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The Suprasegmental Phonology of Yonghe Qiang in Typological Perspective

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by

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1. Theoretical background

The classification of tone and word level prominence are particularly thorny issues within the field of linguistic typology. Many typological studies of suprasegmental phonology assume a binary split of languages into those with stress (relative metrical prominence) and those with tone (contrastive pitch) (see Hyman 2009 for discussion). However, Gordon (2016: 216) notes that "classifying languages as possessing tone or stress systems is often problematic when one moves beyond prototypical instantiations of the two systems".

Hyman (2006, 2007, 2009, 2012) has argued against both a stress-tone dichotomy as well as stress-tone continuum, and posits that stress and tone are orthogonal properties. Adopting a 'property-driven' approach to prosodic typology, he defines stress as "a structural property in which syllables are metrically hierarchized as relatively strong vs. weak (however this contrast is realized phonetically)," and defines tone as a "featural property referring to contrastive relative pitch" (Hyman 2009:215). According to Hyman, non-prototypically stress or tone languages, which have sometimes been called 'pitch-accent' languages, are merely "defective or restricted tone systems" (Hyman 2009:222), in which tone may have some or all of the properties outlined in (1) (from Hyman 2009:220).

(1) a. obligatory ("at least one per word")
b. culminative ("at most one per word")
c. privative (e.g. /H/ vs. Ø rather than /H/ vs. /L/)
d. metrical (e.g. positionally restricted, subject to reduction/subordination in compounding or when out of focus)

An advantage of this approach is that it can readily account for languages such as Pirahã (Everett 1986, 1988), in which tone and stress-accent are clearly independent phonological

properties. However, there are at least two problems with this approach. First, a view which strictly delineates stress and tone cannot easily account for languages such as Nubi (Gussenhoven 2004), in which prosodic prominence is a property of the syllable that is culminative, obligatory, and realized with a high pitch. At best, such systems represent an analytic indeterminacy between a restricted tone system and a stress-accent or pitch-accent system (see van der Hulst 2011). At worst, they undermine the possibility of maintaining a clear typological distinction between stress and tone across languages. Second, these definitions have an implicit asymmetry in the degree to which stress and tone are construed as abstract properties. Given the variety of attested acoustic correlates of stress, including: pitch, amplitude, duration, and vowel quality (Gordon 2011, 2016, *inter alia*), why should only one phonetic exponent, pitch, be relevant for characterizing tone? Such a view is particularly problematic for languages in which pitch is one of many features which indicate tonal category.

To illustrate that tone can be a more abstract property realized by multiple features, let us consider the case of Burmese. Burmese has four tones, each characterized by a combination of four different phonetic exponents: duration, intensity, pitch, and phonation type (Watkins 2001).[1] An experimental study by Gruber (2011), which tested the relative weight of each of the acoustic correlates for each tone using a forced-choice lexical-recognition task with both

1 Burmese has also been analyzed as a 'register' system (Bradley 1982) and as a 'pitch register' system (Jones 1986). However, I follow Brunelle & Kirby (2016) in their view that "conceiving of tone and phonation as discrete categories is neither typologically or diachronically useful." This view has also been expressed in earlier work by Matisoff (1973) who claims that a clear distinction between tone and phonation is impossible.

natural and altered stimuli, found that "a single feature fails to define not only the four-way contrast, but also any individual category within that system" (Gruber 2011:327). The results of this study demonstrate that there is no *a priori* reason to consider pitch the primary indicator of tone in Burmese. These findings lend support to a theory of tone as a more abstract category which may be realized via multiple phonetic exponents.

Pulling the lens back from Burmese, we see that multiple phonetic exponents of tone have been documented in several other Tibeto-Burman (TB) languages, including but not limited to Tamang (Mazaudon 2014), Manange (Hildebrandt 2007) Kham (Watters 2002), Kyirong Tibetan (Huber 2005), and Kurtöp (Hyslop 2009).

The fuzzy boundary between tone and phonation has long been recognized as an areal trait of the Mainland Southeast Asia *Sprachbund* (Haudricourt 1954, Matisoff 1973, Mazaudon 1977, Pulleyblank 1978, Diffloth 1986, Thurgood 2002, Enfield & Diffloth 2009). Although contrastive pitch and phonation type may be orthogonal in languages such as Jalapa Mazatec (Garellek & Keating 2011) and Mpi (Ladefoged & Maddieson 1996), languages of this type are less common than ones in which tone is realized through multiple features (Brunelle & Kirby 2016).

In sum, the definitions put forward by Hyman cannot account for the diversity of ways in which tone is realized phonetically. I instead adopt Matisoff's (1999) position that "Tone is by no means a simple matter of relative pitch, but a complex bundle of features, including phonation-type, tongue position, pharyngeal tension, vowel length, and contour" (Matisoff 1999: 86).

I posit that this understanding of tone is still compatible with a property-driven approach to phonological typology, with the added stipulation that distinctive phonological features are both emergent (Blevins 2004, Mielke 2008) and language-specific (Trubetzkoy 1939). Thus, rather than attempt to revise and reify definitions of 'tone' or 'tone languages' (e.g. Pike 1948, Welmers 1959, Hyman 2006), I believe it is more useful to emphasize that 'tone', 'stress', and 'accent' are language-specific descriptive categories. Although these categories do not represent valid cross-linguistic categories, they can be used as comparative concepts (Haspelmath 2010).

Following the work of typologists such as Comrie (1976:10), Bybee (1985:141), Croft (2001), and Haspelmath (2010), who use an initial capital to refer to language-specific descriptive categories, I extend this convention to language-specific phonological categories (for example 'the Yonghe Accent').

1.1 Goals of this study

The goal of this study is to provide a synchronic description of the prosodic phenomena in Yonghe, and to place the language within a broader typology of prosodic phonology. This will include both phonetic descriptions and phonological analyses of the prosodic patterns attested in Yonghe Qiang nouns as well as tone and accent sandhi phenomena in noun compounds and demonstrative-classifier constructions.

The organization of this thesis is as follows: Section 2 gives an introduction to the Qiang language-complex, the Yonghe variety of Qiang, as well as the data and methodology used in

this study. Section 3 provides an overview of the segmental phonology of the Yonghe variety: consonants, vowels, syllable structure, word structure, and word-level accent. Section 4 gives an account of accent and tone in the Yonghe variety as these categories pertain to disyllabic and monosyllabic nouns. Section 5 deals with tonal and accentual alternations in noun compounds, and constructions involving nouns and demonstratives. Lastly, Section 6 examines the Yonghe system in typological perspective and compares the Yonghe system to other languages that have both stress-accent and lexical tone.

2. Introduction to Qiang/Rma

Qiang,[2] also known as Rma, is an Eastern Tibeto-Burman[3] language-complex[4] spoken by about 100,000 people in Rngaba Prefecture, Sichuan, China. Rma varieties are spoken by people belonging to both Qiang and Tibetan ethnic groups. The language is largely agglutinative, with predominately verb final constituent order, and directional prefixes which function as perfective aspect and imperative mood markers. There is no grammaticalized syntactic pivot, but instead pragmatically based agentive marking (LaPolla & C. Huang 2003; C. Huang 2010).

Rma varieties have traditionally been labeled as belonging to two subgroups: Northern

2 In my experience, the Chinese exonym 'Qiang' is offensive to speakers of Tibetan ethnicity. The autonym Rma, or a dialectal variant, is used by both ethnic Tibetan and Qiang speakers, and has occurred alongside 'Qiang' in some recent publications attentive to this issue (Evans & J. Sun 2013).
3 Following J. Sun & Evans (2013), rather than consider Rma as a single language I believe it is more accurate to characterize it as a language-complex, as it contains many mutually unintelligible varieties.
4 There is some controversy as to the exact genetic affiliation of Rma within Tibeto-Burman (see Chirkova 2012). I use the term Eastern Tibeto-Burman from Bradley (1997) as a neutral term that is non-committal with regard to position within Tibeto-Burman subgrouping.

Qiang or Southern Qiang (H. Sun 1981, Liu 1998, B. Huang & Zhou 2006). Prototypical Northern Qiang (NQ) varieties have lexically contrastive stress and lack tonal phenomena (H. Sun 1981, B. Huang & Zhou 2006, Evans & J. Sun 2013), whereas prototypical Southern Qiang (SQ) varieties lack stress and have tonal phenomena (see Evans 2001 for a review of the literature). Although the terms NQ and SQ are useful as typological classifications, the dialectal variation more closely resembles a continuum than it does a simple genetic bifurcation (LaPolla & C. Huang 2003, C. Huang 2004, Zheng 2015, Sims 2016).

The Yonghe variety is spoken by about 3,000 people residing in the Yonghe Valley of southeastern Mao County, as well as in the county seat of Fengyi. Yonghe is situated near the center of the dialect chain and contains some characteristic features of both NQ and SQ varieties (Sims 2014). Within the Yonghe valley, the speech of Ka'er, Yongning, and Lili villages represent at least three distinct sub-varieties. The data presented in this study represent the speech of Ka'er Village.[5] Thus, I use 'Ka'er Yonghe' and 'Yonghe' interchangeably and mean nothing different by them.

2.1 Data and methodology

The data for this study come from several recording sessions involving five different speakers, summarized in Table 1.

5 Yonghe data are given in IPA following the phonologization put forward in Sims (2016), with a few minor revisions. Diacritics used to represent surface pitch patterns include acute accents for high [H], grave accents for low [L], and hácěks for rising [LH]. Accent is marked with an asterisk in the phonological representation, and with an IPA stress symbol in phonetic notation.

Dataset	Type	Recording type	Consultants	Year
1	500 entry word list	2 times in isolation	Bai Jun (M)	2006
2	1,400 entry word lexicon	2 times in isolation	Yang Zhiquan (M)	2010
3	120 entry word list	3 times in isolation; 3 times in frame	Yang Zhiquan (M); Yang Guomei (F); Yang Guojie (F)	2015
4	250 compound words	2 times in isolation[6]	Yang Zhongshang (M)	2016

Table 1: Data Sets used in the study

Data Sets 1 and 2 provided a baseline for assessing the phonological inventory of Yonghe. In those recordings, each form was said twice and no carrier sentence was used. Data Set 3 constitutes the basis for the acoustic descriptions of Yonghe Qiang. It was recorded in August 2015 in the Mao County Seat with three native Yonghe Qiang speakers: two female speakers (ages ~45 and ~60) and one male speaker (age 46). Speakers were asked to repeat each form three times in isolation, and then three times in the 'carrier sentence' /qɑ́ X tə-zɨtɑ̌/, "I just said X" before passing the microphone to the next speaker.

This carrier sentence was chosen for various reasons. First, it places the target word in utterance-medial position and thereby lowers the chance of utterance boundaries affecting the realization of the target word. Second, it was chosen because it includes an emphatic pronoun. Because Qiang has pronominalized polypersonal verbal agreement, independent pronouns are typically omitted unless signaling topic shift, or to convey emphasis (LaPolla & C. Huang 2003: 51). Thus, placing the emphasis of the carrier sentence on the pronoun rather than the target word avoids the problem of conflating multiple types of prominence

[6] The forms in the fourth dataset were recorded with two repetitions due to time constraints, speaker-fatigue, and the fact that I have not noticed strong list intonation effects in earlier data sets with three repetitions.

associated with different prosodic levels (Gordon 2014). Lastly, the sentence does not place high vowels, which have higher intrinsic fundamental frequencies (Maddieson 1997), on either side of the target word, thus minimizing the chance that neighboring vowels would affect the pitch of the target syllable.

All recordings were made using the built-in microphone of the Edirol R09 digital recorder at a sampling rate of 48 kHz.[7] Recordings were saved as .WAV files and analyzed using Praat (Boersma & Weenink 2013).

3. Phonology of Yonghe Qiang

This section provides a description of Yonghe phonology which includes an overview of Yonghe consonants (§3.1), vowels (§3.2), phonological processes (§3.3), and syllable structure (§3.4). This section also covers the Yonghe prosodic word and phrase (§3.5) word shapes and their relative frequencies (§3.6), and the phonological property of accent (§3.7)

3.1 Consonant phonemes

The segmental inventory of the Ka'er Yonghe variety includes 40 consonant phonemes. These are given in Table 2.

7 A head-worn microphone was not used as some speakers expressed discomfort with the idea of wearing one.

	Bilabial	Alveolar	Retroflex	Palatal	Velar	Uvular	Glottal
[-Voice] stops	p, p^h	t, t^h			k, k^h	q, q^h	
[+Voice] stops	b	d			g		
[-Voice] affricates		ts, ts^h	tʂ, $tʂ^h$	tɕ, $tɕ^h$			
[+Voice] affricates		dz	dʐ	dʑ			
[-Voice] fricatives		s	ʂ	ɕ	x	χ	h
[+Voice] fricatives		z	ʐ	ʑ	ɣ	ʁ	ɦ
Nasals	m	n		ɳ			
[-Voice] lateral		l					
[+Voice] lateral		ɬ[8]	ɻ				
Approximants	w			j			

Table 2: The consonant inventory of Yonghe

3.2 Vowel phonemes

Ka'er Yonghe has eight different vowel phonemes which are given in Table 3. The high front rounded vowel is in complementary distribution with /i/ following labio-velar approximants, and also with /u/ after palatals. Oral vowels may be sub-phonemically nasalized after nasals as well as after glottals.[9]

	Front	Central	Back
High	i [y]	ɨ	u
Mid	ɛ	ə	ɔ
Low	æ		ɑ

Table 3: The vowels of Yonghe Qiang

8 For some speakers [ɬ] is in free variation with [ɸ] before /u/.
9 This may be due to 'rhinoglottophilia' (Matisoff 1975).

All but the mid vowels /ɛ/ and /ɔ/ have rhotic counterparts. The distinction between /æ/ and /ɑ/ and /ə/ is neutralized when these vowels are rhoticized, a process also found in the Ronghong variety (LaPolla & Huang 2003:footnote 14). Thus, I will represent non-high rhotic vowels as [aɪ] to avoid making a claim about their underlying representation.

3.3 Phonological processes

Phonological processes include vowel harmony, including rhotic harmony, and consonant lenition. For a more in-depth treatment of Yonghe segmental phonology as well as phonological processes, see Sims (2014:35-42).

3.4 Syllable structure in Yonghe Qiang

The maximal syllable structure allowed for monomorphemic stems is a consonant initial, followed by a vowel nucleus which may be either preceded or followed by a glide.[10] Onsetless syllables are rare and appear to be restricted to function words and interjections. Table 4 gives examples of the different possible monosyllabic structures in simplex lexemes.

10 Note that CGVG sequences are allowed in polymorphemic syllables such as when the stative verb /dʐwă/ 'to be wealthy' is followed by an mediative marker /-j/, yielding: /dʐwă-j/. Syllables with CGVG structures are also found in loanwords from Sichuanese, such as /k^{h}wăj/ 'to be fast'.

Syllable	**Form**	**gloss**
V	ú	2sg
VG	ə́w	‘OK’
G**V**	jɛ́	‘to exist (of animate entities)’
C**V**	tí	‘bear’ (n.)
CG**V**	ts^{h}wá	‘bridge’
C**V**G	dǎj	‘beancurd’

Table 4: Possible Syllable structures

The syllable, defined as a “phonological unit which organizes segmental melodies in terms of sonority” (Blevins 1995:75) is not an unproblematic notion for some languages (Kohler 1966, Blevins 1995), and in some languages, phonological processes may be described without explicit reference to the syllable (see Hyman 2011 for further discussion of this issue). Evidence for the Yonghe syllable as a useful unit of analysis are twofold. The first piece of evidence is native-speaker intuition. Speakers with whom I have worked have clear intuitions about the number of syllables in a given word as well as the location of syllable boundaries. Further evidence comes from a local language game which involves transposition of syllables within a word. Table 5 gives examples of this language game.

Regular form	Language game form	Gloss
[ˈmú.sɨ̀]	[ˈsɨ́.mù]	‘air’
[wù.ˈjí]	[jì.ˈwú]	‘bird’
[ˈdú.tʂù.pù]	[ˈpú.tʂù.dù]	‘Daocai Village’
[kɛ̀.pú.zɨ̀]	[zɨ̀.ˈpú.kɛ̀]	‘pillow’
[dɛ̀.sɨ̀.ˈpú]	[pù.sɨ̀.ˈdɛ́]	‘Dawudu Village’
[sɨ̀.ˈtɕ^{h}wí.mù.là]	[là.ˈtɕ^{h}wí.mù.sɨ̀]	‘butterfly’
[ˈts^{h}ɛ́.jɑ̀.wɔ̀.kə̀]	[ˈkɔ́.jɑ̀.wɔ̀.ts^{h}ɛ̀]	‘Songpan County’

Table 5: Language game data, provided by Mr. Yang Zhiquan

At least two insights into the phonology of Yonghe can be gleaned from this game. First, it provides evidence for the syllable as a unit of analysis as reference to the syllable is necessary for describing the rule of the game, which is: transpose the initial and ultimate syllable of the word.[11]

Second, the game also elucidates syllable structure in the Yonghe variety. Some published work by C. Huang (2009:225-226, 228; 2010:258, 288) has described Ka'er Yonghe as possessing syllabic codas.[12] Yonghe does have surface codas due to apocope of low-sonority vowels in unaccented position. That is, /*CVCV/ → [ˈCVC]. For example, the words /*musɨ/ 'air' and /*ləpu/ 'turnip' are realized as [mús̩̩ ~ mús] and [ləpu̯̩ ~ ləp] in regular speech, but as [ˈsɨ́mu̯̩ ~ sɨ́m] 'air' and [púlə̯̩ ~ púl] in the language game. That is, the reduced/deleted vowels are realized as full vowels in the language-game forms, which indicates the vowel reduction a post-lexical effect and the unreduced vowels are present in phonological forms. Third, this play language gives two pieces of evidence for the phonological word as a constituent. First, the rules of the game make reference to phonological word boundaries. Second, at least some compound forms, such as 'Dao Cai Village', behave as one single phonological words in the language game.

11 Note that although the disyllabic and trisyllabic forms are uninformative as to whether the rule of the game involves syllable transposition or reversal of syllable order, the tetrasyllabic forms 'butterfly' and 'Songpan County' are probative in that regard.

12 The Yonghe data in the articles cited above draw on survey data recorded by Zhou Facheng and Yu Zongming in 2002 (C. Huang 2010:254).

3.5 The Yonghe Qiang Word and Phrase

Typological studies of prosodic hierarchies and domains have suggested that the word is an emergent, language-specific category (Schiering, Bickel, & Hildebrandt 2010). In Yonghe Qiang, as in other varieties of Qiang (LaPolla & C. Huang 2003, C. Huang 2004) there is not a lexeme meaning 'word'. The noun classifier [-sá] can be used to refer to single words as well as entire utterances. In this section, I propose defining the Yonghe Word as: a minimal free form, isomorphic with the domain of operation for certain phonological processes (such as rhotic harmony, or the play language), into which pauses may not be inserted in normal speech. I define the phrase as a unit within an utterance which contains more than one phonological word.

To demonstrate the domain of phonological processes, consider the example of rhotic vowel harmony. Rhotic harmony, also known as 'r-coloring', is a type of vowel quality assimilation in which vowels take on retroflex qualities of neighboring syllables.[13] In Yonghe rhotic harmony may be anticipatory or progressive. Examples of both regressive and progressive rhotic harmony are given in (2-3) below. An example illustrating blocking of rhotic harmony across separate phonological words within a phonological phrase is given in (4).

(2) [hàɹ.káɹj]
/hə-*kaɹ-j/
outwards.PFV-go.PFV-MED
'S/he went out.' (Example provided by Mr. Yang Zhiquan)

13 Rhotic harmony is found in northern Rma varieties such as Ronghong (LaPolla & C. Huang 2003:35-36), but is not typical of geographically southern varieties. In the Ronghong variety, rhotic harmony seems to be lexically specified and is less prevalent among younger speakers (Evans & C. Huang 2007).

(3) [ˈkʰǎɪ.pùɪ]
/*kʰàɪ-pu/
Ka'er-village
'Ka'er Village' (from Data Set #2)

(4) [ˈkʰǎɪ.pùɪ][xù.ˈpɑ́]
/*kʰàɪ-pu/ /xu*pɑ/
Ka'er-village riverbank
'Ka'er Village riverbank' (from Data Set #2)

In Yonghe, phonological phrases can be demarcated by glottal stops on either end. If the first word in a phrase has a zero onset, such as in the word /ú/ 'you', a glottal stop is inserted before the vowel, yielding [ʔũ]. This glottal stop does not appear in phrase medial positions. Glottal stops may also occur at the ends of phonological phrases. For example, the word /mæ̀/ 'mother' is realized with a glottal stop in isolation as [mæ̌ʔ], but is realized without a glottal stop in non-final positions, as in [mǎ=sɨʔ] 'mother=AGT'.

These examples demonstrate that the word can be defined by the domain of certain phonological processes such as rhotic harmony and the play language, and that the phonological phrase boundaries may be defined by the presence of phrase-final glottal stop insertion. These definitions remain somewhat tentative, as a future, more in-depth study of additional phonological processes may reveal different domains of application.

3.6 Word shapes and their relative frequencies

Most non-compound words are either monosyllabic or disyllabic. Table 6 shows that the frequency of monosyllabic and disyllabic Qiang words is similar in both the Swadesh List

(Swadesh 1971) and the Leipzig-Jakarta Wordlist (Tadmor 2009), and that monosyllabic forms are slightly more numerous than disyllabic forms.[14]

Wordlist	Monosyllabic	Disyllabic	Trisyllabic	Total
Swadesh	52 (52%)	46 (46%)	2 (2%)	100
Leipzig-Jakarta	54 (54%)	43 (43%)	2 (2%)	100

Table 6: Frequency of different word shapes in Yonghe

Simplex trisyllabic words are rare, and simplex tetrasyllabic forms are vanishingly rare. Both trisyllabic forms in Table 6 are derived from older compounds. Thus, this thesis will ignore larger forms and focus on the mono and disyllabic forms. Although the tendency is for words to be either mono or disyllabic, compounds of up to seven syllables have been elicited, for example, [sɨ.ˈtɕhwí.mù.là-lɛ̀.xù.pæ̀] 'butterfly shoulder'. In naturally occurring discourse and texts, the longest attested prosodic word is six syllables [tə̀-mə̀-tà-ˈdʐ̩wí-zù-k-ù-j] '(S/he) hadn't yet gone to ask (her/him) again'.

3.7 Accent in Yonghe

This section discusses issues pertaining to the phonological property of accent in Yonghe. In Yonghe, accent is obligatory, culminative, and lexically specified.[15] In this paper, accent is represented with the IPA 'primary stress' symbol in surface representations, and with an asterisk in underlying representations.

14 This tendency towards monosyllabicity in Qiang was first noted by Benedict (1982).
15 Recall that these are precisely the properties of 'tone' in Nubi (Gussenhoven 2004).

I use the term 'accent' as opposed to 'stress' for three different reasons. First, accent placement is lexically specified and the relevant domain is the word rather than the syllable. Second, while accent is culminative at the level of the phonological word, some compounds consist of two (or multiple) phonological words and thus may contain two (or more) accents.

Third, 'stress' generally refers to relative prominence, however, as will be discussed below, Yonghe accent is not strictly an issue of relative prominence as it is obligatory even for monosyllabic forms in isolation. I also avoid using the term 'pitch-accent' because increased fundamental frequency is but one of several different phonetic exponents of accent.

An acoustic correlate which provides robust evidence for word-level prominence in accentual Rma varieties is vowel devoicing.[16] In the Yonghe variety, non-prominent (unaccented) vowels are subject to gradient devoicing. Low vowels are slightly devoiced; mid vowels are more devoiced than the low vowels; high vowels /i, ɨ, u/ are even further reduced; schwa is often deleted entirely. Thus, the vowels undergo reduction in order of decreasing sonority: /ɑ, æ / > /ɛ, ɔ/ > /i, ɨ, u/ > /ə/. Figure 1 illustrates the high central vowel in both tonic and non-tonic position and shows that the same vowel position has a greater amplitude and duration in tonic position than in non-tonic position. This token comes from Data Set #3 and was produced by the male participant Yang Zhiquan in isolation. A spectrogram of the same token is given in Figure 2. Note that the non-modal phonation visible on the second vowel is because it is in utterance-final position.

[16] For example, devoicing or deletion of non-prominent vowels is attested in the Mawo (Liu 1998, Evans & J. Sun 2013), Ronghong (LaPolla & C. Huang 2003), Shiguzi Luoduo (author's fieldwork), Qugu (B. Huang & Zhou 2006), and Puxi varieties of Rma (C. Huang 2004).

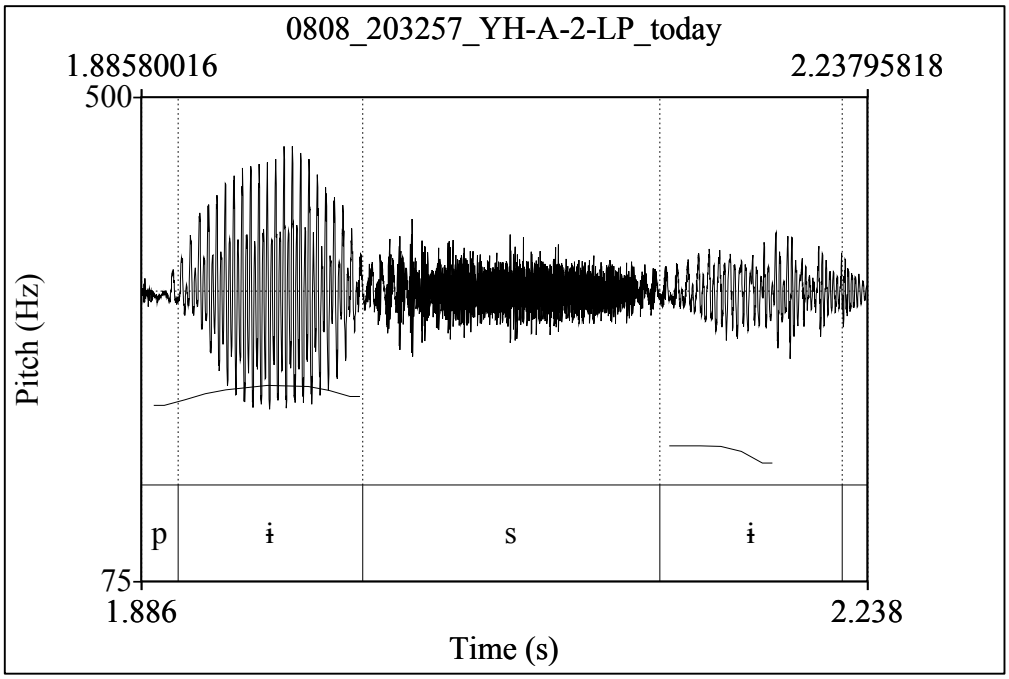

Figure 1: Pitch trace and waveform of the word [ˈpí.sì] 'today' recorded in isolation by Yang Zhiquan.

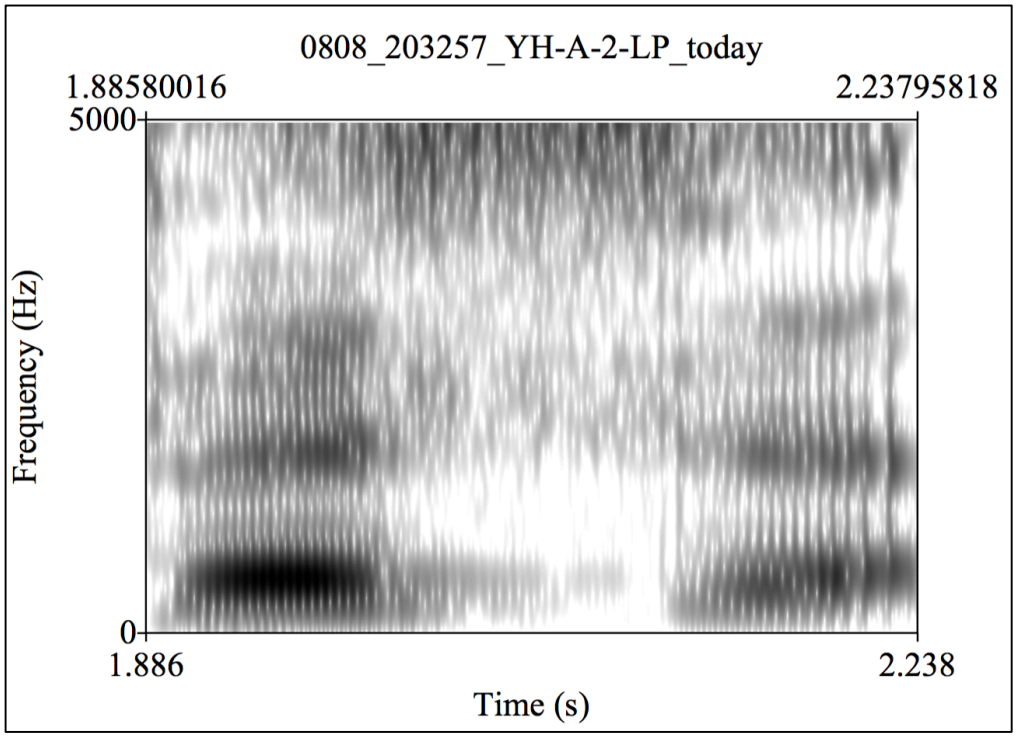

Figure 2: Spectrogram of the word [ˈpí.sì] 'today' recorded in isolation by Yang Zhiquan.

4. Yonghe suprasegmental phonology: interaction of tone and accent

This section deals with the suprasegmental phonology of Yonghe, and analyzes Yonghe as having a privative tonal contrast which interacts with the obligatory accent described above. Sections 4.1-4.3 describe the interaction of tone and accent in disyllabic forms. Sections 4.4-4.5 cover the phonetic and phonological accounts of tone and accent on monosyllabic forms.

4.1 Accent and tone in disyllabic forms

Simplex disyllabic Yonghe nouns have one of three major melodies which may be described as high-initial, high-final, and high-medial. Minimal triplets for these three pitch patterns are few, even in a relatively large lexical database (about 3,000 words). Nevertheless, there are several near minimal pairs. Examples of near minimal pairs are given in Table 7.

high-initial	high-final	high-medial
[ˈmú.zɻ̀] ‘chopsticks’	[mù.ˈzɻ́] ‘sleep (n.)’	[ˈmŭ.zɻ̀] ‘rain’
[ˈmú.sɨ̀] ‘air’	[mù.ˈɕí] ‘sun’	[ˈmŭ.nə̀] ‘sun (2)’
[ˈmú.k^{h}ɨ̀] ‘smoke’	[mù.ˈxí] ‘mushroom’	[ˈmă̋.k^{h}wì] ‘owl’
[ˈhá.wù] ‘yellow’	[hæ̀.ˈtwí] ‘ten’	[ˈhă̋.qə̀] ‘grass’
[ˈɕí.xwì] ‘leopard’	[ɕì.ˈmí] ‘fruit’	[ˈɕĭ̋.ɕwì] ‘machete’
[ˈɕí.wù] ‘chain’	[ɕì.ˈpí] ‘chives’	[ˈɕĭ̋.zù] ‘necklace’

Table 7: Near minimal sets of pitch patterns on disyllabic nouns

Pitch traces of the three melodies are given in Figure 3 (male) and Figure 4 (female). The forms measured and measurements are given in Tables 8-13 below).

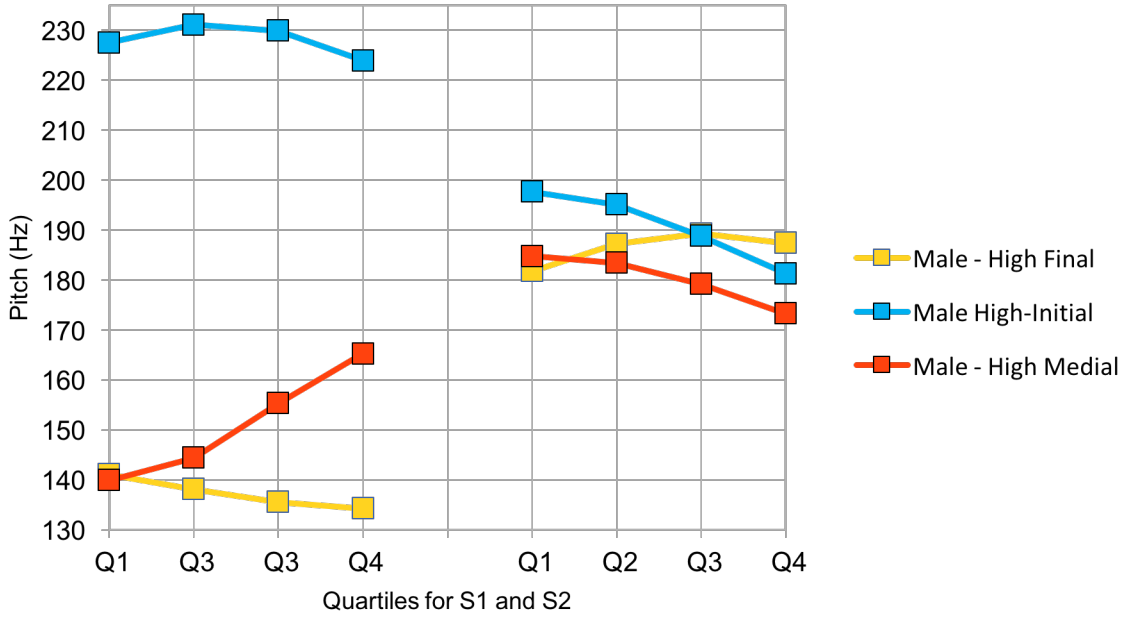

Figure 3: Average pitch of the 3 disyllabic tonal melodies by Yang Zhiquan (M).

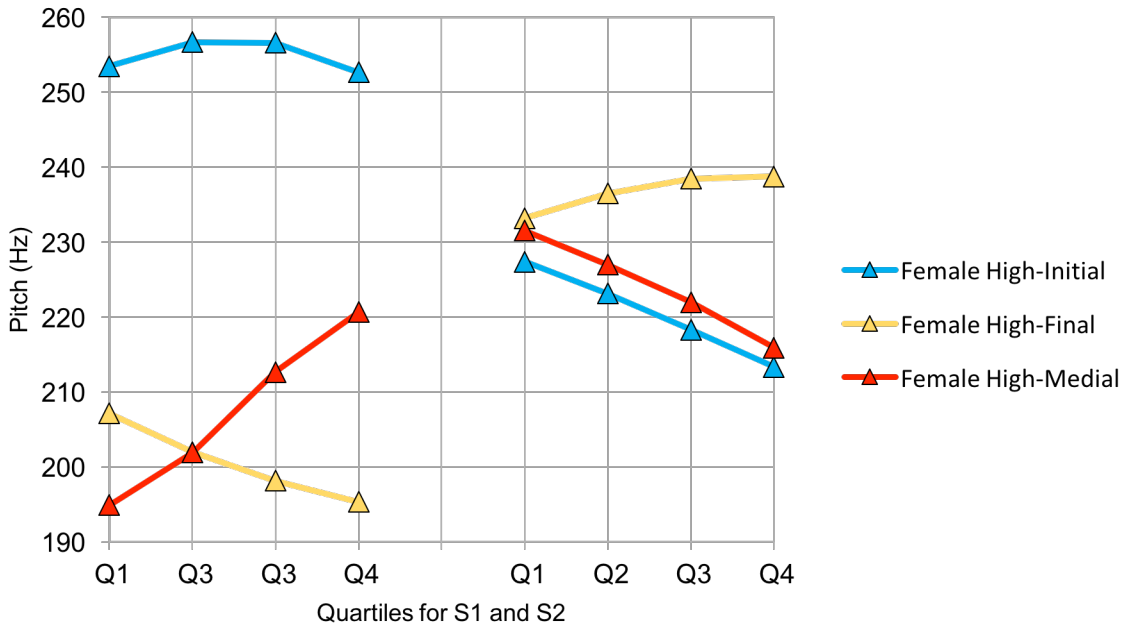

Figure 4: Average pitch of the 3 disyllabic tonal melodies by Yang Guomei (F)

What follows is a phonetic description of each pattern (§4.1.1-4.1.3), followed by a phonological analysis for all three attested patterns (§4.2).

4.1.1 The high-initial pattern

Forms with the high-initial pattern have an f0 peak towards the beginning of the vowel of the first syllable and a slight decline in pitch over the second syllable. Forms with the high-initial pattern measured for this study are given in Table 8. Table 9 gives average values of f0 for these forms. Measurements were taken from the recordings of two speakers, at four equidistant points of the vowel of each form in the second of three tokens within the carrier sentence.

[ˈmú.kʰɨ̀]	‘smoke’	[ˈn̪í.kwì]	‘ear’
[ˈmú.sɨ]	‘air’	[ˈlátɛ̀]	‘fly’
[ˈlá.pà]	‘flower’	[ˈhá.wù]	‘yellow’
[ˈpɨ́.sɨ̀]	‘today’	[ˈnɨ́.sɨ̀]	‘yesterday’
[ˈmú.z̪ɨ̀]	‘chopsticks’	[ˈpá.kʰwì]	‘dhole’
[ˈzɨ́.mù]	‘song’	[ˈdz̪ɨ́.sɨ̀]	‘day before yesterday’
[ˈpú.qə̀]	‘bracelet’	[ˈdzwí.zɨ̀]	‘lightning’

Table 8: Words measured of the high-initial pitch pattern

		σ1				Diff	σ2				Diff.
Speaker		Q1	Q2	Q3	Q4	Q4-Q1	Q1	Q2	Q3	Q4	Q4-Q1
M	Mean	**227.50**	**231.11**	**229.99**	**223.89**	**-3.60**	**197.69**	**195.09**	**188.82**	**181.32**	**-16.37**
	STDEV	17.76	19.83	20.99	21.93	9.74	13.56	14.34	15.52	15.93	7.89
F	Mean	**253.45**	**256.68**	**256.60**	**252.64**	**-0.81**	**227.38**	**223.16**	**218.30**	**213.35**	**-14.55**
	STDEV	17.111	17.62	18.88	20.34	7.86	9.05	9.11	8.29	7.91	5.34

Table 9: f0 measurements for disyllabic words of the high-initial pitch type

4.1.2 The high-final pattern

The high-final pattern is the most common pattern for disyllabic forms. The nineteen forms with this pitch pattern measured for this study are given in Table 10. Recordings from two speakers were measured. Table 11 gives average f0 values. Measurements of pitch values were taken at four equidistant points of the vowel of each form in the second of three tokens within the carrier sentence.

[bù.ˈʐú]	‘bee’	[nə.ˈwɔ́]	‘earring’
[dzɔ̀.ˈwɔ́]	‘donkey’	[mà.ˈtʂá]	‘cooked rice’
[phù.ˈtú]	‘apron pouch’	[mù.ˈxí]	‘mushroom’
[pà.ˈthí]	‘table board’	[ɛì.ˈtʰə́]	‘thongs’
[mù.ˈtú]	‘ceiling’	[kʰə̀ɹ.ˈlú]	‘wall’
[khə̀.ˈwú]	‘coffin’	[dzæ̀.ˈmǽ]	‘lunch’
[tì.ˈmí]	‘heart’	[là.ˈwú]	‘crow’
[dʑwì.ˈpá]	‘foot’	[mù.wú]	‘wind’
[mù.ˈwú]	‘bamboo’	[dzæ̀.ˈmǽ]	‘lunch’
[wà.ˈsá]	‘monkey’		

Table 10: Words measured of the high-final pitch pattern

		σ1				Diff	σ2				Diff.
Speaker		Q1	Q2	Q3	Q4	Q4-Q1	Q1	Q2	Q3	Q4	Q4-Q1
M	Mean	**141.08**	**138.12**	**135.57**	**134.28**	**-6.8**	**181.79**	**187.25**	**189.31**	**187.39**	**+5.6**
	STDEV	10.92	10.64	10.06	9.77	9.21	17.01	15.50	14.75	14.27	9.53
F	Mean	**207.16**	**201.98**	**198.18**	**195.35**	**-11.81**	**233.18**	**236.51**	**238.45**	**238.77**	**+5.59**
	STDEV	13.36	13.26	13.94	13.20	9.30	19.37	18.90	19.97	19.18	9.95

Table 11: f0 measurements for disyllabic words of the high-final pitch type

4.1.3 The high-medial pitch pattern

Forms with the high-medial pattern have a rise on the first syllable, and a slight fall on the second syllable. The ten forms with this melody that were measured for this study are given in Table 12. Table 13 gives average f0 values for measurements of pitch values at four equidistant points of the vowel of each form in the second of three tokens within the carrier sentence.

[ˈbŭ.nə̀]	‘bug’	[ˈmŭ.nə̀]	‘sun’
[ˈtʰŏ.mù]	‘brother’	[ˈɬŭ.pù]	‘demon’
[ˈzǎe.tɛ̀]	‘Hou’er village’	[ˈbɨ̌.sɨ̀]	‘snake’
[ˈtsɛ̌.kə̀]	‘spring’	[ˈɹǎ.qə̀]	‘horn’
[ˈxŭ.tʂù]	‘fate’	[ˈdzwɛ̌.nə̀]	‘millstone’

Table 12: Measured words with the high-medial pattern

		σ1				Diff	σ2				Diff.
Speaker		Q1	Q2	Q3	Q4	Q4-Q1	Q1	Q2	Q3	Q4	Q4-Q1
M	Mean	**139.67**	**144.45**	**155.33**	**165.26**	**+25.59**	**184.80**	**183.42**	**179.21**	**173.32**	**-11.48**
	STDEV	21.40	22.83	23.20	22.28	11.86	26.87	26.37	26.15	25.86	5.84
F	Mean	**194.91**	**201.94**	**212.67**	**220.67**	**+25.76**	**231.54**	**226.99**	**222.01**	**215.94**	**-15.6**
	STDEV	23.59	28.33	28.02	26.89	13.36	20.13	21.26	21.01	19.65	6.74

Table 13: f0 measurements for disyllabic words of the high-medial pitch type

Note that the second syllable for the high-final melody has a rising trajectory throughout the second syllable whereas the high-initial and high-medial have a falling trajectory.

4.2 Phonological analyses of the disyllabic patterns

This section presents a phonological analysis for the disyllabic patterns. A salient distributional characteristic of the disyllabic patterns is the limitation of one high-pitch syllable per word, a restriction that mirrors the culminative property of accentual systems. This parallel, as well as independent evidence from morphology (§4.2.3), motivates a hybrid analysis of Yonghe prosody featuring both tone and accent. Sections 4.2.1-4.2.2 give the

analysis of the high-initial, high-final, and high-medial pitch patterns. Section 4.2.3 gives evidence for the independence of accent and tone.

4.2.1 High-initial and high-final as /*Ø-Ø/ vs. /Ø-*Ø/

The phonological analysis of the high-initial and high-final forms are as follows. The high-initial forms are toneless trochees, and are represented as /*Ø-Ø/. Although the second syllable still has a relatively high-falling pitch, I interpret this as the phonetic interpolation of a toneless syllable following an accented syllable. The high-final forms are analyzed as toneless iambs. For these forms, the high pitch on the second syllable is the realization of the iambic accent, while the low pitch on the syllable can be explained as the default realization of Ø as low in unaccented position. Words of this type are represented as /Ø-*Ø/.

There are two main reasons for treating the disyllabic forms with the high-initial and high-final patterns as /*Ø-Ø/ vs. /Ø-*Ø/ as opposed to /HL/ vs. /LH/. First, language internal evidence for accent comes from processes such as accent driven vowel reduction (described in §3.7), which are not typically exponents of tone. Second, typological studies have suggested that HL often shows vertical dissimilation, whereas LH often shows vertical assimilation (Hyman 2001a:1375). The pitch patterns for the high-initial and high-final forms (see Figures 3-4 above) run counter to this expectation; as the fall in pitch on the high-initial forms is slight, whereas the difference in pitch for the high-final forms is much greater. Thus, the lack of either assimilatory or dissimilatory processes can be explained by positing that there is no underlying tone in these melodies that would trigger such movement. This lack of assimilation/dissimilation provides evidence that unaccented syllables in iambs and trochees remain tonally unspecified on the surface (Keating 1988), as opposed to being assigned a

default surface pitch pattern. It is for these reasons that I treat the high-initial and high-final pitch patterns as phonologically /*Ø-Ø/ vs. /Ø-*Ø/, in which [H] is predictable from accent placement.

4.2.2 High-medial as /*L-Ø/

While both the high-initial and high-final pitch patterns can be analyzed as toneless forms with differing accent placement, forms with the high-medial pitch pattern make necessary an appeal to tone in addition to accent. I analyze the rising pitch pattern on the first syllable of the high-medial forms as the realization of the obligatory accent on a /L/ toned syllable, represented as /*L-Ø/. The falling pitch pattern on the second syllable is similar to the second syllable of the /*Ø-Ø/ pattern. Again, I interpret this as the phonetic interpolation of a toneless syllable following an accented syllable. Example (5) illustrates that the rising pitch pattern on the initial syllable is the result of a confluence of accent and tone. Tone is represented autosegmentally (Goldsmith 1976), and accent is marked using the asterisk.

(5)
L
|
[ˈɬǔpù]
/*ɬùpu/
‘demon’

4.2.3 Accent and tone as orthogonal properties: evidence from morphology

Although the scope of this thesis is limited to nominals, examples from Yonghe verbal morphology are given to show the orthogonal relationship between accent and tone. For at least some verbs, alternations in accent placement serve the purpose of distinguishing imperative and prohibitive mood (6-7).

(6) [hà.ˈqwá]
/hə-*qwɑ/
outwards.IMP-close
‘Close (the door)!’ (elicited from Yang Zhiquan)

(7) [há.qwà]
/*hə-qwɑ/
outwards.PROH-close
‘Don’t close (the door)!’ (elicited from Yang Zhiquan)

Examples (8-9) show that a tonal alternation on the same verb can distinguish between perfective and inchoative aspects.

(8) [hà.ˈqwáj]
/hə-*qwɑ-j/
outwards.PFV-close-EVID
‘S/he closed (the door).’ (elicited from Yang Zhiquan)

(9) [hà.qwǎj]
/hə-*qwà-j/
outwards.PFV-close:CSM-EVID
‘S/he has started closing (the door).’ (elicited from Yang Zhiquan)

These morphological alternations provide further evidence for the orthogonal nature of accent and tone in Yonghe, as they show that they can be independently manipulated to indicate changes in verbal mood and aspect.

4.2.4 Interim summary

In summary, morphologically simplex disyllabic forms exhibit three surface melodies which may be analyzed as the result of differing accent placement overlaying a privative tonal contrast between Ø and /L/. Underlyingly /L/ tones are realized as rising in accented position. Unaccented syllables are realized with a slight declination from the level of the preceding *H assigned default low pitch patterns. The following rules can account for the accentual and tonal phenomena described thus far.

Rule I: Associate underlying tones with syllables from left to right.
Rule II: Assign accented syllables a high tone. If the syllable is /L/, the high tone follows the /L/, yielding [LH].

Rule I accounts for the otherwise conspicuous absence of simplex iambic disyllables with a rising pitch on the final syllable, a gap that creates an asymmetry in the crossing of tone and accent. Simplex disyllabic nouns with a [L-LH] pattern are unattested, and this may be explained with reference to left to right tone association in conjunction with tonal culminativity. However, final rises can surface in morphologically complex environments, as in (9) above. Rule II accounts for the fact that accented /L/ syllables are realized as [LH] as opposed to [HL]. Having established the need for both accent and tone to account for the patterns attested in disyllabic forms, the next section demonstrates that these categories may be profitably extended to account for the surface pitch patterns in monosyllabic forms.

4.3 Pitch patterns in monosyllabic words

There are two attested pitch patterns for monosyllabic nouns, high and low-rising. A line-plot of the average pitch-values (in Hz) for both a female and male speaker are given in Figures 5-6 (forms measured and the measurement values are given in Tables 14-15 below).

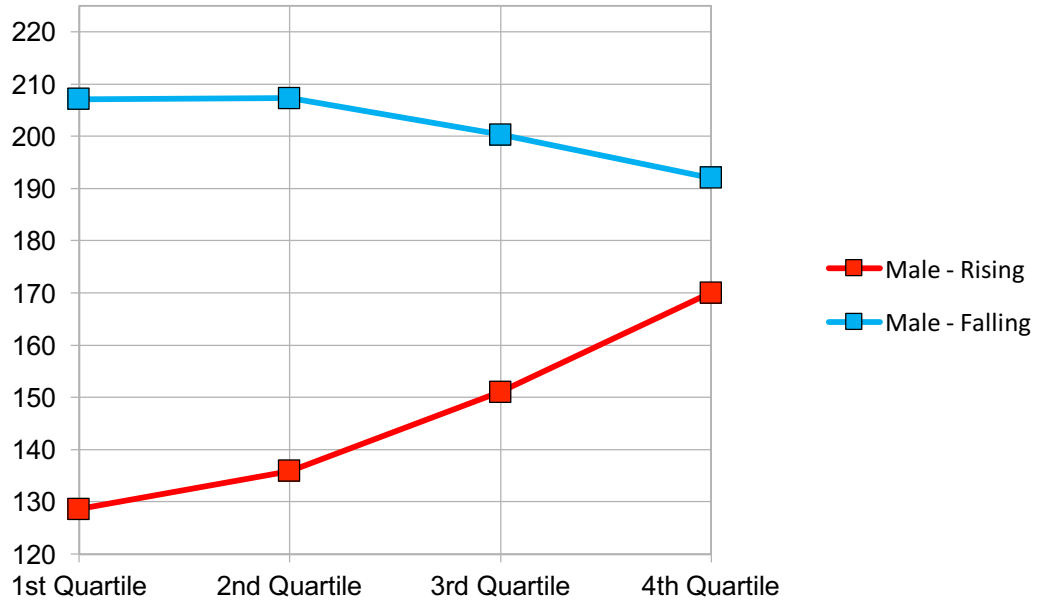

Figure 5: Average pitch values for monosyllables by Yang Zhiquan (M) (pitch in Hz)

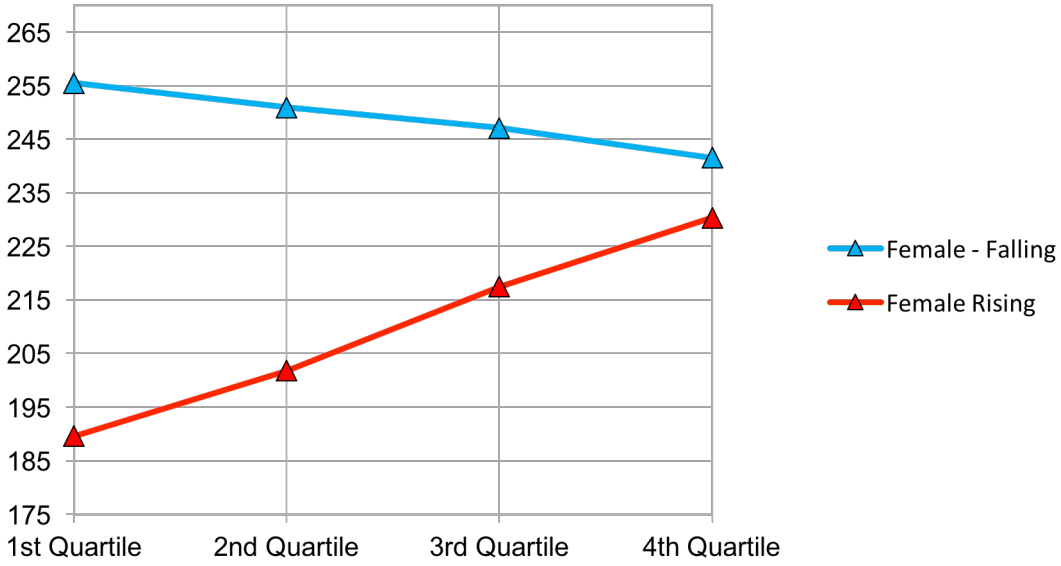

Figure 6: Average pitch values for monosyllables by Yang Guomei (F) (pitch in Hz)

The following sections include phonetic description of the two pitch patterns (§4.3.1-

4.3.3) as well as their phonological status (§4.4).

4.3.1 The high pitch pattern

The high pitch pattern is the most frequent type for monosyllabic forms. Some examples are given in Table 14 below. This pitch pattern is similar to that of the "high-initial" pattern on the first syllable of the toneless trochees, and the second syllable of the toneless iambs.

[ts^{h}é]	'goat'	[k^{h}wí]	'dog'
[k^{h}áɹ]	'rice'	[dɑ́]	'cloud'
[dʑú]	'door'	[t^{h}ú]	'oil'
[ɕí]	'red'	[mɛ́]	'person'
[qɑ́]	'1sg'	[mú]	'fire'
[zɑ́]	'ladle'	[tí]	'bear' (n.)

Table 14: Monosyllabic forms with high pattern

4.3.2 The low-rising pitch pattern

The low-rising pattern occurs less frequently in the Yonghe lexicon. Examples of lexical forms with the low-rising pitch pattern are given in Table 15. This pitch pattern closely resembles the pitch pattern of the first syllable of the /*L-Ø/ forms discussed above.

[pæ̌]	'pig'	[mɑ̌ɹ]	autonym
[tswæ̌]	'spittle'	[mɔ̌]	'noodles'
[sɑ̌]	'blood'	[mæ̌]	'mother'
[hɑ̌]	'sword'	[p^{h}ɔ̌]	'cards'
[jɑ̌]	'cliff'	[p^{h}ǔ]	'stomach'
[sǔ]	'hemp'	[χɔ̌]	'needle'
[kwæ̌]	'hoe'	[xǐ]	'liquor'

Table 15: Monosyllabic forms with the rising pattern

4.3.3 Phonetic differences between high and rising

Monosyllabic words with the high and low-rising pitch patterns measured for this study are given in Table 16. The average and standard deviation of f0 on vowel nuclei of these

words, taken from Data Set #3, are given in Table 17. Measurements of f0 were taken on the second repetition of tokens repeated within the carrier sentence at four equidistant points in the vowel.

High	Rising
[ts^{h}ɛ́] ‘goat’	[tswǎ] ‘spittle’
[ɬú] ‘hawk’	[χə̌] ‘needle’
[tʂú] ‘knife’	[pə̌] ‘snow’
[t^{h}ú] ‘oil’	[sŭ] ‘hemp’
[k^{h}wí] ‘dog’	[kwǎ] ‘hoe’
[q^{h}wɑ́] ‘valley, ditch’	[sɑ̌] ‘blood’
[tsú] ‘water’	[tɕǐ] ‘daughter’
[ts^{h}ɨ́] ‘scale’	[p^{h}ǎɪ] ‘vest’
[ts^{h}ǽ] ‘stack’	[kwǐ] ‘vegetables’
	[twǐ] ‘light’

Table 16: High and low-rising forms measured.

Speaker	Pitch		Q1	Q2	Q3	Q4	Diff. Q4-Q1
Male	**High**	Mean	**207.12**	**207.26**	**200.30**	**192.02**	**-15.1**
		SDEV	26.72	27.97	28.00	27.22	6.27
	Rising	Mean	**128.65**	**135.90**	**151.03**	**170.02**	**+41.37**
		SDEV	14.51	16.07	20.27	25.01	13.12
Female	**High**	Mean	**255.44**	**250.91**	**247.06**	**241.49**	**-13.95**
		SDEV	34.60	32.04	30.49	29.54	10.98
	Rising	Mean	**189.61**	**201.80**	**217.50**	**230.34**	**+40.73**
		SDV	19.57	19.57	21.38	19.88	10.84

Table 17: Average pitch values on high vs. rising pattern for Yang Zhiquan (M) & Yang Guomei (F)

Note that the average decrease in pitch was 15.1 Hz for the male speaker and 13.95 Hz

for the female speaker for the high pitch pattern, and the average increase in pitch was 41.37 Hz for the male speaker and 40.73 Hz for the female speaker on words with the rising pitch pattern.

4.4 The phonemic analysis of the high and low-rising pitch patterns

This section deals with the phonemic analysis of pitch patterns on monosyllables. Section 4.4.1 provides evidence for the phonemic status of the pitch contrast. Section 4.4.2 argues that the high and low-rising surface pitch patterns reflect a privative tonal contrast between Ø and /L/.

4.4.1 Evidence for phonemic contrast

In many TB languages of the Himalayan region, sub-phonemic pitch patterns co-vary with onset type (B. Huang 1995, J. Sun 1997, Watters 2002, Hildebrandt 2007). This is not the case in Yonghe, however, as pitch pattern and onset consonant are independent. The forms in Table 18, while not all perfect minimal pairs, demonstrate that pitch pattern and onset consonant do not co-vary.

Onset manner	VOT	High	Rising
Plosive	Voiceless Unaspirated	[tí] ‘bear’	[pǎ] ‘pig’
Plosive	Voiceless Aspirated	[p^{h}ú] ‘tree’	[p^{h}ǔ] ‘stomach’
Plosive	Voiced	[dɛ́] ‘new year’	[dɛ̌j] ‘beancurd’
Fricative	Voiceless	[sá] ‘utterance’	[sǎ] ‘blood
Nasal	Voiced	[mú] ‘fire’	[mǎɪ] autonym
Lateral	Voiceless	[łú] ‘hawk’	[łǎ] ‘side of mountain’
Lateral	Voiced	[lú] ‘hunting bow’	[lǐ] ‘penis’

Table 18: Pitch patterns on monosyllabic words with different onsets

Minimal pairs such as [p^{h}ú] ‘tree’ and [p^{h}ǔ] ‘stomach’ provide further evidence for the phonemic nature of the contrast in pitch.[17]

4.4.2 The phonemic nature of the high vs. low-rising contrast

Having established the phonemic status of pitch, there remain two analytical questions to be resolved. The first is whether the surface low-rising contours on monosyllables are unitary or composite clusters of discrete tonemes, a rather controversial topic within tonal phonology (Yip 1989, van der Hulst & Snider 1993). Evidence that low-rising pitch patterns are not unitary elements comes from the fact that they are composed of a /L/ tone syllable bearing a word-level accent, and /L/ tones are not realized as rising unless in accented position.

[17] Although the scope of this study is limited to nominals, more minimal pairs may be found in other word classes such as stative verbs. For example: [bá] ‘to be old (of an inanimate object)’ vs. [bǎ] ‘to be radially thick’.

The second question is whether the two-way surface pitch contrast between high and low-rising is best analyzed as an equipollent contrast, or as a privative contrast between the presence or absence of tone. The phonemic analysis of the high and low-rising pitch patterns is as follows. Forms with the high pitch are toneless and receive their high pitch from the obligatory accent. The forms with rising pitch patterns are /L/, and have a rising pitch pattern due to an interaction between the lexical /L/ tone and the obligatory accent. Examples (10-11) give a representation of this analysis.

(10) [ˈp^{h}ú]
/*p^{h}u/
'tree'

(11) L
|
[ˈp^{h}ǔ]
/*p^{h}ù/
'stomach'

Evidence for a privative contrast is twofold. First, this two-way contrast parallels the distinction between Ø and /L/ found in the disyllabic forms. The high pitch pattern on monosyllables closely resembles the high pitch of toneless accented syllables in the /*Ø-Ø/ and /Ø-*Ø/ disyllabic forms. Likewise, the rising pitch pattern on monosyllabic forms is parallel to the realization of /L/ as rising in the /*L-Ø/ disyllabic forms. Second, the expression of accented Ø as [H] and accented /L/ as [LH] on monosyllabic forms can be accounted for with the same rules formulated for the disyllables.

Further evidence that the high pitch pattern does not reflect a lexical /H/ comes from

alternations involving accent shift. When monosyllabic words in compounds are unaccented, they are realized with a low-level pitch, regardless of their tonal category. The following examples illustrate that the contrast between Ø and /L/ manifests when monosyllabic forms are in accented position (12-13), but is neutralized in unaccented position within a phonological word (14-15). If we did not recognize the accent as the source of the high pitch for the word 'dog' in (12), we would likely have to appeal to tonal polarity to explain the fact that the same form carries a low pitch in (14).

(12) [kʰwí]
/*kʰwi/
'dog'

(13) [pǎ]
/*pà/
'pig'

(14) /*kʰwi/ + /*hə-tə/ = [kʰwì-ˈhə́-tə̀]
'dog' DEM-CLF 'that dog'

(15) /*pà/ + /*hə-tə/ = [pà-ˈhə́-tə̀]
'pig' DEM-CLF 'that pig'

This analysis falls out naturally from the analysis of disyllabic nouns presented in §4.2. Further evidence against an analysis of the rising pitch pattern as a unitary contour comes from typological studies which suggest that languages with contour tones also have level tones (Maddieson 1978). Furthermore, since the low pitch target is tonal, and the high pitch target is accentual, the contours are never specified as /LH/ underlyingly.[18] Thus, I conclude that it is more felicitous to analyze Yonghe as having a privative contrast in which the

[18] Thanks to Eric W. Campbell for pointing this out.

relevant tone, /L/, is realized as rising in accented position.

Having analyzed the basic inventory for disyllabic and monosyllabic nouns, we now turn to issues of tone and accent alternations in nominal compounds.

5. Noun-Noun compounds

Compounds are an area that often exhibit unpredictable tone and accent alternations in Rma varieties (Evans 2008), and in other languages of Sichuan as well (Matisoff 1997, Daudey 2014, Jacques 2011). Yonghe is no exception. In Yonghe Qiang N-N compounds, the tonal melody shape of the word is largely predictable from the first element of the compound.[19] However, compounds also involve complex tone sandhi phenomena which are not easily explained.

There are, broadly speaking, two types of noun compounds: lexical and syntactic. Lexical compounds have idiosyncratic meanings which are not predictable, whereas syntactic compounds are productive structures in which one noun modifies the other (Dryer 2007). In Yonghe Qiang, the tonal and accentual alternations which occur on syntactic compounds are generally more uniform than those found in lexical compounds, although both types exhibit deaccentuation and tonal neutralization. Table 19 provides examples of N-N syntactic compounds in which both elements are monosyllabic.

[19] This is a common pattern in the TB languages of Sichuan (Evans 2009a, Chirkova & Chen 2013).

Tones	1st Element	2nd Element	Result
/*Ø/+/*Ø/=[L-H]	/kʰwi/ ‘dog’	/dzi̱/ ‘tendon’	[kʰwì.ˈdzí̱] ‘dog tendon’
/*Ø/+/*L/=[L-H]	/kʰwi/ ‘dog’	/sɑ̀/ ‘blood’	[kʰwì.ˈsɑ́] ‘dog blood’
/*L/+/*Ø/=[L-H]	/pæ̀/ ‘pig’	/dzi̱/ ‘tendon’	[pæ̀.ˈdzí̱] ‘pig tendon’
/*L/+/*L/=[L-H]	/pæ̀/ ‘pig’	/sɑ̀/ ‘blood’	[pæ̀.ˈsɑ́] ‘pig blood’

Table 19: Monosyllabic N-N syntactic compounds in Yonghe Qiang

Note that the phonetic forms for the compounds in Table 8 are invariably [L-H]. One way of dealing with these alternations, is to posit that these forms are characterized by an iambic accent pattern which serves to mark these forms as syntactic compounds. The same pattern is also found on noun + stative verb compounds. Examples, elicited from Yang Zhiquan, are given in Table 20.

/*L/+/*Ø/=[L-H]	/sɑ̀/ ‘blood’	/pʰi/ ‘white’	[sɑ̀.ˈpʰí] ‘white blood’
/*L/+/*L/=[L-H]	/sɑ̀/ ‘blood’	/ŋ̩̀/ ‘black’	[sɑ̀.ˈŋ̩́] ‘black blood’
/*Ø/+/*Ø/=[L-H]	/tsu/ ‘water’	/pʰi/ ‘white’	[tsù.ˈpʰí] ‘white water
/*Ø/+/*L/=[L-H]	/tsu/ ‘water’	/ŋ̩̀/ ‘black’	[tsù.ˈŋ̩́] ‘black water’

Table 20: Monosyllabic N-V syntactic compounds in Yonghe Qiang

This pattern may be due to a general areal preference for iambicity (see Evans 2008), or also perhaps because in these syntactic compounds the second element is the head-noun. Given the rules described thus far, we would expect a rising contour on the second syllable for both ‘black blood’ and ‘black water’. I propose that tone is neutralized in the second elements of compounds. This tonal neutralization of the second element of compounds may be viewed as a type of accent-driven reduction (van der Hulst 2011), and this generalization that tone is neutralized in the second element of compounds obtains for lexical compounds as

well.

The second type of compound, lexical compounds, may exhibit either iambic or trochaic accent patterns. Examples of lexical compounds are given in Table 21.

Tones	1st Element	2nd Element	Result	Gloss
/*L/+/*L/= [L-H]	/pæ̀/ 'pig'	/hàɹ/ 'grass'	[pàɹ.ˈháɹ]	'pigweed'
/*L/ +/*Ø/ = [LH-L]	/pæ̀/ 'pig'	/tshɨ/ 'flesh'	[ˈpǎ.tshɨ]	'meat'
/*Ø/+/*L/= [L-H]	/k^hwi/ 'dog'	/pæ̀/ 'pig'	[k^hwì.ˈpǽ]	'domesticated animal'

Table 21: N-N lexical compounds

In summary, neutralization of tone belonging to the second element can account for why a /L/ word such as 'pig' may be realized as low (when unaccented), rising (when accented), or as high (when accented as part of a second element of a compound).

This section will give an account of syntactic compounds; covering each possible combination of first and second elements, beginning with the compounds involving two monosyllabic elements.

4.2 Syntactic compounds with disyllabic first elements

Syntactic compounds with disyllabic first elements present complex accent sandhi. This section will discuss the three disyllabic tone patterns when they occur as the first element in syntactic compounds.

4.2.1 The /*Ø-Ø/ pattern

Accent placement in compounds where the /*Ø-Ø/ pattern is the first element is rather straightforward. Examples are given in Table 22.

Tonal pattern	First	Second	Output
/*Ø-Ø/ +/*Ø-Ø/ = [H-L-L-L]	/*ʐə̹mu/ ‘cow’	/*mikjæ/ ‘eye’	[ˈʐə̹mù-mìkjæ̀] ‘cow eye’
/*Ø-Ø/ + /Ø-*Ø/ = [H-L-L-L]	/*ʐə̹mu/ ‘cow’	/ti*mi/ ‘heart’	[ˈʐə̹mù-tìmì] ‘cow heart’
/*Ø-Ø/ + /*L-Ø/ = [H-L-L-L]	/*ʐə̹mu/ ‘cow’	/*ɹàqə/ ‘horn’	[ˈʐə̹mù-ɹàqə̀] ‘cow horn’
/*Ø-Ø/ + /*Ø/ = [H-L-L]	/*ʐə̹mu/ ‘cow’	/*dzi̹/ ‘tendon’	[ˈʐə̹mù-dzi̹] ‘cow tendon’
/*Ø-Ø/ + /*L/ = [H-L-L]	/*ʐə̹mu/ ‘cow’	/*sà/ ‘blood’	[ˈʐə̹mù-sà] ‘cow blood’

*Table 22: /*Ø-Ø/ initial syntactic compounds in Yonghe Qiang*

Note that all the syllables which occur after the accented syllable are realized as with a decline in pitch, each lower than the one before it. Again, the distinction between /L/ and toneless is obscured in non-accented positions. An example of a syntactic compound from Table 22 is given in (16), and a corresponding pitch trace is given in Figure 7.

(16) /*ʐə̹mu/ + /*mikjæ/ = [ˈʐə̹mù-mìkjæ̀]
‘cow’ ‘eye’ ‘cow-eye’

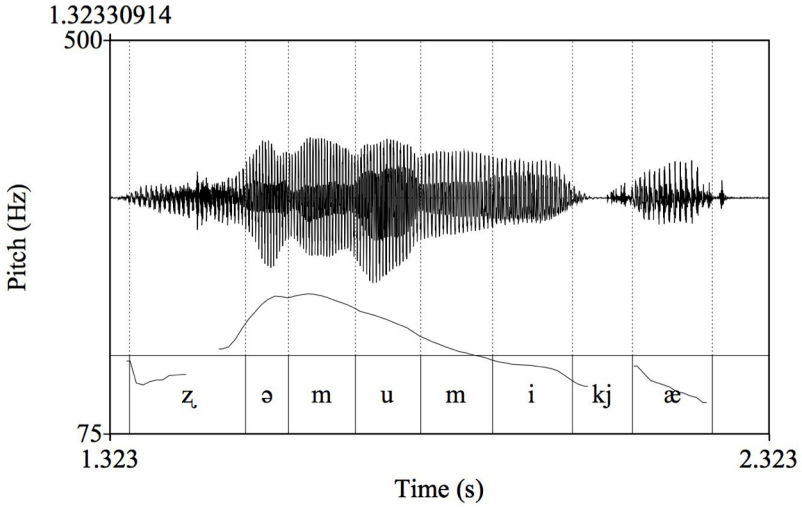

Figure 7: Pitch trace for [ˈʐə̹mù-mìkjæ̀] ‘cow eye’

A rule which can account for these alternations is as follows: If the first element of a compound is /*Ø-Ø/, delete the accent belonging to the second element of the compound. We now turn to the alternations found in compounds in which the initial element is /Ø-*Ø/.

4.2.2 The /Ø-*Ø/ pattern

When /Ø-*Ø/ occurs as the first element of a compound both the accent of the first element and the second element are realized. Examples are given in Table 23.

/Ø-*Ø/ + /*L-Ø/ = [L-H-H-L]	/ʐə*hwəɹ/ ‘wild cow’	/*ɹàqə/ ‘horn’	[ʐə̀.ˈhwə́ɹ-ˈɹá.qə̀] ‘wild cow horn’
/Ø-*Ø/ + /Ø-*Ø/ = [L-H-L-H]	/ʐə*hwəɹ/ ‘wild cow’	/ti*mi/ ‘heart’	[ʐə̀.ˈhwə́ɹ-tì.ˈmí] ‘wild cow heart’
/Ø-*Ø/ + /*Ø-Ø/ = [L-H-H-L]	/ʐə*hwəɹ/ ‘wild cow’	/*mikjæ/ ‘eye’	[ʐə̀.ˈhwə́ɹ-ˈmí.kjæ̀] ‘wild cow eye’
/Ø-*Ø/ + /*Ø/ = [L-H-H]	/ʐə*hwəɹ/ ‘wild cow’	/*dʐi/ ‘tendon’	[ʐə̀.ˈhwə́ɹ-ˈdʐí] ‘wild cow tendon’
/Ø-*Ø/ + /*L/ = [L-H-H]	/ʐə*hwəɹ/ ‘wild cow’	/*sɑ̀/ ‘blood’	[ʐə̀.ˈhwə́ɹ-ˈsɑ́] ‘wild cow blood’

*Table 23: /Ø-*Ø/ initial syntactic compounds*

The alternations found in these syntactic compounds may be accounted for with the following rule: if the first element of a compound is /Ø-*Ø/, retain the accent of both the first and the second element. An example is given in (17) with a corresponding pitch trace given in Figure 8.[20]

(17) /ʐə*hwəɹ/ + /ti*mi/ = [ʐə̀ˈhwə́ɹ-tìˈmí]
‘wild cow’ ‘heart’ ‘wild cow heart’

[20] Forms such as the word ‘wild cow heart’ are ‘minimally compounded’ in the sense that neither of the forms undergo tonal or accentual alterations, and are identical to the pitch patterns on a periphrastic construction with a relativizer intervening between the two nouns. For example, [ʐə̀ˈhwə́ɹ=sɨ tìˈmí] ‘the heart of a wild cow’. Thus, these syntactic compounds may be considered to make up two separate phonological words, as they violate culminativity of accent.

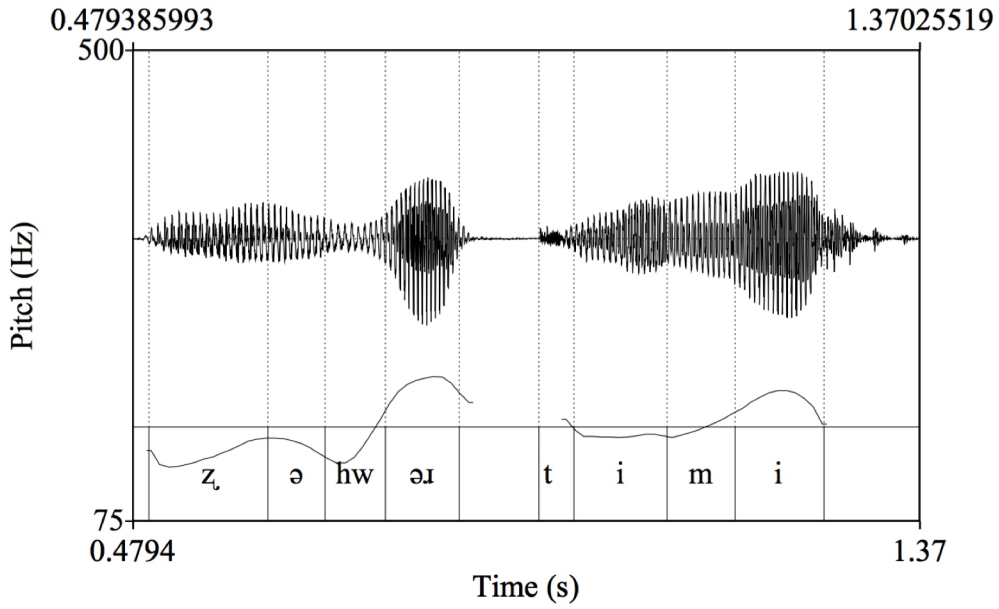

Figure 8: Pitch trace for the compound form [ʒə̀ˈhwə́ɹ-tìˈmí] 'wild cow heart'

In the forms from Table 23 in which the second element has a /L/ tone, such as 'wild cow horn', and 'wild cow blood', the accent of the second element is retained, yet the /L/ tone is neutralized, yielding a surface high pitch instead of a rise on the accented syllable of the second form. A pitch trace of the form for 'wild cow blood' is given in Figure 9.

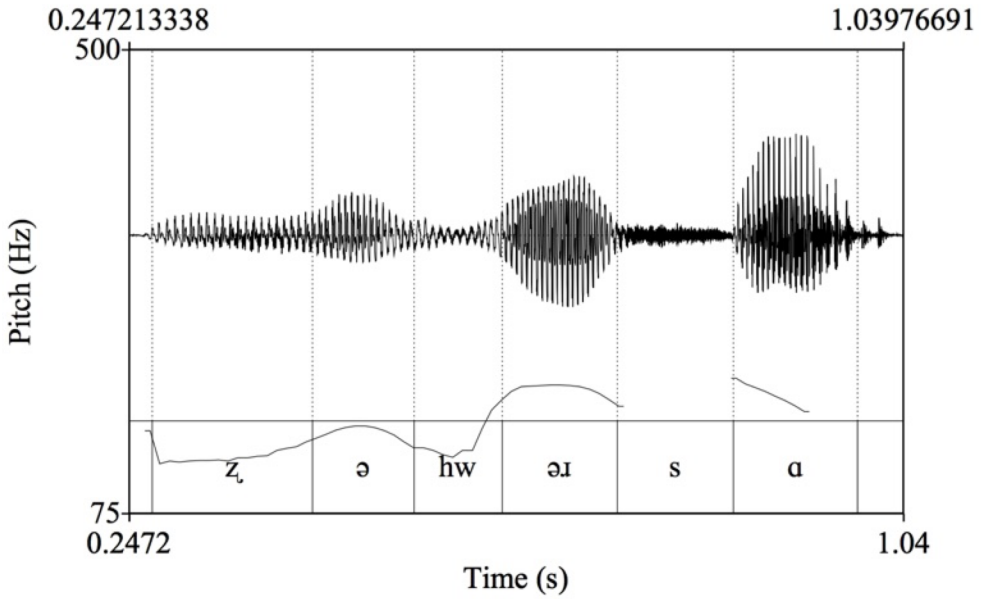

Figure 9: Pitch trace for the compound form [zə̀ˈhwə́ɹ-ˈsɑ́] *'wild cow blood'*

Next we will turn to compounds in which the first element is /*L-Ø/.

4.2.3 The /*L-Ø/ pattern

Examples of alternations in compounds with /*L-Ø/ as the initial element are given in Table 24.

/*L-Ø/ + /*Ø-Ø/= [L-L-*H-L]	/*łùpu/ 'demon'	/*mikjæ/ 'eye'	[łùpù-ˈmíkjæ̀] 'demon eye'
/*L-Ø/ + /Ø-*Ø/ = [*LH-L-L-*H]	/*łùpu/ 'demon'	/ti*mi/ 'heart'	[ˈłŭpù-tìˈmí] 'demon heart'
/*L-Ø/ + /*L-Ø/ = [L-L-*H-L]	/*łùpu/ 'demon'	/*ɹàqə/ 'horn'	[łùpù-ˈɹáqə̀] 'demon horn'
/*L-Ø/ + /*Ø/ = [L-L-*H]	/*łùpu/ 'demon'	/*dzi̱/ 'tendon'	[łùpù-ˈdzí̱] 'demon tendon'
/*L-Ø/ + /*L/ = [L-L-*H]	/*łùpu/ 'demon'	/*sà/ 'blood'	[łùpù-ˈsɑ́] 'demon blood'

*Table 24: / *L-L/ initial syntactic compounds*

Excepting the form for ‘demon heart’ (see below), each of alternations from Table 24 may be accounted for by the following rule: If the first element of a compound is /*L-Ø/, delete the accent of the first element. An example from Table 24 is given in (18) and a pitch trace in Figure 10.

(18) /*łùpu/ + /*dzį́/ = [łùpù-ˈdzį́]
‘demon’ ‘tendon’ ‘demon tendon’

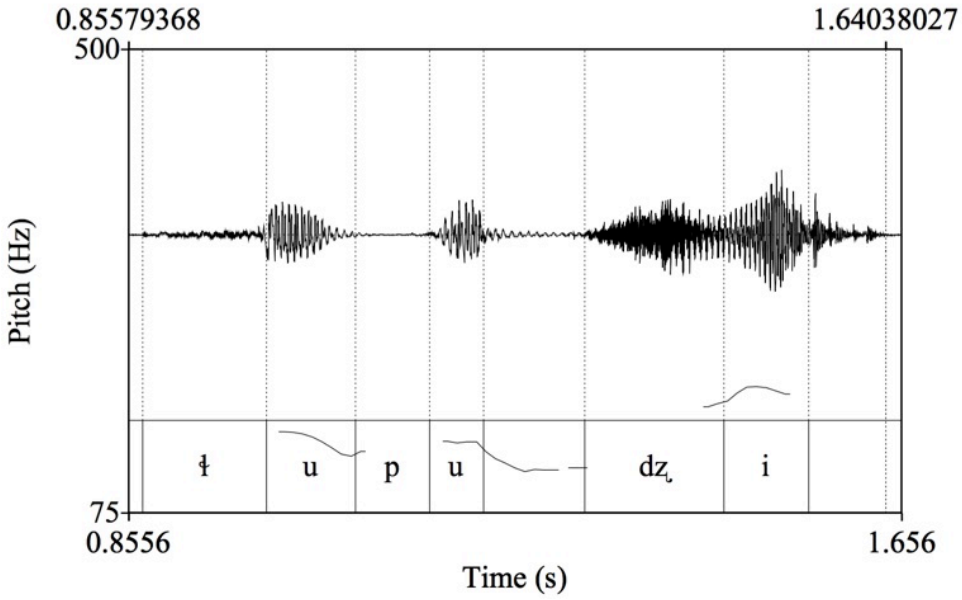

Figure 10: Pitch trace for the compound form [łùpù-ˈdzį́] 'demon tendon'

As Table 24 shows above, there is an exception to this generalization. The exception occurs when /*L-Ø/ is the first element and the second element is /Ø-*Ø/. Thus, the output of the compound ‘demon heart’ (19) has two accents and may be considered as two phonological words. A pitch trace for this form is given in Figure 11.

(19) /*łùpu/ + /ti*mi/ = [ˈłŭpù-ˈtìmí]
‘demon’ ‘heart’ ‘demon blood’

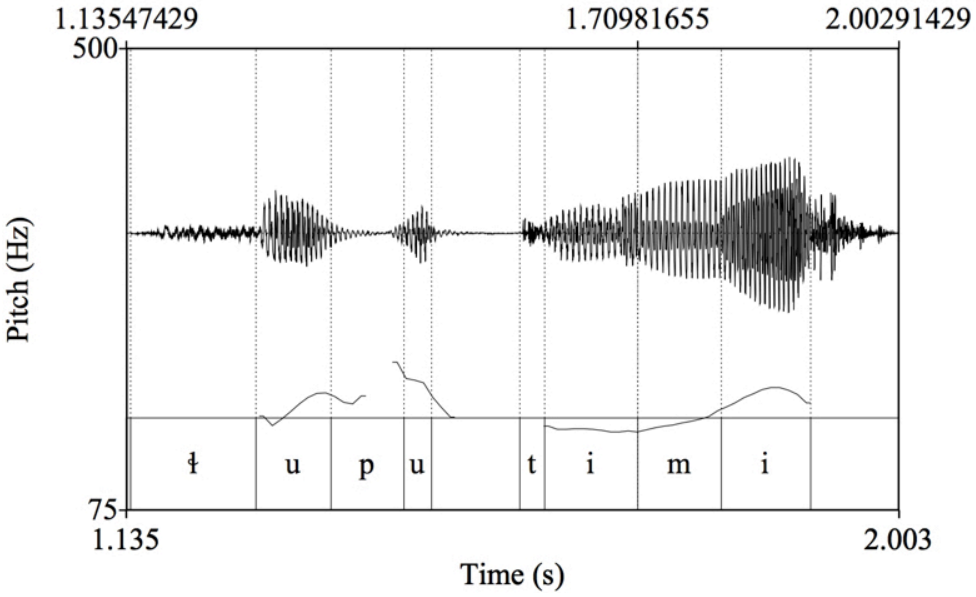

Figure 11: Pitch trace for the compound form [ˈɬǔpù-tiˈmi]

Lastly, we will turn our attention to syntactic compounds involving a monosyllabic first element and a disyllabic second element.

4.3 Syntactic compounds with monosyllabic first elements

In this last section on compounds, we will investigate compounds in which the first element is monosyllabic. Table 25 shows that when a monosyllabic word is followed by a disyllabic word, the properties of the resulting compound are recoverable from the second element of the compound, and that the first element is invariantly [L].

	2nd Element	a	b	c
1st Element		/*Ø-Ø/	/Ø-*Ø/	/*L-Ø/
1	/*Ø/	L-*H-L	L-*H-*H	L-*H-L
2	/*L/	L-*H-L	L-*H-*H	L-*H-L

Table 25: Monosyllabic + disyllabic compounds

The outputs for (1-a), (1-c), (2-a), and (2-c) are predictable based on prior generalizations about neutralization of the tone of the second element of compounds. In this case, the second syllable of the output for (1-c) and (1-d) is [H] because the /L/ tone in the underlying representation of the second element is neutralized. However, the outputs for (1-b) and (2-b) are unusual in that they are the only attested forms with multiple accents on one morpheme in an otherwise culminative system. I do not currently have an elegant explanation for this. Example forms for the (1-a) and (1-b) patterns are given in (20-21). Pitch traces are given in Figures 12-13.

(20) /*ɕi/ + /ti*mi/ = [ɕì-ˈtíˈmí]
'pianniu'[21] 'heart' 'pianniu heart' / 'to be brave'

[21] /ɕi/ refers to the offspring of a bull and a female yak. The gloss used here is a transliteration of the Chinese corresponding Chinese word: *pianniu*.

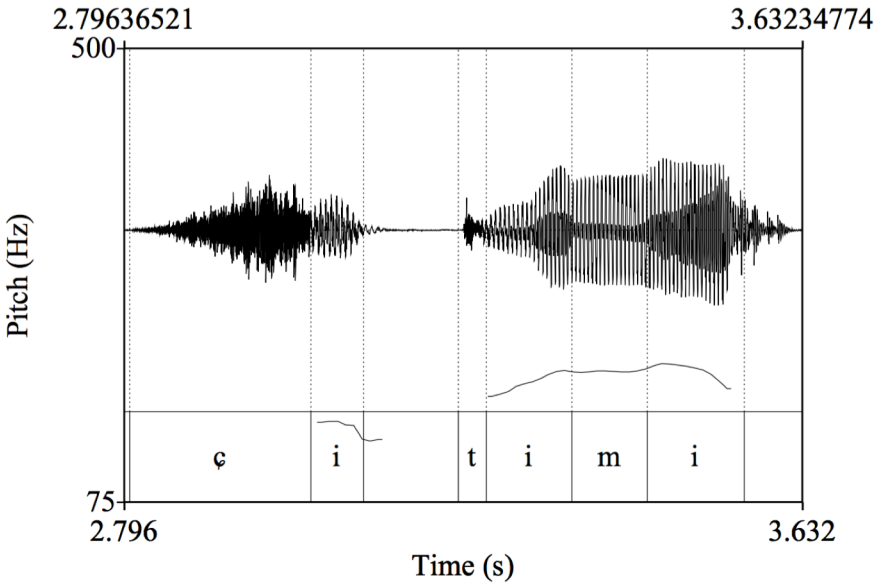

Figure 12: Pitch trace for the word [ɕì-ˈtíˈmí] 'pianniu-heart'

(21) /*dʐə̀ɹ/ + /ti*mi/ = [dʐə̀ɹ-ˈtíˈmí]
‘ram’ ‘heart’ ‘ram heart’

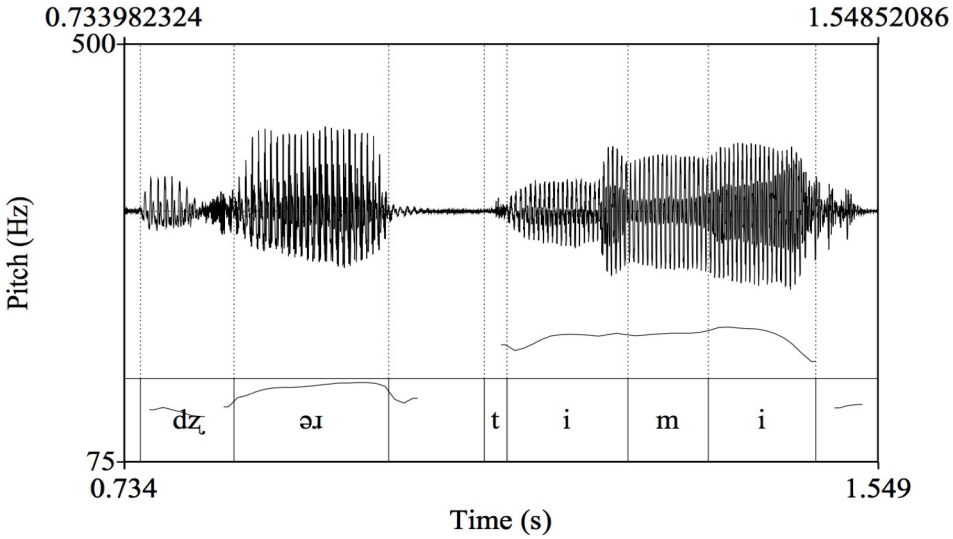

Figure 13: Pitch trace of the word [dʐə̀ɹ-ˈtíˈmí] ‘ram heart’

4.7 Noun-Demonstrative constructions.

This section will describe tonal and accentual alternations which occur in noun+demonstrative-classifier constructions, with the aim of showing that the rules posited thus far can account for all the patterns found in these constructions.

There are three demonstratives (DEM) in Yonghe: the distal demonstrative /hə-/, the medial demonstrative /thɑ-/, and the proximal demonstrative /tsɨ-/. Demonstratives occur directly after the nouns that they modify and are obligatorily followed by classifiers (CLF). The alternations found in N-DEM-CLF constructions, are listed in Table 26.

Noun + DEM-CL	Noun	DEM-CLF	N-DEM-CLF
/Ø/ + /*Ø-Ø/ = [L-*H-L]	/*k^{h}wi/ ‘dog’	*hə-tə	[k^{h}wì-ˈhə́-tə̀] ‘that dog’
/L/ + /*Ø-Ø/ = [L-*H-L]	/*pæ̀/ ‘pig’	*hə-tə	[pæ̀-ˈhə́-tə̀] ‘that pig’
/*L-Ø/+/*Ø-Ø/ = [L-L-*H-L]	/*ɬùpu/ ‘demon’	*hə-tə	[ɬùpù-ˈhə́-tə̀] ‘that demon’
/*Ø-Ø/ +/*Ø-Ø/ = [*H-L-L-L]	/*ʐə̀mu/ ‘cow’	*hə-tə	[ˈʐə́mù-hə̀-tə̀] ‘that cow’
/Ø-*Ø/+/*Ø-Ø/ = [L-*H-*H-L]	/ʐə̀*hwəɹ/ ‘wild cow’	*hə-tə	[ʐə̀ˈhwə́ɹ -ˈhə́-tə̀] ‘that wild cow’

Table 26: Tonal alternations in N+DEM-CL constructions

If the first element of a Noun + DEM-CLF construction is monosyllabic, accent falls on the second syllable of the compound form. If the first element of the construction is /*L-Ø/, the accent of the first element is deleted. If the first element is /*Ø-Ø/, the accent of the second element is deleted. If the first element is /Ø-*Ø/, both accents are realized. The fact that words such as /ʐə̀*hwəɹ/ ‘wild cow’ and /*ʐə̀mu/ ‘cow’, which are both atonal, behave

differently in compounds is further evidence that accent is lexically specified.

5. The Yonghe system in typological perspective

This study has argued that, rather than categorize Yonghe as a 'restricted tone language' or as a 'pitch-accent language', it is necessary to differentiate between two different levels of prosodic phonology: an obligatory word-level accent, and a privative tonal contrast of Ø vs. /L/. Since /L/ is culminative and links from the beginning of a word, these distinct properties yield a three-way contrast for disyllabic forms and a two-way contrast for monosyllabic forms. Tone and accent, while distinct, have complex interactions, as tonal contrast is only realized on accented syllables and is subject to neutralization in compounds.

In this section, I attempt to place the Yonghe system within a broader typology of suprasegmental phonology based on several typological criteria. These criteria include the nature of the privative tonal contrast (5.1), the type of surface contrasts (5.2), tonal culminativity (5.3) the relationship between accent and tone (5.4), tonal density (5.5), and the phonological properties of contoured pitch patterns (5.6). Lastly, I discuss possible directions for future studies (5.7).

5.1 The nature of the privative tonal contrast

Privative tone systems have been put forward as an areal feature of languages of the Himalayan linguistic area (Evans 2008, 2009). Yonghe is not the only Qiang variety described as having a privative system. For example, Muka Qiang also has a privative tonal contrast (Evans 2007). However, Yonghe is the only described variety with a privative contrast in which the relevant tone is /L/. Systems of this typological profile are attested, but

are less common than those in which /H/ is the specified tone (Hyman 2001b). Hyman (2001b: 245) summarizes Nash's (1992-1994) description of a privative L vs. Ø in the Bantu language Ruwund as follows.

(21)

a. H's are by far more numerous than L's, hence "unmarked"
b. floating L exists, while floating H does not
c. morphological rules assign L tones, not H's
d. phonological rules manipulate L tones, not H's

By comparing Yonghe with Ruwund, we see that the two languages are similar in that in that morpho-phonological alternations only assign /L/, and there is no evidence for a phonologically active high tone. However, Yonghe differs from Ruwund in that the default expression of Ø is not [H], as high pitch patterns are associated only with accented syllables. The fact that Ø is not assigned a default tone, and that surface [H] is a result of stress-accent sets Yonghe apart from Ruwund, and other Bantu languages with L vs. Ø systems (see Hyman 2001b for discussion). Thus, Yonghe is distinct from both other privative systems in Qiang, and also differs from other languages with L vs. Ø contrasts, such as Ruwund, with respect to the default realization of Ø.

5.2 Surface contrast: high vs. low-rising

As discussed above, Yonghe Qiang is unique within Tibeto-Burman in having a privative L vs. Ø system. While no other TB languages have been analyzed as a privative L vs. Ø underlying contrast, many languages of the Himalayan region exhibit the same surface contrast between high and low-rising, and the region has been characterized as having a "prevalence of binary oppositions, with one member of the pair more marked than the other" (Evans 2009a:200). An examination of other Tibeto-Burman languages of Western Sichuan

reveals that this type of patterning is well attested, although the ways these patterns have been analyzed vary considerably.

For example, consider the case of Prinmi (also called Pumi), typically regarded as being closely genetically related to Rma (Jacques & Michaud 2011), which also exhibits a tendency to avoid surface low pitches on monosyllabic forms in isolation. There are three ways that a lack of surface [L] has been analyzed in Prinmi.

First, the lack of surface [L] has been interpreted as a lack of /L/. This is the approach taken by Ding (2006), who analyzes the Niuwozi variety of Prinmi as lacking /L/, but having a contrast between /H/, /LH/, and /HL/ on monosyllabic forms. Second, the lack of surface [L] and the presence of [LH] on monosyllables has been explained by positing that [LH] is a realization of /L/. This is the approach taken by Daudey (2014) in describing Wadu Prinmi. Similarly, Matisoff (1997) describes the Dayang variety of Prinmi as having a /H/ vs. /L/ contrast in which the /H/ is phonetically level and /L/ is phonetically rising. The third approach has been to treat the low-rising contours as underlyingly /L/, but account for their realization as rising with a post-lexical rule which mitigates against 'low-tone only' words. This approach is taken up by Jacques (2011) in his analysis of Shuilo Prinmi /L/.

Similar patterns are common to other languages of the region. In the Yongning variety of Na, words lacking a lexical /H/ are remedied by a rule which inserts /M/ tones post-lexically (Michaud 2009). The Ersu language varieties contrast high level with low; high may be realized as falling, and low as low-rising (Yu 2012). A two-way phonemic tonal contrast is reconstructed for Proto-Ersuic (Yu 2012). In Muya (also called Minyak; closely related to Rma by almost all accounts), monosyllabic forms contrast falling and rising pitch patterns

(B. Huang 1985). Ikeda (2002) analyzes Muya low-rising pitch patterns as /L/ tones that surface as rising at prosodic word boundaries. The Caodeng variety of rGyalrong (J. Sun 2008) contrasts high and falling pitch contours. This two-way contrast is common throughout rGyalrong varieties (J. Sun 2008), and is found in the Zhoukeji variety as well (Lin 2012). Shixing contrasts /H/ with /LH/ and /HL/ on monosyllabic forms (Chirkova 2009). Both upper and lower varieties of Xumi (Chirkova & Chen 2013; Chirkova, Chen & Antolík 2013) have a binary contrast between high and rising on monosyllables, in which "the high tone may be realized with a continued falling [sic][22] after the alignment of the f0 peak in the early part of the syllable, giving the perception of a falling tone."[23] Lastly, the extinct Tangut language once had a two-way tonal contrast between high-level and low-rising (Gong 2003:605).

Thus, a two-way distinction between a level and a low-rising pitch, although cross-linguistically unusual (Maddieson 1978; Yip 2002; Zhang 2000, 2013), is not so unusual in the context of the Himalayan language area. We also see that different scholars have analyzed the lack of [L] in a variety of ways. Table 27 provides a summary of the ways in which the lack of [L] has been analyzed for the languages discussed in this section.

[22] Presumably missing the word 'pitch' here.
23 Interestingly, in the non-tonal Amdo Tibetan varieties spoken in rNgaba Prefecture, monosyllabic forms "invariably carry a high falling pitch 53" (B. Huang 1995: 45).

Analysis of lack of [L] on monosyllables	Language Variety	Source
Accidental gap: No /L/	Niuwozi Prinmi	(Ding 2006)
	Shixing	(Chirkova 2009)
	Zhoukeji rGyalrong	(Lin 2012)
	Caodeng rGyalrong	(J. Sun 2008)
/L/ realized as [LH]	Tangut	(Gong 2003)
	Ersu	(Yu 2012)
	Dayang Prinmi	(Matisoff 1997)
	Wadu Prinmi	(Daudey 2014)
/L/ realized as [LH] due to post-lexically inserted H	Shuiluo Prinmi	(Jacques 2011)
	Yongning Na	(Michaud 2009)
/L/ realized as [LH] at prosodic boundaries	Muya	(Ikeda 2002)
/L/ realized as [LH] due to obligatory word-level accent	Yonghe	

Table 27: Variegated explanations for the lack of [L] on monosyllables

From Table 27, we see that while the lack of [L] on monosyllables is a common characteristic of the area, Yonghe is the only variety in which the lack of [L] has been attributed to the presence of an obligatory word-level accent.[24]

5.3 Tonal culminativity

The culminative nature of tone in Yonghe parallels other varieties of Qiang, and in the wider Himalayan linguistic area (see Evans 2008, 2009 for a discussion). For example, in Mianchi Qiang, only the leftmost underlying /H/ is realized within a phonological word (Evans 2008). In Yonghe, culminativity and left-to-right tonal associations account for the

[24] It is possible that an accentual analysis could be extended to include other varieties with [LH]. This remains an area for future research.

lack of simplex forms with the pattern [L-LH], and tonal contrast is only maintained in the first syllable of disyllabic forms. It is worth noting that this patterning is widespread in the Tibetic languages, in which tone is only contrastive on the first syllable of disyllabic nouns (see Caplow 2009:523-527).

5.4 Interaction of accent and tone

Languages with both stress-accent and tone differ in terms of the degrees to which these two properties are interdependent. For example, in Pirahã (Everett, 1986, 1998), tone and stress are entirely orthogonal dimensions. In Curaçao Papiamentu (Remijsen & van Hueven 2006), however, tonal contrast is limited to accented syllables. Yonghe more closely resembles the latter type as the expression of tonal contrast is neutralized in unaccented position.

Yonghe is unique among Rma/Qiang varieties in possessing contrastive tone in addition to stress-accent. Prior studies of Qiang have suggested that tone in the varieties that have it represents a development from a reanalysis of older accentual patterns, catalyzed by contact with Sichuanese Mandarin (Evans 2001). The Yonghe system is interesting in that, by having both tone and accent, it complicates the picture of Qiang tone systems. Further research is needed on the historical origins of /L/ in Yonghe.

5.4 Tonal density

Another dimension along which we may examine the Yonghe system is tonal density. Table 28, which compares frequency of tone categories in monosyllabic forms from the

Swadesh list, demonstrates that toneless words are much more frequent than tonally specified words.[25]

Word shape	Monosyllabic forms (53/100 total)	
Tone	Ø	/L/
Number	42	11
Percentage	42/53 = 79.3%	11/53 = 20.7%

Table 28: Frequency of tonal categories in monosyllabic Swadesh list words

The same generalization obtains for disyllabic forms; even fewer of which are tonally specified. The distribution of tonal categories in disyllabic forms are given in Table 29.

Word shape	Disyllabic forms (45/100 total)	
Tonal category	Ø	/L/
Number	39	6
Percentage	39/45 = 86.66%	6/45 = 13.33%

Table 29: Frequency of tonal categories in disyllabic Swadesh list words

This distribution is in contrast with tonal varieties of southern Qiang such as Longxi, Mianchi, and Taoping, which have equipollent contrasts in which /L/ tones are more frequent than /H/ (Evans 2001). Thus, it appears that Yonghe has less tonal density than other varieties of southern Qiang.

An examination of accent-type frequency reveals that iambs and trochees are equally distributed, although there is a slight tendency towards iambicity. Table 30 shows the

25 Although this is based on a small data set, I feel that this is a fair estimate. For example, in the numerals 1-10, only two (20%) of the numerals are specified for tone.

distribution of tone and accent pattern for disyllabic forms.

Word shape	Disyllabic (45 of the 100 words)			
Accent pattern	Trochaic		Iambic	
Tonal Category	Ø	/L/	Ø	/L/
Number	12	6	27	0
Percentage	18/45 = 40%		27/45 = 60%	

Table 30: Frequency of tone and accent pattern in disyllabic Swadesh list words

Note that the lack of /L/ toned forms with iambic patterns may be explained as being due to the left-to-right association and tonal culminativity.

5.5 The phonological typology of contoured pitch patterns

Typological studies of suprasegmental phonology have typically categorized tonal languages into one of two types, based on how contoured pitch patterns are represented phonologically. For example, Pike (1948) distinguishes between 'Register' type tone systems, in which contoured pitch patterns are sequences of level tones, and 'Contour' type systems, in which the contours are unitary.

This categorization captures the differences in patterning between many African languages (which tend to be 'Register' systems) and languages of Mainland Southeast Asia (which are predominately 'Contour' systems). However, this dichotomy cannot fully account for phonological properties of contours in Yonghe Qiang, in which surface contour pitch patterns are formed from an interaction between /L/ and accent.

Thus, Yonghe does not fit the 'Contour type' classification, as surface contours in Yonghe are not indivisible units at deeper levels of representation. Yet, Yonghe contours do

not completely fit the description of a 'Register type' tone system. This is because contoured pitch patterns in Yonghe, while they are decompositional in the sense that they are born out of a confluence of two phonological properties at different levels, do not represent clusters of tones on the same phonological tier.

5.7 Further directions

Some areas that merit further investigation include: a full account of tone and accent in the Yonghe verb complex, a study of tone drawn from spoken texts which includes rapid speech phenomena, an investigation into influence of borrowings from Sichuanese on the tones of Yonghe phonology, and possibly a quantitative study of the acoustic correlates of stress-accent in neighboring, atonal Rma varieties. Above all, documentation of suprasegmental phonology in endangered and unstudied varieties is critical. A solid description of neighboring (and undocumented) varieties such as Goukou and Heihu may illuminate issues of accent sandhi in Yonghe, and in suprasegmental phonology more generally.

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