive patterns of production, which can be seen in Figures 3.3-3 through 3.3-6:

a) H% b) L% c) LHL% d) LH%

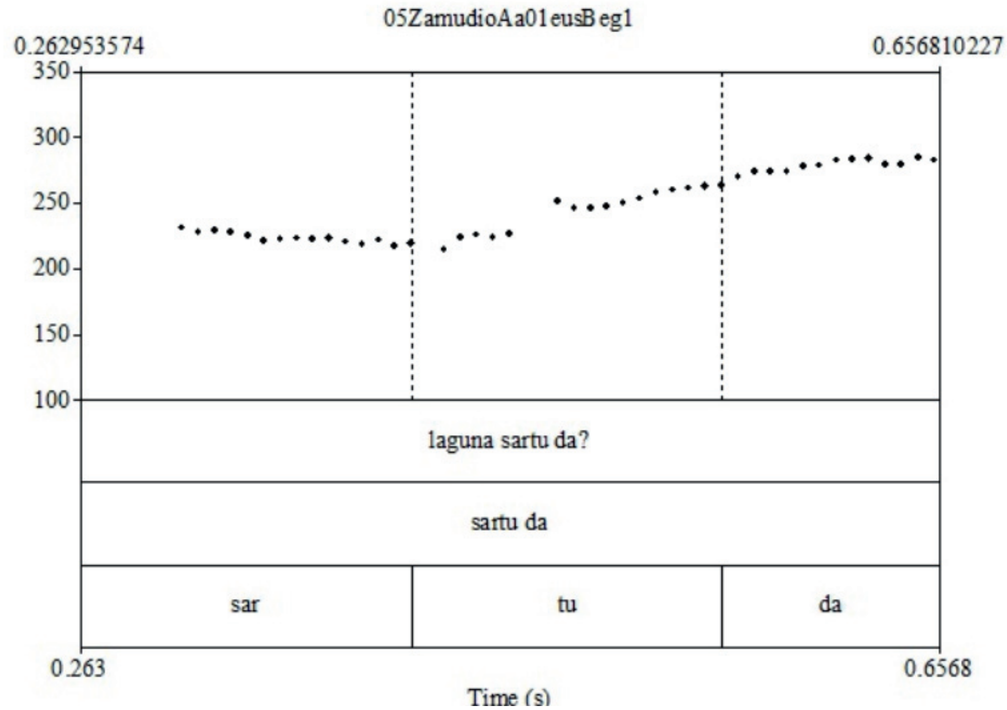

Figure 3.3-3: H% Intonation (Eguskiza 2019:76-77)

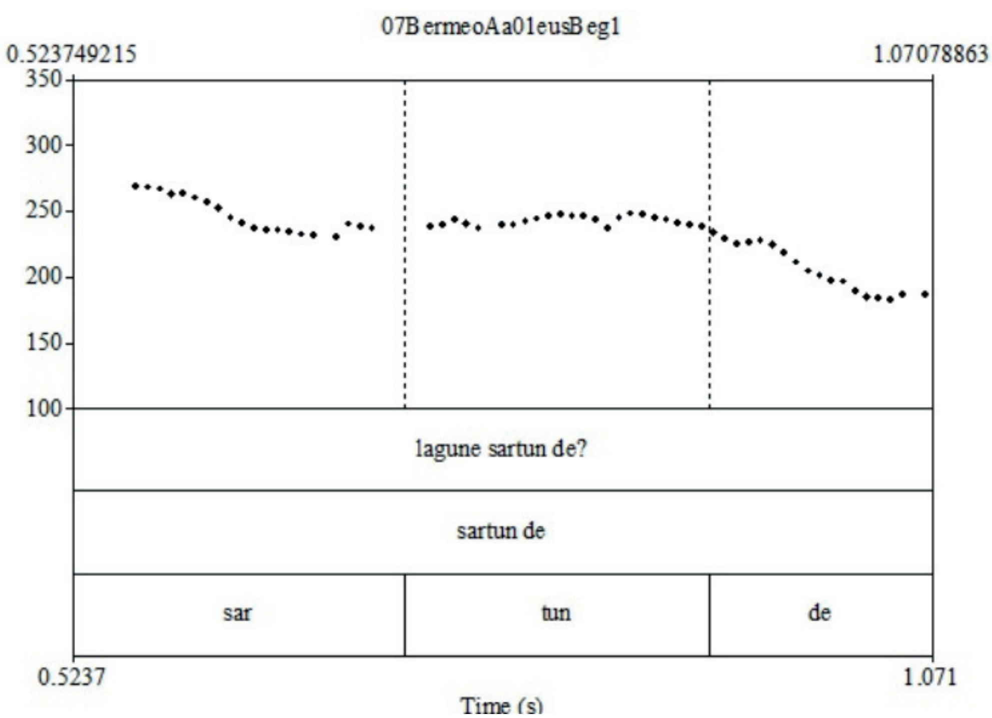

Figure 3.3-4: L% Intonation (Eguskiza 2019:76-77)

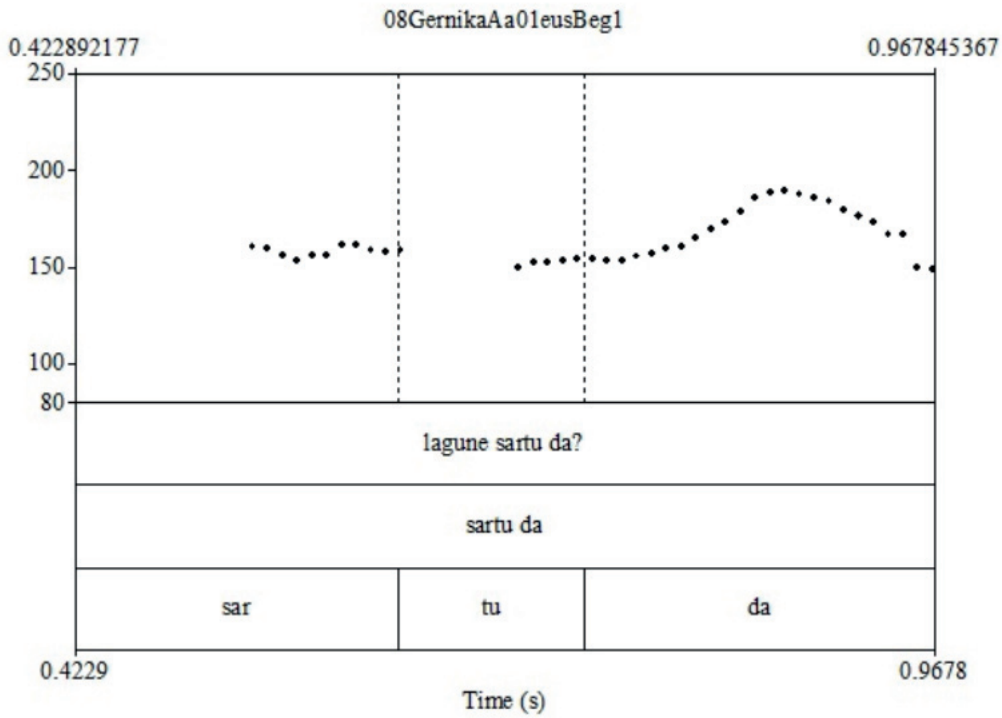

Figure 3.3-5: LHL% Intonation (Eguskiza 2019:76-77)

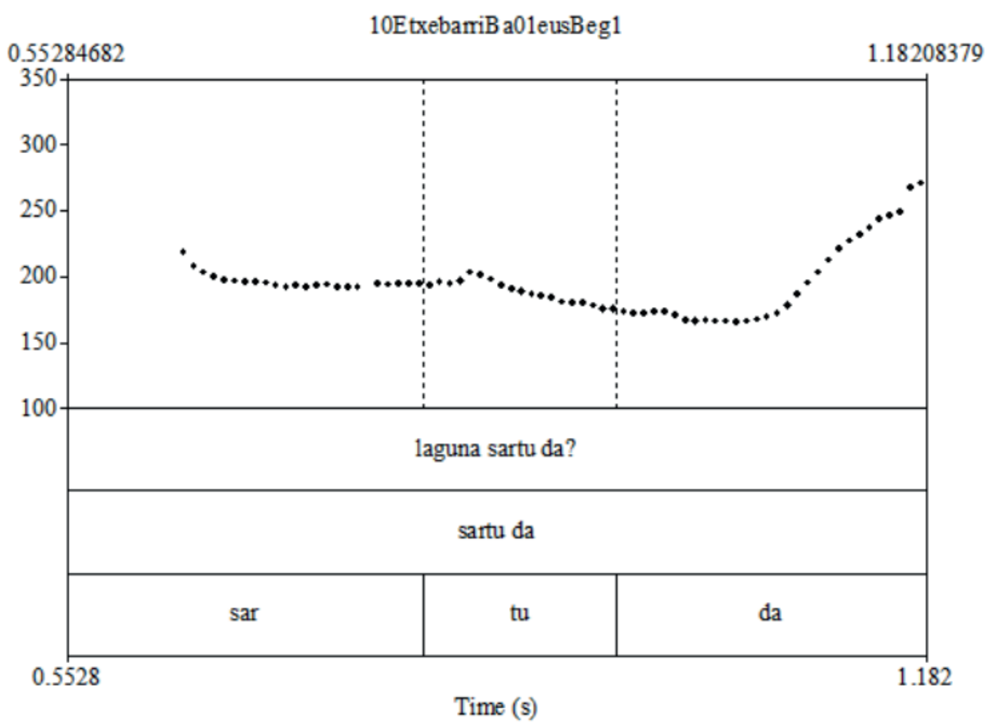

Figure 3.3-6: LH% Intonation (Eguskiza 2019:76-77)

Among the group of Spanish L1 speakers, patterns a) and b) were the most common. This makes sense given that most dialects of peninsular Spanish has rising intonation on interrogatives whereas pitch-accent Basque dialects have falling intonation. Among the group of Basque L1 speakers, pattern a) was the most common. It should be noted that Eguskiza's study found more variation in intonation than the Hualde study that came before it.

In summation, the following facts are known about Standard Basque prosody; at the word-level and in the case of bi- and trisyllabic words, stress does not fall on the final syllable unless said syllable is heavy. Outside of these cases, the final syllable is considered extrametrical. At the phrasal-level, Standard Basque displays downstep and the patterns of yes-no contours depend on the L1 of the speaker, but on average feature either rising or falling intonation. Other syntactic mechanism such as topicalization and focus can affect the realization of phrasal boundaries, resulting in things like tone spreading and insertion.

3.4 Spanish Prosody

Spanish is classified as an SVO-pattern Western Romance language with stress-accent prosodic system. Lacking any classes of lexical contrast, words in Spanish—like those of modern-day Errenteria Basque—all words have a stress-bearing syllable; function words, such as clitics and prepositions, being one of few exceptions. Opposite to the accentuation rules for the various pitch-accent Basque varieties, most Spanish words bear stress on the second syllable counting from the right (Hualde 2005)[8]. Take the examples shown in Table 3.4-1:

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[8] Words that end in vowels, [s], or [n] typically have stress on the penultimate syllable; this is only overruled in the case of orthographic accent.

Table 3.4-1: Examples Of Spanish Stress Placement

WORD	**bán**.co	den.**tís**.ta	se.**ñó**.ra
GLOSS	*bank, bench*	*dentist*	*Missus, Mrs.*

Spanish neutral declaratives, like those of NBB varieties, show downstep at the intonational phrase level. In Spanish, pitch is the key marker of stress, but both duration and intensity are correlates. Additionally, the pitch contour of the stressed syllable does not peak until the end of the syllable, with its fall continuing into the beginning of the next segment; this contrasts with the varieties of Basque, wherein the peak of the pitch contour is centered over the entire accented syllable. In Spanish words, the stressed syllable is realized longer and with more intensity and a higher F0 than the rest of the word.

In yes-no questions in Spanish, intonation may be the only difference between a declarative and an interrogative. While neutral pronominal questions have falling intonation, in most Spanish dialects, neutral yes-no questions have rising intonation denoted by a boundary H% tone (Hualde 2005:267-270). Given the prolonged contact between Basque and Spanish, as well as Spanish's position as the dominant, unmarked language, there are likely numerous ways in which the two have influenced each other (Elordieta & Hualde 2006). Hualde et al.'s (2002) hypothesis of tonal rises being reinterpreted as a signal of accentual prominence is only one example of this kind of contact-based influence.

CHAPTER 4

PRODUCTION

4.1 Introduction

The goal of the production tasks is to address the research question given in the first chapter: what are the acoustic correlates of accentual prominence in Standard Basque? To expound upon this, the tasks were designed to cover the following sub-questions:

- What are the acoustic correlates of Standard Basque at the word level? Do singular/plural contrasts occur through prosodic operations?
- What are the acoustic correlates of Standard Basque in neutral declarative sentences?
- What are the pitch contours for yes-no interrogative questions?

Data was gathered by the means of two tasks: Task 1 elicited words in isolation, in order to examine word level prosody via acoustic measurements; Task 2 elicited productions at the phrasal level, using both neutral declaratives and yes-no questions, which were examined via acoustic measurements and pitch contour tracking. These production tasks will not only be comparing results against the findings previously reported, but will also provide quantitative data for heretofore unpublished prosodic phenomena[9] in Batua, contributing to the larger body of research involved with typologizing the dialects of the language.

4.1.1 Participants

For convenience and expediency, data was collected from a selection of Basque speakers in the state of Illinois. The pool of participants is comprised of six speakers of Standard Basque, most of whom learned Basque via immersion as children[10]. The same participants were used for both tasks. The profile of the participants are detailed below in Table 4.1, with information gathered

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[9] It bears repeating that, at the time of writing, most of the work on Batua's prosodic system has been at the word-level.

[10] Although there are six speakers, there is no Speaker 2; participants were numbered 1, 3, 4, 5, 6 & 7.

via the Bilingual Language Profile Questionnaire (Birdsong et al., 2012). The questionnaire asked participants to describe their own language dominances in terms of how often they use their L1 and L2 and in what contexts and for what purposes, a useful tool for providing robust standardized measurements based on a speaker's perception of their own language use[11].

Speaker 1 started learning Standard Basque in their 20s and has only ever studied Standard Basque, but lives in Gernika, a NBB zone, and uses Basque very actively as their dominant language. Speaker 3 has been speaking both Spanish and Basque from birth and has had equal schooling in both languages, as well as having an equal amount of interpersonal interaction with family and friends. However, Speaker 3 largely only uses Basque with family and has little opportunity to speak it in the work place. They consider themselves to be fairly equally proficient in Basque and Spanish, with the exception of reading and writing.

Speaker 4 has been speaking both Spanish and Basque from birth. They have had equal amounts of formal education in both languages and speak both among family and friends. However, they use more Spanish in the workplace and are dominant in Spanish as far as weekly interpersonal interactions. Speaker 5 started learning Basque at 2 years old. Although they have had roughly the same amount of formal education in both Basque and Spanish, as well as the same degree of usage in the workplace, their interactions with family have been solely in Spanish. They do not speak Basque with family or friends. Spanish is considered to be their dominant language.

Speaker 6 started learning Basque at the age of 2; they feel comfortable with both Basque and Spanish, though they have used Basque in formal education more than Spanish. However,

[11] It is worth noting that the questionnaire is in itself biased, operating on assumptions of what constitutes a 'speaker' and ignoring any cognitive or social perception of the concept of 'native' speakers.

Speaker 5 has next to no interpersonal interactions in Basque, neither with their family and friends, nor in their work environment. They consider Spanish their dominant language by a slight margin. Speaker 7 began learning Basque at 3 years old. Like Speaker 6, they have more formal education experience in Basque than in Spanish. Speaker 7 does not use Basque in the workplace but uses it amongst family. In fact, Speaker 7 recently changed dominant languages, making the conscious effort to recover their Basque competency and both they and their spouse speak only Ondarru Basque, a NBB variety, at home. A condensed table covering speaker demographics can be in Table 4.1. The diversity in the speaker demographics is intended to shed light on any potential similarities or differences with respect Batua prosody.

Table 4.1-1. Speaker Demographics

Sex	
Male	***Female***
2	4
Language Dominance	
Spanish	***Basque***
4	2
Current Residence	
Within BAC	***Outside BAC***
1	5
Current Age	
< 30	***30 - 39***
1	3
40 - 49	***50 +***
1	1
Age Of Acquisition	
From birth	***Childhood / Adolescence***
2	3
Adult	***Senior***
1	0

4.2 Task 1

Task 1's goal is to examine the word level prosodic features of Batua speakers. Participants were prompted with a list of bisyllabic and trisyllabic words, each word given in isolation. Each word appeared thrice: in a) in its bare form, b) with the genitive singular postposition attached (-

(a)ren), and c) with the genitive plural postposition attached (*-en*). The lengthening of the bare words—already 2 or 3 syllables long—provides data for the effect of both syllable weight and extrametricality and any potential effects these two factors may have on prosodic operations.

4.2.1 Stimuli

The stimuli consists of twenty-six common bisyllabic and trisyllabic words in Standard Basque, sourced via native speakers and supplemented with online Basque-Spanish dictionaries. Words were chosen to allow for a mix of light and heavy final syllable composition. The initial stimuli with English glosses are shown below in Table 4.2-1 and Table 4.2-2[12].

Table 4.2-1. The Initial Bisyllabic Stimuli, Grouped By Syllable Structure

	Light-Light Syllable Structure	GLOSS	**Light-Heavy Syllable Structure**	GLOSS
Bisyllabic Stimuli	seme	*son*	txakur	*dog*
	negu	*winter*	lagun	*friend*
	neke	*fatigue*	lapur	*thief*
	bide	*path*	gizon	*man*
	zulo	*hole*		
	putzu	*well*		
	hezur	*bone*		
	oihan	*forest*		

[12] Errata: In preparing the instruments, bisyllabic tokens hezur ‘bone’ and oihan ‘forest’ were erroneously put in the LH group. Similarly, trisyllabic hutsune ‘’, inurri ‘’ and zuhaitz ‘’ were also treated as LH. The intent was to have a relatively even spread of syllable weight, but regardless, the data presented reflects all stimuli sorted correctly.

Table 4.2-2. The Initial Trisyllabic Stimuli, Grouped By Syllable Structure

	Light-Light Syllable Structure	GLOSS	Light-Heavy Syllable Structure	GLOSS
Trisyllabic Stimuli	hutsune	*hollow*	garapen	*development*
	inurri	*ant*	hondamen	*destruction*
	alaba	*daughter*	maitasun	*love*
	amona	*grandmother*	kokapen	*place*
	jarrerra	*attitude*	harakin	*butcher*
	aitona	*grandfather*	bilbotar	*A person from Bilbao*
	liburu	*book*		

Looking closer, the stimuli can be divided into a 2x2 design: bisyllabic words with light-light (LL) syllable structure, bisyllabic words with light-heavy (LH) structure, trisyllabic words with LL structures and lastly, trisyllabic words with LH structures. An attempt was made to formulate a relatively even distribution of syllable weight, but finding common words with heavy syllables proved difficult to achieve, even in the case of the trisyllabic stimuli.

With the overall goal of establishing an idea of how Standard Basque speakers are signaling stress placement at the word-level, there is also the need to determine if there is any transfer from other dialects of Basque, such as NBB and its word-level contrastive distinction. This is especially important for Speakers 1, 3 and 7, given their dialectal dominance with varieties of NBB or their current residence in a NBB zone . Another point of interest is whether or not affixation causes any change in stress placement, and if stress ever crosses morpheme boundaries; an effect is not expected but may play a role for those speakers in contact with northern varieties, which make singular/plural distinctions through pitch. An example of some affixed stimuli are provided in Table 4.2-2.

4.2.2 Procedures

Speaker responses were recorded using the open-source audio editing software Audacity, and then later manually segmented in Praat. Once the larger sound files were cut into smaller .wav files, they were then individually analyzed. Both file splitting and the measurements taken were extracted through the use of scripts. Statistical analysis was then done in R.

For Task 1, the stimuli were presented to the participants via a self-advancing powerpoint presentation. The stimuli were run through a randomizer to avoid having multiple forms of the same word being presented together (for example, a speaker being prompted with two or three forms of the same word consecutively), such that the stimuli appeared in random order. Each slide contained only one word, and participants were prompted to read the given word aloud. For the sake of thoroughness, a trial run was included at the very beginning of the presentation, so that the task would proceed only after the speaker felt comfortable with the mechanics of the task.

Table 4.2-3. Example of Genitive Postpositions

Bare Form	Gloss	Genitive Singular (-ren)	Genitive Plural (-en)	Gloss
txa.kur	*dog*	txa.ku.rra.ren	txa.ku.rren	*of the dog/dogs*
zu.haitz	*tree*	zu.hai.tza.ren	zu.hai.tzen	*of the tree/trees*
he.zur	*bone*	he.zu.rra.ren	he.zu.rren	*of the bone / bones*
oi.han	*forest*	o.iha.na.ren	o.iha.nen	*of the forest / forests*

Following Gaminde et al. (2015) and later Hualde & Beristain (to appear), elicitations were segmented by phoneme, such that the vowels could be highlighted to ease the process of comparing the measurements of the potential stress correlates by location (pre-accent, accented, and the optional post-accent). The three properties being measured are the mean pitch (measured in Hz), mean intensity (measured in dB) and mean duration (measured in milliseconds). Any statistically significant difference between the three measurements of the stressed vowel and the non-stressed vowels will clarify what the acoustic correlates of Batua are, and—reproducing the procedures of Gaminde et al. (2015)—whether there is a hierarchy of force relative to the strength of each of the aforementioned properties.

Keeping in mind the results of Aurrekoetxea et al. (2015), it is hypothesized that the stress in polysyllabic words is anchored on the second syllable from the left and that the vowel of the stressed syllable will have measurements higher than both the pre-accent vowel and the post-accent vowel (where applicable). It is also anticipated that results will corroborate with those of Gaminde et al. (2015) in that accentual prominence will have multiple correlates in addition to pitch—specifically duration and intensity—in contrast to the pitch-accent prosodic systems of other dialects. However, due to the influence of dialect contact, it is believed that there may be different results regarding the prosodic force reported by Gaminde et al. (2015) and Hualde & Elordieta (2014), the ranking of which was reported as pitch ⟶ duration ⟶ intensity.

4.2.3 Analysis

Given that the stressed syllable should be the second from the left, the first two vowels of each bisyllabic token and the second and third vowels of the trisyllabic tokens were manually segmented and measurements were then extracted via the use of scripts. Following Hualde & Beristain (to appear), the following 3 acoustic properties were measured:

1) Pitch / F0 (measured in Hz)
2) Intensity (measured in dB)
3) Duration (measured in ms)

For pitch, both the mean and max F0 measurements were taken; Hualde's previous investigations only looked at the mean values for vowels, whereas this study will look at the peak measurements for F0 as well as the mean. These three acoustic measurements were extracted in order to compare the average for pitch, duration and intensity as it varied between speakers and within the individual speakers themselves and to then compare findings against those of previously conducted studies. First, the means and standard deviations were calculated and extracted using R[13]. Data was normalized to z-scores using R's *ave()* function, in order to account for variation between speakers and within a single speaker's productions, with continuous factors converted to categorical via the *factor()* function where necessary. A linear mixed-effects regression was then conducted using the *lmer()* function from the *lme4* package[14]; this was in order to observe the difference between the vowel measurements. The three measurements—pitch, duration, and intensity—were set as the dependent variables and each Individual model looked at the effects of a single variable, with the word form and syllable weight functioning as the fixed factors and speaker, the vowel position (V1, V2) and word form included as fixed factors[15]. The model for fundamental frequency, wherein all factors were fixed while also looking at interactions between speakers, word form and vowel, is shown as entered:

```
model_F0.lm <- lm(z_F0 ~ word_form + syll_weight + word_form *
speaker * v1v2_new, data = task1)
```

[13] (R Core Team, 2014)

[14] (Bates et al., 2015)

[15] Speaker was also included as a random effect in effort to control for intra-speaker variation.

4.2.4 Results

Results will be presented in the following order: first, we will look at the bare word forms, and then the singular and plural constructions. Within the bare word forms, results for bisyllabic bare words will be presented first, followed by trisyllabic bare words. The means and standard deviations will be given[16], as well as the results from the model and its post-hoc analysis.

4.2.5 Bisyllabic Bare Words

Beginning with the bisyllabic bare word forms, the question of where stress will fall is something of a coin toss. The survey conducted by Aurrekoetxea et al. (2015) returned ambiguous results; although stress typically falls on the second syllable from the left, instances of stress being placed on the first syllable—the second syllable from the *right*, it should be noted, where stress typically falls in Spanish bisyllabic words without lexical stress—were observed, as well as speakers producing both variations within their idiolects. For example, a token like *negu* ‘winter’ could be produced as either *négu* or *negú*. The acoustic measurements of both vowels, separated by speaker, are presented in Tables 4.2-3 and 4.2-4[17][18].

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[16] In the tables that follow, the means will be provided with the standard deviation given in parenthesis below it.

[17] For this and all following tables, the highest values are bolded and highlighted.

[18] The full table of measurements can be found in Appendix A.

Table 4.2-4. Means & Standard Deviations For Fundamental Frequency

	bisyllabic bare nouns n<u>e</u>-g<u>u</u> 'winter' & g<u>i</u>-z<u>o</u>n 'man' type	
SPEAKER 1	**V1**	**V2**
Max F0 (Hz)	**217.13 (30.23)**	205.41 (52.66)
Mean F0 (Hz)	**197.9 (28.73)**	172.91 (36)
SPEAKER 3	**V1**	**V2**
Max F0 (Hz)	158.31 (20.52)	**169.42 (19.08)**
Mean F0 (Hz)	151.18 (19.52)	**154.6 (11.46)**
SPEAKER 4	**V1**	**V2**
Max F0 (Hz)	123.9 (12.5)	**147.93 (41.51)**
Mean F0 (Hz)	113.84 (7.10)	**127.43 (20.1)**
SPEAKER 5	**V1**	**V2**
Max F0 (Hz)	**180.95 (22.1)**	174.04 (23.13)
Mean F0 (Hz)	**162.57 (12.74)**	150.84 (8.62)
SPEAKER 6	**V1**	**V2**
Max F0 (Hz)	**239.44 (23.33)**	222.88 (47.48)
Mean F0 (Hz)	**223.42 (14.34)**	202.07 (40.03)
SPEAKER 7	**V1**	**V2**
Max F0 (Hz)	93.67 (13.49)	**109.41 (28.86)**
Mean F0 (Hz)	87.91 (9.2)	**89.3 (7.31)**

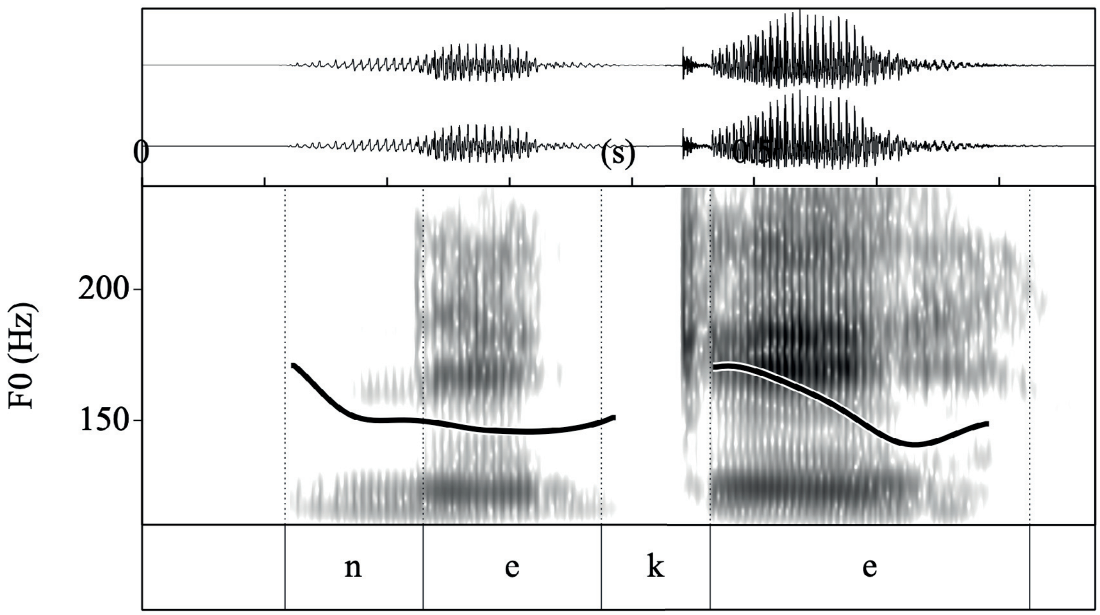
With respect to F0, the data shows that there is indeed variation in stress placement. Speakers 1, 5, and 6 all place stress on the first syllable on average more often than the anticipated second syllable, whereas speakers 3, 4, and 7 more frequently stress the second syllable. These patterns are reflected in both the maximum and mean F0 measurements.

Of interest is the pattern seen in duration. All speakers, regardless of whether or not pitch was also raised in that syllable, produce the second syllable at a longer length than the first. This means that although speakers 3, 4, and 7 are using both pitch and duration as cues of accentual prominence, there is a correlate disconnect for speakers 1, 5 and 6, where pitch indicates stress placement on the first syllable but duration indicates stress placement on the second.

Table 4.2-5. Means & Standard Deviations For Mean F0 And Duration

	bisyllabic bare nouns n<u>e</u>-g<u>u</u> 'winter' & g<u>i</u>-z<u>o</u>n 'man' type	
SPEAKER 1	**V1**	**V2**
Mean F0 (Hz)	**197.9 Hz (28.73)**	172.91 (36)
Duration (ms)	92.27 ms (29.26)	**153.09 (66.99)**
SPEAKER 3	**V1**	**V2**
Mean F0 (Hz)	151.18 (19.52)	**154.6 (11.46)**
Duration (ms)	103.82 (31.49)	**196.79 (67.77)**
SPEAKER 4	**V1**	**V2**
Mean F0 (Hz)	113.84 (7.10)	**127.43 (20.1)**
Duration (ms)	124.87 (25.49)	**148.74 (53.29)**
SPEAKER 5	**V1**	**V2**
Mean F0 (Hz)	**162.57 (12.74)**	150.84 (8.62)
Duration (ms)	140.66 (43.41)	**226.12 (72.79)**
SPEAKER 6	**V1**	**V2**
Mean F0 (Hz)	**223.42 (14.34)**	202.07 (40.03)
Duration (ms)	85.88 (20.18)	**146.21 (28.73)**
SPEAKER 7	**V1**	**V2**
Mean F0 (Hz)	87.91 (9.2)	**89.3 (7.31)**
Duration (ms)	102.34 (25.01)	**142.64 (24.75)**

The aforementioned variation in stress placement can be seen more clearly when looking at individual tokens. For example, there was a split amongst the participants as to where stress fell in bisyllabic words with light-light syllable construction, such as *neke* ‘fatigue’. Stress in both the first and second syllable was observed. To illustrate this point, the spectrograms for Speakers 3 and 5 are given in Figures 4.2-1 and 4.2-2.



Figures 4.2-1. Speaker 3’S Production Of Neke ‘Fatigue’

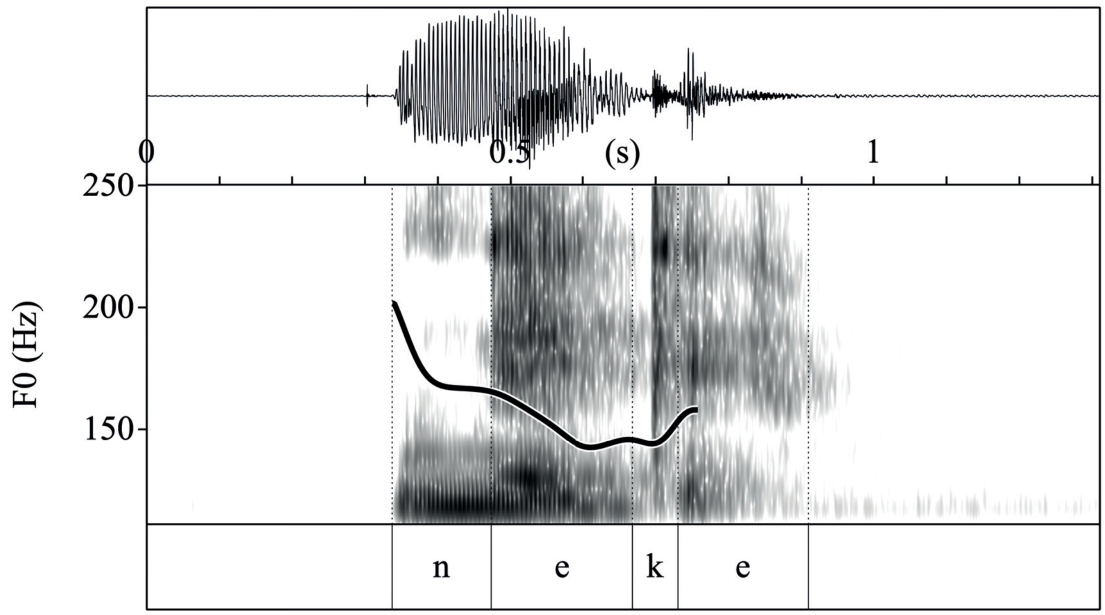


Figure 4.2-2. Speaker 5'S Production Of Neke 'Fatigue'

Following the pitch contour, the difference between these two pronunciations of the same token are obvious. Speaker 3 placed stress on the second syllable, with the final [e] showing greater duration, F0 and intensity measurements than the first. On the other hand, Speaker 5 placed stress on the first syllable, where pitch, duration and intensity measurements are greater for the first vowel than for the second.

Another variation can be seen in the production of *bide* 'path'. One thing to note is that from the data given at this point, Speaker 3 has shown both first syllable and second syllable stress placement. Where they placed stress on the second syllable as in *ne.ké* ' fatigue' (Figure 4.2-1), they also placed stress on the first syllable as in *bí.de* 'path' (Figure 4.2-3), giving us a clear display of intra-speaker variation.

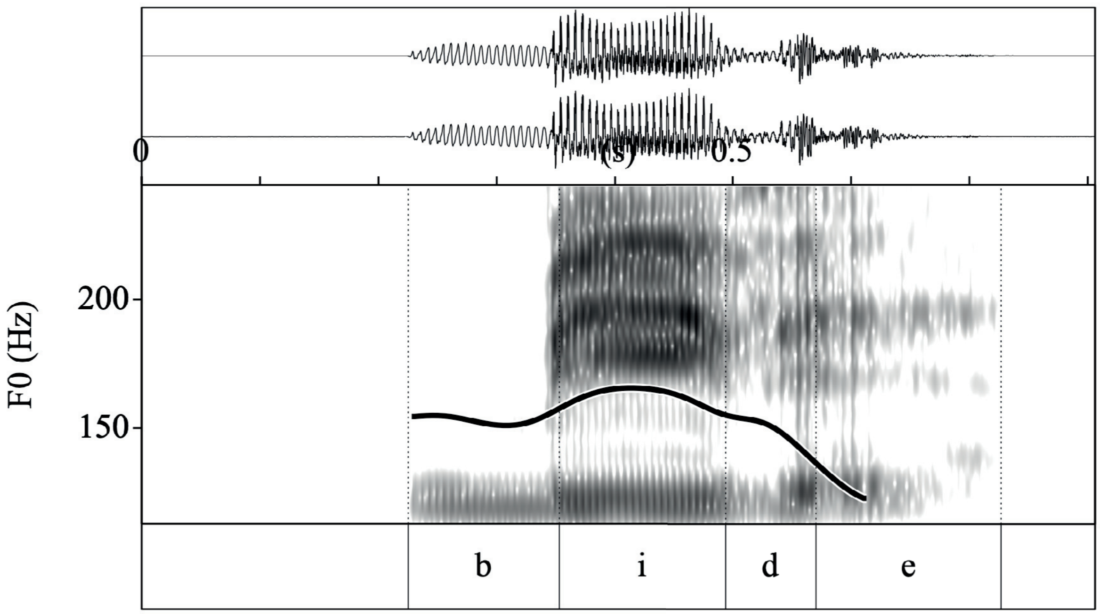


Figure 4.2-3: Speaker 3'S Production Of Bide 'Path'

A closer look at the structure of each respective token reveals that syllable weight does play a role with regards to bisyllabic stress placements. While there is more free variation in where stress falls in stimuli with light-light syllable structure, the production of light-heavy constructions is more uniform and predictable. Every speaker, regardless of their patterns with LL stimuli, stress the second, heavier syllable in LH words like *txa.kur* 'dog' and *gi.zon* 'man'. That is to say, such words are always produced as *txa.kúr* and *gi.zón*, with zero attested instances of *txá.*kur* or *gí.*zon*. This supports Aurrekoetxea et al.'s (2015) assertion that heavy syllables attract stress. Productions of LH stimuli can be found in Figures 4.2-5 and 4.2-6.

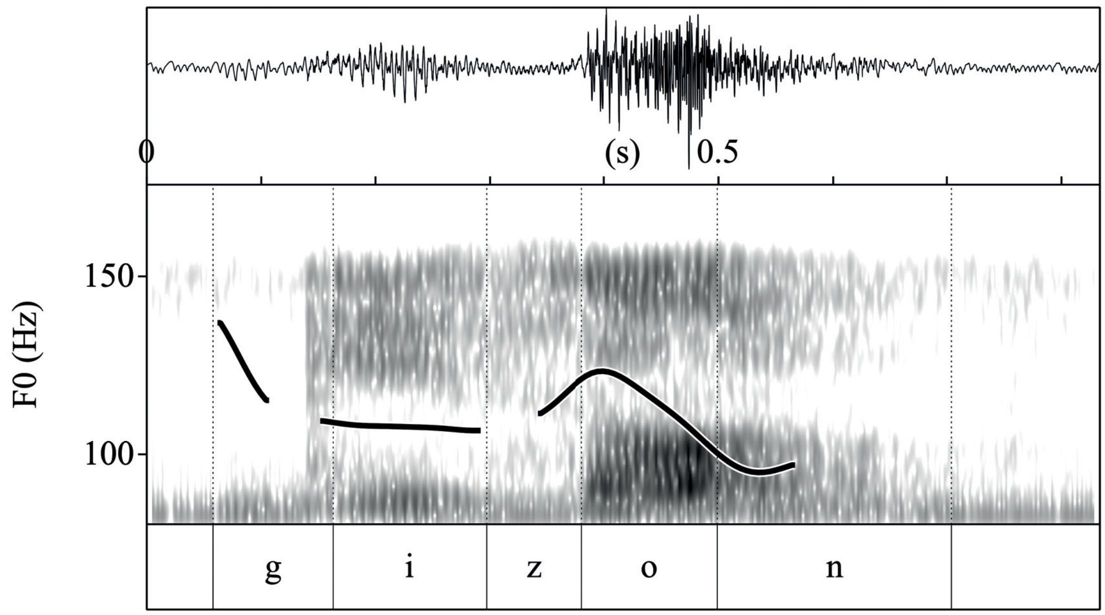


Figure 4.2-4: Speaker 4'S Production Of Gizon 'Man'

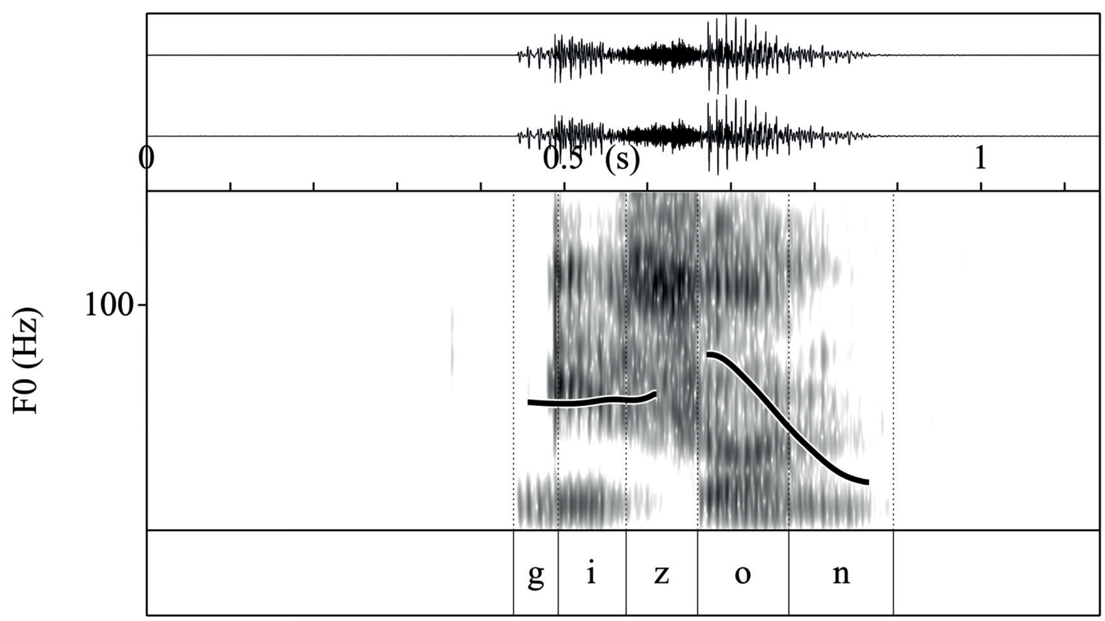


Figure 4.2-5: Speaker 7'S Production Of Gizon 'Man'

Despite this pattern, syllable weight did not give an overall statistically significant effect. One possibility is that while LH bisyllabic constructions show a clear preference for stress placement, the frequency of bisyllabic tokens is near negligible in comparison to all other larger polysyllabic words. This does make a kind of sense, given that the set of bisyllabic constructions is much smaller than the set of trisyllabic or higher words when taking into account not only trisyllabic bare nouns, but the singular and plural genitive constructions of bisyllabic bare forms.

4.2.6 Trisyllabic Bare Words

Looking now at trisyllabic words, measurements were taken for all three vowels. Given the findings of Gaminde et al. (2015), two concurrent patterns are anticipated: that V2 has the highest values of the three vowels, and that the pre-accent V1 will measure higher than post-accent V3. The means and standard deviations of the collected measurements are provided in Tables 4.2-4 - 4.2-6[19].

Table 4.2-6: Means And Standard Deviations For All Trisyllabic Stimuli, Speaker 3

	trisyllabic bare nouns li-bu-ru 'book' & ko-ka-pen 'place' type		
SPEAKER 3	**V1**	**V2**	**V3**
Max F0 (Hz)	161.23 (11.22)	**167.91 (18.56)**	140.96 (9.7)
Mean F0 (Hz)	153.43 (9.29)	**162.05 (16.47)**	132.18 (6.61)
Duration (ms)	91.6 (37.76)	**137.48 (30.21)**	111.73 (45.48)
Intensity (dB)	70.41 (3.67)	**72.33 (4.35)**	67.5 (6.05)

Looking just at the means and standard deviations, the results for trisyllabic words are surprising.

[19] The full table can be found in Appendix A.

Speaker 3 (Table 4.2-4) produced the anticipated results, in that the measurements for pitch, duration and intensity are all highest in V2, followed by V1 and ending with V3 producing the lowest numbers. Even so, the results for Speaker 3 doesn't seem to support the findings of Gaminde et al.'s (2015) and the proposed hierarchy of prosodic force; the difference between V1 and V2 is highest in duration, then (mean) pitch, which would imply that Speaker 3, on average, relies on duration as a correlate of stress more than they do pitch. Unsurprisingly, the differences in intensity are very small, as intensity—if it can even be said to be a correlate—carries the least prosodic force.

Table 4.2-7: Means And Standard Deviations For All Trisyllabic Stimuli, Speakers 4 & 7

	trisyllabic bare nouns l**i**-b**u**-r**u** 'book' & k**o**-k**a**-p**e**n 'place' type		
SPEAKER 4	**V1**	**V2**	**V3**
Max F0 (Hz)	112.68 (4.96)	129.81 (22.15)	**227.24 (57.42)**
Mean F0 (Hz)	110.21 (4.16)	119.34 (8.02)	**198.42 (42.75)**
Duration (ms)	93.06 (29.94)	140.56 (28.72)	**142.77 (105.93)**
Intensity (dB)	64.6 (4.45)	**64.72 (5.06)**	62.09 (4.18)
SPEAKER 7	**V1**	**V2**	**V3**
Max F0 (Hz)	88.83 (7.78)	98.61 (19.76)	**121.13 (63.05)**
Mean F0 (Hz)	85.23 (6.12)	90.31 (8.18)	**112.82 (60.84)**
Duration (ms)	86.02 (18.87)	108.7 (23.74)	**127.42 (47.73)**
Intensity (dB)	62.33 (3.65)	**65.63 (5.2)**	61.75 (3.84)

Interestingly enough, Speakers 4 and 7 (Table 4.2-5) accentuate the third syllable, producing forms as in *liburú* ‘book’ and *kokapén* ‘place’. While this can easily be explained for Speaker 7, attributed to their exposure to the Ondarru Basque dialect[20] and recent changes in language dominancies, there is not so neat an explanation for what has caused Speaker 4 to put stress on the third syllable instead of the anticipated second syllable from the left.

On the other hand, Speakers 1, 5, and 6 (Table 4.2-6) seem to be stressing the first syllable, as in *líburu* ‘book’ and *kókapen* ‘place’. For all three of these speakers, the highest measurements for pitch, duration and intensity are all found in V1, with the values progressively lowering as the word continues. One key factor that must be kept in mind is that these measurements are for words in isolation, which can at best help us to establish a general idea of what speakers are doing.

[20] Recall that Ondarru Basque is the NBB spoken by Speaker 7’s spouse, and is the dialect spoken in the home.

Table 4.2-8: Means And Standard Deviations For All Trisyllabic Stimuli, Speakers 1, 5 & 6

	trisyllabic bare nouns li-bu-ru 'book' & ko-ka-pen 'place' type		
SPEAKER 1	**V1**	**V2**	**V3**
Max F0 (Hz)	**218.23 (22.09)**	207.55 (17.06)	186.8 (40.66)
Mean F0 (Hz)	200.58 (11.44)	**200.78 (16.16)**	159.07 (17.67)
Duration (ms)	93.44 (36.16)	102.06 (35.21)	**125.39 (32.36)**
Intensity (dB)	**75.83 (5.79)**	74.5 (4.25)	70.63 (4.41)
SPEAKER 5	**V1**	**V2**	**V3**
Max F0 (Hz)	**180.17 (24.52)**	172.45 (16.99)	158.08 (10.76)
Mean F0 (Hz)	**167.37 (11.66)**	163.96 (9.12)	148.17 (8.79)
Duration (ms)	115.34 (34.58)	154.08 (27.87)	**175.62 (46.97)**
Intensity (dB)	**76 (2.25)**	75.25 (1.65)	75 (1.75)
SPEAKER 6	**V1**	**V2**	**V3**
Max F0 (Hz)	**238.17 (14.37)**	223.64 (15.71)	204.13 (40.83)
Mean F0 (Hz)	**220.44 (15.56)**	210.18 (22.14)	192.64 (36.42)
Duration (ms)	78.76 (17.48)	111.83 (20.4)	**127.11 (24.94)**
Intensity (dB)	**69 (2.13)**	68.58 (4.64)	59.7 (3.05)

Overall, the model revealed that in both bisyllabic and trisyllabic words, there was an interaction between maximum F0 and light syllables ($\beta = -0.18$, $t = -2.52$, $p = 0.01$), as well as V2 ($\beta = -0.41$, $t = -1.70$, $p = 0.08$), and V3 ($\beta = -1.10$, $t = -3.55$, $p = 0.0004$). Mean F0 was shown to have similar interactions with V2 ($\beta = -0.53$, $t = -2.34$, $p = 0.01$), and V3 ($\beta = -1.54$, $t = -5.30$, $p =$

<0.0001). Finally, while duration saw interaction with V2 (β = 1.01, t = 0.24, p = 2.88e-05) and V3 (β = 0.30, t = 2.76, p = 0.005), intensity only saw significant interactions with V3 alone (β = -1.27, t = -3.80, p = 0.0001). In the post-hoc analysis, the individual effects of these interactions see speakers falling into curious but clear patterns.

Starting with Speaker 1, their bare V1 had the highest maximum F0 measurements, much larger than bare V3 (β = 1.1, t = 3.55, p = 0.22), plural v3 (β = 1.16, t = 4.7, p = 0.003) as well as higher than singular v3, though the latter was not in any statistically significant manner. This is reflected when looking at intensity as well, with bare V1 reported as much louder than the bare V3 (β = 1.27, t = 3.80, p = 0.11) and the plural V3 (β = 0.93, t = 3.58, p = 0.20). What is interesting is the same relationships with respect to duration: as far as this property is concerned, the bare V1 was shorter on average than the bare V3, but not in a statistically significant manner. Recalling that Speaker 1 had higher values on V1 than the expected V2 in the previously covered means & standard deviations, it is not surprising that no significant values were found for the interaction between the bare V2 and the plural V2, nor between the singular V2 and plural V2. If not for the higher pitch in V1, it could be said that Speaker 1's productions support previous research, as there is no kind of word form distinction occurring between the singular and plural.

In accordance with their earlier results, all of Speaker 3's V2 measurements were much higher than all V3 measurements when looking at maximum F0, though only the interactions between bare and plural forms were significant. Interestingly, when looking instead to the mean F0, bare V3 is far higher than bare V3, plural V3 and singular V3. Speaker 3 is unique in that there is a significant difference between the duration of bare V2 over that of singular V2 (β = 0.77, t = 3.17, p = 0.51), while at the same time, the bare V2 has lower intensity than both singular and plural V2, albeit not in any significant manner. Thus, as we observed that Speaker 3 was using intensity as a correlate, its hierarchical force seems to be very weak in comparison to F0 and duration, further supporting the findings of Gaminde et al. (2015).

Consistently contrary to previous findings, Speakers 4 and 7 have the highest values in V3. For Speaker 4, the bare V1 is significantly lower than the bare V3 ($\beta = -3.70$, $t = -8.48$, $p = < 0.0001$). More importantly, the bare V2—that is, the place where stress was anticipated to fall—is also of a much lower maximum frequency than the bare V3 ($\beta = -3.06$, $t = -6.97$, $p = <0.0001$), a result which is repeated when looking at the mean F0 ($\beta = -3.40$, $t = -8.27$, $p = <0.0001$). However, this relation is not reflected in duration or intensity. This suggests that Speaker 4, at least, is relying more heavily on F0 than the other two acoustic properties.

Speaker 5 falls into the same pattern as Speaker 1, with bare v1 significantly higher than bare v3 ($\beta = 1.29$, $t = 4.15$, $p = 0.03$). And again, both the plural v1 and singular v1 measurements are significantly higher than the respective bare v3 and plural v3, but the effect on the singular word form remains less significant. The same can be said of the interaction between V2 and word form; all three V2 measurements were consistently of a higher frequency than all of the V3 measurements. Just like Speaker 1, these results are only in the context of frequency and duration; there are no significant differences in the measurements for intensity, which is yet more support for its low prosodic force amongst Batua speakers.

Up to this point, it seems that these results are suggesting that word form plays a role the production of words in isolation. That singular forms are continually returning insignificant values, there must then be something about the bare word form and the plural word form that is causing these differences. The plural v3 being much lower than the bare v1 is possibly an affect of the morphological process of affixing the genitive postposition. We saw earlier that stressed syllables don't cross the morpheme boundary, so there is a chance that the addition of postpositions affect the intonation processes that a word can undergo. With a word like maitasun maitasunen, but there are nearly quadruple the number of light syllables than there are heavy syllables. therefore, most of the processes presumably look like hutsune becoming hutsunen, where the elision/truncation of the stem final /e/ results in the third syllable being pulled onto the other side of the morpheme boundary, rendering it extrametrical. This idea finds support in the fact that the interactions between the v1 and v3 of the bare/plural forms consistently return significant values.

For both maximum and mean F0, the bare V2 of Speaker 6 is lower than both of its singular and plural counterparts, although neither interaction proved to be significant. What did return noteworthy values was duration. Speaker 6's bare V2 has a longer duration than both the plural V2 ($\beta = 0.98$, $t = 4.06$, $p = 0.04$) and the singular V2 ($\beta = 1.36$, $t = 5.56$, $p = <0.0001$), implying that either there is something happening in the bare word forms that prolong them, or there is some kind of sound change process occurring in the singular and plural forms, presumably as a result of the morphological process of adding the genitive postpositions.

Much like Speaker 4, Speaker 7 also produced contrary results, with V3 having the highest pitch values. The bare V1 has a far lower maximum than the bare V3 ($\beta = -1.20$, $t = -3.47$, $p = 0.27$), a result reflected in both the singular and plural forms, but only the bare word forms have proved to be significant. The same pattern emerges when looking between the bare V1 and the bare V3 ($\beta = -0.93$, $t = -3.73$, $p = 0.13$). Again, the differences between V1 and V3 only having meaningful effect in the bare word form. Although Speaker 7 was observed to employ pitch, duration, and intensity to some extent, a significant relationship occurs only with pitch. In fact, when it comes to duration and intensity, the values for V2 are higher than those of V3. For the plural word form in particular, the V2 is much higher than the V3 ($\beta = 1.05$, $t = 4.07$, $p = 0.04$). We have a plausible explanation for why this phenomena is occurring with Speaker 7 (i.e., having recently switched language dominance to their spouse's NBB dialect), but the reason behind Speaker 4 producing similar results remains a mystery.

Ultimately, these results does in fact cement the fact that duration can be used as an acoustic correlate of accentual prominence, but not for all speakers. The idea of a hierarchy managing the stress correlates is harder to definitively support. As mentioned previously, Speaker 3's results are the only ones which have all three factors—pitch, duration and intensity—measuring highest in the anticipated V2. Even so, the measurements in question do not obey the proposed hierarchy of effect, wherein pitch carries the most force, followed by duration and then intensity. As far as the data for Speaker 3, it could be argued that duration carries more force as a correlate than intensity. This could be an effect of contact with Spanish prosody, but an answer can also be found in the works of Rodríguez-Ordóñez (2018, 2019), where speakers of local dialects that speak the Standard can lose pitch as a correlate, and can (and have) bridge this gap by compensating with increased duration. Such a hypothesis is likely considering that Speaker 3 is in fact dominant in the NBB variety studied in Rodríguez-Ordóñez (2019).

4.2.7 Singular & Plural Word Forms

We now move on to the singular and plural word forms. A crucial goal here is to provide further evidence that speakers of Standard Basque do not make prosodic distinctions between the singular and plural forms of words. Northern Bizkaian Basque dialects display word-level contrastive distinctions; if the speakers have not been too heavily influenced by any of these dialects, there should not be a statistically significant difference between the V2 measurements of a singular word and its plural counterpart. As a reminder, the singular construction involves the affixation of the genitive singular suffix *-(a)ren*, which increases the number of syllables of a word by as many as two syllables dependent upon the weight and construction of the final syllable (for example, bisyllabic *txa.kur* 'dog' to polysyllabic *txa.ku.rra.ren* 'of the dog' where the trisyllabic *a.la.ba* 'daughter', which already ends in -a, extends to *a.la.ba.ren* 'of the daughter', and not **a.la.ba.a.ren*). The means and standard deviations for mean F0 for singular constructions can be found in Tables 4.2-5[21].

Table 4.2-9: Means & Standard Deviations For Mean F0 Of Singular Constructions

	Singular Word Forms l**a**-g**u**-n**a**-ren 'of the friend' & tx**a**-k**u**-rr**a**-ren 'of the dog' type		
Singular Mean F0 (Hz)	V1	V2	V3
SPEAKER 1	203.06 (17.52)	**216.21 (22.38)**	178.85 (19.09)
SPEAKER 3	156.5 (12.21)	**164.01 (9.86)**	137.38 (7.77)
SPEAKER 4	110.67 (3.7)	**124.59 (8.45)**	104.77 (9.01)
SPEAKER 5	169.06 (8.08)	**171.49 (7.19)**	161.45 (9.46)
SPEAKER 6	**221.54 (27.09)**	216.86 (18.29)	200.46 (23.24)
SPEAKER 7	87.64 (5.16)	**94.13 (6.34)**	84.88 (5.98)

Considering the mean values, the majority of speakers show results that support the findings of Gaminde et al. (2015), with V2 having the highest measurement. For Speakers 5 and 6, however, the very minimal difference between the measurements for V1 and V2 indicate that these two speakers variably change pitch between these two vowels; that is to say, they pronounce singular

[21] Tables for both mean F0 and maximum F0 can be found in Appendix A.

word forms with higher V1 in some instances and higher V2 in other cases. These results also indicate that the pattern of producing polysyllabic words in isolation as an accentual unit of progressively lowering intonation was not necessarily a case of outliers. If similar results are given for the plural constructions, then it may very well be that Speakers 5 and 6 have this phenomena as part of their respective idiolects. A closer look at the spectrograms of individual tokens will help to visualize these patterns, such the one in Figure 4.2-11 below.

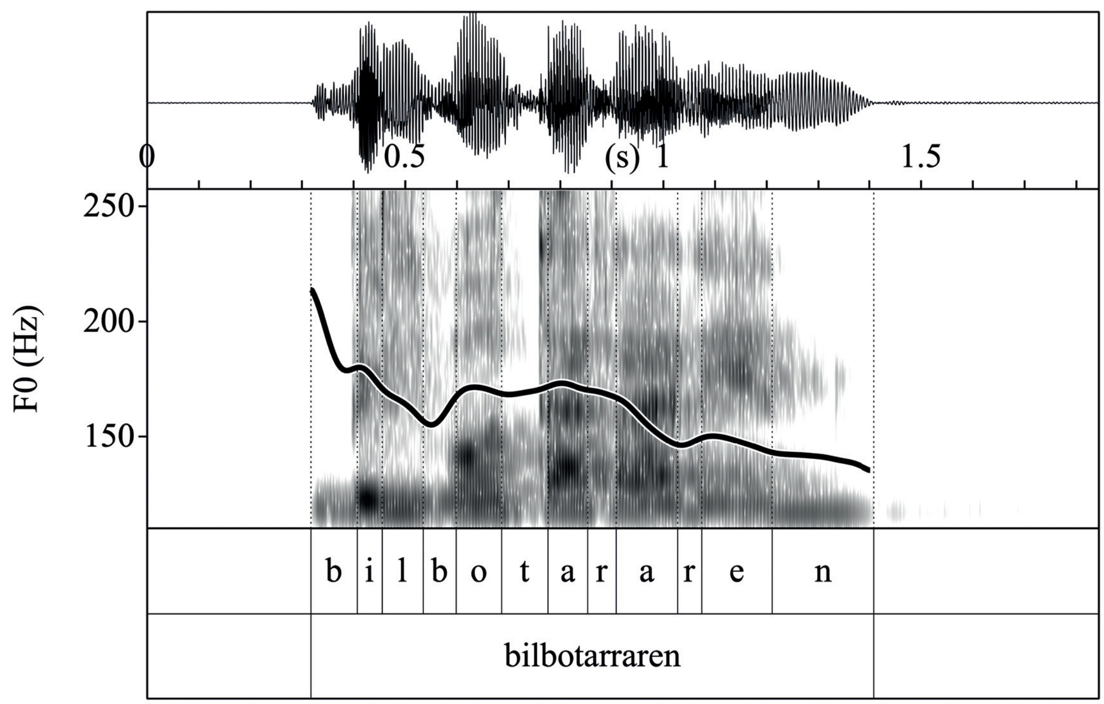


Figure 4.2-6: Speaker 5'S Production Of Bilbotarraren 'Of The Person From Bilbao'

The above figure features a token from Speaker 5, and we can see that while there is lowering intonation once the morpheme boundary is passed—as expected, given that it was not anticipated for the genitive singular or plural morphemes to bear stress—the peaks of the vowels are of comparable height, with V1 eking out just ahead of V2 and V3. One potential explanation for this phenomena is that arrangement of the stimuli; as the words are given in isolation—as opposed to being embedded within a carrier phrase—it is possible that speakers began to recite the stimuli as though it were part of listed speech, given that a feature of list intonation is a lack of pitch lowering. The instrument was designed with the hope that the 4-second pause between stimuli would be enough to avoid the effects of this, though it seems to have not worked as well as intended.

Moving on to duration, a pattern different from that found in the bare word forms emerges, as can be seen in Table 4.2-6 below. This is to say, regardless of the mean and maximum F0 measurements, the majority of speakers produce V2 with the longest duration. The sole exception to this pattern (Speaker 1) can potentially be attributed to list intonation, just as was found with some cases of fundamental frequency.

Table 4.2-10: Means & Standard Deviations For Duration Of Singular Constructions

	Singular Word Forms l**a**-g**u**-n**a**-ren 'of the friend' & tx**a**-k**u**-rr**a**-ren 'of the dog' type		
Singular Duration (ms)	V1	V2	V3
SPEAKER 1	97.75 (42.02)	86.71 (20.57)	**97.88** **(20.98)**
SPEAKER 3	107.69 (31.56)	**120.24** **(27.23)**	98.01 (32.12)
SPEAKER 4	99.88 (31.78)	**113.79** **(26.35)**	81.75 (27.67)
SPEAKER 5	103.4 (28.89)	**106.08** **(21.54)**	104.95 (28.09)
SPEAKER 6	76.09 (21.12)	**86.66** **(25.69)**	72.12 (18.14)
SPEAKER 7	82.05 (22.46)	**103.12** **(25.19)**	87.33 (24.72)

Ultimately, these results confirm that while duration is largely employed as a correlate, it is not always employed in tandem with pitch by all speakers, notably Speaker 1. The regularity of V2 measuring highest could even be thought of as proof that perhaps duration has come to carry more prosodic force than pitch, where pitch is more likely to fluctuate and vary by speaker.

Turning now to the measurements for plural constructions, results very similar to those of the trisyllabic bare word forms are revealed. Once again, both Speakers 5 and 6 produced the highest peak on V1, rather than the anticipated V2, as shown in Table 4.2-8.

Table 4.2-11: Means & Standard Deviations For Mean F0 Of Singular Constructions

	Plural Word Forms o-iha-nen 'of the forests' & he-zu-rren 'of the bones' type		
Plural Mean F0 (Hz)	V1	V2	V3
SPEAKER 1	192.61 (17.2)	**205.9 (14.08)**	163.74 (11.21)
SPEAKER 3	151.22 (11.2)	**158.76 (11.44)**	131.33 (8.98)
SPEAKER 4	111.42 (5.53)	121.36 (6.17)	**124.72 (45.35)**
SPEAKER 5	**166.98 (8.74)**	165.67 (7.30)	151.76 (11.05)
SPEAKER 6	**225.45 (12.08)**	214.13 (26.15)	195.38 (22.77)
SPEAKER 7	85.19 (4.9)	91.65 (5.92)	**102.41 (34.81)**

Where these two speakers have a falling intonation, Speakers 4 and 7 has rising intonations, where the highest measurements are found in V3. This suggests that these two speakers are consistently placing stress on the third syllable, regardless of whether or not a word is in its bare form or bearing some postposition.

Table 4.2-12: Means & Standard Deviations For Duration Of Plural Constructions

	Plural Word Forms o-ih**a**-n**e**n 'of the forests' & h**e**-z**u**-rr**e**n 'of the bones' type		
Plural Duration (ms)	V1	V2	V3
SPEAKER 1	90.22 (24.9)	**95.57 (23.3)**	93.28 (29.26)
SPEAKER 3	101.62 (38.21)	**134.54 (34.53)**	97.72 (37.03)
SPEAKER 4	101.95 (32.07)	**127.09 (31.96)**	88.48 (31.13)
SPEAKER 5	106.82 (31.75)	**137.3 (40.86)**	127.06 (48.03)
SPEAKER 6	75.18 (20.18)	**99.3 (28.58)**	96.82 (32.88)
SPEAKER 7	88.19 (28.18)	110.65 (39.44)	**110.95 (38.66)**

However, when looking to duration (Table 4.2-9), the patterns change for some speakers. Both Speakers 1 and 3 fall in line with anticipated results, with V2 having the longest measurement, and in the case of Speaker 3, pre-accent V1 measuring higher than post-accent V3. Speaker 4's fundamental frequency measurements indicated rising intonation, but their duration patterns adhere to the previously attested patterns. This is in contrast to Speaker 7, who pitch and duration both indicate raising intonation. It is worth noting that there is a very minimal difference between V2 and V3 for Speaker 7. A similar pattern is seen in Speakers 5 and 6: recall that these two speakers' pitch measurements indicated falling intonation. Duration, on the other hand, sees the anticipated V2 having the highest measurements. These discrepancies between the two acoustic properties suggest that there is perhaps a kind of correlational disconnect, where different properties indicate different stress placements.

Another interesting point of comparison is the production of the singular and plural counterparts of *bide* 'path', as made by speaker 3, who gave bisyllabic light-light constructions variable stress. As previously stated, bisyllabic words with light syllables are more prone to variable stress, whereas heavy syllables (in light-heavy constructions) always receive stress.

Speaker 3's productions can be found in Figures 4.2-14 through 4.2-16.

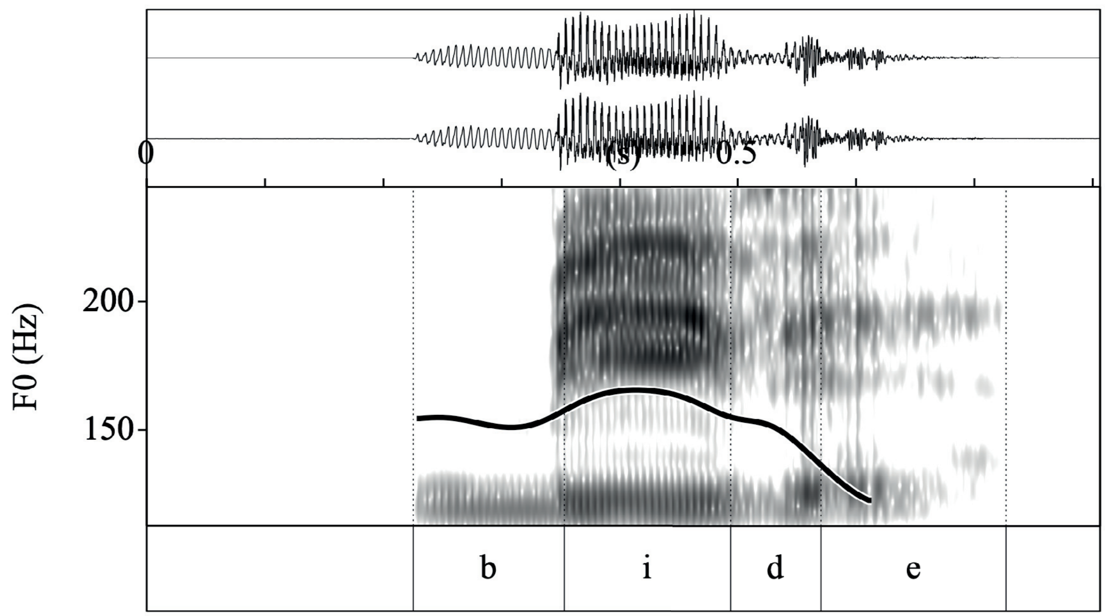


Figure 4.2-7: Speaker 3'S Production Of Bide, ‘Path’

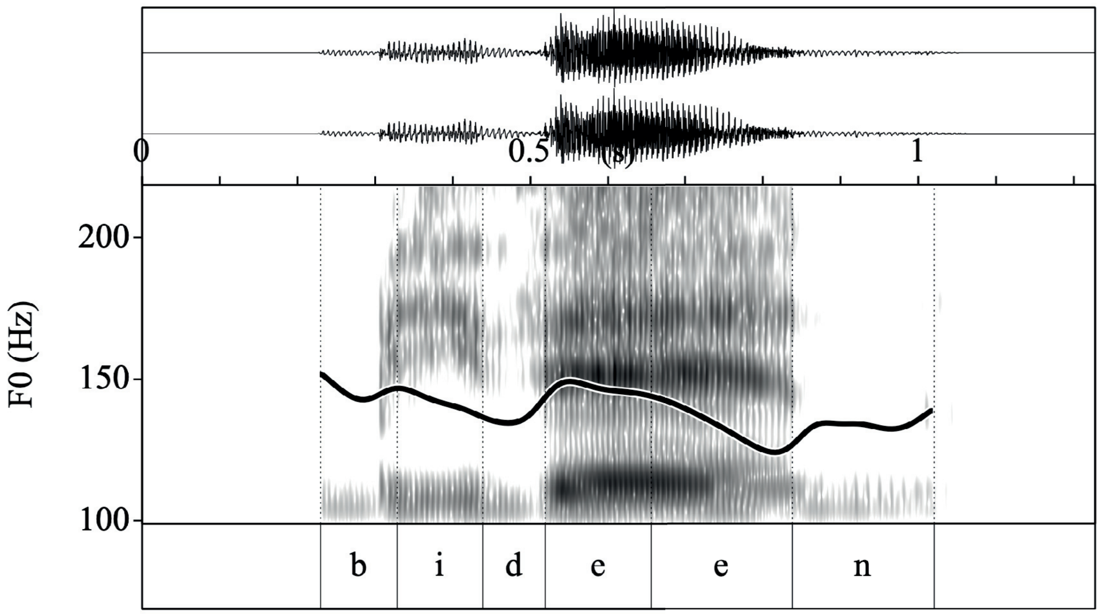


Figure 4.2-8: Speaker 3'S Production Of Bideen, 'Of The Paths'

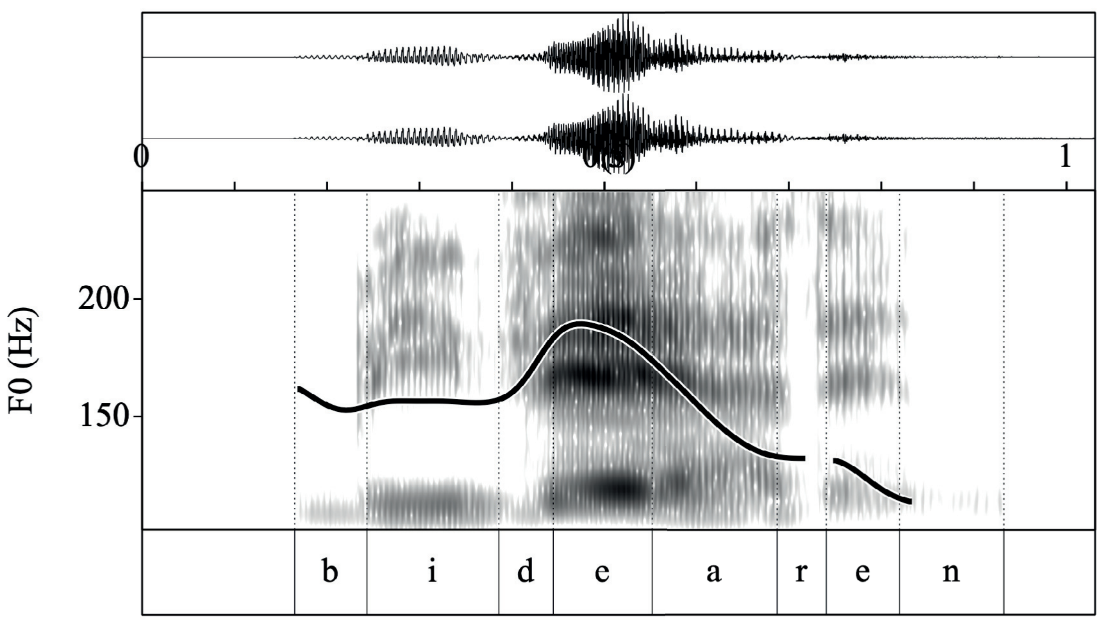


Figure 4.2-9: Speaker 3'S Production Of Bidearen, 'Of The Path'

Looking at the contours, it is clear that when not in the bare form, stress seems to be placed invariably on the anticipated second syllable. In its bare form, Speaker 3 uses pitch to mark V1 as the stressed syllable. To that end, both the form of the word and the syllable weight do have some bearing on prosody, in that light-light bisyllabic constructions are more prone to intra-speaker variation, whereas polysyllabic words fall more in line with previous findings, with stress falling on the second syllable from the left.

Recall that the model reported the following: maximum F0 affecting syllable weight, V2, and V3; mean F0 and duration affecting V2 and V3; and intensity only affecting V3. While still important to consider the bare word forms, the post-hoc analysis of the singular and plural genitive constructions will likely bear the greater amount of significant results, given that these two forms are, at a minimum, trisyllabic. Further, results will be able to show whether or not the morphological boundary affects extrametricality.

Speaker 1's results here are very different from those reported for the bare word forms; the plural V2 has a far higher maximum F0 than the plural V3 ($\beta = 1.12$, $t = 4.56$, $p = 0.006$). That the V1 is smaller than V2—albeit, not significantly—this corroborates with the earlier reported means and standard deviations. Thus, while bare trisyllabic words were produced with the peak in the first syllable, for plural constructions, Speaker 1 raises their pitch in the anticipated V2. The same pattern can be found in the singular construction, with V2 outstripping V3 by a considerable margin ($\beta = 0.92$, $t = 3.81$, $p = 0.10$). Both duration and intensity were employed in indicating stress; for both the singular and plural forms, V2 was higher than V1 and V3, with the intensity of the plural V2 being significantly louder than its V3 ($\beta = 0.94$, $t = 3.68$, $p = 0.15$). It is clear that this speaker is not doing the same thing as they did with bare word forms.

Rather than having high V1 values, stress is instead falling on the anticipated v2, with duration and intensity mirroring pitch to some extent.

Maintaining their propensity towards what has previously been suggested to be Standard Basque prosody, Speaker 3's results here are very similar to those given for the bare word forms. As would be expected, the plural V1 is lower than V2 for both maximum and mean pitch, duration, and intensity. There is a difference wherein the maximum F0 of the plural v1 is far higher than its V3 ($\beta = 0.92$, $t = 3.75$, $p = 0.12$), which is mirrored in the measurements for the singular ($\beta = 0.92$, $t = 3.62$, $p = 0.18$)[22]. Along this same vein, the singular V1 is much less intense than V2 ($\beta = -1.05$, $t = -3.94$, $p = 0.07$). Additionally, the mean F0 saw singular V2 being higher than V3 ($\beta = 1.69$, $t = 7.05$, $p = <0.0001$) with the same thing occurring with the plural V2 ($\beta = 1.32$, $t = 5.33$, $p = 0.00015$) and although the same could be said for duration and intensity, neither of these factors interacted in a statistically significant way.

Speaker 4 also maintains their heretofore observed pattern; for both maximum and mean F0, the plural V1 measures lower than both V2 and V3. On the other hand, V1 is shorter on average than V2, but longer than V3 and what's more, opposite the effect on pitch, the plural V1 is more intense than both V2 and V3. These findings are mirrored in the singular V1, with V1 measuring lower than V2 and V3 for pitch, while duration sees a hierarchy of V2 > V1 > V3. Additionally, there is still an inverse correlation between pitch and intensity, as the singular V1 is more intense than both V2 and V3. What is interesting to note here is that despite these patterns, none of the aforementioned effects are interacting in a significant manner. This changes only slightly when looking at V2; the plural V2 has lower maximum and mean pitch than V3, but is

[22] The mean F0 was also significant, as the singular V2 was also higher than V3 ($\beta = 1.25$, $t = 4.90$, $p = 0.001$), as was the plural ($\beta = 1.74$, $t = 7.51$, $p = <0.0001$).

significantly longer (β = 0.89, t = 4.03, p = 0.05), and less intense than V3. In the singular constructions, V2 measures higher than V3 in both F0 (β = 0.89, t = 3.54, p = 0.23) and duration, but with a lower intensity than V3.

One of the more interesting patterns that seems to be occurring is that regarding the singular genitive construction; a number of speakers had effects between vowels in the bare and plural forms that did not extend their significance to the singular form. This presumably occurs due to the nature of the singular postposition, given that it can add up to 2 syllables to the bare stem, as there have been no observed instances of vowel hiatus between stem-final light syllables that end with vowels other than /a/ and the initial /a/ of the singular postposition -(a)ren.[23]

Speaker 5 was observed to have maintained stress on the first syllable, even across different word forms. With maximum F0, the plural V1 measures higher than V2 and significantly higher than V3 (β = 1.27, t = 5.16, p = 0.0003). The singular V1 is similarly higher than both V2 and V3, though not significantly. This trend repeats with the mean F0, with V1 being higher than V2 and notably larger than V3 (β = 1.32, t = 5.74, p = <0.0001). Duration and intensity were also used as correlates by this speaker, seeing as both the singular and plural V1 were on average both longer and more intense than their respective V2 and V3 counterparts. What is interesting is that the results for V2 do not seem to mesh with those of V1. To explain, there was both a higher maximum plural V3 (β = 0.99, t = 4.04, p = 0.04), and mean plural V3 (β = 1.20, t = 5.24, p = 0.0002), with the singular V2 behaving similarly (β = 0.86, t = 3.69, p = 0.15). Duration and intensity were once again used as correlates, but with much less force than

[23] For example, a token with a stem-final /a/ such as semea 'son', becomes semearen 'of the son', whereas a token that still has a stem-final vowel, but one that is not /a/, there is no vowel hiatus. Tokens like liburu 'book' become liburuaren 'of the book', not *liburuen or *liburaren.

pitch.

In the means and standard deviations, Speaker 6—much like Speaker 5—maintained stress on the first syllable, largely indicated through pitch. And this pattern holds with V1. Like Speaker 5, there is a significant difference between the maximum F0 of V1 and V3 for both the singular ($\beta = 0.82$, $t = 3.28$, $p = 0.41$) and plural ($\beta = 1.09$, $t = 4.41$, $p = 0.01$) forms, with very similar results for the mean F0. As far as duration is concerned, there is some discrepancy between the forms; the plural V1 is shorter than both V2 and V3, but the singular V1 is shorter than V2 while still being longer than V3. Interestingly enough, there is an interaction with intensity regarding V1 being produced more intensely than V3 in both forms, but only with significant effect in the plural ($\beta = 0.89$, $t = 3.41$, $p = 0.31$). In V2, there is a pattern of V2 outranking V3 across the board; in max F0, mean F0, duration, and intensity, V2 is higher, longer and more intense than V3. However, this effect is only significant when it comes to the intensity of the plural V2 ($\beta = 1.53$, $t = 5.88$, $p = <0.0001$) and singular V2 ($\beta = 1.14$, $t = 4.29$, $p = 0.01$).

Last, we come to Speaker 7. Recall that Speaker 7 has been producing results unanticipated for speakers of Standard Basque, but well within the prosodic systems of Ondarru Basque, the NBB dialect that this speaker has the most contact with, via their spouse. Consistently, we have observed Speaker 7 indicating prominence on the final syllable of a word with bare forms. However, this pattern does not hold when postpositions are involved, lending more credit to the idea that the morphological boundary plays a role in persuading speakers towards the previously studied and theoretically anticipated second-syllable-from-the-left stress. However, contrary to the patterns established by the means and standard deviations, the significant effects pertain to V1. That is to say, while V1 is consistently of a lower pitch, shorter duration and lesser intensity than V2, the relation in which V1 greatly outstrips V3 in both the max F0 of the plural (β = -1.06, t = -4.15, p = 0.03) and the mean (β = -0.90, t = -3.57, p = 0.12) is the one that has the greater value. Essentially, although Speaker 7 produced tokens with V2 stress, there is no significance to the interaction between V1 and V2, only V1 and V3, which is "expected" for singular and plural word forms. In fact, the only interaction of relevance to V2 is in the intensity of the plural being produced much louder than that of V3 (β = 1.05, t = 4.07, p = 0.04).

Concerning the measurements of V3, there were far fewer significant effects to be found. Concerning F0, only three speakers had meaningful interactions. Speaker 4's bare V3 measured higher than both the plural (β = 3.2, t = 7.12, p = <0.0001) and singular (β = 3.91, t = 8.81, p = <0.0001), with the plural also having a higher frequency than the singular. Speaker 5 had only a single effect, producing the plural V3 a much lower frequency than its singular counterpart (β = -0.78, t= -3.13, p = 0.55). Speaker 7 saw the plural V3 much higher than the singular V3 (β = 0.89, t = 3.47, p = 0.27).

There were slightly more effects in interactions involving duration. In all four of the observed instances, the bare V3 is, on average, much longer than either the singular and/or plural. Speaker 4 had both, in that the bare V3 was longer than the plural (β = 1.23e+00, t = 4.02, p = 0.05) and the singular (β = 1.35e+00, t = 4.16, p = 0.03). The same occurred with Speaker 5[24]. But for Speaker 6, there was only the matter of the bare form having a longer duration than the singular (β = 1.70e+00, t = 5.35, p = 0.001), which was mirrored in the results for Speaker 7 (β = 1.12e+00, t = 3.72, p = 0.13). It should be noted that there zero significant values for the

[24] Bare V3 > Plural V3 (β = 9.51e-00, t = 3.1, p = 0.57) and Bare V3 > Singular V3 (β = 1.35e+00, t = 4.36, p = 0.01)

interaction between V3 and intensity, which is unsurprising as it has shown itself to be a relatively weak correlate.

Overall, the following conclusions can be made: there is notable influence from NBB dialects in those who are exposed to them (i.e., Speaker 7), but even when that influence is absent, there is still the possibility for some speakers to treat suffixed words as either single accentual units (e.g., Speaker 4 maintaining a pattern of word final stress in plural genitive constructions as they all end in heavy syllables, but are normally considered extrametrical) or multiple accentual units (e.g., Speaker 3, who consistently used pitch to accentuate V2, regardless of word form). Gaminde et al. (2015) proposed a hierarchy of prosodic force that is not completely supported by the data given here. It is clear that some speakers are using pitch to indicate stress, but this does not always occur on the expected syllable. Moreover, there are many instances wherein a speaker might have a higher pitch on one syllable, but a longer duration and higher amplitude on a completely different syllable. Can all three acoustic properties be considered correlates of stress if there is a discrepancy between which properties are present on which syllables? As theorized by Hualde & Beristain (to appear), it is likely that there are many different regional patterns within the standard dialect. As the majority of the participants in this study reside outside of the BAC, there is no telling whether prosodic influence is spreading from Spanish, English, or some other language, to say nothing of other varieties of Basque.

4.3 Task 2

Task 2 was designed to elicit the pitch contours at the phrasal level—specifically neutral declarative statements and yes-no questions—using the same participants from the first task and much of the same methodology. At the time of writing, there is little data on Batua's prosody at the phrasal level. The elicitations for task 2 will make steps toward clarifying the baseline contours for neutral declarative statements and yes-no questions in the standard dialect. Based on prior research, it is expected that downstep will be observed in the declaratives, with four potential patterns of rising/falling intonation in the yes-no questions.

4.3.1 Stimuli

Pulling from the list of initial polysyllabic stimuli, participants were asked to produce the same sequence of words as a neutral declarative, as well as a yes-no question. In order to control the environment as much as is possible, the sentences were identical, using the same inflected versions of 4 words (taken from the larger set of words used in Task 1) and one of two simple verb constructions. The underlying content words in question are *lagun* ‘friend’, *txakur* ‘dog’, *gizon* ‘man’, and *lapur* ‘thief’.

Declaratives	Declaratives Gloss
1) Lagúnaren alába etorri da.	*1) The friend's daughter has arrived.*
2) Lagúnen alába etorri da.	*2) The friends' daughter has arrived.*
3) Txakúrraren hezúrra agertu da.	*3) The dog's bone has appeared.*
4) Txakúrren hezúrra agertu da.	*4) The dogs' bone has appeared.*
5) Gizónaren seméa etorri da.	*5) The man's son has arrived.*
6) Gizónen seméa etorri da.	*6) The men's son has arrived.*
7) Lapúrraren libúrua agertu da.	*7) The thief's book has appeared.*
8) Lapúrren libúrua agertu da.	*8) The thieves' book has appeared.*

Yes-No Questions	Yes-No Gloss
1) Lagunaren alaba etorri da?	*1) Has the friend's daughter arrived?*
2) Lagunen alaba etorri da?	*2) Has the friends' daughter arrived?*
3) Txakurraren hezurra ikusi dut?	*3) Has the dog's bone appeared?*
4) Txakurren hezurra ikusi dut?	*4) Has the dogs' bone appeared?*
5) Gizonaren semea etorri da?	*5) Has the man's son arrived?*
6) Gizonen semea etorri da?	*6) Has the men's son arrived?*
7) Lapurraren alaba ikusi dut?	*7) Has the thief's book appeared?*
8) Lapurren alaba ikusi dut?	*8) Has the thieves' book appeared?*

4.3.2 Procedures

Just like the task before it, speakers were recorded using Audacity, and the files were later segmented by hand in Praat. Measurements were pulled with the use of scripts and statistical analysis was later done in R. Prompted by another self-advancing powerpoint, speakers were presented with one stimulus at a time, randomized from the original list of neutral declarative sentences and yes-no questions. All plots were created using the *ggplot2* package for R[25].

4.3.3 Analysis: Declarative Sentences

For this task, only the first two words of each sentence were analyzed; taking the first two vowels of both the first word (W1) and the second word (W2) and extracting measurements for fundamental frequency, duration and intensity. Of key importance is the fact that previous research claimed that Batua does not make a pitch distinction between the singular and plural constructions, because there is no lexical stress. All words bear stress based on syllable weight and polysyllabicity, as seen in the results and analysis of Task 1. As such, it is anticipated that each word in the declarative statement will have a stressed syllable and that, due to the phrasal boundaries, downstep will occur, such that the first word will have the highest peak anchored on

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[25] (Wickham 2009)

the stressed second syllable, word two has a peak lower than word 1, but still higher than word 3, etc.

The analysis was conducted as follows: first, each utterance was segmented across three tiers. One tier contains segmentation by word, another the segmentation by sound, with the whole phrase on Tier 3 for legibility. For the neutral declarative statements, only the first two words were more closely examined, where only *lagunaren alaba* ‘the daughter of the friend’ would be examined in a token like *lagunaren alaba etorri da* ‘the daughter of the friend has arrived’. For Word 1, the measurements for the pre-accent [a] and the accented [u], such that for l**a**-g**u**-n**a**-ren, V1=[a] and V2=[u]. Similarly, for Word 2, measurements were taken for the pre-accent [a] and accented [a], such that for **a**-l**a**-b**a**, V1=[a]. And V2=[a].

Based on previous findings (Hualde, 1991; Hualde & Beristain, to appear; Elordieta & Hualde 2003), one would expect to see a contour similar to the one found in Figure 3-1[26]; each word would have a stressed syllable, and the F0 would rise on that syllable. Downstep would occur, with the measurement of the first peak being the highest, and each subsequent peak gradually lowering. That is to say, the V2 in Word 1 should measure higher than the V2 of Word 2. Using Figure 4.3-1 as an illustrative example, it was anticipated that the stress would fall as *lagúnen alába etórri da*, with the measurements for each peak progressively lowering as the phrase continued.

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[26] Refer back to Chapter 3

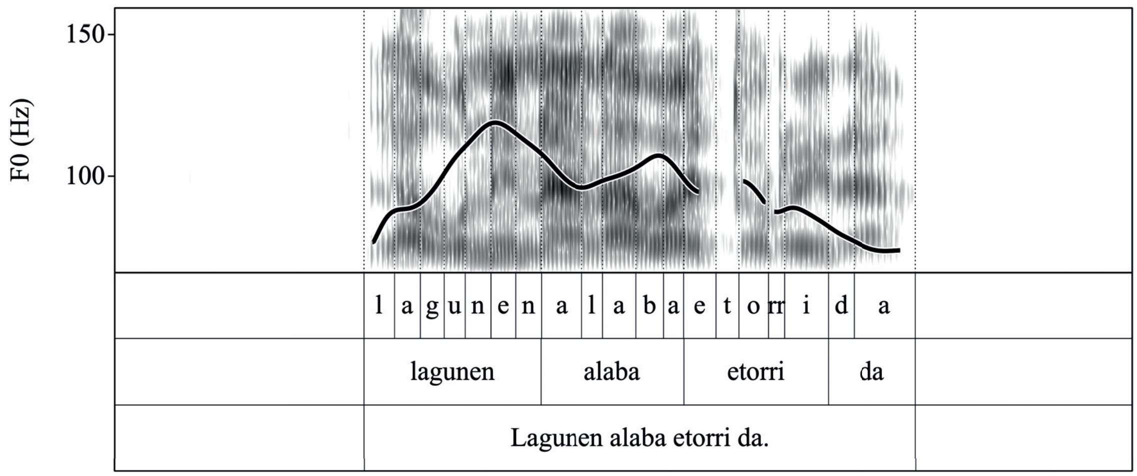

Figure 4.3-1: Production Of Lagunen Alaba Etorri Da ‘The Friends’ Daughter Has Arrived’

As can be seen, the token shown in Figure 4.3-1 falls in line with the patterns established by previous research. There is a clear downstep between each successive peak, which lowers as the utterance continues.

One the other hand, a token such as the one provided in Figure 4.3-2 does not fall in line with expectations at all. Three peaks are expected, wherein the first peak would be higher than the second, and the second peak higher than the third. However, in this token, the first peak is even lower than the third, and the difference between the second and third peak is not large enough to give the impression of a clear downstep.

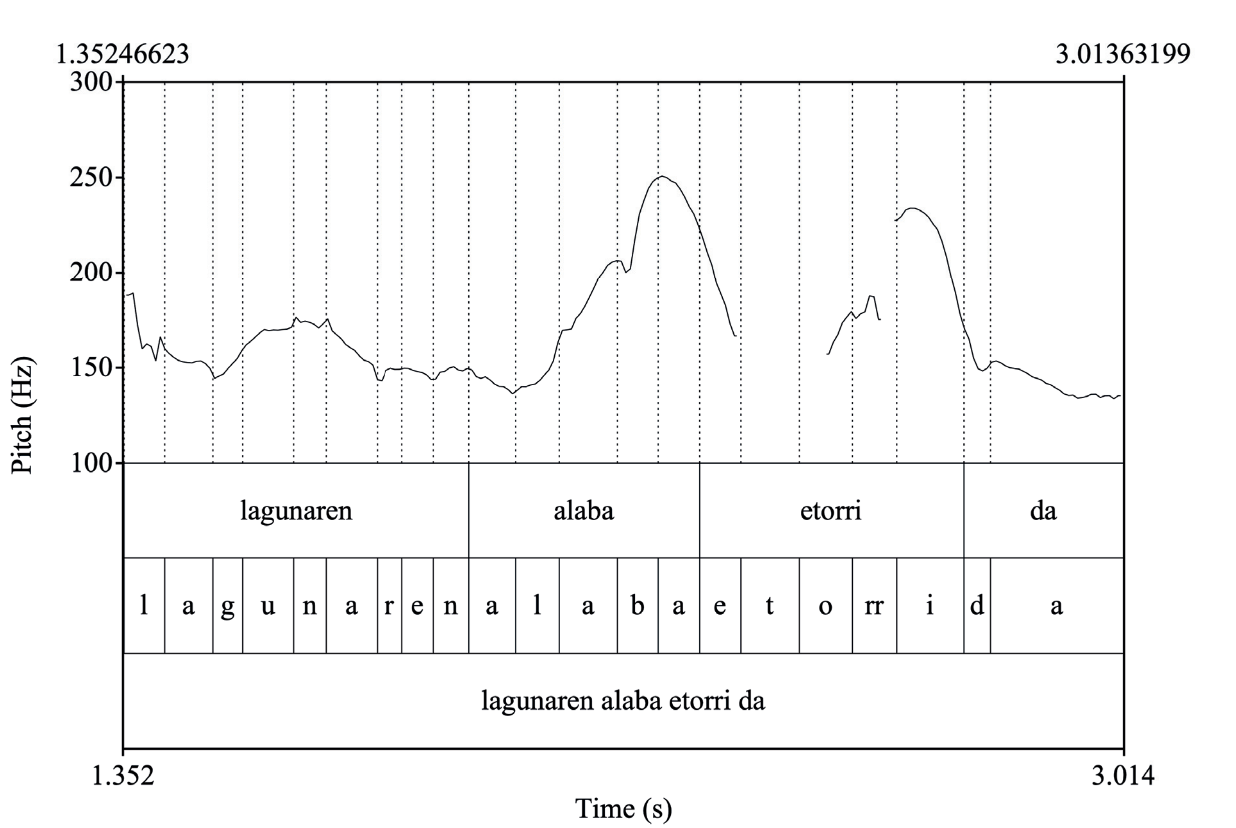

Figure 4.3-2:
Production Of Lagunaren Alaba Etorri Da 'The Friend's Daughter Has Arrived'

While it is clear, from just a glance, that downstep does occur, it does not occur in the predicted positions. First, it occurs on *alaba* 'daughter' and *etorri* 'arrive', with no such downstep occurring on *lagunaren* 'the friend's', which instead has a boundary high-low %HL- tone, with a very slight H* raise on the anticipated stressed syllable *gu*. Along the vein of stressed syllables, neither of the two F0 peaks present fall on the anticipated syllables; in both *alaba* and *etorri*, the rise in pitch comes at the end of the word. Measurements for this token are detailed in Table 4.3-1.

Table 4.3-1: Measurements For Figure 4.3-2, Lagunaren Alaba Etorri Da 'The Friend's Daughter Has Arrived'.

	PRE-ACCENT [A]	STRESSED [A]	POST-ACCENT [A]
Mean Intensity (dB)	66.865 dB	**70.758 dB**	65.904 dB
Duration (ms)	78 ms	**96 ms**	68 ms
Mean Pitch (Hz)	142.474 Hz	186.717 Hz	**241.815 Hz**

What is interesting here is that the other two correlates—intensity and duration—*do* fall in accordance with what would be expected for all three vowels. The stressed vowel has both higher mean intensity and duration, but the pre-accent values are also higher than the post-accent values. The main oddity is that the post-accent vowel is the one that bears the highest mean pitch. It seems as though the speaker has pronounced those two segments as having derived accents, rather than stressing the second syllable from the left, as Batua accentuation rules would dictate.

Looking now to a token that mirrors previous findings, recall Figure 3.3-1 from Chapter 3[27]. There is a very clear downstep occurring, the stress peak anchored on the third syllable and displaying LHL% with the preceding and succeeding vowels. Furthermore, the peak of the second word is lower than that of the word before it, with the falling intonation across the verb and auxiliary provide the last, lowest peak.

[27] Reproduced here for convenience.

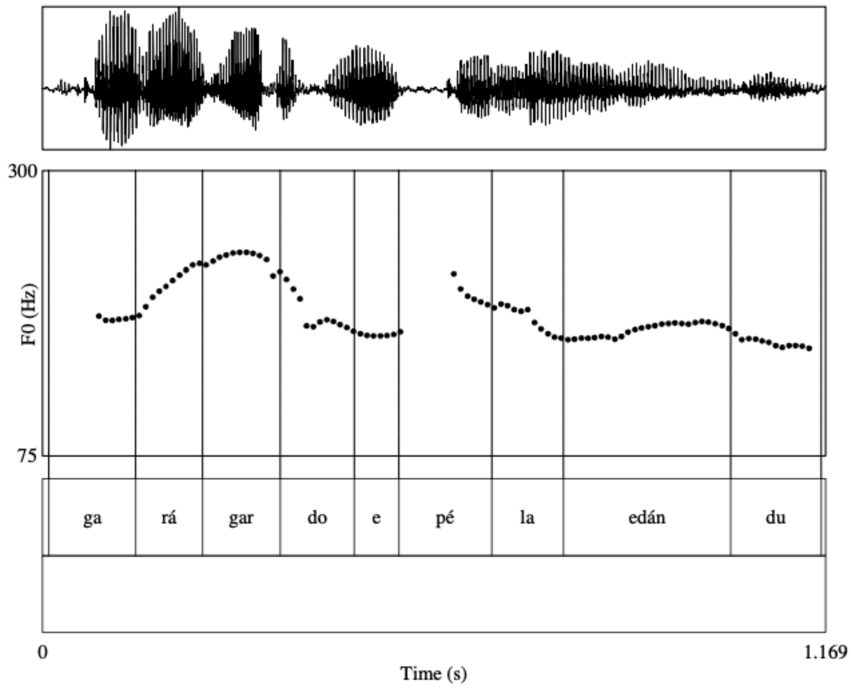

Figure 3.3-1: Batua *Garágardo Epéla Edán Du*, 'She Drank Lukewarm Beer' (Hualde & Elordieta 2014:440)

If the findings of Hualde & Elordieta (2014) hold true, then we should see clear examples of downstep in the declarative sentences produced by our speakers. Once again, the three properties being measured were pitch, duration and intensity; however, given the nature of the task, there were dependent variables for these properties across the four factors of V1 and V2 for the first two words of each sentence. Much like the analysis in Task 1, means and standard deviations were calculated and extracted with R, data then normalized to z-scores using the *ave()* function. The data was then fitted to a model with word form (singular or plural) and V2 measurements as independent variables, along with speaker and word (word 1 or word 2 in the sentence). The model for F0 as entered is shown:

```
model2_f0.lm <- lm(z_F0 ~ word1_form + speaker * w1v2_f0 *
w2v2_f0, data = task2)
```

4.3.4 Results: Declarative sentences

Unlike single words in isolation, it is more likely for neutral declarative sentences to produce results that form more consistent patterns than those found in words solicited in isolation. As noted by Hualde & Beristain (to appear), syntactic phrases can merge into larger accentual phrases, and in Standard Basque, the accentual phrase usually receives an edge-accent.

If we look at F0, we can see that all speakers display downstep between the V2 peak of the first word and the V2 peak of the second word, even those speakers who had other tendencies when producing words in isolation. Looking at Table 4.3-2, it is clear that not all speakers are employing pitch to the same degree; where the difference between word 1 and word 2 is a whopping 73 Hz for Speaker 3, it is only a mere 4 Hz for Speaker 7.

Table 4.3-2: Means & Standard Deviations For F0 By Speaker

Mean F0 (in Hz)	W1 V2	W2 V2
SPEAKER 1	**259.18 (51.73)**	254 (26.82)
SPEAKER 3	**229.21 (13.75)**	156.22 (12.39)
SPEAKER 4	**169.01 (8.55)**	146.66 (16)
SPEAKER 5	**209.91 (10.17)**	197.99 (15.53)
SPEAKER 6	**255.46 (6.17)**	245.41 (14.67)
SPEAKER 7	**116.65 (6.04)**	112.66 (8.09)

Duration, on the other hand, gives us a different pattern. Across the board, all speakers held the (presumably) stressed syllable of the second word longer than the first, as can be seen in Table 4.3-3. One potential explanation is that duration carries more prosodic force at the accentual and phrasal levels than it does in isolated words. The construction of the neutral declaratives also surely plays a role, as the structure is meant to purposefully avoid focusing or topicalization, but the second word occurs just before the verb and might be receiving durational stress as a result of being immediately preverbal. This is where prominence tends to fall in NBB, but if a speaker does not merge syntactic units into a larger whole, then stress before the verb does not seem all that surprising.

Table 4.3-3: Means & Standard Deviations For Duration By Speaker

Mean Duration (in ms)	W1 V2	W2 V2
SPEAKER 1	78.47 (15.22)	**95.21 (19.66)**
SPEAKER 3	77.37 (13.53)	**80.44 (13.04)**
SPEAKER 4	58.67 (19.51)	**67.55 (13.82)**
SPEAKER 5	64.41 (13.48)	**67.57 (12.29)**
SPEAKER 6	63.04 (12.01)	**78.42 (14.59)**
SPEAKER 7	53.41 (10.15)	**62.88 (10.35)**

Interestingly enough, it seems as though intensity might carry slightly more prosodic force at the phrasal level than duration, contrary to previous research. All speakers produced the first word of the sentence with a higher intensity, as is expected at the beginning of an utterance.

This makes sense; intensity returned almost negligible results at the word level, but at the phrasal level, it is much more likely for the correlates of prominence to align in a more clear pattern as a result of connected, continued speech.

Table 4.3-4: Means & Standard Deviations For Intensity By Speaker

Mean Intensity (in dB)	W1 V2	W2 V2
SPEAKER 1	**73.37 (3.51)**	73.25 (5.31)
SPEAKER 3	**78.87 (2.94)**	69.81 (1.93)
SPEAKER 4	**68.53 (1.18)**	67.66 (2.63)
SPEAKER 5	**74.81 (2.85)**	73.81 (2.22)
SPEAKER 6	**70.31 (1.57)**	69.56 (2.58)
SPEAKER 7	**71.66 (2.29)**	69.33 (2.38)

It should be noted that while intensity is used in tandem with pitch by all speakers, the difference between the intensity of the first word and the second is not always drastic. For example, while Speaker 3 shows a difference of 9 dB, Speaker 1 only has a difference of 0.12 dB. Thus, while intensity seems to be a correlate at the phrasal level, its force can vary by speaker, where some speakers use it to a greater degree than others, perhaps a reflection of the degree to which they use it at levels smaller than the AP.

Looking that the results for all three factors together (Table 4.3-5), it becomes clear that at the phrasal level, pitch and duration appear to be working separately. Pitch and intensity mark the downstep, whereas duration seems to be tied to the boundary between NPs and the sentence final VP. It could be that this is influence from the languages that the other speakers are in contact with, but Task 2 sees the first time that *all* speakers are returning the same pattern of averages.

Table 4.3-5: Means & Standard Deviations For All Measurements

SPEAKER 1	W1 V1	W1 V2	W2 V1	W2 V2
Mean F0 (Hz)	224.15 (33.07)	259.18 (51.73)	211.19 (34.76)	254 (26.82)
Duration (ms)	124.51 (22.52)	78.47 (15.22)	100.74 (16.78)	95.21 (19.66)
Intensity (dB)	78.68 (3.66)	73.37 (3.51)	69.93 (5.02)	73.25 (5.31)
SPEAKER 3	**W1 V1**	**W1 V2**	**W2 V1**	**W2 V2**
Mean F0 (Hz)	187.11 (13.64)	229.21 (13.75)	154.82 (19.19)	156.22 (12.39)
Duration (ms)	101.34 (15.52)	77.37 (13.53)	65 (9.02)	80.44 (13.04)
Intensity (dB)	72.06 (2.83)	78.87 (2.94)	69.31 (2.15)	69.81 (1.93)
SPEAKER 4	**W1 V1**	**W1 V2**	**W2 V1**	**W2 V2**
Mean F0 (Hz)	124.09 (8.31)	169.01 (8.55)	146.29 (16.99)	146.66 (16)
Duration (ms)	87.36 (18.62)	58.67 (19.51)	68.58 (15.48)	67.55 (13.82)
Intensity (dB)	68.86 (3.52)	68.53 (1.18)	66.93 (2.18)	67.66 (2.63)
SPEAKER 5	**W1 V1**	**W1 V2**	**W2 V1**	**W2 V2**
Mean F0 (Hz)	184.47 (11.96)	209.91 (10.17)	190.12 (13.38)	197.99 (15.53)
Duration (ms)	99.23 (26.70)	64.41 (13.48)	73.57 (13.07)	67.57 (12.29)
Intensity (dB)	74 (1.86)	74.81 (2.85)	72.31 (1.70)	73.81 (2.22)
SPEAKER 6	**W1 V1**	**W1 V2**	**W2 V1**	**W2 V2**
Mean F0 (Hz)	237.68 (10.94)	255.46 (6.17)	225.34 (14.82)	245.41 (14.67)
Duration (ms)	79.42 (29.89)	63.04 (12.01)	66.83 (24.61)	78.42 (14.59)
Intensity (dB)	69.18 (2.97)	70.31 (1.57)	65.37 (2.36)	69.56 (2.58)
SPEAKER 7	**W1 V1**	**W1 V2**	**W2 V1**	**W2 V2**
Mean F0 (Hz)	93.38 (3.50)	116.65 (6.04)	103.07 (5.14)	112.66 (8.09)
Duration (ms)	84.20 (20.67)	53.41 (10.15)	78.34 (12.46)	62.88 (10.35)
Intensity (dB)	69.26 (3.30)	71.66 (2.29)	68.33 (1.75)	69.33 (2.38)

Is this influence from another dialect of Basque, or perhaps a dialect of Spanish, or even English? It seems hasty to try and make a definitive claim, given the sparsity of the sample size analyzed here, not to mention trying to find a common factor between speakers of different age groups, situated in various locations and thus in contact with varying dialects of some number of languages. Perhaps this pattern holds more weight than can be derived at a first glance. Despite the models created and the post-hoc analysis run using *emmeans*, there were no significant findings. In fact, the majority of the models had essentially perfect fits, resulting in unreliable summaries.

To that end, more insight can hopefully be derived from plots of the mean F0 intonation patterns. Results can thus be split into three groups: one group which does not display downstep as described the prior findings of Hualde & Elordieta (2014); one group which *does* show the anticipated downstep contour; and the final group, which has such huge variation that there is some intra-speaker variability at work. Each contour plot has four points, for W1V1, W1V2, W2V1, and W2V2.

In the first group, we have Speakers 3 and 4 (Figure 4.3-2), neither of which show downstep. The V2 of the first word is very high for Speaker 3 and consequently sees a huge drop to the beginning of the second word. In addition to that, rather than V2 of word 2 rising to the anticipated downstepped peak, there is instead a sustained low tone, L%. The size of the error bars, however, also indicate the possibility that speakers are also placing stress on the second word of the phrase. Note that the error bar of word 2, vowel 2 never rises above that of the preceding vowel, a sure sign that downstep is not occurring because the speaker is producing a plateau that looks to continue on to the verb.

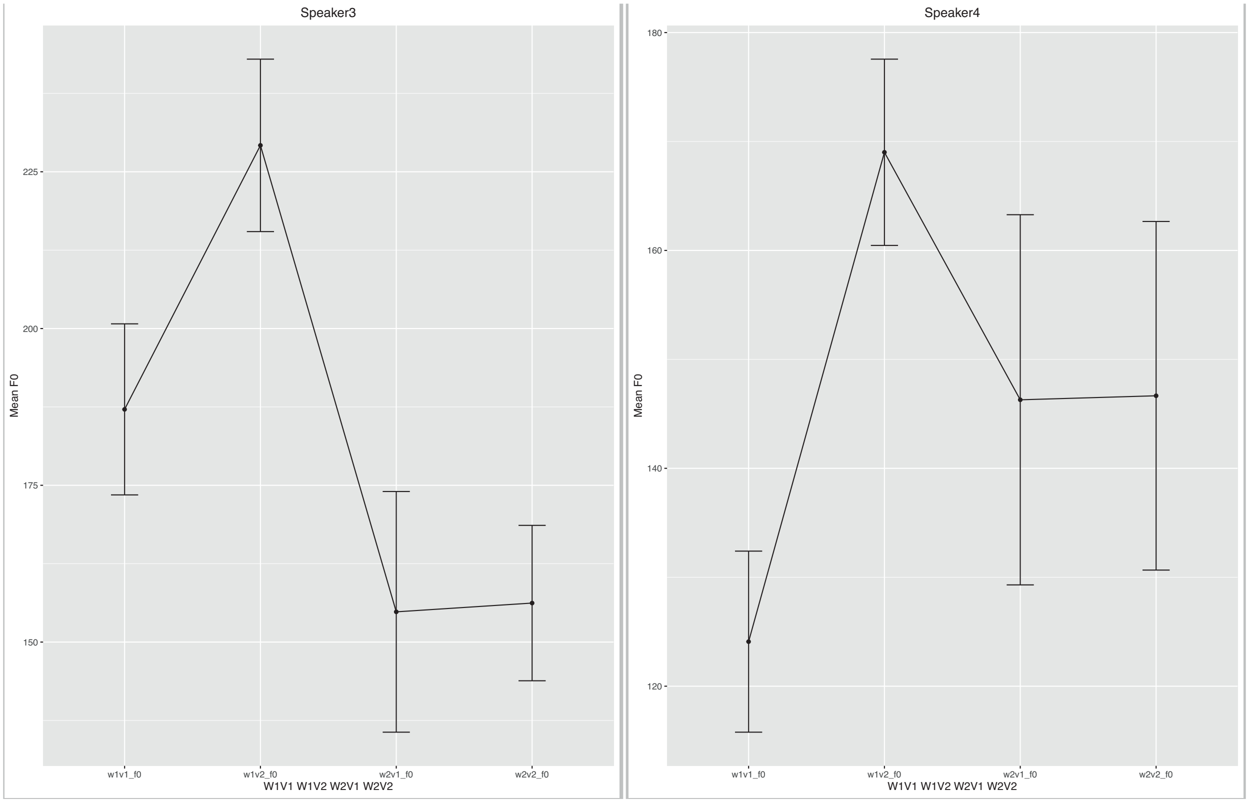

Figure 4.3-2. Contour Plots For Declarative Statements, Speakers 3 & 4

Similarly, Speaker 4 is also not performing downstep. In a reverse of Speaker 3, Speaker 4 makes an enormous leap between the first and second vowel of the first word. There is a drop when moving to the second word, but this speaker too has a sustained low tone, forming a plateau.

In the second group, Speakers 5 and 7 have contours that mostly align with the findings from previous studies (Figure 4.3-3). There is a clear peak on the V2 of the first word, a drop and then the beginning of a secondary, lower peak over word two.

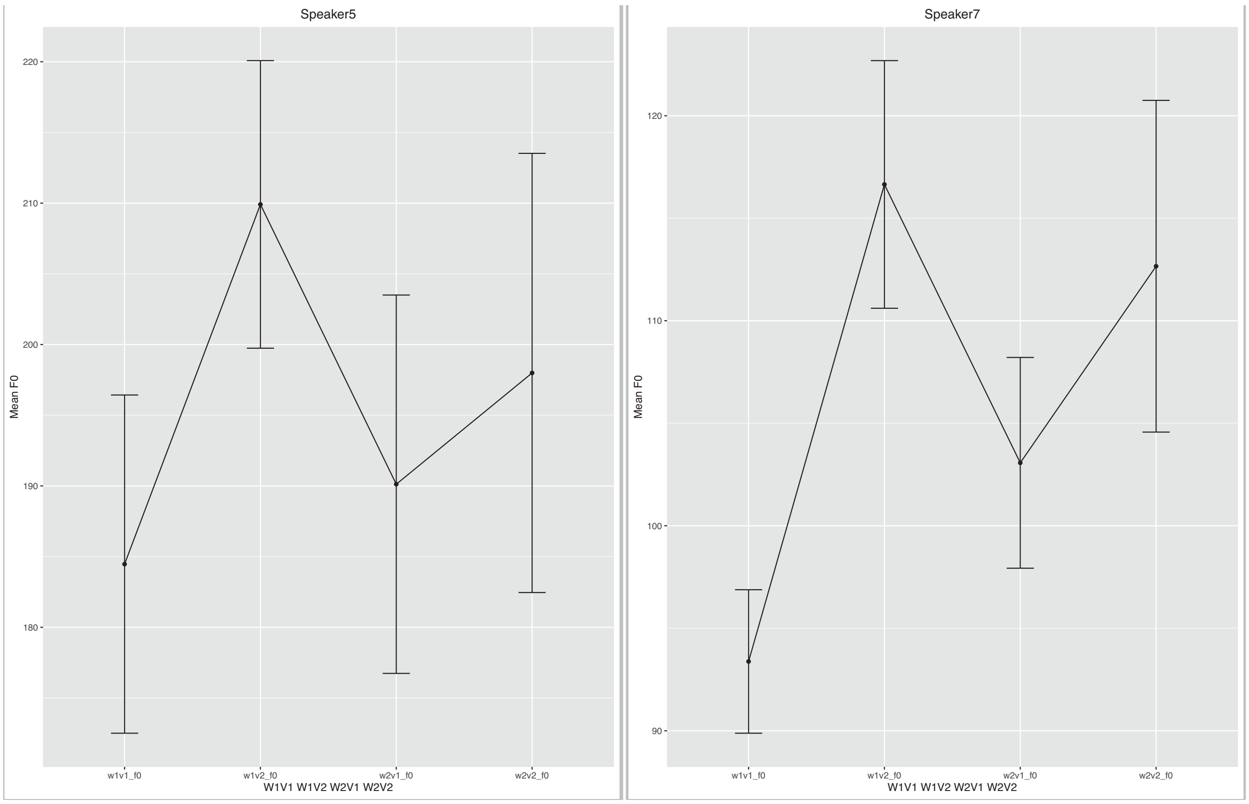

Figure 4.3-3. Contour Plots For Declarative Statements, Speakers 5 & 7

It should be noted, however, that all of Speaker 5's error bars are of considerable length, indicating that there is a good deal of intra-speaker variation occurring over the course of the task. Speaker 5 ultimately produces the anticipated contour for downstep, but there is a large range in terms of how high or low the stress can be. In a similar vein, the error bar for Speaker 7's final V2 suggests that this speaker has variation in the degree of downstep they produce. That is, the magnitude of difference between word 1, vowel 2 and word 2, vowel 2 can be of variable size.

The final group contains Speakers 1 and 6, and show clear signs of intra-speaker variation given the scale of the error bars and the placement of the mean values on the plot (Figure 4.3-4).

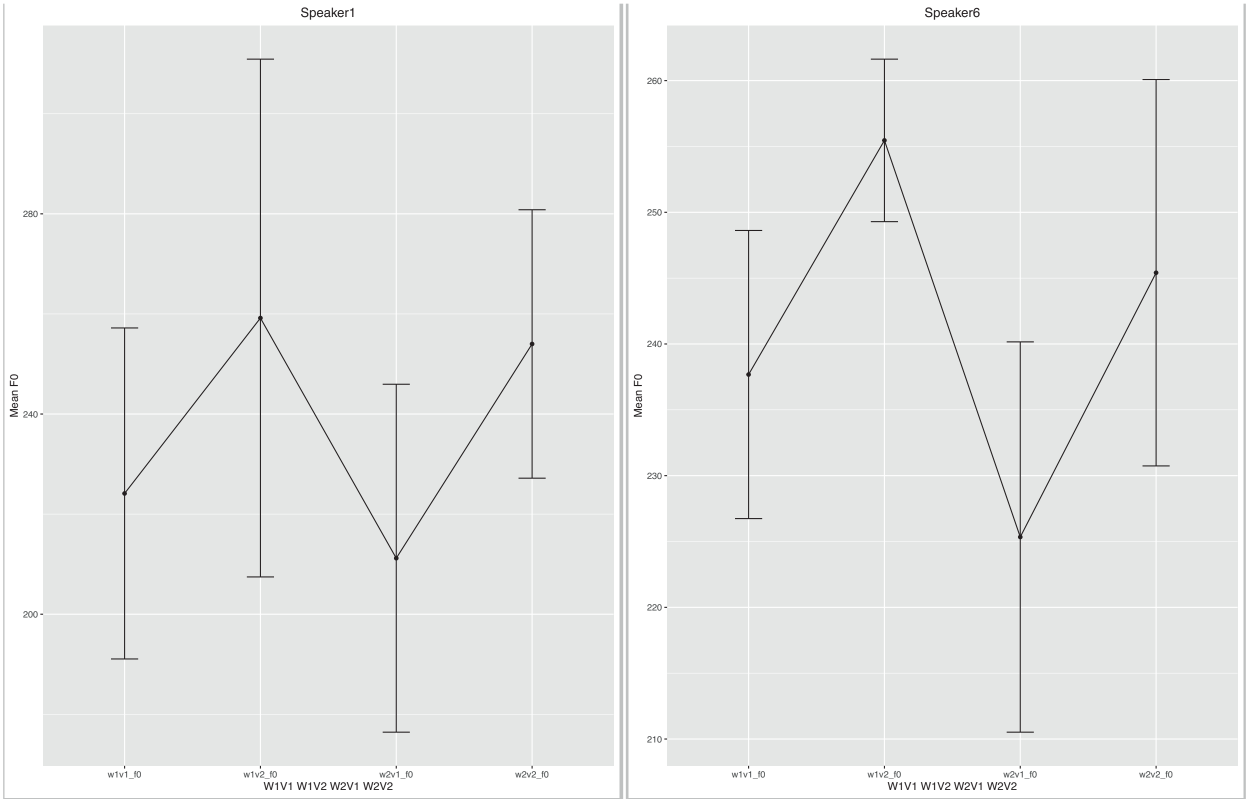

Figure 4.3-4. Contour Plots For Declarative Statements, Speakers 1 & 6

Looking first to Speaker 1, the size of the error bar for W1V2 suggests that, similarly to Speaker 5, this speaker heavily fluctuates how high that vowel is. While all four mean values have larger than average error bars, the W1V2 bar outstrips them by quite a margin, indicating that the first word at times receives more stress than any of its counterparts. There is a similar pattern to be found for Speaker 6, as well. For this speaker, it is the last two mean values that have the highest degree of variability; in some cases, the word two peak can be nearly as high as the preceding peak, which rather muddies the waters of claiming that this speaker is performing downstep as it has been defined.

These plots provide evidence that the majority of speakers are falling into the patterns previously defined, although there are exceptions as well. For example, the first group seems somewhat similar to the prosodic system(s) of Southern Bizkaian Basque, where a single peak is enclosed by two lower plateaus; both speakers have the phrase initial peak that is expected, but the sharp drop into a plateau is proof of some encroaching influence, or perhaps of these speakers using F0 with less force at the phrasal level. The second and third groups pattern more closely to the stress-based prosodic systems defined by Hualde & Elordieta (2014), but with a much larger degree of variation within and amongst speakers.

4.3.5 Analysis: Yes-No Questions

In replication of the study conducted by Eguskiza et al. (2019), only the last three syllables were examined and analysis will be conducted with the use of autosegmental phonology. Differing from that study, it was only the last syllable (the auxiliary verb) that had measurements extracted[28]. The goal for analyzing these sentences is to measure the order of magnitude that pitch changes; this was accomplished by taking measurements from three separate points of the final syllable: the onset of the segment, the midpoint and the offset. Thus, while there might be obvious differences between speakers, we measured the *degree* of change and will look not at the peak of the segment, but select points in the interval. Stimuli for the yes-no questions were a part of the larger set of stimuli given for Task 2. Again, the yes-no questions and declarative statements were presented together randomly, in hopes of evading list intonation.

It was anticipated that that speaker productions will fall in line with the patterns given by Eguskiza et al. (2019), with varying rising or falling boundary tones. To recap, results of that study revealed four patterns that speakers could be grouped into, as well as potential explanations for why each speaker fell into the category that they did, based on their L1. Recall

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[28] All of the questions contained the same auxiliary verb, *da.*

that there are two common patters for yes-no questions in Basque: either High-Low (HL%[29]) or Low-High-Low (LHL%); both of these have falling intonation, which is found in a number of Basque dialects. However, Eguskiza et al. (2019) found that some speakers also display rising intonation, either as a sustained high tone (H%) or first lowering and then raising at the end of the boundary (LH%). These last two patterns fall in line with the intonation patterns for most standard dialects[30] of Spanish. Thus, the four patterns of all make sense as possible contenders given not only the difference between Spanish and Basque intonation, but also the effects of constant language contact and a speaker's language dominance.

4.3.6 Results: Yes-No questions

First, we will cover an overall summation of the results, followed by more detailed examinations of each pattern group. Again, autosegmental phonological terms and notation will be used to describe the phrase-final pitch contours. Much like Eguskiza et al. (2019), we can see two clear patterns emerging; some speakers display LHL% and the rest LH%.

To begin, we look to the pattern with the smallest group: Speakers 3 and 7 use LHL% contours in yes-no questions as a means of signaling the the end of the phrasal boundary, as seen in Figure 4.3-9 below. Although Speaker 7 *appears* to have the greater degree of fluctuation, their plot actually has the smallest mean F0 range: Speaker 7's productions do not reach even 120 Hz, where all other speakers have *at least* a range of 10 Hz. The use of the LHL% supports the observation that these speakers are using some of the same prosodic processes as speakers of other dialects, which favor falling intonation on interrogatives (contrasted with the rising

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[29] The percentage sign (%) in these notations marks a phrasal boundary.

[30] "Standard" dialects are specified here as there are dialects of Spanish with lowering intonation.

intonation of Spanish).

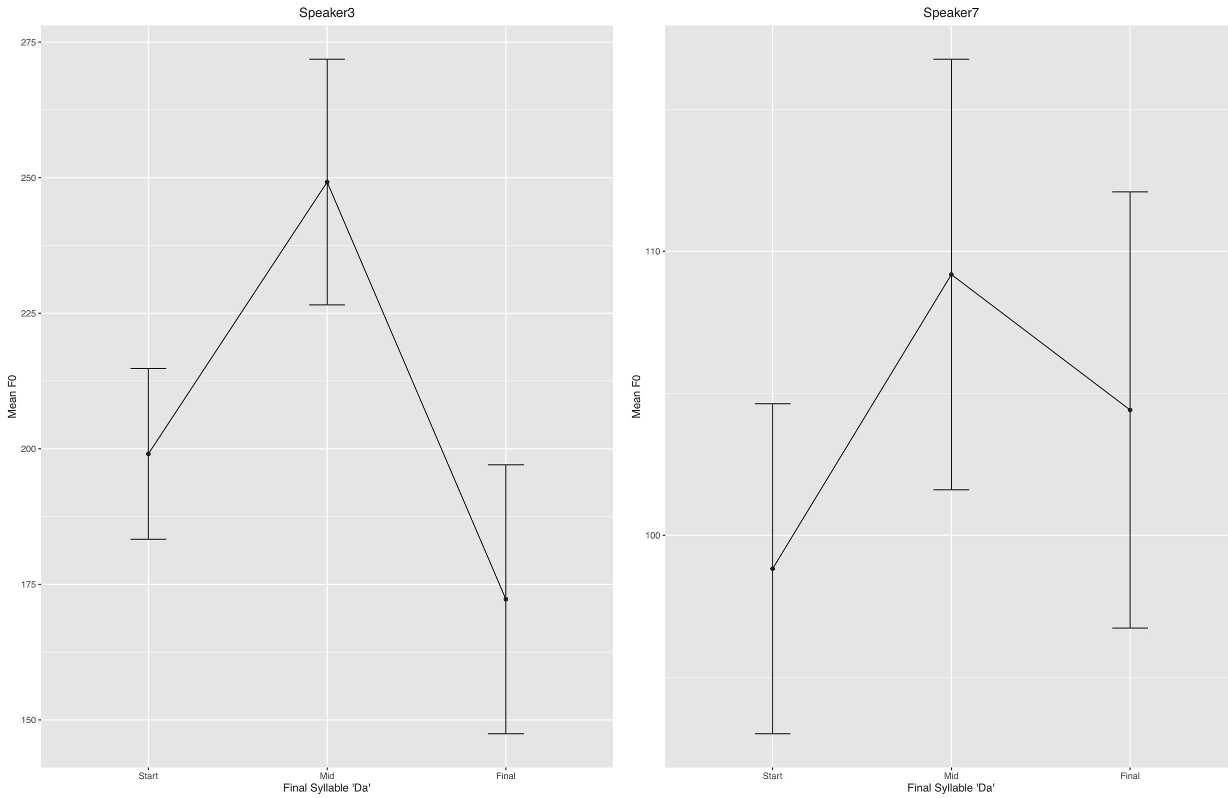

Figure 4.3-9: Speaker 3 And Speaker 7, Lhl%

The rest of the speakers—1, 4, 5, and 6—can all be grouped into the LH% pattern. However a few stipulations: Speaker 1 displays a pitch rise of such magnitude that it outclasses the range of all other speakers; although Speaker 4 could be said to have a continually rising H*% tone, this speaker has too been classified as LH%[31]. For these reasons, Speakers 1 and 4 will be shown first, with speakers 5 and 6 serving as the final pair. The plots for speakers 1 and 4 can be found in Figure 4.3-10 below.

[31] Largely because H*% is not an attested pattern.

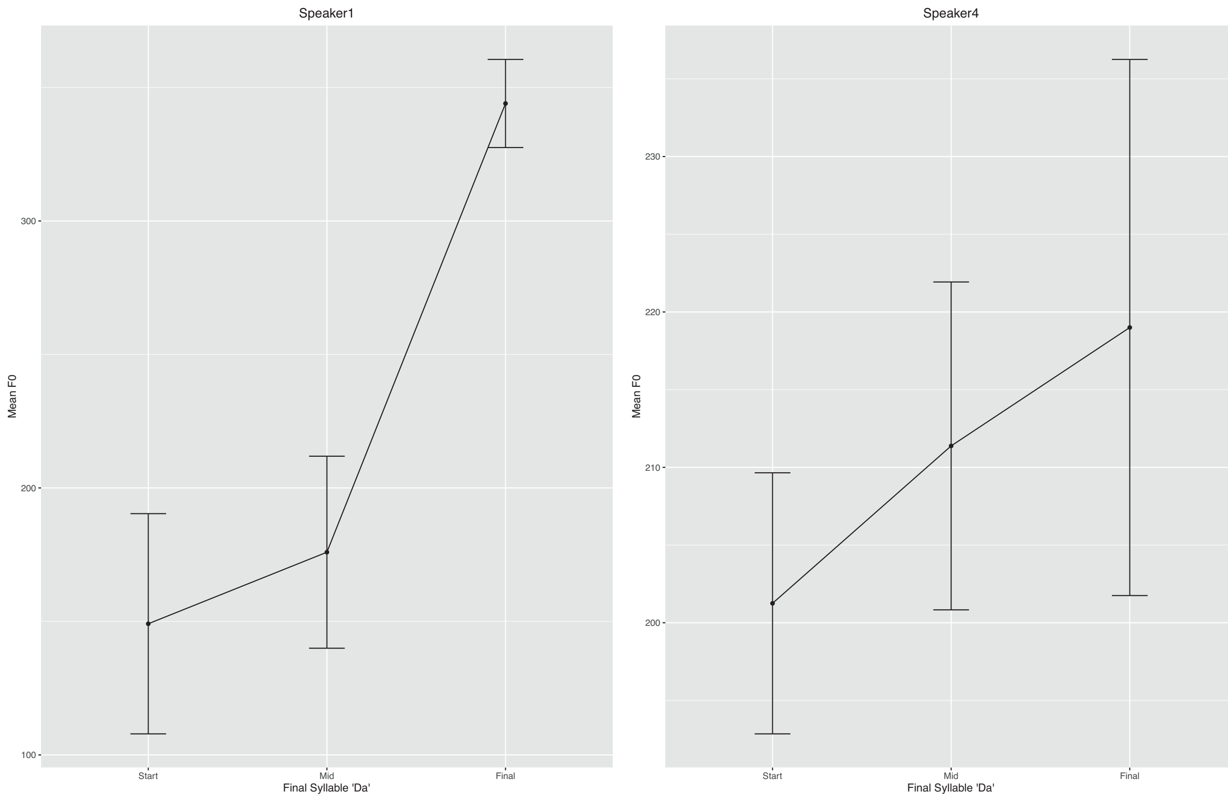

Figure 4.3-10: Speaker 1 And Speaker 4: H%

What makes Speaker 1's results so unexpected is not the rising intonation, but rather the degree of pitch raising that occurs at the end of their interrogative productions. There is a mean difference of more than 100 Hz between the F0 measurement at the mid-point and the offset; this means that Speaker 1 has a sharp phrase-final rise halfway through the final syllable, rather than the more incremental rise found in Speaker 4. It should be noted that Speaker 4's productions have their own oddities, notably that there is not simply a jump from low to high tone, LH%, but a steadily rising contour; the upward slope removes the potential of a true H% label, as those involved H% high tone plateaus. At the same time, the consistent rate of increase would disallow for the idea of naming this a "true" LH%, except that LH% is the only attested pattern that Speaker 4 could be classified as.

Lastly, both Speaker 5 and Speaker 6 fall within the parameters of LH%, though only Speaker 6 could be said to have "regular" results. The vertical length of Speaker 5's error bar strongly indicates that this speaker is displaying intra-speaker variability; Speaker 5 must be producing *both* LHL% and LH%. Other than that, the onset and mid-point measurements of Speaker 6 neatly align with Eguskiza et al's (2019) LH% pattern.

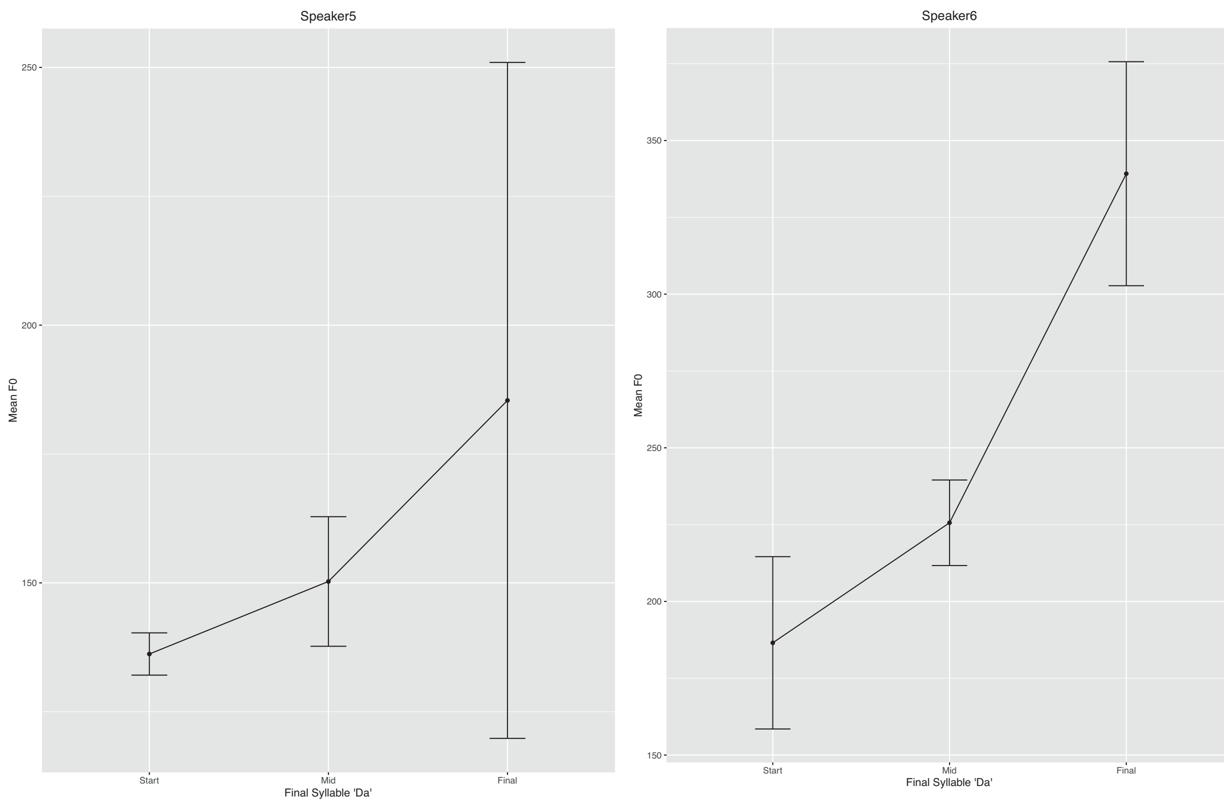

Figure 4.3-11: Speaker 5 And Speaker 6: LH%

This pattern of rising intonation is one that carries the implication of an encroachment of Spanish prosody. Furthermore, this falls in line with the other data provided by these two speakers, whom consistently seem to combine dialectal Basque and Spanish prosody into a single idiolectal system, with variation in stress placement and accentual phrase grouping (and in the case of Speaker 5, the use of elements from both prosodic systems within the same speech event).

CHAPTER 5

CONCLUDING REMARKS & FUTURE RESEARCH

The purpose of this study was to make progress in the task of typologizing the Basque language and its many dialects, with specific focus on Standard Basque. Data was collected through the means of two elicitation tasks that targeted polysyllabic words in isolation, the effect of morphological processes such as case and the pitch contours for both neutral declaratives and yes-no interrogatives.

To summarize, while the results largely overlap with previously reported patterns, they cannot be said to support them entirely or unconditionally. To that end, evidence was found that concurs with some of the findings of Gaminde et al. (2015), and Rodríguez-Ordóñez (2018, 2019), showing that a) F0, duration and intensity *can* all be used to signal accentual prominence, but that there is indeed a hierarchy of force, and not all three acoustic properties will be employed by all speakers. In accordance with these findings, F0 and duration carry the most force, though some speakers used F0 and intensity, but *not* duration, and others used pitch to accentuate prominence on unanticipated segments, with duration and intensity falling within the expected parameters. Even so, the variation in the number of correlates used concurrently to signal stress seems to be reason enough to hold off on committing to the hierarchy of prosodic force.

With isolated words, it was found that speakers in contact with NBB dialects draw heavy influence that consistently affects the patterns used by the speaker(s) in question. It was also observed that there is variation in whether or not speakers treat suffixed words as single accentual units, or consider the suffixed morphemes to be extrametrical. Despite variation amongst speakers, clear patterns emerged: bisyllabic words with light syllable weights are more susceptible to stress variation, where heavy syllables more regularly attract stress in both bisyllabic and trisyllabic words. While the standard dialect does not have pitch-based lexical distinction, there is inter-speaker variation as to whether or not speakers treat morpheme boundaries as boundaries between accentual units.

The question still remains whether or not one can consider a language to have three acoustic correlates if all three correlates are not always used at the same time, in the same place. That is to say, if speakers show an increase in pitch on the anticipated segment, but duration and intensity correlate on a separate segment, should all three still be considered correlates? What about cases with the reverse, where duration and intensity fall in line with previous findings, but pitch is raised on an unexpected segment? If we assume a hierarchy of prosodic force, does this affect the magnitude of an acoustic property's presence? Since the vast majority of the participants in this study currently reside outside of the Basque Autonomous Community (in addition to the small number of participants in general), there is no clear cut way to determine what other languages or dialects speakers are being influenced by. An additional issue is the size of the data set; there were not many speakers and not many tokens per speaker, such that these findings are generalizations based on what was given. A much larger study with a wider breadth of speakers and tokens both may give clearer results.

Looking above the word-level, results fall into more familiar patterns, though there are exceptions in this regard as well. In declarative statements, most speakers showed some variation of the expected downstep, but there were also speakers who have produced something more reminiscent of SBB. With yes-no questions, speakers again could be grouped into neater categories, but with both types of phrases, there was a great deal of intra-speaker variation to account for, on top of interspeaker variation; for example, speakers using both rising and falling intonation for yes-no questions. In one sense, these results do support previous findings, but how can one make definitive claims about potential prosodic systems if speakers can not (and perhaps, should not) be confined to a single category?

Ultimately, this data set is not large enough to make definitive statements about the overall prosodic system of Standard Basque in the Bilbao Area. However, there is sufficient enough data to note that idiolectal variation amongst speakers covers a broad range, such that one could propose the bare-bones structure of different prosodic systems at work, as well as what languages and dialects speakers are influenced by, just as Eguskiza et al. (2019) looked at speakers' L1. To that end, a closer look at language dominances and how speakers (and interlocutors) perceive the "nativeness" of a speaker, both cognitively and socially, is worth investigating.

Further research still needs to be done, hopefully involving a much larger data set (as allowed by the limitations of funding, participants, and time) and an overview of the current typological models for Basque and potential places where this data can fit in. Research with a more sociolinguistic slant might benefit from investigating speakers' feelings toward and perception of Basque, both Standard and other dialects. A more in-depth inquiry of usage and the evocation of meta-linguistic commentary may provide more detail on certain ambiguities of unavoidable language and dialect contact and L1/Heritage speaker retention.

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APPENDIX A

Full Prosodic Typology Chart

Figure 3.2-1: Prosodic Typology Based On Prominence And Rhythmic Unit. (Taken From Jun 2014:444)

	Prominence					Rhythmic/Prosodic Unit					
	Lexical			*Postlexical*		*Lexical*			*Postlexical*		
	Tone	Stress	LPA	Head	Edge	Mora	Syll	Foot	AP	ip	IP
English		x		x				x		x	x
German		x		x				x		x	x
Dutch		x		x				x			x + 1
Greek		x		x				x		x	x
Italian		x		x			x	(x)		x	x
Spanish		x		x			x			(x)	x
Portuguese		x		x			x				x
Arabic		x		x				x		x	x
Farsi		x		x	x		x		x	x	x
Bgw		x		x	x			x	(x)		x + 1
Swedish		x	x	x				x			x
Sb-Croat.		x	x	x	x			x			x
Chickasaw		x	x	x	x			x	x		x
Japanese			x	x	x	x			x	(x)	x
Basque			x	x	x		x		x	x	x
French				x	x		x		x	(x)	x
Bengali				x	x		x		x		x
Korean					x		x		x		x
Mandarin	x	x		(x)			x			x	x
Cantonese	x						x				x
Kinande	x				x		x		x		x

Table 4-2.3 Means & Standard Deviations for all Bisyllabic Stimuli

	bisyllabic bare nouns ne-gu ‘winter’ & gi-zon ‘man’ type	
SPEAKER 1	**V1**	**V2**
Max F0 (Hz)	217.13 (30.23)	205.41 (52.66)
Mean F0 (Hz)	197.9 (28.73)	172.91 (36)
Duration (ms)	92.27 (29.26)	153.09 (66.99)
Intensity (dB)	76.57 (2.7)	74.66 (3.15)
SPEAKER 3	**V1**	**V2**
Max F0 (Hz)	158.31 (20.52)	169.42 (19.08)
Mean F0 (Hz)	151.18 (19.52)	154.6 (11.46)
Duration (ms)	103.82 (31.49)	196.79 (67.77)
Intensity (dB)	68.42 (3.97)	72.92 (4.12)
SPEAKER 4	**V1**	**V2**
Max F0 (Hz)	123.9 (12.5)	147.93 (41.51)
Mean F0 (Hz)	113.84 (7.10)	127.43 (20.1)
Duration (ms)	124.87 (25.49)	148.74 (53.29)
Intensity (dB)	65.5 (3.18)	63.42 (4.81)
SPEAKER 5	**V1**	**V2**
Max F0 (Hz)	180.95 (22.1)	174.04 (23.13)
Mean F0 (Hz)	162.57 (12.74)	150.84 (8.62)

Duration (ms)	140.66 (43.41)	226.12 (72.79)
Intensity (dB)	74.85 (2.79)	76.78 (1.71)
SPEAKER 6	**V1**	**V2**
Max F0 (Hz)	239.44 (23.33)	222.88 (47.48)
Mean F0 (Hz)	223.42 (14.34)	202.07 (40.03)
Duration (ms)	85.88 (20.18)	146.21 (28.73)
Intensity (dB)	67.5 (3.81)	64.57 (5.07)
SPEAKER 7	**V1**	**V2**
Max F0 (Hz)	93.67 (13.49)	109.41 (28.86)
Mean F0 (Hz)	87.91 (9.2)	89.3 (7.31)
Duration (ms)	102.34 (25.01)	142.64 (24.75)
Intensity (dB)	62.92 (4.6)	61.76 (5.24)

Table 4.2-4: Means And Standard Deviations For All Trisyllabic Stimuli			
	trisyllabic bare nouns l**i**-b**u**-r**u** 'book' & k**o**-k**a**-p**e**n 'place' type		
SPEAKER 1	**V1**	**V2**	**V3**
Max F0 (Hz)	218.23 (22.09)	207.55 (17.06)	186.8 (40.66)
Mean F0 (Hz)	200.58 (11.44)	200.78 (16.16)	159.07 (17.67)
Duration (ms)	93.44 (36.16)	102.06 (35.21)	125.39 (32.36)
Intensity (dB)	75.83 (5.79)	74.5 (4.25)	70.63 (4.41)
SPEAKER 3	**V1**	**V2**	**V3**
Max F0 (Hz)	161.23 (11.22)	167.91 (18.56)	140.96 (9.7)
Mean F0 (Hz)	153.43 (9.29)	162.05 (16.47)	132.18 (6.61)
Duration (ms)	91.6 (37.76)	137.48 (30.21)	111.73 (45.48)
Intensity (dB)	70.41 (3.67)	72.33 (4.35)	67.5 (6.05)
SPEAKER 4	**V1**	**V2**	**V3**
Max F0 (Hz)	112.68 (4.96)	129.81 (22.15)	227.24 (57.42)
Mean F0 (Hz)	110.21 (4.16)	119.34 (8.02)	198.42 (42.75)
Duration (ms)	93.06 (29.94)	140.56 (28.72)	142.77 (105.93)
Intensity (dB)	64.6 (4.45)	64.72 (5.06)	62.09 (4.18)

SPEAKER 5	V1	V2	V3
Max F0 (Hz)	180.17 (24.52)	172.45 (16.99)	158.08 (10.76)
Mean F0 (Hz)	167.37 (11.66)	163.96 (9.12)	148.17 (8.79)
Duration (ms)	115.34 (34.58)	154.08 (27.87)	175.62 (46.97)
Intensity (dB)	76 (2.25)	75.25 (1.65)	75 (1.75)
SPEAKER 6	**V1**	**V2**	**V3**
Max F0 (Hz)	238.17 (14.37)	223.64 (15.71)	204.13 (40.83)
Mean F0 (Hz)	220.44 (15.56)	210.18 (22.14)	192.64 (36.42)
Duration (ms)	78.76 (17.48)	111.83 (20.4)	127.11 (24.94)
Intensity (dB)	69 (2.13)	68.58 (4.64)	59.7 (3.05)
SPEAKER 7	**V1**	**V2**	**V3**
Max F0 (Hz)	88.83 (7.78)	98.61 (19.76)	121.13 (63.05)
Mean F0 (Hz)	85.23 (6.12)	90.31 (8.18)	112.82 (60.84)
Duration (ms)	86.02 (18.87)	108.7 (23.74)	127.42 (47.73)
Intensity (dB)	62.33 (3.65)	65.63 (5.2)	61.75 (3.84)

Table 4.2-5: Means & Standard Deviations For Maximum F0 Of Singular Constructions

	Singular Word Forms lagunaren 'of the friend' & txakurraren 'of the dog' type		
Singular Max F0 (Hz)	**V1**	**V2**	**V3**
SPEAKER 1	214.93 (17.53)	228.19 (26.9)	199.82 (26.23)
SPEAKER 3	166.4 (20.01)	172.2 (12.38)	149.82 (9.07)
SPEAKER 4	114.74 (5.38)	129.6 (11.09)	112.67 (11.38)
SPEAKER 5	184.55 (17.69)	180.46 (15.75)	173.03 (13.68)
SPEAKER 6	236.82 (33.13)	230.36 (19.21)	214.45 (14.71)
SPEAKER 7	90.67 (7.08)	97.89 (7.54)	92.22 (15.93)

Table 4.2-6: Means & Standard Deviations For Mean F0 Of Singular Constructions

	Singular Word Forms lagunaren 'of the friend' & txakurraren 'of the dog' type		
Singular Mean F0 (Hz)	**V1**	**V2**	**V3**
SPEAKER 1	203.06 (17.52)	216.21 (22.38)	178.85 (19.09)
SPEAKER 3	156.5 (12.21)	164.01 (9.86)	137.38 (7.77)
SPEAKER 4	110.67 (3.7)	124.59 (8.45)	104.77 (9.01)
SPEAKER 5	169.06 (8.08)	171.49 (7.19)	161.45 (9.46)
SPEAKER 6	221.54 (27.09)	216.86 (18.29)	200.46 (23.24)
SPEAKER 7	87.64 (5.16)	94.13 (6.34)	84.88 (5.98)

Table 4.2-8: Means & Standard Deviations For Maximum F0 Of Singular Constructions

	Plural Word Forms o-ih**a**-n**e**n 'of the forests' & h**e**-z**u**-rr**e**n 'of the bones' type		
Plural Max F0 (Hz)	**V1**	**V2**	**V3**
SPEAKER 1	208.68 (23.65)	217.35 (19.42)	184.4 (26.06)
SPEAKER 3	161.07 (12.56)	165.16 (13.17)	142.08 (10.2)
SPEAKER 4	116.97 (12.5)	131.14 (12.42)	134.17 (47.93)
SPEAKER 5	182.54 (16.28)	177.67 (15.75)	159.73 (13.26)
SPEAKER 6	241.28 (17.26)	228.49 (24.95)	213.77 (16.09)
SPEAKER 7	88.74 (7.07)	97.37 (13.8)	114.49 (38.58)

Table 4.2-9: Means & Standard Deviations For Mean F0 Of Singular Constructions

	Plural Word Forms o-ih**a**-n**e**n 'of the forests' & h**e**-z**u**-rr**e**n 'of the bones' type		
Plural Mean F0 (Hz)	**V1**	**V2**	**V3**
SPEAKER 1	192.61 (17.2)	205.9 (14.08)	163.74 (11.21)
SPEAKER 3	151.22 (11.2)	158.76 (11.44)	131.33 (8.98)
SPEAKER 4	111.42 (5.53)	121.36 (6.17)	124.72 (45.35)
SPEAKER 5	166.98 (8.74)	165.67 (7.30)	151.76 (11.05)
SPEAKER 6	225.45 (12.08)	214.13 (26.15)	195.38 (22.77)
SPEAKER 7	85.19 (4.9)	91.65 (5.92)	102.41 (34.81)

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