

## THE PITCH-ACCENT SYSTEM OF NIUWOZI PRINMI

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### 1. INTRODUCTION

Tone is an areal feature found in the majority of Southeast Asian languages. Just as not every Southeast Asian language is characterized by tone, it is not necessary that every tone language be characterized by the same mechanism for expressing tonal contrast. Over a decade ago, Bradley (1982) pointed out that tone languages of Southeast Asia do not represent a homogeneity. Rather, there are considerable variations in terms of voicing quality, phonation type, and prosodic domain which defines the basic scope of a toneme. More recently, Matisoff (1999) discusses a number of tonal phenomena in an array of languages of Southeast Asia. Syllable-tone, word-tone, and other suprasegmental systems are reported to exist in Tibeto-Burman languages, but pitch-accent systems are not specifically discussed.

Prinmi (or Pumi), a Tibeto-Burman language of China, is spoken by the Pumi nationality in northwestern Yunnan and by the Tibetan nationality in southwestern Sichuan.<sup>1</sup> Presently five works on Prinmi provide, with varying degrees of detail, original descriptions of phonological systems in five dialects: (a) Jinghua, Lanping County (Lu 1983), (b) Taoba, Muli County (Lu 1983), (c) San'ai, Jiulong County (Huang et al 1992), (d) Dayang, Lanping County (Matisoff 1997; Fu 1998), and (e) Niuwozi, Ninglang County (Ding 1998). Taoba and San'ai are spoken in southwestern Sichuan, while the others are found in northwestern Yunnan. Under Lu's (1983: 90) scheme of classification, Taoba and San'ai belong to Northern Prinmi, whereas Jianghua, Dayang, and Niuwozi all fall within Southern Prinmi. The information on the two Northern Prinmi dialects is extremely sketchy. Three tonemes (without any allotone) are recognized in Taoba Prinmi, with high level (<sup>55</sup>) versus high falling (<sup>53</sup>) versus high rising (<sup>35</sup>) (Lu 1983: 95; Sun 1991: 200). San'ai is also claimed to have three tonemes, contrasting between high level (<sup>55</sup>), rising (<sup>35</sup>), and low level (<sup>11</sup>) (Huang et al 1992: 639). Nonetheless, unlike the

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<sup>1</sup> Before the official designation of 普米 (hence Pumi) by the central Chinese government in Beijing in 1960's, this ethnic minority was generally referred to by the term *Hsi-fan* (西番). I shall use 'Prinmi', the autonym of the people, to refer to their language and 'Pumi' for addressing those who identify themselves as such.

Taoba, no minimal sets of words are given in San'ai to show these suprasegmental oppositions.<sup>2</sup>

Despite the fact that Lu's (1983) account of Prinmi is based on Jinghua, the description of tone in Jinghua takes up a total of less than two full pages. Jinghua is regarded as having two tonemes, but each with a pair of allotones, i.e. high level (<sup>55</sup>)/high falling (<sup>53</sup>) versus low rising (<sup>13</sup>)/low falling (<sup>31</sup>) (Lu 1983: 15; Huang et al 1992: 638). Tone sandhi is mentioned in passing with examples exclusively drawn from compounds. No analysis or detailed transcription of data involving the so-called tone sandhi is provided.<sup>3</sup>

Matisoff (1997) also considers Dayang Prinmi, a dialect quite close to Jinghua linguistically and geographically, as a two-tone language. The low tone in Dayang has two allotones: low rising (<sup>13</sup>) and low level (<sup>11</sup>), but the high level tone (<sup>55</sup>) has no allotone. The two allotones of the low tone, however, involve a rampant tone sandhi that is considered as outright unpredictable in utterances of two or more syllables. Fu's (1998) portrayal of Dayang tones essentially coincides with that presented in Matisoff (1997). Curiously, Fu (1998: 18-20) reckons the low rising and low level tones as two tonemes instead of allotones, but the actual phonemic contrast lies in the opposition between the high level tone (<sup>55</sup>) versus the low rising (<sup>24</sup>)/low falling (<sup>31</sup>) tone.

Field data from Niuwozi Prinmi suggest that its tonal system is fundamentally different from the one operating in Mandarin, but closer to those of some Tibeto-Burman languages of Nepal such as Gurung (Glover 1972), Thakali (Hari 1971), and Tamang (Mazaudon 1973). While there is no doubt that Niuwozi Prinmi is a tone language (in the broad sense of the term, cf. Section 2.2 below), the question as to the precise nature of its suprasegmental system is the subject of the present investigation.

The main body of the paper is organized as follows: Section 2 is devoted to the recognition of pitch-accent systems in tonal languages. The basic tonal patterns of Niuwozi Prinmi will be presented in Section 3. Based on these fieldwork data, I will identify Prinmi as a pitch-accent language in Section 4. Finally, Section 5 deals with the strong propensity for tone changes that are characteristic of pitch-accent systems.

<sup>2</sup> It is doubtful whether the low level tone, occurring also frequently in other dialects of Prinmi, represents a phonemic tone. Since Huang et al (1992) have made a large body of lexical data available for San'ai, I attempted to find three words that would bear minimal contrast on the suprasegmental but without success. Indeed, even minimal pairs with a clear contrast between the low level tone and the other tones in monosyllabic words are yet to be found.

<sup>3</sup> Lu (1983: 19-20) mentions three sandhi phenomena. Only one of them involves the change from one toneme to another, i.e. from low rising to either high level or high falling when the low tone follows a high tone. The others concern variation between the pair of allotones within each toneme. No specific environment for the changes are given.

## 2. THE PLACE OF PITCH-ACCENT IN TONAL LANGUAGES

While the line between tone and stress is clear-cut (e.g. no one seriously argues for treating English as a tone language or Mandarin as a stress language), the distinction between tone and pitch-accent is rather obscure. For instance, Shibatani (1994: 1810) mentions that it is not unreasonable to regard Japanese, a pitch-accent language, as a kind of tone language (cf. also Clark 1986). In the broad sense, tone can embrace three types of tonal systems, namely: syllable-tone, word-tone, and pitch-accent (cf. Donohue 1997; Ding forthcoming). On the other hand, the discrepancy between pitch-accent and tone (usually abbreviated from syllable-tone) should not be ignored or overlooked. Unless the context of discussion indicates otherwise, 'tone' will be generally used in its narrow sense, meaning syllable-tone.

### 2.1 *Syllable-tone and pitch-accent: a brief comparison*

As Odden (1995) remarks, differences between (syllable-)tone and (pitch-)accent languages have been noticed and discussed for some time. The significant disparities between these two types of tonal systems may be summarized as follows (adapted from Odden 1995: 467-8):

#### *Syllable-tone*

For a language with  $n$  tones, the number of contrasting tonal patterns in words with  $k$  syllables approaches  $n^k$ .

Phonological rules are triggered by tones of an immediately adjacent syllable.

Rules are assimilatory or dissimilatory.

#### *Pitch-accent*

The number of contrasts in words with  $k$  syllables approaches  $k+1$ : at most one syllable bears an accent.

Phonological rules may apply over great distances.

Rules are primarily insertion, deletion, and movement of accents.

If we regard (standard) Mandarin and (standard) Japanese as representing archetypes of tonal and accentual systems, a few more points can be added to the above list. Let us first consider some examples from these languages: Mandarin in (1) and Japanese in (2).

- (1) fei<sup>55</sup> 'to fly'      fei<sup>35</sup> 'to be fat'      fei<sup>214</sup> 'bandit'      fei<sup>51</sup> 'lung'

	Meaning	In citation		In connected speech	
(2) a	'fire'	hi	H	hi wa	H-L
b	'day, sun'	hi	H	hi wa	L-H
c	'nose'	ha <sup>na</sup>	L-H	ha <sup>na</sup> wa	L-H-H
d	'flower'	ha <sup>na</sup>	L-H	ha <sup>na</sup> wa	L-H-L

The four tonal categories in Mandarin are expressed conventionally in (1). Taken as combinations of level tones, they can be analyzed roughly as follows: HH for the high level tone, MH for the rising tone, MLH for the dipping, and HL for the falling.<sup>4</sup> The specification of tone in terms of its components can be referred to as 'Basic Tone Melody', or BTM. In tone languages each lexical word bears a BTM. Since morphemes in Chinese, to a large extent, have been monosyllabic, it leads to the bearing of all the tonal components of a BTM on a single syllable. This is necessary if tonal contrast is to be preserved on monosyllabic words, paving the way for a one-to-one association between a BTM and a syllable. In this kind of language, the syllable actually acts as a melody-bearing unit. Mandarin is thus qualified as a *syllable*-based tone language in relation to the BTM.

The Japanese examples in (2) demonstrate that the prosodic pattern in a pitch-accent system covers a larger domain than the morphological word. When the full domain for a BTM is not available (as in individual words in citation), a minimal pair of words will neutralize their suprasegmental contrast, as shown in (2)a-b and (2)c-d. The neutralization of the tonal contrast between (2)a and (2)b illustrates another characteristic of pitch-accent languages: level tones do not contrast directly with each other. Tonal contrasts such as H versus L or H-H

<sup>4</sup> The simplified representation is necessarily imprecise, using three levels L, M, and H to signify a five-level distinction. See Yip (1995) for an alternative representation with the concept of "register".



versus L-L are not permitted. Finally, the minimal pair in (2)c-d shows that a suprasegmental contrast can be realized according to whether the H tone spreads in the prosodic domain. It is apparent that Japanese suprasegmentals operate in a wider prosodic domain that may be termed a 'template'.<sup>5</sup> There holds a one-to-one association between a BTM and a template.

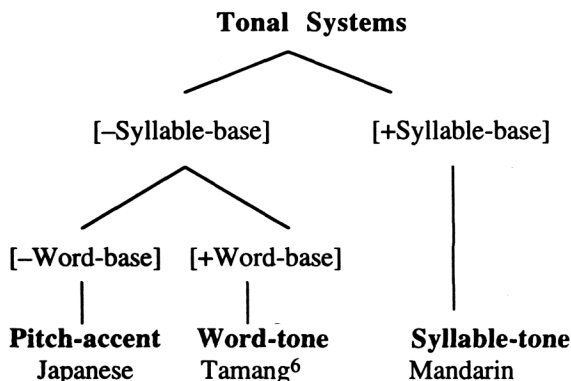
The comparison of the two types of tonal systems in Mandarin and Japanese reveals that these languages achieve tonal contrast through remarkably different mechanisms. The dissimilarity is reflected in two major ways. First, in Mandarin the BTM occupies a minimal domain — a single syllable, whereas in Japanese the domain is larger than a morphological word and plays a crucial role in achieving tonal contrast. When a full template is not available, the tonal contrast is prone to neutralization. Secondly, Mandarin contrasts different tonal categories in terms of different level tones or their combination, whereas Japanese does not contrast level tones. The essential element in the tonal category of pitch-accent languages is not the tone itself but the placement of a marked tone in the template and the potential spreading of the marked tone.

## 2.2 *Pitch-accent system: a definition*

As mentioned earlier, there are three types of tonal systems: syllable-tone, word-tone, and pitch-accent. The preceding subsection has highlighted the difference between syllable-tone and pitch-accent. The dissimilarity between pitch-accent and word-tone will not be noted here, owing to the scope of this paper (cf. the discussion in Ding forthcoming). As observed in Donohue (1997: 352), the distinction between the three types of tonal systems mainly rests on the difference in prosodic domains. If we formulate the prosodic domain in terms of [Syllable-base] and [Word-base] and assign binary values to them, a classificatory tree of tonal systems can be sketched as follows:

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<sup>5</sup> In the context of Japanese suprasegmentals, a template can be construed as what McCawley (1968: 137-138) calls a 'minor phrase'. But his terminology is too specific to be applicable to various kinds of prosodic domains in pitch-accent systems (cf. Ding forthcoming).



*Figure 1. A classification of tone languages.*

As indicated in the diagram, the template is independent of the syllable and of the word. It is more abstract than the prosodic domain of syllable-tone and word-tone languages, for the domain of syllable and that of (morphological) word are readily observable.

Since the prosodic domain is vital to recognizing different kinds of tonal systems, pitch-accent system may be defined with respect to this property as follows:

A language possesses a **pitch-accent system**, if, and only if, it generates suprasegmental patterns by placing a marked tone (usually H) on the first, the second, the third, ... and the  $n$ th positions, respectively, in an underlying domain of  $n$  units (either syllables or moras), irrespective of syllable weight.

The proposed definition hinges on the organizational uniqueness of pitch-accent systems, with an emphasis on the orderly movement of the marked tone in the template. This separates it from word-tone and syllable-tone systems. The final statement about its insensitivity to syllable-weight is necessary for two reasons. First, it clarifies that the possible locus of the marked tone is not constrained by phonological factors such as syllable-weight. Secondly, it distinguishes pitch-accent systems from other 'accent' systems in which the occurrence of suprasegmentals is determined by syllable-weight.

<sup>6</sup> For further examples of word-tone languages of Tibeto-Burman, see Mazaudon (1977: 76-84).

### 3. TONAL PATTERNS OF NIUWOZI PRINMI

In spite of its huge number of compounds, Prinmi morphemes are predominantly monosyllabic. There are only a few non-decomposable disyllabic words; the great majority of polysyllabic words are compounds.<sup>7</sup> Thus most of the examples to be given below are inevitably complex in the word structure. Tonal interactions that may arise in morphological processes will be addressed in Section 5. This section describes the surface tonal phenomena of words from monosyllables to quadrisyllables, covering the basic tonal patterns of Niuwozi Prinmi.

#### 3.1 *Tonal contrast on monosyllabic words*

In Niuwozi Prinmi, a three-way suprasegmental opposition is found in the citation form of monosyllabic words. They can be described in terms of three different tones: a high falling tone, a high level tone, and a low rising tone. These three surface tones will simply be referred to as 'falling' (abbreviated as F at the upper right corner of a syllable), 'high' (H), and 'rising' (R). The following examples show minimal contrasts between them:

(3)	<i>Falling</i>	<i>High</i>	<i>Rising</i>
a	ʃi <sup>F</sup> 'louse'	ʃi <sup>H</sup> 'hundred'	ʃi <sup>R</sup> 'new'
b	ne <sup>F</sup> 'soy bean'	ne <sup>H</sup> 'red'	ne <sup>R</sup> 'you (singular)'
c	bjẽ <sup>F</sup> 'urine'	bjẽ <sup>H</sup> 'busy'	bjẽ <sup>R</sup> 'to fly'
d	lɔj <sup>F</sup> 'heavy'	lɔj <sup>H</sup> 'to invite'	lɔj <sup>R</sup> 'to seed'

The suprasegmental contrast between the falling tone and the high tone is rather difficult to perceive when words occur in isolation, as this environment is not ideal for manifesting the distinction between them. The opposition is unambiguous when words are followed by clitics such as the topic marker /ge/, which have lost their own lexical tones due to grammaticalization. In such clitic groups, a contrast in terms of H-L versus H-H emerges between the falling tone and the high tone. For example,<sup>8</sup>

<sup>7</sup> Like many minority languages in China, Prinmi is subject to continuing influence from Mandarin. This study only concerns native words in Prinmi, excluding loans from other languages (to the extent that borrowing is discernible). Doubtful data are not used in examples.

<sup>8</sup> Glosses for the topic marker are omitted in the examples.

	<i>Citation</i>	<i>Speech</i>		<i>Citation</i>	<i>Speech</i>	
(4) a	mẽ <sup>F</sup>	mẽ <sup>H</sup> ge <sup>L</sup>	‘hair’	mẽ <sup>H</sup>	mẽ <sup>H</sup> ge <sup>H</sup>	‘name’
b	ne <sup>F</sup>	ne <sup>H</sup> ge <sup>L</sup>	‘soy bean’	ne <sup>H</sup>	ne <sup>H</sup> ge <sup>H</sup>	‘red’
c	dzẽ <sup>F</sup>	dzẽ <sup>H</sup> ge <sup>L</sup>	‘damp’	dzẽ <sup>H</sup>	dzẽ <sup>H</sup> ge <sup>H</sup>	‘drum’
d	tɕu <sup>F</sup>	tɕu <sup>H</sup> ge <sup>L</sup>	‘to deposit’	tɕu <sup>H</sup>	tɕu <sup>H</sup> ge <sup>H</sup>	‘sour’

Similarly, the rising tone is realized with a L-H tonal pattern when the prosodic domain of a monosyllabic word is extended. The tonal patterns of monosyllabic words from citation forms to connected speech can be summarized as follows:

	<i>Pattern</i>	<i>Citation</i>	<i>Speech</i>
1.	<b>F</b>	ʃi <sup>F</sup> 'louse'	H-L
2.	<b>H</b>	ʃi <sup>H</sup> 'hundred'	H-H
3.	<b>R</b>	ʃi <sup>R</sup> 'new'	L-H

*Table 1. Tonal patterns of monosyllabic words in Niuwozi Prinmi.*

Lu (1983:11) points out that the pairs of words in (4)b-d sometimes seem to contrast with each other in Jinghua Prinmi, having a 'tense' vowel in one of the members. Due to the fluctuation of the elusive contrast, Lu eventually did not distinguish these pairs of words in a two-tone system, and treated them as homophones.

Given the elusive contrast between the falling tone and the high tone, it may be useful to investigate their acoustic properties. Figure 2 and Figure 3 present extractions of the fundamental frequency from the minimal pairs of words in (4)a and (4)b respectively.<sup>9</sup> The basic contours of level versus high can be discerned.

<sup>9</sup> The acoustic analysis is performed with MacCECIL, developed at the Summer Institute of Linguistics.

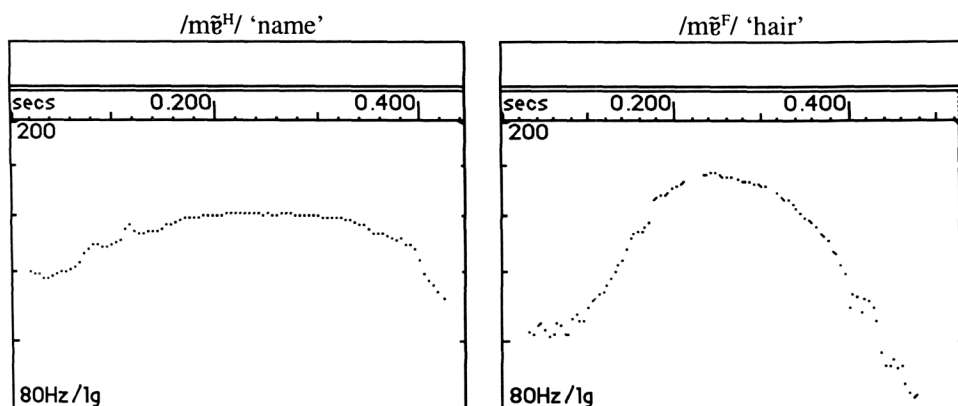


Figure 2. Suprasegmental contrast between the high and the falling tones.

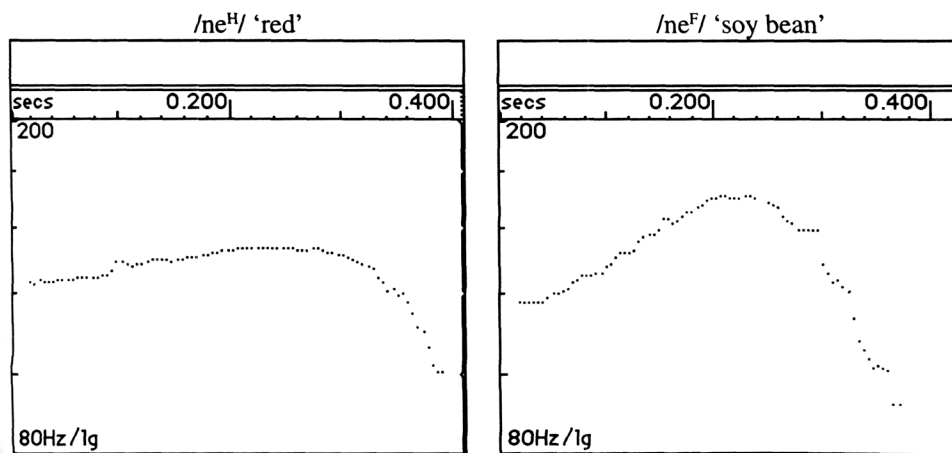


Figure 3. A less clear contrast between the high and the falling tones.

Despite the fact that the intended contrast is not well signaled by means of the contour over the syllable, there is no doubt that the main consultant does not pronounce them as homonyms.

Assuming that a pitch change of 5 Hz is not significant, we can define a level contour as one that does not vary for more than 5 Hz from the peak.<sup>10</sup> When a steady increase of pitch occurs in a given period, we may consider the contour within the period to be rising. Similarly, for a steady decrease of pitch in a given period, we can regard it as a falling contour. With this understanding, we can describe the contour of a pitch in terms of three phases: rising, level, and falling. All these three are relevant in describing the pitch contours for the two minimal pairs presented in Figure 2 and Figure 3. Table 2 and Table 3 show the fundamental frequency at the start, the peak, and the end points of the utterances. The pitch difference between these points is indicated in the middle. At the bottom, the duration of each phase is measured in milliseconds. The overall duration of the utterance is provided at the bottom on the left. To divide the entire pitch into three phases, two points need to be identified after measuring the peak of a pitch. Each point must be less than 5 Hz lower than the peak, and represents the farthest possible point away from the peak in an opposite direction. The level phase lies between these two points. The preceding section is the rising phase, and the following section will be the falling phase.

High	Start point	Peak point	End point
	Frequency	131.6 Hz	151.3 Hz
/mẽ/	Pitch change	+19.7 Hz	-36.6 Hz
'name'	Duration	156ms	191ms
433ms	Rising phase	Level phase	Falling phase

Falling	Start point	Peak point	End point
	Frequency	103.5 Hz	171.0 Hz
/mẽ/	Pitch change	+67.5 Hz	-88.0 Hz
'hair'	Duration	179ms	80ms
442ms	Rising phase	Level phase	Falling phase

Table 2. An acoustic comparison between the minimal pair 'name' and 'hair'.

Table 2 reveals that the overall durations of the minimal pair of words are about the same. Two significant differences between the two tonal categories

<sup>10</sup> I will not discuss here whether the assumption of treating a pitch change of 5 Hz as not significant holds for all tone languages. But this assumption is valid for Prinmi: a clitic following a high tone can be approximately 5 Hz higher than the preceding high tone, and the difference of pitch between the two high tones is unnoticeable to the ear.

are: (a) the falling tone shows a much higher degree of pitch change in transiting from one phase to the other; (b) the duration of level phase for the high tone is substantially longer than that for the falling tone, with a ratio greater than 2:1. These acoustic characteristics are confirmed by the other minimal pair:

High	Start point	Peak point	End point
	Frequency 128.6 Hz	141.7 Hz	100.6 Hz
	Pitch change	+13.1 Hz	-41.1 Hz
	Duration 113ms	<b>183ms</b>	80ms
/ne/	Rising phase	Level phase	Falling phase
'red'			
376ms			

Falling	Start point	Peak point	End point
	Frequency 121.6 Hz	163.6 Hz	91.9 Hz
	Pitch change	+42.0 Hz	-71.7 Hz
	Duration 171ms	<b>71ms</b>	112ms
/ne/	Rising phase	Level phase	Falling phase
'soy bean'			
354ms			

Table 3. An acoustic comparison between the minimal pair 'red' and 'soy bean'.

The relative difference in duration for the level phases between the two tones is useful only when a minimal pair of words are heard one after another in succession, i.e. when a direct comparison of the two is feasible. For a word that cannot be compared to its potentially contrasting word, it is not easy to determine whether it bears a falling tone or a high tone in absolute terms. Therefore, even native speakers of Niuwozi Prinmi may confuse the intended tonal contrast between such minimal pairs of monosyllabic words when occurring in isolation.<sup>11</sup>

### 3.2 Tonal patterns of disyllabic words

The falling tone is of no phonemic significance in polysyllabic words. There are no minimal pairs with intended suprasegmental contrast such as H-H-H versus H-H-L, or L-H-H versus L-H-L (which would take such surface patterns as H-H versus H-F, or L-H versus L-F). Instead, the majority of disyllabic minimal pairs under a suprasegmental contrast have different tones on both syllables, e.g.

<sup>11</sup> Cf. Ding (1998: 48-52) for the perception tests done with native speakers of Niuwozi Prinmi.

- (5) a     $gu^Lz\hat{t}^H$  'middle'                       $gu^Hzi^L$  '(of birth order) middle'
- b     $m\dot{z}^Ltsi^H$  'pincers'                       $m\dot{z}^Htsi^L$  'sparkle'
- c     $s\dot{z}^Ls\dot{z}^R$  'war'                               $s\dot{z}^Hs\dot{z}^L$  'quarrel'
- d     $gj\dot{z}^Lge^R$  'to help each other'       $gj\dot{z}^Hge^L$  'to break off a relationship'

Five tonal patterns are attested in disyllabic words, including compounds and reduplications. These, accompanied by their corresponding patterns found in connected speech, are displayed in Table 4:

	<i>Pattern</i>	<i>Citation</i>	<i>Speech</i>
1.	<b>H-L</b>	$w\dot{z}^Hmi^L$ 'cow'	H-L-L
2.	<b>H-H</b>	$mje^Hsu^H$ 'eyeball'	H-H-L
3.	<b>L-H</b>	$w\dot{z}^Lmi^H$ 'guest'	L-H-H/L-H-L
4.	<b>L-R</b>	$bu^Lm\dot{z}^R$ 'firefly'	L-L-H
5.	<b>R-L</b>	$pi^Rpo^L$ 'abdomen'	R-L-L

*Table 4. Tonal patterns of disyllabic words in Niuwozi Prinmi.*

It should be noted that the final pattern, with an initial rising tone, is marginal. It is found chiefly in a few words ending with the morpheme  $po^R$  'lower (part)'. The pattern could be altered to L-H, which, as a suggestion, is accepted by the consultant, but the alternative has not been observed in his spontaneous speech.

As shown in Table 4, clitics following disyllabic words tend to bear a low tone in connected speech. A noticeable exception is found on the fourth pattern, in which the original rising tone is split into a low tone plus a high tone. Note that for the third pattern, the clitic may acquire a high or a low tone. Such arbitrariness is allowed because there is no intended contrast of L-H-H versus L-H-L, as pointed out earlier. However, the alternative is available for some words, as in (6), but for the others only one option is feasible, as shown in (7).<sup>12</sup>

<sup>12</sup> Since the examples given here are all compounds, one may wonder whether the original tone of the second formative may condition the surface tone of the following clitic. This is not relevant, however. For instance, both  $/\dot{g}i^F/$  'meet' and  $/m\ddot{e}^F/$  'hair' bear a falling tone (as



- (6) a    tʃʷʔe<sup>L</sup>-kʷu<sup>H</sup> ge<sup>H</sup>/ge<sup>L</sup> 'as for the pig head'  
       b    tʃʷʔe<sup>L</sup>-kwa<sup>H</sup> ge<sup>H</sup>/ge<sup>L</sup> 'as for the pig hoof'  
       c    tʃʷʔe<sup>L</sup>-ʃi<sup>H</sup> ge<sup>L</sup>/ge<sup>H</sup> 'as for the pork'
- (7) a    tʃʷʔe<sup>L</sup>-mẽ<sup>H</sup> ge<sup>H</sup>/\*ge<sup>L</sup> 'as for the pig hair'  
       b    ɬɜ<sup>L</sup>-pu<sup>H</sup> ge<sup>L</sup>/\*ge<sup>H</sup> 'as for the rooster'

### 3.3 Tonal patterns of trisyllabic words

Trisyllabic words are largely formed by compounding. A great number of them are verb-ideophone compounds, e.g. the first four examples in Table 5. Note that Prinmi ideophones are reduplicated in form; they are toneless bound words. Enumerated in Table 5 are the nine tonal patterns found with trisyllabic words. Complex trisyllabic words may contain two prosodic domains, as in the last two patterns ('\_' = formative boundary, '+' = domain boundary; embedded compounds are placed in parentheses):

		<i>Citation</i>		<i>Speech</i>
1.	H-L-L	bu <sup>H</sup> _tʃe <sup>L</sup> -tʃe <sup>L</sup>	'really thin'	H-L-L-L
2.	H-H-L	pʰʷʰ_tʃʃe <sup>H</sup> tʃʃe <sup>L</sup>	'really white'	H-H-L-L
3.	L-H-L	nʃe <sup>L</sup> _təw <sup>H</sup> təw <sup>L</sup>	'really lonely'	L-H-L-L
4.	L-H-H	dʒʔe <sup>L</sup> _zi <sup>H</sup> zi <sup>H</sup>	'really glossy'	L-H-H-L
5.	L-L-H	tu <sup>L</sup> _bʷō <sup>L</sup> bʷō <sup>H</sup>	'roasted barley flour mixed with fat'	L-L-H- H/ L-L-H- L
6.	L-L-R	tʃi <sup>L</sup> _tʰo <sup>L</sup> tʰo <sup>R</sup>	'waterfall'	L-L-L-H
7.	R-L-L	(tʰō <sup>R</sup> _po <sup>L</sup> )_ʃi <sup>L</sup>	'to climb mountain'	R-L-L-L
8.	R + L-H	ʒjẽ <sup>R</sup> _(kʰʰ_ə <sup>L</sup> _mẽ <sup>H</sup> )	'body hair'	
9.	H + H-H	ɬɜ <sup>H</sup> _(ʒi <sup>H</sup> _pʰa <sup>H</sup> )	'the first half of a month'	

Table 5. Tonal patterns of trisyllabic words in Niuwozi Prinmi.

monosyllabic words), but when appearing in compounds, the former does not restrict the surface tone of the following clitic, whereas the latter allows it to be a high tone only.

Words with more than one prosodic domain are always morphologically complex in Prinmi, i.e. they involve more than one instance of a morphological process such as compounding or affixation. The reverse is not necessarily true. That is, a complex word can have a single domain, as shown by the seventh pattern in Table 5. The treatment of the final two patterns in the table as having a dual domain is based on the observation that they are found only with complex compounds. For words with two prosodic domains, the domain boundary always coincides with the unit boundary in the word structure. Take the final example in Table 5 as an illustration. Although this pattern consists of three high tones, we cannot group the first two into one domain (i.e. H-H + H), because the first two formatives in the compound do not form a unit. There is no such word as \*/ $\text{ɪə}^{\text{H}}$   $\text{ʒi}^{\text{H}}$ /, but / $\text{ʒi}^{\text{H}}$  p'a<sup>H</sup>/ 'half a month' exists. Discounting the two combinatory patterns, the tonal patterns (over a single domain) for trisyllabic words are seven. Additional patterns, if found, are likely to be combinatory, containing two prosodic domains.

In connected speech where the prosodic domain is extended, the seven simplex tonal patterns of trisyllabic words remain unchanged except for the sixth one, which splits the ultimate rising tone into L-H. This is parallel to the situation found on disyllabic words. Another parallelism is the arbitrary tone for a following clitic in the fifth pattern.

### 3.4 *Tonal patterns of quadrisyllabic words*

All Prinmi quadrisyllabic words are formed through compounding. They are often complex compounds and more likely to have a dual domain in the prosodic structure. In fact, dual-domain patterns outnumber those with a single domain among the attested patterns. For the sake of simplicity, the examples in Table 6 only indicate the major boundary in a compound, although directional prefixes are marked off by '-'.

	Pattern	Citation		Speech
1.	H-L-L-L	ʒjɛ <sup>H</sup> pa <sup>L</sup> _ɪʒ <sup>L</sup> ka <sup>L</sup>	<i>metacarpal</i>	H-L-L-L-L
2.	H-H-L-L	mɛ <sup>H</sup> ʈs <sup>ʰ</sup> o <sup>H</sup> _ɪʒ <sup>L</sup> ka <sup>L</sup>	<i>pelvis</i>	H-H-L-L-L
3.	L-H-L-L	jõ <sup>L</sup> dzi <sup>H</sup> _pa <sup>L</sup> pa <sup>L</sup>	<i>bat</i>	L-H-L-L-L
4.	L-H-H-L	gu <sup>L</sup> ʒi <sup>H</sup> _ɬa <sup>H</sup> tsi <sup>L</sup>	<i>middle finger</i>	L-H-H-L-L
5.	L-L-H-L	dʒi <sup>L</sup> -ts <sup>ʰ</sup> ɪ <sup>L</sup> _ɪʒ <sup>L</sup> ka <sup>L</sup>	<i>lumbar vertebra</i>	L-L-H-L-L
6.	L-L-H-H	k <sup>ʰ</sup> i <sup>L</sup> bõ <sup>L</sup> _tʃ <sup>ʰ</sup> ɣɛ <sup>H</sup> bõ <sup>H</sup>	<i>chicken pox</i>	L-L-H-H-L
7.	L-L-L-H	ɬa <sup>L</sup> tsi <sup>L</sup> _ɪʒ <sup>L</sup> ka <sup>H</sup>	<i>finger bone</i>	L-L-L-H-H/L
8.	H-H + H-L	mɔ <sup>H</sup> tsi <sup>H</sup> _põ <sup>H</sup> põ <sup>L</sup>	<i>uncle (as a polite term)</i>	
9.	H-H + L-H	tsi <sup>H</sup> kɣɛ <sup>H</sup> _k <sup>ʰ</sup> õ <sup>L</sup> kɣɛ <sup>H</sup>	<i>all live beings</i>	
10.	H-L + L-H	wɜ <sup>H</sup> mi <sup>L</sup> _k <sup>ʰ</sup> e <sup>L</sup> pa <sup>H</sup>	<i>milk cow</i>	
11.	H-L + H-L	ts <sup>ʰ</sup> õ <sup>H</sup> ts <sup>ʰ</sup> õ <sup>L</sup> _bjɜ <sup>H</sup> bjɜ <sup>L</sup>	<i>all kinds and sorts</i>	
12.	H-L + H-H	sɜ <sup>H</sup> sɜ <sup>L</sup> _tɔw <sup>H</sup> tɔw <sup>H</sup>	<i>quarrels and rows</i>	
13.	L-H + H-H	u <sup>L</sup> k <sup>ʰ</sup> u <sup>H</sup> _ko <sup>H</sup> ni <sup>H</sup>	<i>the Duodecimal Animals</i>	
14.	L-H + L-H	gɔ <sup>L</sup> -tʃɛ <sup>H</sup> _ʒ <sup>L</sup> -tʃɛ <sup>H</sup>	<i>to pull by all means</i>	
15.	L-R + L-R	gɔ <sup>L</sup> -p <sup>ʰ</sup> i <sup>R</sup> _ʒ <sup>L</sup> -p <sup>ʰ</sup> i <sup>R</sup>	<i>to sway</i>	
16.	L-R + H-H	sɜ <sup>L</sup> sɜ <sup>R</sup> _mɔjɛ <sup>H</sup> mɔjɛ <sup>H</sup>	<i>fight and wars</i>	
17.	L-R + L-H	gi <sup>L</sup> ɬi <sup>R</sup> _gi <sup>L</sup> ʃɔw <sup>H</sup>	<i>to lead a nomadic life</i>	

Table 6. Tonal patterns of quadrisyllabic words in Niuwozi Prinmi.

A reliable method to diagnose the number of prosodic domains in quadrisyllabic compounds is to consider whether the tonal pattern can be broken down into some shorter existent domains. Given the binary structure of compounding in Prinmi, we can posit a domain boundary between the second and the third syllable of a quadrisyllabic word, thereby dividing the tonal pattern into two domains. When this is applied to the first three tonal patterns in Table 6, they result in a second domain having a L-L pattern, unattested for disy

domains in Prinmi. Thus the first three patterns in Table 6 (and the three from 5 to 7, by the same token) must spread over a single domain.

This method does not work well for the fourth pattern, which can be broken down into L-H and H-L, both permitted in the language. Nonetheless, it must be noted that in some quadrisyllabic compounds the second H tone may result from spreading from the second syllable. The spreading can be ascertained in this example, for the original tonal pattern of /ʔa tsi/ 'finger' is L-R. The different tone on the syllable /ʔa/ in the compound is attributed to tone spreading, which is confined to a single domain. Thus the tonal pattern in question must have a single domain. As for those dual-domain patterns in 8 to 17, it is important to ensure that the tones in one domain are independent of those in the other.

While no claim can be made for an exhaustive treatment of tonal patterns for quadrisyllabic words, quadrisyllabic single-domain patterns seem to be complete. In light of this, it is remarkable that the rising tone does not occur in the quadrisyllabic domain. We do not find such patterns as R-L-L-L or L-L-L-R.

As observed in other polysyllabic words, the simplex tonal patterns remain unchanged when quadrisyllabic words extend the prosodic domain in connected speech. Additional syllables simply take a low tone, although a high tone is possible after the ultimate H in the seventh pattern.

#### 4. THE PITCH-ACCENT SYSTEM OF PRINMI

When we compare all the simplex tonal patterns from monosyllabic to polysyllabic ones, we find two parameters at work in the suprasegmental system of Prinmi: (i) the location of the H tone, and (ii) whether it spreads to the next syllable. Consider the following summarized from Tables 1, 4, 5, and 6:

Category	Parameters	Monosyllable	Disyllable	Trisyllable	Quadrisyllable
A	[1] [-spread]	Falling	<b>H</b> -L	<b>H</b> -L-L	<b>H</b> -L-L-L
B	[1] [+spread]	High	<u><b>H</b>-<b>H</b></u>	<u><b>H</b>-<b>H</b></u> -L	<u><b>H</b>-<b>H</b></u> -L-L
C	[2] [-spread]	Rising	L- <b>H</b>	L- <b>H</b> -L	L- <b>H</b> -L-L
D	[2] [+spread]		L- <b>H</b>	L- <u><b>H</b>-<b>H</b></u>	L- <u><b>H</b>-<b>H</b></u> -L
E	[3] [-spread]		L-R	L-L- <b>H</b>	L-L- <b>H</b> -L
F	[3] [+spread]			L-L- <b>H</b>	L-L- <u><b>H</b>-<b>H</b></u>
G	[4] [spread]			L-L-R	L-L-L- <b>H</b>
H	[2][spread]& [0]		R-L	R-L-L	

Table 7. The overall tonal patterns of Niuwozi Prinmi in single domains.

Table 7 is divided into two parts. In the upper part, the underlying patterns for all prosodic domains on a given row are consonant with each other. These patterns are generated according to the two parameters. The bracketed number indicates the location of the H tone on the prosodic domain, while the other signifies whether the spreading of the H tone is: necessary ([+spread]), prohibited ([-spread]), or optional/uncertain ([spread]). The tonal category, as specified by the parameters, remains unchanged. If we compare the patterns on a row from the longest down to the shortest ones, we can observe that the components on the right are subject to truncation as the domain becomes smaller. When the H tone is assigned to the final syllable of a prosodic domain, the value for the spreading parameter is underspecified, and hence [spread].

In addition to the rising tone on monosyllabic words, there are two unusual patterns with an ultimate rising tone. They result from the specification of the H tone as being placed on the next syllable following the morphological word, i.e. outside the word. Consequently, the H tone is 'squeezed' onto the final syllable of the word, rendering an ultimate rising tone.

The only patterns in Table 7 that cannot be represented straightforwardly are the ones in the bottom row under Category 'H'. They both have a rising tone on the initial syllable, and belong to the same exceptional category that is marginally found in Prinmi. One way of analyzing this tonal pattern is to allow a defective prosodic domain that contains no H tone. The parameter settings for this category will then be: [2] [spread] & [0]. Note that two interdependent prosodic domains (conjoined by '&') are postulated.<sup>13</sup> The defective domain is always led by an ordinary domain, and may not occur by itself.

There are two constraints on the parameters: (i) the spreading affects only the adjacent syllable to the right of the H tone, and (ii) there are only four possible choices for the locus of the H tone. The limitation on the H tone location can be attributed to the fact that Prinmi has few words longer than four syllables, and even fewer for those with a single prosodic domain. Although it is true that compounds as long as eight syllables are found in Prinmi, they comprise more than one prosodic domain, each not longer than a quadrisyllable, e.g.

- (8) a. [1; +spread] + [2; spread] + [1; -spread]  
 {[[k<sup>1</sup>ə<sup>H</sup>\_ɹu<sup>H</sup>]-ɹɜ<sup>L</sup>ka<sup>L</sup>]-[(lo<sup>L</sup>\_tʃ'ɥe<sup>H</sup>)-ɹɜ<sup>H</sup>ka<sup>L</sup>]} 'fibula'
- b. [1; +spread] + [1; -spread] + [1; -spread]  
 {[[k<sup>1</sup>ə<sup>H</sup>\_ɹu<sup>H</sup>]-ɹɜ<sup>L</sup>ka<sup>L</sup>]-[(ɪə<sup>H</sup>\_tʃ'ɥe<sup>L</sup>)-ɹɜ<sup>H</sup>ka<sup>L</sup>]} 'tibia'

<sup>13</sup> Since the two domains are interdependent with each other, they are regarded as forming a single (complex) domain.

Even for quadrisyllabic compounds, a great number of them are prosodically compounded from two domains. Thus, the significant syllabicity for prosodic analysis of Prinmi can be safely restricted to quadrisyllables.

Major findings with respect to the suprasegmentals of Niuwozi Prinmi can be summarized as follows:

- a. Prinmi monosyllabic words do not bear a low level tone in direct contrast with the high level tone, i.e. no minimal pair of H versus L exists on monosyllabic words;
- b. The locus of the H tone and its potential spreading to the next syllable implement the suprasegmental opposition in the language.

These characteristics indicate that the high tone functions as a marked tone in Niuwozi Prinmi and that the tonal patterns are generated through varying placement of the H tone in the prosodic domain. Therefore, according to the definition of pitch-accent system proposed in Section 2.2, the kind of tonal system operating in Niuwozi Prinmi can be identified as a pitch-accent system.<sup>14</sup>

Although the three surface tones on monosyllabic words only represent the first three tonal categories, i.e. falling for category A, high for category B, and rising for category C (with spreading unspecified), they are the most frequently used patterns, found with words from monosyllabic to polysyllabic. For the sake of convenience, we will continue to refer to these three tonal categories as a 'falling tone', a 'high level tone', and a 'rising tone' respectively. Likewise, since it is clumsy to express the two underlying parameters explicitly for each word, the notation of marking a tone with a superscribed capital letter after a syllable will be retained.

## 5. TONE CHANGES

As is well-known from the striking tone change phenomena in Japanese (cf. McCawley 1968), suprasegmentals of a pitch-accent system are extremely sensitive to domain change. Tone changes are likely to occur when the prosodic domain is extended or shortened, giving rise to frequent 'tone sandhi' unrivalled by that seen in a syllable-tone language. In pitch-accent languages, there are two major kinds of tone changes of essentially different nature. The first kind, to be called 'natural adjustment', only changes surface tones, whereas the other

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<sup>14</sup> Ding (forthcoming) makes a typological comparison of Prinmi with a variety of Japanese dialects. It turns out that several features found in Niuwozi Prinmi are also shared with one or the other Japanese dialects, although no pitch-accent systems in the seven languages/dialects investigated are exactly identical.

involves a change in the parameter setting or domain structure of the tonal category, i.e. changes on the template. The latter may or may not trigger a noticeable alternation on the surface tone.

Natural adjustments on surface tones in Niuwozi Prinmi include: (a) 'Tone partition', which splits the tones from one syllable onto two syllables; and (b) 'Spreading initiation', which initiates the spreading of the H tone onto a following syllable. Neither of them requires parameter resetting or domain restructure. These two manners of natural adjustment are mutually exclusive with each other. Within a single prosodic domain, only one of them may occur.

In Niuwozi Prinmi, suprasegmental processes which affect template organization are the following: (a) 'H-shift', which shifts the location of the H tone to an adjacent syllable (usually to the right); (b) 'H-blocking', which sets the spreading parameter to negative; (c) 'H-spreading', which changes the setting of the spreading parameter to positive; (d) 'Domain merger', which merges two prosodic domains into one; and (e) 'Domain splitting', which splits the prosodic domain in two. These five suprasegmental processes can be grouped into three: (i) Locus Change, for H-shift, (ii) Spreading Change, for H-blocking and H-spreading, and (iii) Domain Change, for domain merger and domain splitting. It is possible for three suprasegmental processes, each from a different group, to take place in a single prosodic domain. Representative examples of these two kinds of tone changes in Niuwozi Prinmi will be discussed separately below.<sup>15</sup>

### 5.1 Natural adjustment: changes of surface tones

Tonal variation in clitic groups is exclusively attributed to natural adjustment, e.g.

	<i>Citation forms</i>	<i>With Clitics</i>
	[1; -spread]	
(9) a	bjẽ <sup>F</sup> 'urine'	bjẽ <sup>H</sup> ge <sup>L</sup> 'as for urine'
	[2; -spread]	
b	t'ɜ <sup>L</sup> -p'ə <sup>H</sup> 'to spend one's life'	t'ɜ <sup>L</sup> -p'ə <sup>H</sup> si <sup>L</sup> 'spent one's life'

<sup>15</sup> This paper does not exemplify every single manner of tone change mentioned above. For details, see Ding (1998: 67-82).

	[1; +spread]				
(10)a	bjẽ <sup>H</sup>	‘be busy’		bjẽ <sup>H</sup> nō <sup>H</sup>	‘being busy’
	[2; +spread]				
b	tʰɜ <sup>L</sup> -ɥɛ <sup>H</sup>	‘to mix well’		tʰɜ <sup>L</sup> -ɥɛ <sup>H</sup> si <sup>H</sup>	‘mixed well’
	[2; spread]				
<hr/>					
(11)a	gɛw <sup>R</sup>	‘deep’		gɛw <sup>L</sup> nō <sup>H</sup>	‘being deep’
	[3; spread]				
b	gɜ <sup>L</sup> -bjẽ <sup>R</sup>	‘to fly’		gɜ <sup>L</sup> -bjẽ <sup>L</sup> si <sup>H</sup>	‘flew’
<hr/>					

Likewise, certain tone changes on affixed stems are also explainable solely in terms of natural adjustment. As in clitic groups, the suffixed words in (12) extend the prosodic domain rightwards. On the other hand, the prosodic domain is extended leftwards in (13) with prefixes attached to the beginning of the words.

(12)a	[1; -spread]	to <sup>F</sup>	‘to look’	to <sup>H</sup> -ji <sup>L</sup>	‘things to look’
b	[2; spread]	tʰjẽ <sup>R</sup>	‘to drink’	tʰjẽ <sup>L</sup> -ji <sup>H</sup>	‘beverage’
(13)a	[1; -spread]	pō <sup>F</sup>	‘father’	ɐ <sup>H</sup> -pō <sup>L</sup>	‘Dad’
b	[2; spread]	kɛw <sup>R</sup>	‘maternal uncle’	ɐ <sup>L</sup> -kɛw <sup>H</sup>	‘Uncle’

Tone partition may split a falling tone (i.e. a non-spreading final H) to H-L or split a rising tone to L-H. The former pattern is found in (9), (12)a, and (13)a, while the latter appears in (11), (12)b, and (13)b. Spreading initiation of H causes a subsequent syllable to bear a high tone, as seen in (10).

Morphological reduplication in Prinmi often entails tone changes to such an extent that it may be regarded as segmentally-based in which tones are not reduplicated. Under this view, tone changes in some reduplications can be accounted for by natural adjustment. For instance, tone partition is observed in (14)a, (14)c, (15)a, and (15)c, whereas spreading initiation is effected in (14)b and (15)b.



		<i>Base form</i>	<i>Reduplicated noun</i>
(14)a	[1; -spread]	ma <sup>F</sup> 'mother'	ma <sup>H</sup> ma <sup>L</sup> 'maternal aunt'
b	[1; +spread]	tɕj <sup>H</sup> 'big'	tɕj <sup>H</sup> tɕj <sup>H</sup> 'big paternal uncle'
c	[2; spread]	pɕj <sup>R</sup> 'elder sibling'	pɕj <sup>L</sup> pɕj <sup>H</sup> 'elder brother'

		<i>Base form</i>	<i>Reduplicated verb</i>
(15)a	[1; -spread]	tsɕj <sup>F</sup> 'to wash'	tsɕj <sup>H</sup> tsɕ <sup>L</sup> 'to wash ceaselessly'
b	[1; +spread]	ɕu <sup>H</sup> '(of bird) to call'	ɕwɕ <sup>H</sup> ɕu <sup>H</sup> '(of bird) to sing'
c	[2; spread]	p <sup>1</sup> jɛ <sup>R</sup> 'to drop'	p <sup>1</sup> jɔ <sup>L</sup> p <sup>1</sup> jɛ <sup>H</sup> 'to spread (feed)'

## 5.2 Template modification: changes in underlying organization

While tone changes of some reduplications can be handled in a simple manner, as noted above, others require processes at an abstract level, i.e. modification of template. The result of modification is largely unpredictable, contrary to the foreseeable outcome from natural adjustment. For instance, a rightward H-shift changes the template from [1; -spread] to [2; -spread] in (16)a, whereas a leftward H-shift renders the template from [2; spread] to [1; -spread] in (16)b. Although the reduplications in (16)b-d all bear a rising tone in the base form, the ones in (16)c-d undergo a rightward H-shift instead, turning the template to [3; spread] from [2; spread]. The same rightward H-shift also applies to (16)e.

(16)	<i>Base form</i>	<i>Reduplication</i>
a	ɕu <sup>F</sup> 'to be pained'	ɕwɕ <sup>L</sup> ɕu <sup>H</sup> 'to suffer'
b	swa <sup>R</sup> 'to count'	swa <sup>H</sup> swa <sup>L</sup> 'to count continuously'
c	dɕi <sup>R</sup> 'to sew'	dɕi <sup>L</sup> dɕɐ <sup>R</sup> 'to sew continuously'
d	dɕu <sup>R</sup> 'mate'	dɕwɕ <sup>L</sup> dɕu <sup>R</sup> 'friend'
e	k <sup>1</sup> ɔ <sup>L</sup> lɕɛ <sup>R</sup> 'turtledove'	k <sup>1</sup> ɔ <sup>L</sup> lɕɛ <sup>L</sup> lɕɛ <sup>R</sup> 'turtledoves'

As can be seen from (14), (15), and (16), reduplication often involves vowel modification in Prinmi. This segmental process is about as unpredictable as the suprasegmental one. Available data do not suggest a link between the two. Thus the potential vowel change is regarded as irrelevant to the suprasegmentals of reduplications.

Since compounding is an extremely productive morphological process in Prinmi, we would expect a fairly predictable tone change in compounding. Otherwise, new compounds could not be generated regularly by linguistic rules. There are two kinds of tone change in Prinmi compounding: regular and irregular. Compounds exemplified in (17)–(19) have regular tone change that involves only leftward domain merger and natural adjustment of surface tones. As a result of the leftward domain merger, the prosodic domain of the initial formative enlarges and embraces that of the second formative, and the second formative loses its original tonal settings (i.e. it becomes atonic). For instance (glosses for formatives are given after a compound),

(17) Leftward domain merger plus, for (17)a only, H-L partition

a       $\text{ʂi}^{\text{F}}$       +  $\text{tʃy}^{\text{H}}$       =    $\text{ʂi}^{\text{H}}\text{tʃy}^{\text{L}}$       ‘sausage’ < meat\_intestine  
[1; –spread] [1; +spread] [1; –spread]

b       $\text{tsə}^{\text{H}}\text{ʒi}^{\text{L}}$       +  $\text{mẽ}^{\text{F}}$       =    $\text{tsə}^{\text{H}}\text{ʒi}^{\text{L}}\text{mẽ}^{\text{L}}$       ‘monkey hair’ < monkey\_hair  
[1; –spread] [1; –spread] [1; –spread]

(18) Leftward domain merger plus H-spreading initiation

a       $\text{bɐ}^{\text{H}}$       +  $\text{ʂi}^{\text{F}}$       =    $\text{bɐ}^{\text{H}}\text{ʂi}^{\text{H}}$       ‘duck meat’ < duck\_meat  
[1; +spread] [1; –spread] [1; +spread]

b       $\text{ba}^{\text{L}}\text{ɭʒ}^{\text{H}}$       +  $\text{k}^{\text{U}}\text{u}^{\text{R}}$       =    $\text{ba}^{\text{L}}\text{ɭʒ}^{\text{H}}\text{k}^{\text{U}}\text{u}^{\text{H}}$       ‘snake head’ < snake\_head  
[2; +spread] [2; spread] [2; +spread]

(19) Leftward domain merger plus L-H partition

a       $\text{k}^{\text{U}}\text{u}^{\text{R}}$       +  $\text{njẽ}^{\text{H}}$       =    $\text{k}^{\text{U}}\text{u}^{\text{L}}\text{njẽ}^{\text{H}}$       ‘headache’ < head\_ache  
[2; spread] [1; +spread] [2; spread]

b       $\text{dʒjõ}^{\text{L}}\text{ʒi}^{\text{R}}$       +  $\text{ɪə}^{\text{F}}$       =    $\text{dʒjõ}^{\text{L}}\text{ʒi}^{\text{L}}\text{ɪə}^{\text{H}}$       ‘buffalo skin’ < buffalo\_skin  
[3; spread] [1; –spread] [3; spread]

Focusing on disyllabic compounds, Table 8 provides some instances of compounding with irregular tonal patterns. The tonal categories of the formatives are indicated on the leftmost column for the first component and on the top of the table for the second one. Due to space limitation, the table does not detail suprasegmental derivations for every compound, but the surface tones of the syllables are given throughout.

	<i>High/[1; +spread]</i>	<i>Falling/[1; -spread]</i>	<i>Rising/[2; spread]</i>
<i>High/[1; +sp]</i>	kw <sup>3</sup> kw <sup>4</sup> L 'ox hoof'	tʃy <sup>H</sup> bi <sup>L</sup> 'large intestine'	qē <sup>L</sup> de <sup>R</sup> 'old bear'
	kw <sup>3</sup> p <sup>1</sup> i <sup>H</sup> 'white ox'	kw <sup>3</sup> mē <sup>H</sup> 'ox hair'	kw <sup>3</sup> nē <sup>H</sup> 'cow milk'
<i>Falling/[1; -sp]</i>		dz <sup>3</sup> ma <sup>H</sup> 'bitch' <sup>16</sup>	ts <sup>1</sup> i <sup>L</sup> nē <sup>R</sup> 'goat milk'
	tsqē <sup>L</sup> njē <sup>H</sup> 'liver illness'	ɹ <sup>3</sup> ma <sup>F</sup> 'hen'	ɹw <sup>3</sup> nē <sup>H</sup> 'yak milk'
<i>Rising/[2; sp]</i>	sō <sup>H</sup> ʒi <sup>L</sup> 'March'	k <sup>1</sup> u <sup>H</sup> mē <sup>L</sup> '(of head) hair'	tʃ <sup>1</sup> qē <sup>H</sup> nje <sup>L</sup> 'black pig'
	tʃ <sup>1</sup> qē <sup>L</sup> k <sup>1</sup> ə <sup>R</sup> 'pork leg'	nje <sup>L</sup> mi <sup>R</sup> 'Moso'	tʃ <sup>1</sup> i <sup>L</sup> k <sup>1</sup> u <sup>R</sup> 'dog head'

Table 8. Some compounds with irregular tones in Niuwozi Prinmi.

As shown in the table, there is generally more than one possible tonal pattern for compounding between words of any two basic tonal categories. Derivations of these patterns are all explainable in terms of template modification and natural adjustment. For instance, on the first shaded row, where the initial formative in the compounds is /kw<sup>3</sup>H/ 'ox; cow', the processes needed to generate the L-H pattern are simply a leftward domain merger plus a rightward H-shift. However, other compounds starting with the same formative, e.g. /kw<sup>3</sup>Hkw<sup>4</sup>L/ 'ox hoof', may take a different tonal pattern. In this particular case, what happens is a leftward domain merger plus H-blocking.

The tonal patterns exemplified in Table 8 are considered as irregular because the entire procedure for tone changes involved cannot be specified. With the addition of the regular tonal pattern, three possibilities are usually available for the tonal pattern of a disyllabic compound. The problem lies in the difficulty in determining whether the regular domain merger alone is sufficient, and if not, what conditions need to be taken into consideration for any further processes. Potential factors such as syllable weight, semantics and morphological structure of compounds do not appear to condition the details of the suprasegmental processes that may be involved. Thus compounds with irregular tones would need to be registered in the lexicon. Fortunately, these only represent a minority.<sup>17</sup>

<sup>16</sup> This is a taboo word, literally meaning 'mother of an illegitimate child'.

<sup>17</sup> In studying the regularity of tone change in compounding, a matrix table was created with twenty-nine animal terms to be compounded with twenty-two nouns (mostly body-part terms). Even discounting putative instances as unpredictable, the small scale quantity study finds that

## 6. CONCLUSION

Based on the empirical study of original data, this paper has shown that Niuwozi Prinmi possesses a pitch-accent system, which achieves tonal contrast through varying placement of the H tone in the abstract prosodic domain — template. In addition, the potential spreading of the H tone is also crucial to engendering distinct patterns. There are altogether seven major tonal categories in a template whose maximum size is a quadrisyllable.

Some phonologists consider tonal rules as an important reflection of different tonal systems. They observe that suprasegmental processes in pitch-accent languages typically involve insertion, deletion, and movement of 'accent' (cf. Odden 1995; McCawley 1978). After Niuwozi Prinmi is identified as a pitch-accent language according to an explicit definition, we can clearly see that *template modification* — *merging two domains, shifting the H tone, and switching the spreading parameter* — is comparable to phonological processes typically found in pitch-accent languages. On the other hand, change of surface tones in Niuwozi Prinmi because of domain-extension or domain-shortening occurs as frequently and in a manner as predictable as that noted in Japanese. Thus, the analysis of Niuwozi Prinmi as having a pitch-accent system stands squarely in the realm of ubiquitous tone change phenomena. This demonstrates, from a different angle, the adequacy of the treatment advanced in this paper.

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