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Intonation Patterns in Pijal Media Lengua

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Abstract

Pijal Media Lengua (PML) is a mixed language described as having Quichua morpho-syntactic and phonological systems where nearly every content word (89%), including pronouns and determiners, is replaced by its Spanish-derived counterpart through the process of relexification. PML speakers however, often regard their language as intonationally distinct from both Quichua and Spanish. This paper offers a basic description of the pitch accent and boundary tone configurations found in PML using the autosegmental framework (Pierrehumbert, 1980) in a ToBI transcription system (Silverman, 1984). This paper also explorers the current literature on mixed language phonetics and attempts to promote acoustic analyses of intonation as a useful investigative tool for analyzing the origins of prosodic material. The results suggest that PML predominantly makes use of Quichua-like intonation patterns along with innovative and/or preserved structures.

Keywords

Media Lengua – Imbabura Quichua – Spanish – mixed language – intonation – ToBI – Quechua

1 Introduction

The aim of this paper is to identify and describe basic intonation patterns found in the Pijal dialect of Media Lengua (PML), a mixed language (Imbabura Quichua[1] / Rural Ecuadorian Spanish) spoken in the Northern Ecuadorian

1 The Ecuadorian variety of Quechua is officially known as *Quichua* or *Kichwa* /ˈki.ʧwa/ by the Government of Ecuador and both the mestizo and indigenous populations.

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province of Imbabura in the community of Pijal. For this analysis, I adopt the autosegmental phonology framework developed by Pierrehumbert et al (Pierrehumbert, 1980; Pierrehumbert and Beckman, 1988; Pierrehumbert and Hirschberg, 1990; Ladd, 1996) and the *Tone and Break Indices* (ToBI) tradition for transcription (Silverman et al, 1992). This paper also explorers the current literature on mixed language phonetics and attempts to promote acoustic analyses of intonation as a useful investigative tool for analyzing the origins of prosodic material.

Media Lengua (ML) is often described as an excellent case of a bilingual mixed language (Backus, 2003; McConvell and Meakins, 2005) because of its split between roots (mostly of Spanish origin ~ 89%) and suffixes (mostly of Quichua origin). While evidence suggests that relexification was the primary process involved in developing ML's lexicon (Muysken, 1980, 1981), it has also been suggested that lexical freezing (Gómez-Rendón, 2005; Muysken, 1997; Stewart, 2011), translexification (Muysken, 1981), adlexification (Shappeck, 2011) and code-switching (Stewart, 2011) played a formative role as well. Through the process of relexification nearly all the lexical roots in Quichua, including core vocabulary, were replaced by their Spanish counterparts. Impressionistically, ML appears to conform to Quichua phonology (Muysken, 1997; Gómez-Rendón, 2005) while also maintaining Quichua word order and the vast majority of Quichua's agglutinating suffixes (Gómez-Rendón, 2005; Muysken, 1997; Stewart, 2012). Example (1) illustrates a typical PML sentence. The italicized elements are derived from Spanish:

(1)

Ese	*caballu*	-ka	*el*	-pa	*rabo*	-wan	-llata	*quita*	-chi	-n	*mosco* -ta.
DET	horse	-TOP	3	-GEN	tail	-INST	-TOT	remove	-CAU	-3	fly -ACC

'That horse makes the flies leave with his tail until they're all gone.' Consultant #43

1.1 *Prosody in Media Lengua, Quechuan Languages and Ecuadorian Spanish*

There is little information in the literature regarding the prosodic structures of either ML or Imbabura Quichua (Quechua IIB). For ML, Muysken (2013: 207) states that "Spanish stems inserted into Media Lengua may retain some of their features on the lower levels, but not on the higher levels of prosodic structure." Similarly, van Gijn (2009) describes ML has having a stratified phonology on the lower levels of the prosodic hierarchy (Fig. 1) where elements are likely to contain material from either language. His findings show that stratified material probably exists from the syllable level downward. Muysken (2013) in reference to van Gijn's (2009) analysis however, extends the likelihood of stratified phonological material into the foot level and even possibly into the prosodic word level. Both authors however, concur that higher level structures (above the prosodic word) assimilate to Quichua phonology. Van Gijn's (2009) explanation for this phenomenon stems from the fact that material from both source languages are likely to co-exist in a given utterance at these higher levels.

(1)

Ima	*-shpa*	*-tax*	*-shamu*	*-ngi.*	*Kitu*	*-manda*	*shamu*	*-ngi.*
why	-SSC	-INTER	come	2	Quito	-from	come	-2

'Why do you come? You come from Quito.' (Cole, 1982: 211)

FIGURE 2 *A Wh-question (left) and declarative (right) in IQ (adapted from Cole, 1982)*

Regarding Quichua, Cole (1982) suggests that the same intonation pattern in Imbabura Quichua (IQ) is used for statements, information (wh) questions and yes-no questions. His description shows a flat tone with final rise-fall at the utterance boundary (Fig. 2). Documentation of several Southern Quechua varieties including Cusco-Collao (Quechua IIC), Ayacucho (Quechua IIC) and Cuzco (Quechua IIC) provide identical descriptions of intonation based on impressionistic reporting (O'Rourke, 2007).

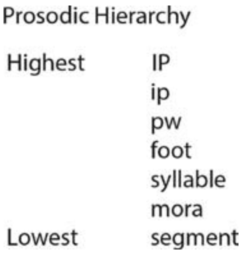

FIGURE 2 *Prosodic Hierarchy*

In an acoustic study of pitch in Cuzco Quechua, O'Rourke (2007) shows that declaratives, wh-questions, and yes-no questions marked with the yes-no question marker *-chu*, end in one of three boundary tones: (1) a fall (L%), (2) a bitonal rise-fall (LH%) or (3) the lack of a tonal movement (Ø%). On the other hand, certain questions with a "non-neutral" pragmatic meaning, resumptive questions, and echo questions show the opposite trend: (1) a final high boundary tone (H%), (2) a bitonal fall-rise (HL%), or (3) the lack of tonal movement (Ø%). O'Rourke's findings also show a number of monotonal and bitonal prenuclear and nuclear configurations associated with declaratives, pronominal questions, and yes-no questions. These include: monotone high target pitch accents (H*), and high target pitch accents with both downstep (!H*) and upstep (^H*), and a bitonal low-high pitch accent (L+H*) with both downstep (L+!H*) and upstep (L+^H*). In addition, her findings show evidence of intermediate phrase boundary tone configurations in the form of a monotone low boundary tone (L-) (and possibly a high tone (H-)) which appear with pronominal questions, yes-no questions, 'non-neutral' questions, and declaratives.

Regarding Ecuadorian Andean Spanish, O'Rourke (2010) provides a detailed description of intonational patterns found in the Quito dialect. Her findings show a complex number of pitch configurations shown to be quite distinct from those presented in her 2007 analysis of Cuzco Quechua intonation. To summarize of her findings, the Table 1 provides a breakdown of the nuclear pitch accents and boundary tone configurations found in Ecuadorian Andean Spanish:

TABLE 1 *Ecuadorian Andean Spanish NPA+BT configurations based on O'Rourke (2010)*

Utterance type	**NPA+BT configuration**
Broad focus statements, uncertainty statements, statements of the obvious, irritated imperative wh-questions, command, requests	L*L%
Narrow focus and contradiction statements	L+H*L%
Exclamative statements and imperative wh-questions	H*M%
Information seeking and confirmation yes-no questions	L*HH%
Echo and counterexpectational yes-no questions, and echo wh-questions	L*HL%
Imperative yes-no questions	L+H* HH%
Invitation yes-no questions	L+H*L% or L*HL%
Information seeking wh-questions	L*M% or L+H* M% or L*HH%
Vocatives	L+H* M%

Table 2 also shows a variety of monotonal and bitonal prenuclear pitch accents at work in Ecuadorian Spanish as described in O'Rourke, 2010.

TABLE 2 *Ecuadorian Andean Spanish PNPAs based on O'Rourke (2010)*

Utterance type	**PNPAS**
Uncertainty statements, invitation yes-no questions, information-seeking wh-questions and imperative wh-questions	L*
Broad focus statements, statements of the obvious, uncertainty statements, information-seeking wh-questions, imperative wh-questions, commands and requests	H*
Exclamative statements, statements of the obvious, uncertainty statements, disjunctive questions, imperative yes-no questions, echo wh-questions, and imperative wh-questions	L+H*
Broad focus statements, exclamative statements, contradiction statements, commands, and information-seeking, echo, counterexpectational, imperative and invitation yes-no questions	L+H>*
Yes-no questions, including information-seeking, counterexpectational, invitation, and confirmation questions	L*+H
Imperative wh-questions	H+L*

Being that the intonational typologies of both Spanish and Quechua appear quite distinct, I ask the questions, what evolutionary path did ML take regarding suprasegmental phonology? Do intonation patterns conform to those found in Quichua as per Muysken (2013) and van Gijn (2009)? Does Spanish have any influence on higher prosodic structures in ML? Does variability or overlap exist from each source language? A fourth option may also include a certain degree of innovation. One possible clue can be found in an important, albeit impressionistic, observation by Toscano Mateus (1953) who makes mention of prosodic similarities in rural dialects of Spanish to that of Quichua. I too have noticed similarities during the course of my own fieldwork. At the same time however, it is worth noting that rural Ecuadorian Spanish intonational patterns do not appear to have fully converged with Quichua.

These observations might suggest ML indeed conforms predominately to Quichua-like intonation… if it were not for the following anecdote:

> Once [the speakers] were comfortable and began to speak [Media Lengua] freely, we noticed a change in language attitude. Everyone was

> laughing and having fun with the language. When we asked what was so funny, we were told that [PML] has a different intonation pattern than Quichua which sounds humorous.
>
> STEWART 2011: 35

This detail and past studies concerning the vowel inventory of PML (Stewart, 2011, 2012, (Section 1.2)) raise questions concerning the supposed assimilation of PML to the Quichua phonological system.

Another characteristic of PML is that of code-switching (CS). While CS is also common in Quichua, there is a higher propensity towards CS in PML. Stewart (2011) notes that in addition to PML's position as an intermediate language between Quichua and Spanish, a higher rate of CS may result from PML being spoken by bilinguals who typically use more Spanish in their day-to-day lives.

It is a common assumption that, unlike lexical borrowings which typically conform to the phonology of the language they have entered, CS utterances are often assumed to preserve phonological characteristics of the guest language. This of course, depends on a number of factors including social circumstances and the level of bilingualism of the speaker. Bullock (2009) and Myers-Scotton (1993) suggest that instead of a clear cut transition from one phonology to the other, CS is often gradient. Given that the phonological system of Rural Andean Spanish shows a shift towards that of Quichua, both production and perception of CS utterances may require little effort to switch between phonological systems. I predict very little if any difference between Spanish CS utterances and ML intonation contours.

1.2 *Phonetic Analyses of Mixed Languages*

Since no information currently exists regarding the acoustic nature of higher level prosodic structures in mixed languages, an overview of lower level elements may shed some light on the prosodic nature of these languages. While there is a relatively large body of literature describing morphosyntactic aspects of mixed languages, phonetic analysis has been virtually inexistent until recent years. Recently, Michif (Rosen, 2007), Gurindji Kriol (Jones and Meakins, 2013; Jones, Meakins, and Muawiyath, 2012; Jones, Meakins, and Buchan, 2011), and Media Lengua (Stewart, 2011, 2012) have received attention regarding phonetic aspects of language mixing.

In Gurindji Kriol, a mixed language with verbal and nominal systems derived from each source language, Jones and Meakins (2013) test whether the voice onset time (VOT) values systematically relate to those in English cognates and how they compare to those in Gurindji Kriol. Their results suggest that there is no effect of source-voicing among English voiced, English voiceless, and Gurindji

Kriol (non-contrastive) stops in word-initial position. They conclude that Gurindji Kriol stops, regardless of their source-voicing category, are produced with short lag VOT, with the exception of English code-switching utterances.

Regarding vowel production, Jones, Meakins, and Buchan (2011), Jones, Meakins, and Mauwiyath (2012), Rosen (2007), and Stewart (2012, 2011) provide insights into mixed language vowel accomodation. Jones et al (2011) showed more formant (both F1 and F2) overlap in the Kriol-derived front vowels /æ/ and /e/, and back vowels /ʉː/ and /oː/ in Gurindji Kriol compared to those in Kriol. Jones *et al.* (2011) also show that the duration differences between the Gurindji Kriol short and long vowel contrasts were also reduced compared to those in Kriol.

In Michif, a mixed language containing Plans Cree verb phrases and Métis French noun phrases, Rosen (2007) describes the phonetic variability in back vowel production. She describes Plans Cree as only having one high-mid-back vowel ([o]), typically consisting of a higher F1 formant frequency than French [u]. When the high-back vowel is produced from a French-derived lexeme, it may be produced as either [u] or [o], however when derived from the Plans Cree's 'lower-high' back vowel, it only surfaces as [o].

Stewart's (2011, 2012) vowel space analysis demonstrates that both Quichua-derived and Spanish-derived high- and low-vowels (/i/, /u/, /a/) co-exist as extreme mergers (covert contrast) while Spanish-derived mid-vowels (/e/, /o/) co-exist with Quichua-derived high vowels (/i/, /u/) with considerable merger. Similar to the Gurindji Kriol study (Jones *et al.*, 2011), both mixed languages show considerable overlap – ML with the emerging vowels and Gurindji Kriol with the merging vowels. Stewart (2011) also shows that the same overlapping formant frequencies were dissimilar for Spanish vowel borrowings in Imbabura Quichua. Here, Quichua-derived and Spanish-derived high- and low-vowels (/i/, /u/, /a/) underwent complete merger while Quichua-derived high-vowels maintained negligible contrast with Spanish-derived mid-vowels (/i/, /e/). Unlike Gurindji Kriol and Michif, ML is often described as a mixed language with few stratified elements at the phonological level.

The results from these studies suggest that stratification at the segmental level in all three mixed languages is more complicated than a simple clear-cut division between source languages. If this pattern holds true at the suprasegmental level, it could show that mixed languages may in fact incorporate overlapping prosodic material.

1.3 *Autosegmental-Metrical Phonology*

Autosegmental-metrical phonology (AM) is a model of phonological representation which presupposes a non-linear approach to phonology (Goldsmith, 1979: 202). In this framework, suprasegmental elements such as tone, stress, and nasal harmony are represented independently of both vowel and consonant features. The original concept of AM, developed by Goldsmith (1976), mainly focuses on the interactions between tones and segments. In the Pierrehumbert (1980) AM model and subsequent versions (Pierrehumbert and Backman, 1988; Pierrehumbert and Hirschberg, 1990), the original AM approach of lexical tone was applied to a higher order of prosodic structures in an independent-suprasegmental framework. These elements typically include intonation, pitch range, final lengthening, and overall changes to the pitch contour (Jun, 1988; Baltazani, 2002).

According to the AM model, the building blocks of intonational phonology are posited in one or more tones assigned to the string within a prosodic unit. These tones may consist of either a single high (H) tone or low (L) tone or a combination of tones e.g. H+L, L+H, H+H. Because of the hierarchical structure, each unit has identifiable criteria setting it apart from other levels.

In most versions of AM analysis, the highest level in the hierarchy consists of the intonational phrase (IP). The IP is a prosodic unit roughly associated with a clause level utterance, which may contain one or more intermediate phrases. Intermediate phrases (ip), the next lower level, may consist of one or more prosodic words (pw). Hall (1990: 9) defines a prosodic word as a constituent that dominates both the foot and the syllable but is dominated by the ip. Intermediate phrases are often times defined as having preboundary lengthening (Michelas and D'Imperio, 2012) and pitch resets (Liberman and Pierrehumbert, 1984).

1.4 *ToBI*

Tones and Break Indices (ToBI) is a system of conventions designed to transcribe prosody in spoken language. The ToBI system can either be language specific e.g., sp_ToBI for Spanish (Estebas-Vilaplana and Prieto, 2009), GRToBI for Greek (Arvaniti and Baltazani, 2005), or based on the generalized system adapted from Pierrehumbert's (1980) initial work with English. ToBI transcriptions may contain four levels:

- The orthographic level containing the 'text' of the utterance including fillers.
- The break index level used to mark break indices with numerical representation.
  - 0 = Word internal or clitic boundary (little or no change to F0 contour)
  - 1 = Prosodic word (containing PAs)
  - 2 = Disjunctures (uncommon)
  - 3 = Intermediate phrase (ip)
  - 4 = Intonational phrase (IP)

- The tone level for marking the high and low F0 contour.
- A miscellaneous level used to measure silence, laughter, disfluencies and other notations.

(Based on Gibbon, Moore, and Winski, 1997)

Because of the hierarchal nature of this system, higher levels automatically correspond to lower levels i.e., a 4 BI coincides with an implied 3 BI, which coincides with a 1 etc. In this study, word internal boundaries are left unmarked due to their minor influence on the F0 contour. Pitch accents are marked with an asterisks following the corresponding H or L e.g., H*, L* or L+H*. Intermediate phrase boundary tones are marked with a dash following the corresponding H or L tone e.g., H-, L- or H+L-. The intonational phrase (IP) boundary tone is marked with a percent sign on the corresponding H or L tone e.g., H%, L% or H+L%. This study does not contain any tokens with disjunctures.

Finally, in this analysis I mark relative/ substantial differences in pitch height, which indicate emphasis of a prosodic word. These differences are marked with the carrot symbol prior to the corresponding H tone e.g., ^H.

2 Method

The data for this study were collected during two separate fieldwork trips to Ecuador in 2011 and 2012. Recordings are primarily of spontaneous storytelling speech, but also include elicited sentences and semi-spontaneous conversations. While the data were not recorded under laboratory conditions, the field recordings are of high quality and F0 contours are clearly identifiable.

This analysis consists of 400 utterances derived from these recordings. They consist of declarative, emphatic, exclamative, imperative, list, negation, surprisal, vocative, wh-question, yes-no question, and clarifier utterances (Table 3). For the present study, mostly spontaneous sentences are used, but there have been no observable differences from the elicited and semi-spontaneous data. The spontaneous speech data comes from over 40 narrations (cf Stewart, 2013) from six speakers (4 hours of recordings) and the semi-spontaneous data were recorded from prompted conversations between two speakers.

I recorded this data on a TASCAM DR-1 portable digital recorder using TASCAM's compatible TM-ST1 MS stereo microphone set to 90° stereo width. The data was recorded in 16-bit Waveform Audio File Format (WAV) with a sample rate of 44.1 kHz.

TABLE 3 *PML utterance types broken down by number of tokens (Nº tokens), number of speakers (Nº of speakers), gender, number of tokens uttered by men and women (M. tokens/F. tokens), spontaneous speech, semi-spontaneous speech and elicited utterances.*

	Nº of tokens	Nº speakers	Males	Females	M. Tokens	F. Tokens	S. Speech	SS. Speech	Elicited
Clarifiers	12	4	1	2	2	10	12	0	0
Declaratives	96	10	4	6	19	87	1	5	90
Emphatic	78	5	2	4	3	75	74	2	2
Exclamatives	12	4	0	4	0	12	12	0	0
Imperatives	29	7	3	4	10	19	16	2	11
Lists	48	4	0	4	0	48	48	0	0
Negation	26	6	3	3	3	23	26	0	0
Surprisal	4	1	0	1	0	3	4	0	0
Vocative	5	2	0	2	0	5	0	5	0
Wh-questions	63	11	5	6	18	44	17	7	39
Yes/no Question	27	5	3	2	9	18	6	3	18
Total	400	avg. 5	avg. 2	avg. 3	64	344	216	24	160

2.1 *Participants*

Eleven Quichua /ML /Spanish trilinguals (seven women and four men) participated in this study. All participants reported acquiring Quichua and ML simultaneously from birth and began learning Spanish upon entering primary school at around the age of six or seven. Among PML speakers, trilingualism is the norm. All participants were from the community of Pijal Bajo and reported normal hearing. Table 4 provides the age and gender of the participants in this study.

2.2 *Data Collection*

A native Spanish speaker and I provided all of the instructions and verbally elicited a 100-sentence list in Spanish for the participants. Before beginning, we asked the participants their name, age, place of birth, age of Spanish acquisition, places of residency throughout their life, the native language of each parent and language typically spoken at home and in the community.

For the spontaneous storytelling data, we simply asked the speakers to tell us about their traditions, life growing up, and legends they knew. The semi-spontaneous data was gathered after asking the speakers to ask each other random questions about, for example, the weather or how many children they had. In almost every instance the speakers would continue asking and commenting on questions that they had not been asked to role play.

TABLE 4 *This table provides the age and gender of the 11 consultants who participated in the recording sessions.*

Consultant	Gender	Age at the time of recording
#41	Male	59
#42	Female	~40
#43	Female	39
#44	Female	44
#48	Female	43
#50	Female	42
#51	Female	60
#52	Male	40
#53	Male	58
#78	Female	63
#79	Male	58

During the elicitation sessions, we would read each sentence on the elicitation-list and the participants were asked to provide their best oral interpretation of each sentence. Since the elicitation sessions were conducted with three consultants at a time (speaking in 5 minute blocks), we encouraged participants to seek advice from others if any doubts arose. We asked participants to speak at a normal conversational speed and to repeat if needed. Participants were compensated monetarily for their time.

2.3 *Data Format and Analysis*

Sound files were imported into Praat 5.3.03 (Boersma and Weenink, 2011) where a three-tier text grid was added for annotation. The interval tier contained the utterance divided into syllables represented in IPA. A point tier contained the break indices and another point tier contained the tone level marking the F0 contour.

In order to avoid micro perturbations, gender differences in pitch range and octave jumps (often caused by turbulent excitation from the vocal track during frication), I made the following adjustments to the pitch contour: in Praat's advanced pitch settings, the voicing threshold was increased from the 0.45 default to 0.6 and the octave-jump cost was increased discretely from 0.35 until any octave jumps were eliminated without drastically altering the rest of the pitch contour. For utterances produced by women, I used Praat's default 75–500 Hz pitch range (Fig. 3) while I adjusted the pitch range to 50–250 Hz for the utterances produced by males (Fig. 4). These frequency ranges were used to account for the lower F0 frequencies found in male speech compared to female speech. Finally, I extracted the pitch contour of each utterance and smoothed them using Praat's built in *Smooth* function. I adjusted the bandwidth between 4 Hz to 6 Hz—the lower the bandwidth the smoother the pitch contour.

3 Intonation Patterns in Pijal Media Lengua

This analysis uses the autosegmental-metrical framework discussed in section 1.3 in a ToBI style transcription, as discussed in section 1.4. The following sections provide an analysis of both pitch accents (PA) (sections 3.1, 3.2, and 3.3) and boundary tones (BT) (sections 3.4 and 3.5) found in declarative statements and most other utterance types from this dataset. Subsequent sections provide prosodic information regarding wh-questions (3.6), list intonation (3.7), surprisals, and interjections (3.8).

3.1 *Primary Pitch Accent*

In the tradition of metrical phonology, Pijal Media Lengua is a quantity insensitive language and like most Quechuan languages, has fixed primary stress[2] (henceforth pitch accent) on the penultimate syllable of a word. As suffixes are added, the pitch accent continually 'shifts' to the 'new' penultimate syllable as is shown in example 2 with the primary stress diacritic (ˈ).

(2)	ˈʒa.ma					*llama*	'sheep/ (llama)'
	ʒa.ˈma	-.wa				*llamawa*	'little lamb'
	ʒa.ma	-.wa	-.ˈku.na			*llamawakuna*	'little lambs'
	ʒa.ma	-.wa	-.ku.na	-.ˈman.ta		*llamawakunamanta*	'from the little lambs'
	ʒa.ma	-.wa	-.ku.na	-.man.ˈta	-.mi	*llamawakunamantami*	'I know from the little lambs.'
	sheep	-DIM	-PL	-ABL	-VAL		Consultant #50

In nearly every utterance type in this dataset (declaratives, questions, exclamatives, vocatives and imperatives), a bitonal L+H* pitch accent is realized as a

2 To avoid cross-over concepts in the terminology, I henceforth refer to this event as 'accent', instead of 'stress' as is the case in the traditional Quechuan literature, since this paper focuses solely on changes to the F0 pitch frequency and not dynamic, qualitative or quantitative differences at the lexical level.

rising pitch movement associated with the penultimate syllable of a prosodic word (pw) in both nuclear and prenuclear configurations. While I do not have a strong feeling about the overall declination, I mark relative/ substantial differences in pitch height to indicate emphasis at the pw level. Almost every spontaneous and semi-spontaneous utterance in my dataset bears the L+H* PA on at least one pw.

In PML, lexical words typically receive prominence over function words within an utterance. Function words such as pronominals and determiners may either appear with little or no change in the pitch contour but may also receive prominence similar to that of lexical words (see the first person possessive pronoun *mio* in Figure 4 vs. Figure 8). It is also quite common for the rise to begin one or more syllables before the accented syllable. Thus, in ToBI tradition, I use L+H* to indicate that the H is typically located on the accented syllable, and the L is somewhat free to be realized ahead of the H*. Nevertheless, there always seems to be a distinct rise toward the accented syllable (Fig. 9), in keeping with the impressionistic descriptions of Quichua (Fig. 1). Figure 3 shows three realizations of the L+H* PA, each one associated with the penultimate syllable of each pw.

(3) *Papa -su -ka wawa -kuna -wan -mi colera -hu -rka.*
father -DIM -TOP child -PL -INST -VAL angry -PROG -PAST
'Father was angry with the children.'

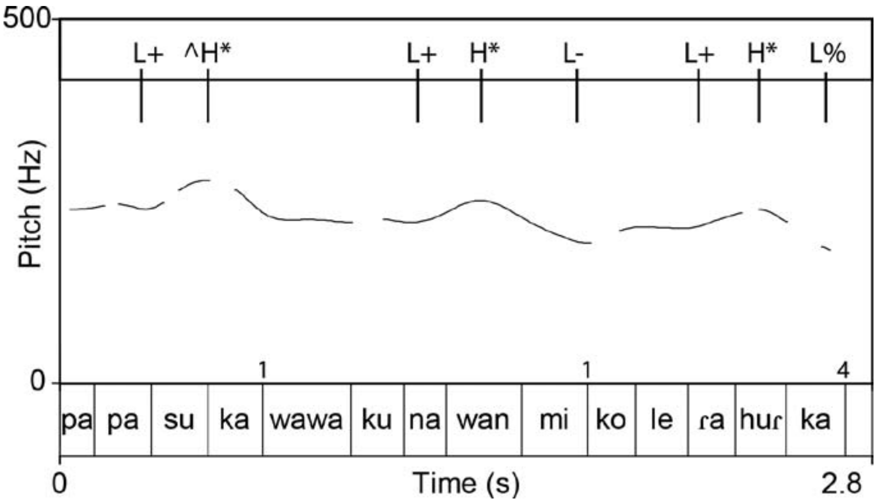

FIGURE 3 *This pitch track shows an L+H* pitch accent associated with the penultimate syllable of each word. Each PA ends its fall on the post-accented syllable.* Consultant 50 - elicitation

(4) *Mio* *terreno* *-ka* *propio* *-mi.*
1.POSS land -TOP own -VAL
'This is my own land.'

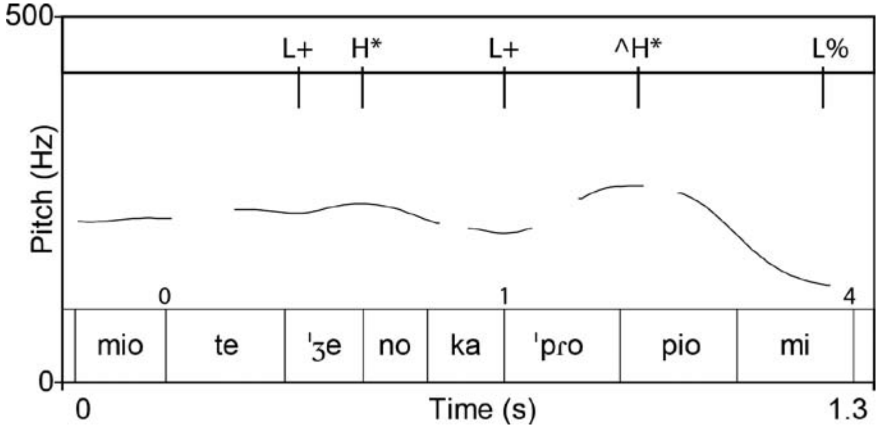

FIGURE 4 *This pitch track shows the pronominal* mio [*mi.o*] *'my' to be part of the prosodic word* mio terrenoka [*mi.o te.ʒe.'no.ka*] *'my land' due the flat Fo contour.* Consultant 44 – elicitation.

This same pitch accent may also be realized as a simple high (H) tone. This PA often times appears with disyllabic words such as *vela* ['be.la] 'candle' as observed in Figs 5, 16, 19, and 20. I suspect that this PA is structural in nature rather than a contrastive feature of the grammar since it is realized on the word-initial syllable where the L has no associating material and may delete.

While once again not directly correlated with a contrastive grammatical form, the L+H* PA may perceptually lose the initial rise through devoicing. This is due to the fact that the fundamental frequency (Fo) is a measurement of the temporal distance between wave cycles produced by vocal fold vibration, a crucial feature for tone realization not present in voiceless segments. Therefore an H* PA will often appear on an accented syllable with a voiceless onset.

In PML, vowels can be devoiced between voiceless obstruents during fast speech which can leave no discernable information in the acoustic pitch track. If this phonological condition appears on an accented vowel, identifying it as such becomes problematic since any evidence of the PA may be completely

(5) *Bela* *quema* *-hu* *-n.*
candle burn -PROG -3
'The candle is burning.'

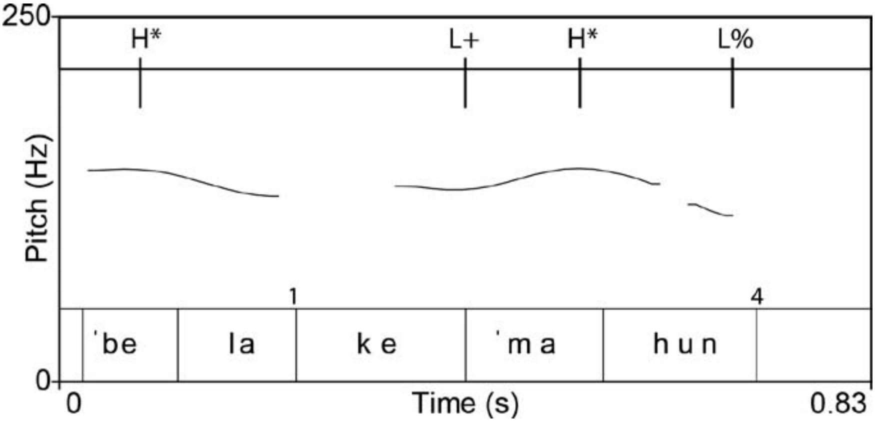

FIGURE 5 *This pitch track shows an H* PNPA on the initial/penultimate syllable* vela [*ˈbe.la*]. *The realization of an accented syllable in the syllable-initial position causes the loss of the initial L PA since there are no segments to bear the preaccentual rise.* Consultant 52 – elicitation

observed in both commonly accented (3a) and unaccented (3b) syllables in addition to both closed (3c) and open (3a) syllables (when preceded by a syllable with another voiceless onset). While less common, this pattern has also been observed crossing word boundaries (3d).

(3)	[+syllabic] →[-voice] /	[-sonorant] [-voice]	__	[-sonorant] [-voice]

(3a) …*vosteka tuyu casapika.* '[What do] you [have planted] at your house?' Consultant #50
[…vos.ˈ**te.-k**a tu.ju ka.za.-ˈ**pi.-k**a] → […vos.ˈ**ʔte̥.k**a tu.ju ka.za.ˈ**ʔpi̥.k**a] (Fig. 20)

(3b) *Ahoritaka solazo…*'Right now, it's really hot…' Consultant #43
[a.ʔo.ɾ-i.ˈ**ta.-ka**# so.ˈla.zo…] → [a.ʔo.ɾi.ˈ**ʔtḁ.kḁ**# so.ˈla.zo…]

(3c) *Mio suedrapish malo malo…*'My mother-in-law is really bad…' Consultant #43
[ˈmi.o sue.ˈdɾa.-**piʃ** ma.lo ma.lo…] → [ˈmi.o sue.ˈdɾa.**pi̥ʃ** ma.lo ma.lo…]

(3d) *Morocho comida…* 'White corn food…' Consultant #78
[mo.ˈɾo.**tʃu**# **k**o.ˈmi.da…] → [mo.ˈɾo.**tʃu̥**# **k**o.ˈmi.da…]

Approximately one quarter of the utterances in my dataset also undergo utterance-final devoicing (see example 4). I have yet to identify any specific discourse context or phonological structure where utterance-final devoicing occurs e.g., the glottal state of the previous consonant does not influence the voicing status of the final segment (4a) and nor does the syllable structure, as seen in the closed syllable in (4b) and the open syllable in (4c).

Based solely on the elicited data, utterance-final devoicing appears to be optional and user specific, while males have a higher tendency towards utterance-final devoicing than females. Some speakers (#79 male, #52 male, #41 male and #44 female) often employed utterance-final devoicing while other speakers (#51 female, #53 male, #48 female and #43 female) did not.

(4) [+sonorant] → [-voice] /__#

(4a) *Juyukuna blancomi.* 'The clouds are white.' Consultant #41
[xu.ˈju.-ku.na blan.ˈku.-**mi**] → [xu.ˈju.ku.na blan.ˈku.**mi̥**]

(4b) *Solka demasmi quemajun.* 'The sun is too much, [it is] burning.' Consultant #44
[ˈsol.-ka de.ˈmas.-mi ke.ma.-**hu-n**] → [ˈsol.ka de.ˈmas.mi ke.ma.**hu̥n̥**]

(4c) *Ese wawaka morishka.* 'That child had died.' Consultant #44
[ˈe.se ˈwa.wa mo.ˈɾi.-sh**ka**] → [ˈe.se ˈwa.wa mo.ˈɾi.sh**kḁ**]

Because utterances with a high degree of voicing are optimal for prosodic analysis, it is worth mentioning that Quichua traditionally contains no phonemically voiced stops. Allophonically however, Quichua has a well-known voicing rule which states that voiceless stops in the post-nasal position become voiced (examples 5 and 5a) (Orr, 1962; Rice, 1993). This rule however, is less productive in PML and only applies to [k], and only in verbal morphology (see example 6a vs. 6b and Figure 6) (Muysken, 1997; Gómez-Rendón, 2008; Stewart, 2011).

All other stops in the post-nasal position remain voiceless (Fig. 7).[3] Voiceless obstruents commonly cause a local increase in the frequency of voice, such, where voiced obstruents may have the opposite effect. Thus there are small perturbations to the F0 contour which are not phonological, but may interact with the pitch targets. For instance, one possible consequence of having a voiceless onset in a syllable with an 'underlying' L+H* PA, is that the low frequency expected from the PA is 'raised' by the voiceless consonant; under these circumstances the bitonal L+H* PA may be realized identically with a simple H* (Figs. 8, 12, 19, and 21).

(5) Quichua voicing rule
[-continuant] → [+voice] / [+nasal]___

3 For a detailed reference of each morpheme and its voicing feature see Stewart, 2011: 50.

(5a) *Chaymanta* 'From here…' Consultant #57
[kaj-manta] → [kajman**d**a] (Quichua speaker)

(6) Pijal Media Lengua voicing rule for verbal morphology
[k] → [+voice] / [+nasal]___

(6a) Verbal Consultant #48
Comerkangui. 'you ate' (Fig. 6)
[kome-ɾka-**nk**i] → [komeɾkan**g**i]

(6b) Nominal (no change) Consultant #50
Patronka 'boss'
[patɾon-**k**a] → [patɾon**k**a]

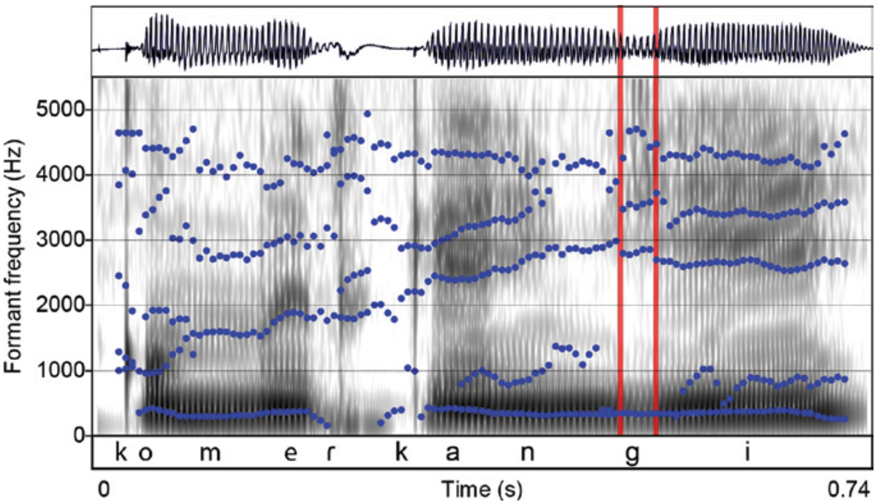

FIGURE 6 *Voicing of [k] in the post nasal position in* comerkangi *'I ate.' Combined with the nasal airflow of [n] and the negative* VOT *common in both* PML *and* IQ *stops, [g] may weaken to [ɣ], however in slower speech a clear difference emerges.* Consultant 50 – elicitation

(7) *comunidad -manta.*
community -ABL
'…from the community.'

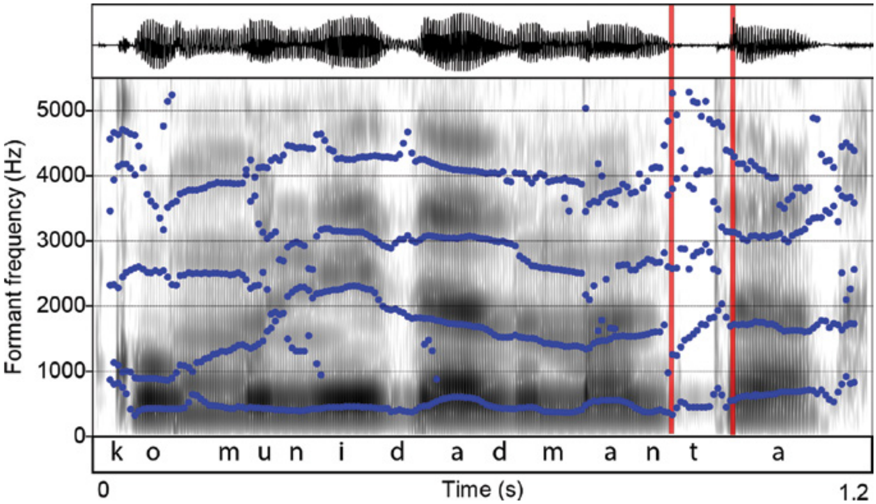

FIGURE 7 *Non-voicing of* [*t*] *in the post nasal position in* comunidadmanta *'from the community'.* Consultant 43 - narration

(8) *Mio* *terreno* *-ka* *bonito* *-mi*
1.POSS land -TOP pretty -VAL
'My land is pretty.'

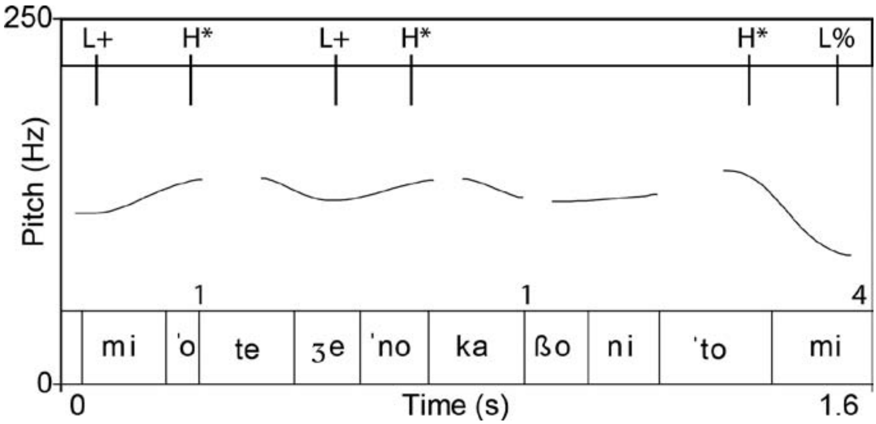

FIGURE 8 *This pitch track shows a single H* PA on the nuclear pitch accent in the word* bonitomi [*βo.ni.'to.mi*] *'pretty'. The NPA only consists of a single high tone due to the absence of Fo in the voiceless segment* [*t*]. Consultant 79 - elicitation

At times, the optional topic marker -*ka* and to a lesser degree the optional validator marker -*mi* fall outside the domain of lexical stress i.e., they become 'extrametrical' as defined by Hayes (1981) (Figs. 4, 9, and 10). Of the 90 elicited declaratives, 59 (67%) contained a topic marker and 10 (17%) of these 59 tokens appear to be extrametrical i.e., they did not seem to 'count' for deciding the realization of the PA. Only four (9%) of the 45 utterances containing the validator marker *-mi* appear as extrametrical elements. It may be the case that accent and word stress are post-lexical; sensitive to deletion but often insensitive to discourse.

If this were 'stress' i.e., a purely lexical process sensitive to word boundaries, it should not be 'shifting' because of a post lexical sandhi process. The fact that it is, suggests that it is not lexical stress in the same sense, but may simply be prosodic prominence governed by the prosody. When this happens, the pitch accent shifts to the antepenultimate syllable (which could also be interpreted as the would-be penultimate syllable if the optional suffix were not present). The function in the prosody of these suffixes appears to be in free variation.

(9) *Ese kogollo -ka retoña -hu -n.*
DET buds -TOP sprout -PROG -3
'The shoots are sprouting.'

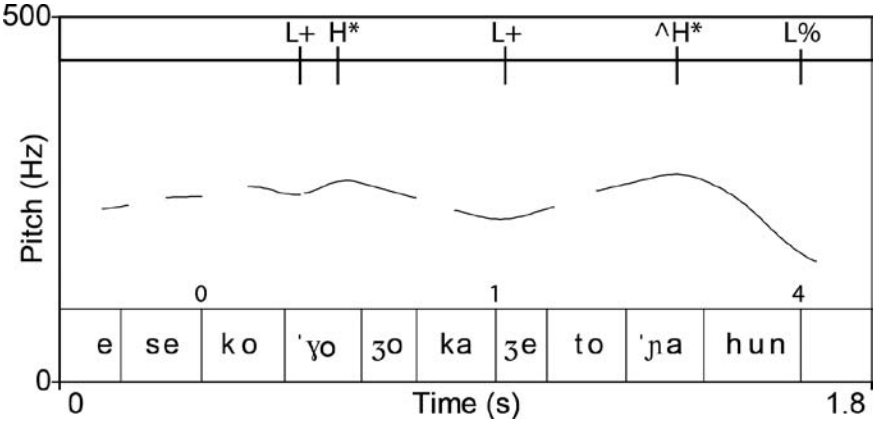

FIGURE 9 *This pitch contour shows a PNPA associated with the antepenultimate syllable in the word* collogoka [*ko.'ɣo.ʒo.ka*] *'shoots'.* Consultant 44 - elicitation

3.2 *Secondary Pitch Accent*

A secondary pitch accent is realized as a less prominent rise found on longer words ahead of the primary pitch accent. I posit the same L+H pitch accent with rising pitch movement associated with the accented syllable. The pitch range is narrower and less prominent than the primary L+H* PA, and typically ends its fall on the same syllable. Of the 90 tokens of elicited declaratives, 7 (8%) show evidence of a secondary pitch accent. All 7 words consist of at least 4 syllables (avg. = 5) and each one shows a secondary PA two syllables before the primary PA which could be equated with alternating 'stress' in the metrical tradition. I have yet to identify any specific environment which consistently makes use of a secondary PA. Figure 10 shows a secondary PA on the preantepenultimate syllable [.ˌmu] and a primary PA on the penultimate syllable [.ˈma]. This area requires more investigation.

(10)	*Lucero*	*-ka*	*sali*	*-mu*	*-hu*	*-n*	*-mari.*
	star	-TOP	appear	-CISLOC	-PROG	-2	-AFF

'The stars are coming out.'

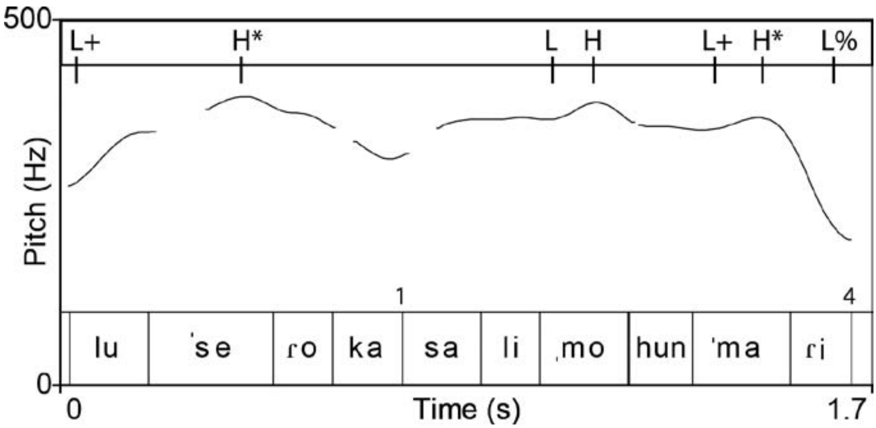

FIGURE 10 *This pitch contour shows a primary and secondary PA in the word* salimujunmari *[sa.li.ˌmu.hun.ˈma.ri] 'are coming out'. A primary PA is realized on the preantepenultimate syllable while a primary PA is realized on the penultimate syllable. The syllable bearing a secondary PA has narrow pitch duration, beginning and ending on the same syllable.* Consultant 42 – elicitation

3.3 *Emphatic Pitch Accents*

In PML, an emphatic pitch accent is a special PA given to one or more words in a sentence by the speaker, usually to indicate a degree of surprise, contrast, or special focus. The most striking feature of an emphatic PA in PML is its prominent rise reaching approximately 1.5 times the height of the standard primary PA. Aguerese Catalan (Prieto, 2014: 52) shows a very similar PA pattern which is assigned an L+H*+L tritonal pitch accent. Prieto describes this PA as "phonetically realized as a complex rise-fall within the accented syllable". While this pattern describes emphatic PAs in PML, the typical L+H* PA also describes this pattern since a fall is predicted after the H* PA. Moreover, like the primary PA, the post H* fall in emphatically accented syllables often times carries over into the next syllable. Since this accent type is not a contrastive feature of the intonational grammar e.g., question intonation vs. declarative intonation, I posit retaining the L+H* PA in order to maintain a more succinct description of PML intonation.

As observed in Figure 11, the word *vuelta* 'again' shows an emphatic PA with a sharp rise-fall on the penultimate syllable (a difference of 111 Hz from the neutral pitch contour). The word *bastanteta* 'bunch', also shows an emphatic PA, beginning on the initial syllable, peaking at 108 Hz above the neutral pitch contour on the antepenultimate syllable, before falling on the penultimate syllable. Finally, an emphatic PA is realized as a NPA on the penultimate syllable of *llevashpa* 'bringing', peaking at 104 Hz above the neutral pitch contour. In summary, emphasis in PML involves a dramatic increase in the H pitch target and a 'narrowing' of the rise-time from the L.

(11) *Y alotro dia -ka vuelta otro bastante -ta lleva -shpa, eskond*
and the.next day -TOP again another bunch -ACC bring -SSC hide

-id -ito mio mama -manta lleva -shpa i -nka -rka -nchi.
-PART.sp -DIM.sp 1.POSS mom -ABL bring -SSC go -COND -PAST -1P
'And on the following day, we would go bringing another bunch [of beans] hidden from my mom.'

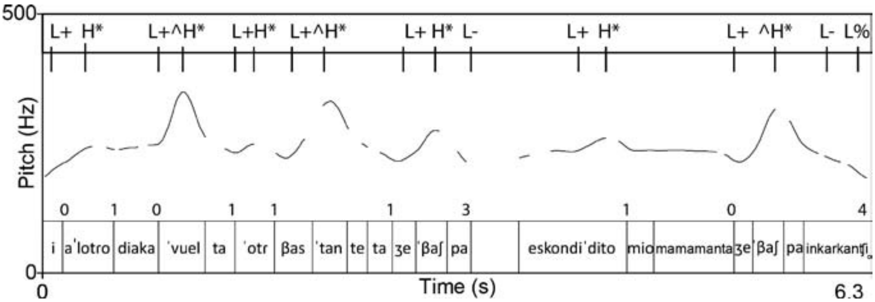

FIGURE 11 *This pitch contour shows emphatic PNPAs realized on* vuelta [*ˈβuel.ta*] *'again' and* bastanteta [*bas.ˈtan.te.ta*] *'bunch' and on the NPA of* llevashpa [*ʒe.ˈβaʃ.pa*] *'bringing'. Words with an emphatic PA have a wider range, beginning on the pre-accentuated syllable and ending the fall on the post-accentuated syllable.* Consultant 43 - narration

PML also makes productive use of reduplication for intensification. The reduplicated pair often functions as a compound where a secondary PA appears on the first instance of a reduplicated pair and the primary PA on the second. For both instances of the reduplicated pair in this configuration, the standard L+H PA is realized, but like an emphatic PA, the syllable bearing the primary PA has a prominent rise well beyond that of the standard primary PA.

The secondary PA often undershoots its post H* fall to the neutral pitch level before the rise on the second word. This undershoot, followed by the high pitch range on the second instance of the reduplicated pair, creates the stair-step pattern observed in Figure 12.

(12)	*Diay*	*-manta*	*wachu*	*wachu*	*busca*	*-shka*	*dezi*	*-n*	*uno*	*caña*	*-ta.*
	from.there	-ABL	plot.of.land	plot.of.land	look.for	-PART	say	-3	one	cane	-ACC

‘So, they say she had looked all over the plot of land, for a stick that is.’

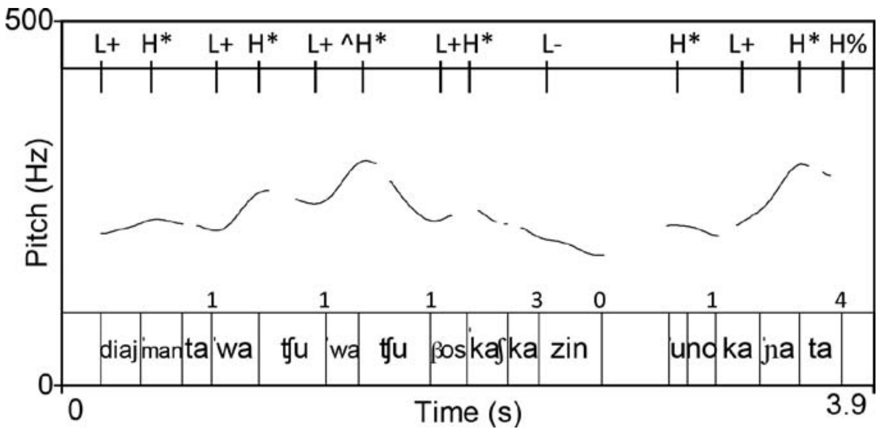

FIGURE 12 *A primary PA appears on the words* diaymanta *[di.aj.ˈman.ta] ‘from there’* buscashka *[βos.ˈkaʃ.ka] ‘looked for’ and* uno *[ˈu.no] ‘one’ (as a simple H*). An L- ip boundary tone appears at the end of* dizin *[zin] ‘say’ and an H% IP boundary tone appears on the word* cañata *[ka.ˈɲa.ta]. The reduplicated phrase* wachu wachu *[wa.ˈʧu wa.ˈʧu] ‘all over the plot of land’ shows a ‘stair-step’ effect with the first utterance receiving a secondary PA with undershoot on the fall followed by a primary emphatic PA on the second instance of* wachu *which doubles in pitch height.* Consultant 43 – narration

3.4 *Intonational Phrase Boundary Tones*

I interpreted the low pitch at the end of nearly every utterance type as a final L% boundary tone associated with the intonational phrase. As in English (Beckman and Hirschberg, 1997), Spanish (Estebas-Vilaplana and Prieto, 2009), Greek (Arvaniti and Baltazani, 2005), Catalan (Prieto, 2014), Cuzco Quechua (O'Rouke, 2007) Persian (Sadat-Tehrani, 2007) etc., this is cross-linguistically a common strategy for winding up declarative and often wh-questions. As observed in every pitch contour figure (3–23), with the exception of 12–15, a low (L%) intonational phrase (IP) boundary tone concludes every utterance.

The only exception to this configuration comes by way of *clarifying* utterances, which end in an H% IP boundary tone (Figs. 12, 13, 14 and 15). PML speakers employ this utterance type in three situations: (1) in order to clarify that information within the discourse topic is shared by the listener(s). In colloquial English this may appear as an embedded relative clause in the form of a question: *We went to the <u>lake…you know, where you fell off the boat?</u>… and had a picnic.* (2) Clarifying utterances in PML are also used to provide discourse information originally left out of a main clause e.g., *So they say that she was looking all over the plot of land…<u>for a stick, that is</u>* (Fig. 3). (3) Finally, clarifying utterances are used to supply necessary information to the listener(s) (see example 7).

(7)	*Gente*	*muñeco*	*pone*	*-ri*	*-n*	*chaupi*	*trigo*	*-pi.*
	People	doll	put	–REFL	-3	middle	wheat	-LOC

'The scarecrows [I had just mentioned] are placed in the middle of the wheat field.' Consultant #42

I observed this final H% in a number of sentences where I would have normally expected an L% and in each case there seemed to be some added information e.g., wh-question utterances (Fig. 20), statements (Figs. 12 and 13) and with tag questions (Fig. 14). Similar to tag questions, the speaker appears to only use a clarifying utterance when seeking affirmation that the knowledge is shared before continuing on with the discourse. If it is not, the discourse topic may switch until clarification is achieved.

(13)	*Ahora*	*-ka*	*i*	*-rka*	*-nchi?*	*Ay*	*atras*	*potrero*	*-man?*
	today	-TOP	go	-PAST	-1P	there	behind	pasture	-DIR

'[You know, where] we went today? Over there beyond the pasture?'

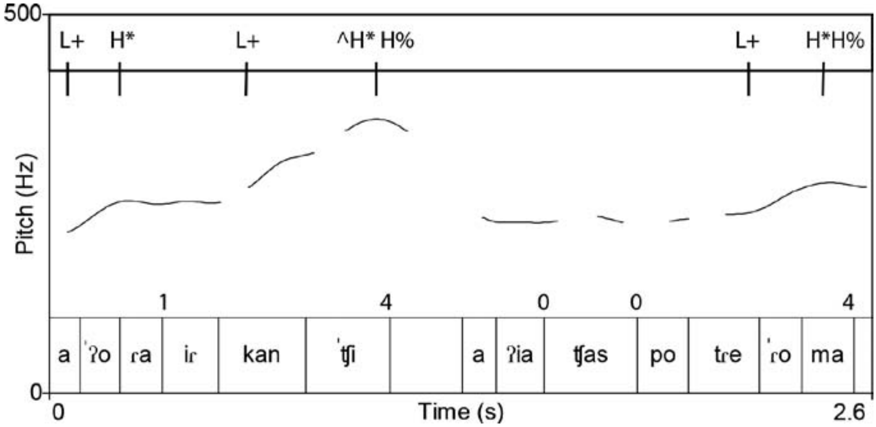

FIGURE 13 *This utterance was produced when the consultant was clarifying to me where the story was taking place. This figure illustrates two clarifying utterances. The first shows a primary* PA *on* ahora [*a.ˈʔo.ɾa*] *'now' with undershoot on the final fall. On the following word* irkanchi [*iɾ.ˈkan.ʧi*] *'we went', a rise begins on the penultimate syllable and ends on the adjacent syllable with an H% boundary tone. This same pattern can be found on the last word of the next utterance where* potreroman [*po.tre.ˈɾo.man*] *ends with an H% IP boundary tone.* Consultant 43 - narration

(14) *Recien ka -rka -ni nuevo nuera, no?*
just be -PAST -1S new daughter.in.law NEG
'I had just become [her] new daughter-in-law, you know?'

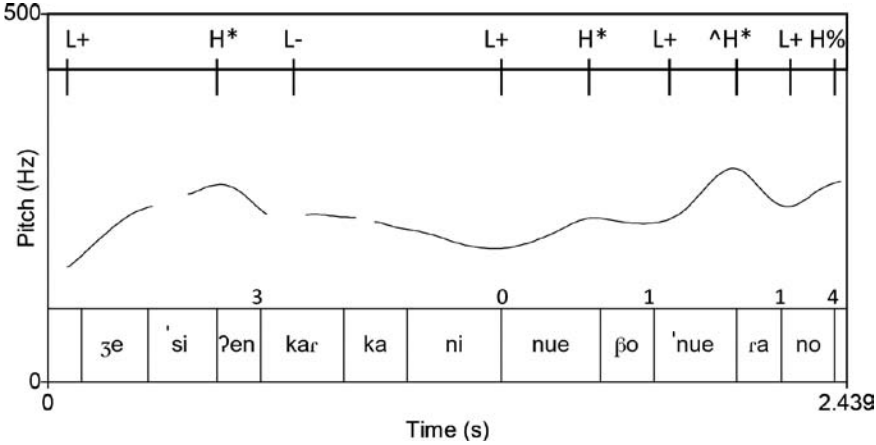

FIGURE 14 *This pitch track shows a primary* PA *on* recien [*ʒe.ˈsi.ʔen*] *'just' followed by an L- ip boundary tone. A primary* PA *also appears on the words* nuevo [*ˈnue.βo*] *'new' and* nuera [*ˈnue.ɾa*] *'daughter-in-law' with undershoot on the post H* fall in the latter (similar to reduplication). The utterance ends with an H% boundary tone on the tag question* no [*no*] *'no'.* Consultant 43 - narrations

(15) *Por onde -tak volvi -shka ay -llata.*
for where -Q.WH return -PART there -TOT
'Just over there, from where we had returned?'

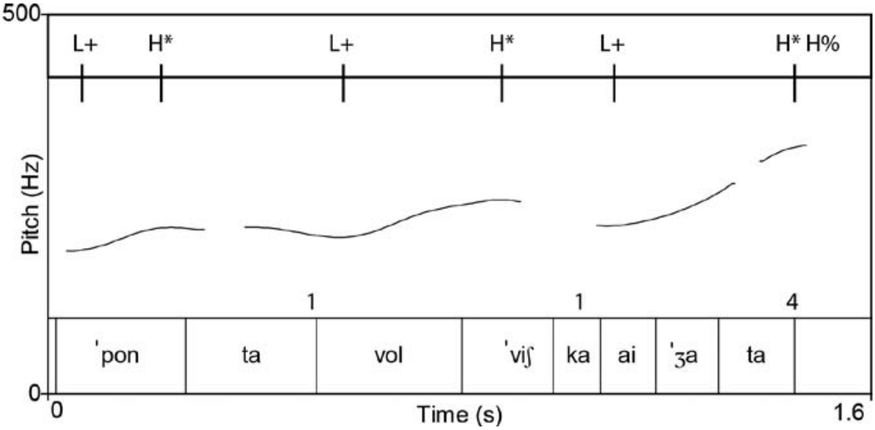

FIGURE 15 *This pitch track shows a primary PA on the penultimate syllable of each prosodic word and the utterance ends with an H% boundary tone.* Consultant 43 - narration

A small subset of yes-no questions also follow this pattern. This subset is made up of 4 of 5 tokens of negative yes-no questions, which may be interpreted as a type of clarifying utterance if the speaker is looking for affirmation that the listener is following the discourse event. For reasons I have yet to fully identify, a handful of wh-questions (5 of 63) also end with a very slight H% boundary tone after the question constituent NPA, which is typically (42 out of 63 tokens) deaccented (Fig. 20).

One possible explanation may be the type of information solicited by the wh-question. The utterance in Figure 20 appears to be asking for information which may call the speaker's intention into question. If the speaker is aware that the question may be imprudent, the pitch increase may show politeness or general curiosity.

3.5 *Intermediate Phrase Boundary Tones*

I identify an intermediate phrase (ip) by the following criteria: (1) a single low (L-) phrase tone affecting the last pitch accent on the boundary (Beckman and Hirschberg, 1997) and (2) pitch reset. A low intermediate phrase boundary tone, as described in the first criterion, can be observed independently of the prosodic words in 17% (15 of 90) of the elicited declarative utterances (Fig. 16).

Of the 42 of 63 wh-questions not followed by an emphatic PA (Section 3.3), list intonation (Section 3.7), or intensified word reduplication (Section 3.3) or a word with a primary PA, a low ip boundary tone also followed the wh-question constituent (Fig. 18). The same L- boundary tone is observed within an utterance in Figures 17 and 14 after the word *devezencuando* [ˌde.βes.en.ˈkuan.do] 'every so often' in the latter and after the word *recien* [ʒe.ˈsi.ʔen] 'just' in the former, both which carry some degree of emphatic accentuation followed by the deaccentuation of the remaining utterance.

(16) *Yo -ka casa -manta veni -hu -ni.*
1 -TOP house -ABL come -PROG -1S
'I am coming from home.'

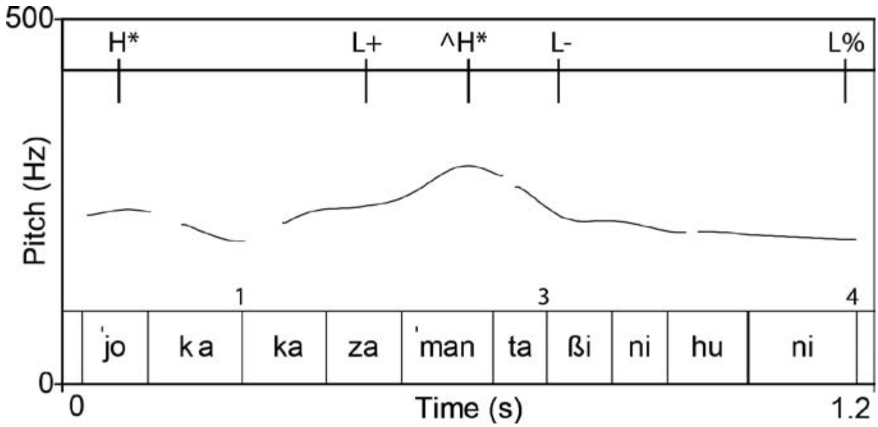

FIGURE 16 *This pitch contour shows an initial H* PA common with disyllable words with a primary penultimate PA (see section 3.1) associated with the word* yoka *[ˈjo.ka] 'I'. A more prominent L+H* PA then appears on the word* casamanta *[ka.za.ˈman.ta] 'from home'. After the fall, a low ip pitch boundary appears on the first syllable of the verb* vinijuni *[βi.ni.ˈhu.ni] 'I am coming' and is maintained throughout the rest of the utterance until the final boundary tone.* Consultant 48 – elicitations

(17) *Yo -ka no teni -ni -ka agua -ta -pay devezencuando mayo -pa*
1 -TOP NEG have -1S -TOP water -ACC -CONJ every.so.often May -BEN

-ka casa -man -kari vini -n no vini -n -ka diario -ka.
-TOP house -DIR *-kari* come -3 NEG come -3 - TOP daily -TOP
'~I don't have any water and every so often in May, it comes and goes daily to my house.'

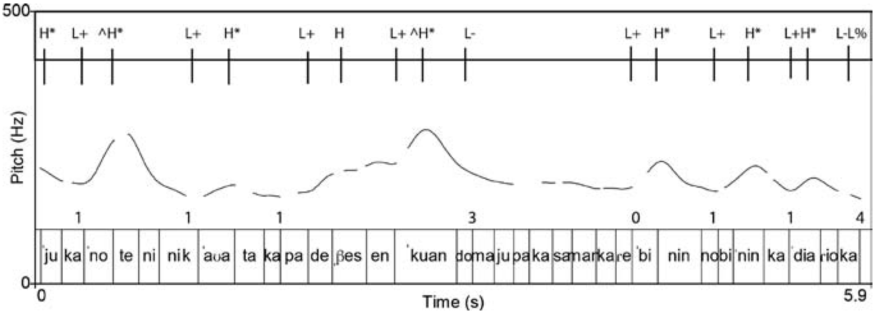

FIGURE 17 *This pitch track begins with an H* PA on* yoka [ˈjo.ka] *'I', common with disyllable words with a penultimate PA (see section 3.1), followed by an emphatic L+H* PA beginning on the negator* no [no] *'no' and ending on the ultimate syllable of* tininika [te.ˈni.nik] *'have'. An emphatic L+H* PA appears on the penultimate syllable of the word* devezencuando [ˌde.βes.en.ˈkuan.do] *'every so often', which also shows evidence of a secondary PA on the first syllable. This word also marks the end of an intermediate phrase indicated by the subsequent L- boundary tone. A slight L- ip boundary tone may also precede the utterance-final L% boundary tone.* Consultant 50 – semi spontaneous speech

The second criterion shows pitch reset at ip boundary tones within an utterance. In these instances, the pitch track reaches a relatively low frequency range, slightly below that of the neutral pitch contour, at which point a slight pause is observed in the utterance. The following phrase then restarts the pitch contour from the neutral pitch contour without a gradual rise from the previous phrase (Figs. 11, 12, and 13). No other ip boundary tone e.g., H-, appeared in my dataset.

3.6 *Wh-Questions*

Wh-question utterances also contain an L+H* PA. Unlike declaratives however, where each prosodic word receives a pitch accent, wh-questions typically (47 of 63 utterances) only receive a PA on the question constituent. This focus on the wh-constituent causes the rest of the utterance to become deaccented, meaning any putative PAs following the nuclear PA are deleted or undershot (Fig. 18). In a small hand full of utterances (5 of 63), a slight utterance-final boundary tone rise is observable (Fig. 20 and Section 3.4 for a description of the IP boundary tone).

In the rest of the wh-question utterances (11 of 63), the question constituent bears a PNPA when a prosodic word bears an emphatic PA (section 3.3), a reduplicated phrase (Section 3.3) or a list phrase (Section 3.7) follows the question constituent i.e., this deaccentuation does not affect 'emphatic' or other complex PAs which follow the wh-constituent (Fig. 19). The remaining 8% show a typical accented utterance, where we would expect an L+H* on each prosodic word.[4]

(18) *Quien* *-pa* *-tak* *ese* *pelota?*
who -GEN -Q.WH DET ball
'Whose ball is that?'

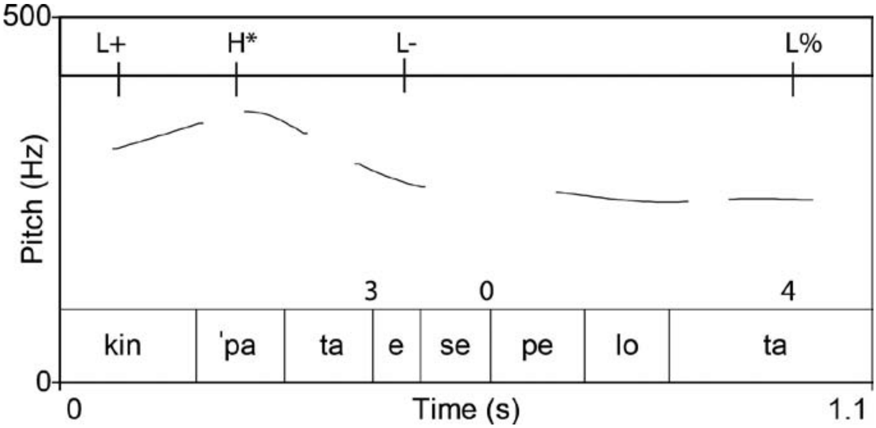

FIGURE 18 *This pitch track shows an L+H* NPA associated with the question constituent* quienpatak [*kin.'pa.ta*] *'whose'. The rest of the utterance following the question constituent is deaccented with no accent on either* ese [*e.se*] *or* pelota [*pe.lo.ta*]. Consultant 48 – elicitation

(19) *Por que* *no* *-ta* *breve* *breve?!*
why neg -ACC fast fast
'Why aren't you faster?!'

4 It is also worth noting that only one example of an exclamative appears in my dataset: *Comomi pikashka!* [ko.'mo.mi pi.'kaʃ.ka] 'How it itched!' The wh-constituent *comomi* 'how' however, does not bear an NPA, and primary stress is barely noticeable on the wh-constituent. The word *pikashka* 'itched' bears the NPA on the penultimate syllable with a relatively prominent rise in pitch compared to the neutral pitch contour.

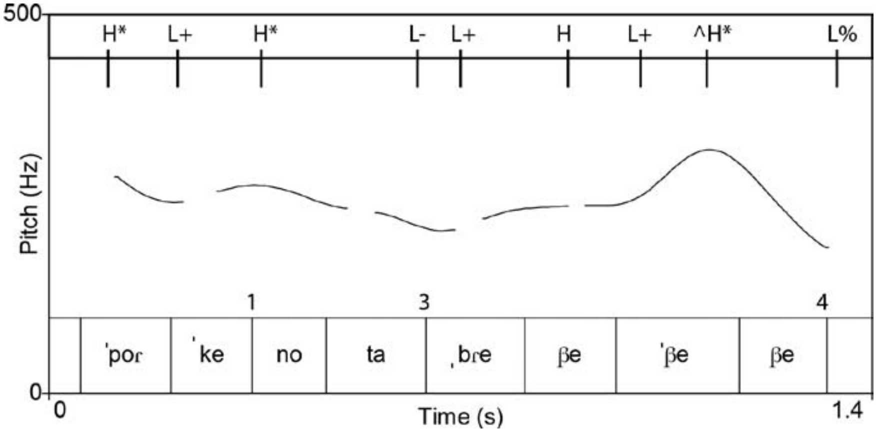

FIGURE 19 *This pitch track begins with an initial H* PA realized on* por [*'por*] *'for'* (*commonly associated with monosyllabic words*), *followed by the standard L+H* PA on the question constituent* que [*'ke*] *'what'. This utterance ends with the reduplicated form of* breve [*'bre.βe*] *'fast', showing a secondary PA on the first instance and emphatic primary on the second. The NPA also shows a substantial increase in pitch height compared to the pitch accent realized on the question constituent* (*diff = 47 Hz*). Consultant 78 - narrations

(20) *Tia Lucia, que -tak sembra -shka teni -ngi voste -ka tuyu kasa -pi -ka?*
aunt Lucia what -Q.WH plant -PART have -2S 2 -TOP 2.POSS house -LOC -TOP
'Aunt Lucia, what do you have planted at your house?'

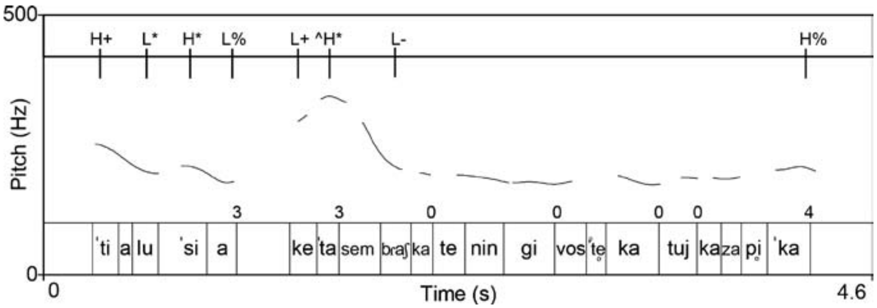

FIGURE 20 *This pitch track of the vocative utterance* Tia Lucia *'Aunt Lucia' shows an H+L* PA on the initial syllable of the honorific tia* [*'ti.a*] *'aunt', followed by the standard primary H* PA, associated with a voiceless onset in an accented syllable, on the name Lucia* [*lu.'si.a*]. *An L+H* NPA appears on the wh-question constituent queta* [*ke.'ta*] *'what' which is followed by the deaccentuation of the rest of the phrase* (*represented with an L- boundary tone*). *As described in section 3.6, this utterance is one of a handful where a slight H% PA boundary tone rise is found at the end of the utterance.* Consultant 50 – semi spontaneous speech

3.7 *List Intonation*

Each consecutive item in a list takes the same L+H* pitch accent as words with a standard primary PA. Little variation exists in the frequency range between peaks. Like emphatic PAs however, the frequency range is often higher than that of standard primary PAs, especially regarding nuclear pitch accents which indicate the end of a list. Figure 21 shows the pitch pattern of consultant #43 listing off the months of the year during a storytelling session.

(21)	*Ese*	*docekachuka*	*sinifican*	*-mi*	*meses*	*delaño:*	*enero,*	*febrero,*	*marzo,*	*abril,*
	DET	twelve.peice	signify	-VAL	months	of.the.year:	January	February	March	April

mayo,	*junio,*	*julio,*	*agosto,*	*septiembre,*	*octubre,*	*noviembre,*	*disiembre.*
May	June	July	August	September	October	November	December

'The twelve pieces signify the months of the year: January, February, March, April, May, June, July, August, September, October, November [and] December.'

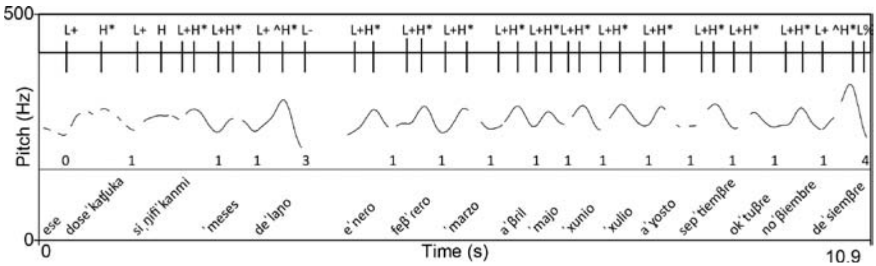

FIGURE 21 *This pitch contour shows a wide rise and fall* PA *on* dosekachuka [*do.se.ˈka.tʃu.ka*] *'twelve-peice', with an extrametrical topic marker* (-ka). *The word* significanmi [*siɣ.ˌni.fi.ˈkan.mi*] *'signify' shows a possible secondary* PA *on* [*.ˌni*] *and a primary* PA *on* [*.ˈkan*]. *The word* meses [*ˈme.ses*] *'months' also shows a primary* PA *with a lower peak frequency. The pitch accents realized on the words* delaño [*de.ˈla.ɲo*] *'of the year' and* deciembre [*di.ˈsiem.bre*] *'December' both have substantial increases in pitch height compared to the previous pitch accent* (*a difference of 39 Hz for the former and 54 Hz for the latter*). *Each month of the year has an L+H* pitch accent on the penultimate syllable with the exception of* abril [*a.ˈβril*] *'April' where the same* PA *appears on the ultimate syllable.* Consultant 43 – narration

3.8 *Surprisals and Interjections*

The L+H* configuration is the default pitch accent in a wide range of utterance types outside declaratives and wh-questions. Based on my data L+H* NPAs and PNPAs are found in: imperatives, imprecatives, exclamatives, and negative declaratives.[5] Like the utterances described hereto, this PA is also associated

5 It is not uncommon to have the L+H* PA shifted from the accented penultimate syllable to the negator *no/na* where the fall then carries over into the following pw (Fig. 19).

with the accented penultimate syllable like those described in section 3.1 (Figs. 3 and 4).

Surprisals on the other hand, provide an interesting take on the positioning of the L+H* PA. While my data is limited to only three tokens of this utterance type, all three shift the L+H* PA to the final syllable. Monosyllabic interjections were also present during two of the tokens, which also bear a complete L+H* (Fig. 22).

(22)	*Ah*	*ese*	*dos*	*chiquito*	*wawa*	*-kuna*	*-chu*	*gemela*	*-kuna!?*
	ah	DET	two	small	child	-PL	-Q.Y/N	twin	-PL

'Ah! Those two little children are twins!?'

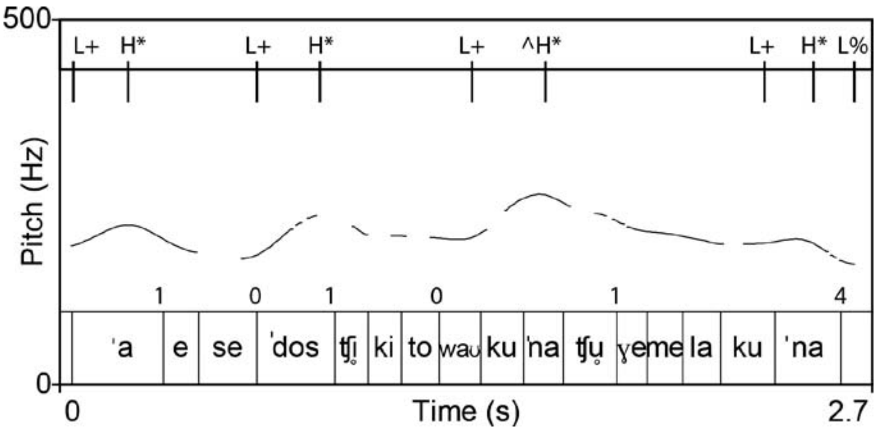

FIGURE 22 *This contour begins with an L+H* PA on the monosyllabic interjection* ah *'ah' along with two more prenuclear pitch accents in* dos [*'dos*] *'two',* wawakunaka [*wa.wa.ku.'na.ka*] *'children' and the nuclear pitch accent found on the ultimate syllable of* gemelakuna [*ɣe.me.la.ku.'na*] *'twins', indicating surprisal. This utterance concludes with an L% boundary tone.* Consultant 43 – semi spontaneous speech

Quichua is also known for having a rich vocabulary of multisyllabic interjections e.g., *achachay* 'it's cold', *arrarray* 'it's hot', *ananay* 'how pretty' etc. These interjections are also common place in PML (Stewart, 2011). While few exist in my dataset (three in total), all bear the L+H* PA on the final syllable, similar to that of surprisals (Fig. 23).

(23)	*Atatay!*	*Navale!*
	yuck	NEG.good

'Yuck! It's no good!'

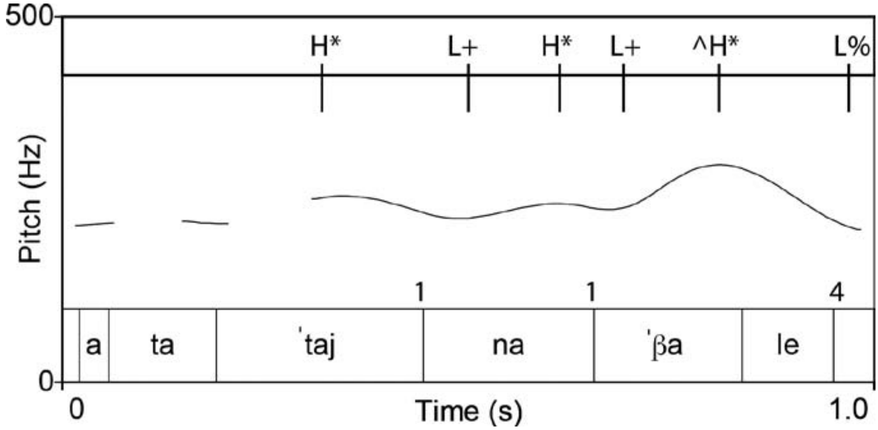

FIGURE 23 *This pitch track shows a simple H* PNPA on the final syllable of the interjection* atatay [*a.ta.'taj*] *'yuck'. This utterance also shows a slight L+H* PA on* na [*'na*] *'no'* (*derived from Quichua*). Consultant 42 – narration

4 Conclusions

I offer this paper as a preliminary description of basic Pijal Media Lengua intonation patterns within the autosegmental-metrical framework of prosody as described by Pierrehumbert inter alia (Pierrehumbert, 1980; Pierrehumbert and Beckman, 1988; Pierrehumbert and Hirschberg, 1990; Ladd, 1996) in the ToBI transcription system for transcription (Silverman et al, 1992). The dataset, made up of 400 tokens from a variety of utterance types (Table 1) and produced under a multiple conditions including elicitation, semi-spontaneous speech and spontaneous speech during storytelling sessions, was used to identify the basic F0 pitch contours described in this study.

Nuclear and prenuclear pitch accents in almost every utterance type were described as a bitonal configuration containing an initial L pitch target which rises to an H pitch target on the accented syllable. Following this, pitch seems to return to a neutral frequency until called upon to change due to the next tonal autosegment (PA of the next word, or boundary tone). While this configuration appears straightforward, its position, realization, length and frequency range depend on the configuration of elements at the segmental level, utterance type at the discourse level and possibly the importance placed on a given word.

Because of utterance-final devoicing, it was often difficult to know the final trajectory of the IP boundary tone. Under these circumstances marking a boundary tone as L% or H% when the final syllable of a word was voiceless became problematic. A similar situation arose for the initial rise in both L+H* PNPAS and NPAS with voiceless onsets in an accented position. Under these conditions, no evidence of an initial rise appeared on the onset, causing the pitch track to appear as a simple H* PA. Finally, the H* PA was also common with disyllabic words since the initial rise often times begins on the nucleus or coda of the preaccented syllable; I have tried to characterize this as undershoot and the effect of local pitch perturbations, but the generalizability of this explanation must be explored further in later work.

While I do not believe there is a difference between the realization of H* and L+H* in the intonational grammar of PML, based solely on these structural conditions, I have taken a conservative approach and identified them as H* for the time being. When inter-voiceless-obstruent devoicing of vowels takes place on an accented syllable, it was also problematic to judge whether an accent appeared at the prosodic word level or not.

Variation seems to exist regarding PA placement which occurs with two optional final suffixes, the topic and validator markers, in that sometimes they 'count' as the final syllable and other times they appear extrametrical. Sometimes the PA may shift onto the 'derived surface' of the second to last syllable, and other times there is no change to the PA position.

Placement of the NPA is also affected by utterance type. In both interjections and surprisals, the NPA is shifted to the last syllable. In wh-questions, the NPA is placed on the question constituent typically found in the utterance-initial position, thus causing the rest of the utterance to be deaccented.

Certain utterance types such as emphatic, reduplication, and list intonation cause the initial rise to quickly reach frequency ranges well above that of the standard primary PA. The overall length/ duration of both PNPAS and NPAS under these conditions can range anywhere from a single syllable to crossing multiple syllables, and even word boundaries.

While there appears to be a substantial number of ways the L+H* PA can be realized in terms of timing, it does not deviate from its basic configuration of an initial L from the neutral pitch contour followed by a rise and subsequent fall to the neutral pitch contour.

Further analysis is needed in order to pinpoint the exact nature and variations in the L+H* PA, especially regarding emphasis and how it may span over anywhere from a single syllable to multiple syllables. More work is also needed to identify if emphasis at the prosodic word level is simply gradient, therefore causing pitch height differences to be based solely on the importance of a lexical item or if there is a grammatical element involved. Because of limited tokens of certain utterance types, some of the PAS e.g., surprisals and interjections only provide suggestive data into their configuration.

One unexpected finding in my data suggests that males have a higher tendency to produce utterance-final devoicing. Physiologically and anatomically, women are more prone to devoicing due to the smaller volume of airflow through the glottis which leads to a quicker neutralization of glottal pressure (Verhoeven, 2011). Slis and van Heugten (1989) also show that women have stiffer vocal folds which require more energy to set them in motion – a condition conducive to utterance-final devoicing since no subsequent energy-requiring elements exist. These details support sociolinguistic trends which show women to have a higher propensity towards devoicing than men. The fact however, that PML speakers are showing the opposite tendency, is not unheard of cross-linguistically. Imai (2010) shows social factors may influence the production of phones, which are traditionally considered voiced. She argues that due to the neutralization of traditional gender differences in Japanese, younger people may be expressing gender distinctions through devoicing, where less devoicing equates to sounding more 'feminine'.

While male devoicing in PML does not appear to be a change 'in-progress', since all speakers are over the age of 35, there may have been social factors in past generations, or during the adolescence of the current generations, which influenced this tendency. From a purely impressionistic standpoint, two distinctive characteristics of PML male speech included a less expressive and softer narrative delivery which had a tendency to 'fade out' near the end of utterances during the storytelling sessions. From a social standpoint, men in Pijal often appeared to be more reserved and softer spoken than women. This social observation could be conducive to utterance-final devoicing, since the lower energy levels could allow for quicker glottal pressure neutralization which may be perceived as the fading effect.

While there is not yet any data on gender differences regarding Imbabura Quichua devoicing, another possibility, if utterance-final devoicing turns out to be a distinctly male quality in IQ, it may be that it carried over during the genesis of PML. This area requires further investigation.

4.1 *Media Lengua and Mixed Language Prosody*

While there are currently no acoustic studies of intonation in the literature for Rural Andean Spanish and Imbabura Quichua, based on prosodic analyses by O'Rourke (2007, 2010) of similar dialects of each source language (Section 1.1), it is safe to assume that PML predominantly conforms to Quechua-like intonation. Comparing O'Rourke's (2007) analysis of Cuzco Quechua with PML, there are striking resemblances e.g., clarifiers in PML and what O'Rourke refers to as "non-neutral" pragmatic questions are the only utterance types to show a final H% boundary tone, while other question types and declaratives show a similar low final (L%) boundary tone. Another clear similarity between both languages is the highly productive use of the bitonal L+H* pitch accent across a number of utterance types.

Even more striking is the fact that PML appears to make no use of any of the Spanish nuclear and boundary tone configurations documented in O'Rouke (2010) that are not already shared with Quichua e.g., L+H*L% list intonation. In addition, there is no evidence of low pitch accents (L*), mid tones (M), continued pitch movement at boundary tones (HH%, LH%), and bitonal falls (H+L*).

Preliminary investigations into Imbabura Quichua (IQ) also suggest that PML may contain innovations and/or preservations that are not presently found in IQ or Spanish. One example includes the production of the emphatic pitch accent (Section 3.3). While it is also found in IQ, both its rate of production and jump in frequency (1.5 times that of the standard PA) appear to be much higher than those in Quichua. Regarding its rate of production, it was the second most common PA analyzed in the dataset (78 tokens), just behind standard declaratives (96 tokens) – making utterances without an emphatic PA, at times, challenging to find.

When I asked the consultants to describe the difference between Quichua and PML intonation, they were quick to point out the 'exaggerated' nature of this PA. This also coincides with testimonials from Stewart (2011) which suggest that Quichua sounds more 'monotonous' than PML. While the following is by no means conclusive, I asked one consultant to provide me with a Quichua equivalent of a PML phrase she had just uttered. The results are shown in figure 24. Notice the large pitch range in both the first prosodic word *demañanaka* 'this morning' and in the stair step pattern associated with the reduplicated adjectives *chiri chiri* 'really cold' (dashed line) compared to their Quichua counterparts *tutamandapa* 'this morning' and *chiri chiri* 'really cold' (solid line). Even though the Quichua expression *chiri chiri* was also used in PML instead of *frio frio*, there was still a substantial difference in pitch range.

What does this mean for the phonology of mixed languages? For one, it means both van Dijn (2009) and Muysken (2013) were largely correct when they stated that ML prosody assimilates to that of Quichua. In addition, Quichua-like intonation even appears to dominate code-switching utterances. While I would not be surprised if longer code-switching phrases or infrequent words retain Spanish prosody to some degree, it is overly apparent PML does not make use of Spanish prosody productively. This can be seen in temporal expressions which are often the most common examples of code-switching e.g., [a las ˈdiez de la maɲaˈnaka] *a las dies de la mañanaka* 'at 10 in the morning'. Even portions

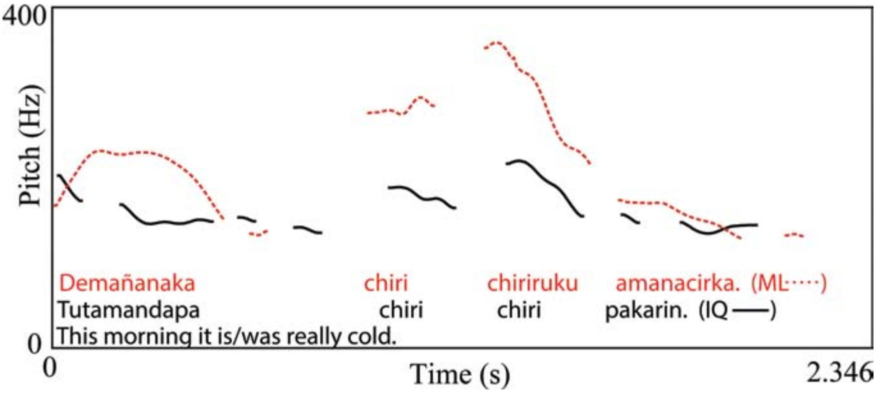

FIGURE 24 *Over lapping pitch tracks of the same utterance produced in both PML (dashed lines) and IQ (solid lines) highlighting the differences in pitch height between languages.*

with productive Spanish gender agreement, they still conform to the standard L+H* PML PA located on the penultimate syllable (Fig. 11).

Regarding acoustic analyses of mixed language material, this is one of the first clear cut examples of assimilation to a single source language with the exception of the innovative/ preserved emphatic PAs. Unlike the phonetic analyses described in section 1.2, which show overlapping systems at the segmental level, higher levels of phonology at least in PML, do not show this trend. The same can be said for the concept of stratification, often used to describe mixed languages from a traditional phonology stand point. Here, suprasegmental material shows no signs of source-language divisions. At this point, van Dijn's analysis of mixed language phonology using the prosodic hierarchy (Fig. 1) coincides with the higher levels of prosodic structure described in this study. Future investigations of prosodic patterns using acoustic methods of analysis however, are still greatly needed to better understand how suprasegmental systems are manifested in mixed languages.

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