

## The Use of Perception Tests in Studying the Tonal System of Prinmi Dialects: A Speaker-centered Approach to Descriptive Linguistics

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Contrary to previous description based on the Mandarin model of syllable-tone system, Xinyingpan, a dialect of Prinmi (a Tibeto-Burman language of China), has been discovered to possess a melody-tone system (or “pitch-accent” system) akin to that of Japanese. Targeting the crux of the unusual characteristics of this melody-tone system, where neutralization of two tonal categories in citation form is possible, this study uses perception tests to explore (dis)similarities among the tonal system of Xinyingpan Prinmi and those of other dialects. The perception tests consist of several minimal pairs of words contrasting solely by tone in a sentence frame. Results from more than twenty native speakers of fifteen Prinmi dialects from Ninglang, Lanping, and Yulong counties in Yunnan show that at least three minimal pairs of words in other dialects use the same tonal patterns for contrast in connected speech as in Xinyingpan. Evidence for the contrastive status of the pairs of words was attained directly from speakers who helped to prepare materials for the perception tests. This paper will also discuss some effects of language shift, such as linguistic attrition, observed in the empirical study.

**1. INTRODUCTION<sup>1</sup>.** Linguists doing fieldwork may observe fresh linguistic phenomena from time to time. Quite often, the new discovery is not shared with others who have worked on the same language at different times and locations. In such cases, it is worth investigating to what extent the discovery may be generalized: to the language as a whole, to most dialects, or only to a small number of varieties. This paper addresses one of these cases, concerning the dialectal aspect of the tonal system of Prinmi dialects.

Based on firsthand fieldwork data, Ding (1998; 2001) has described Prinmi as a “pitch-accent” language, departing from the general description of Prinmi as a syllable-tone language by Lu’s (1983; 2001) pilot study and by Matisoff (1997). One peculiarity of “pitch-accent” languages is the possibility of neutralization of two tonal categories in citation form (cf. Akamatsu’s 1997 discussion of Tokyo Japanese). Similarly a minimal pair of words under a suprasegmental contrast in Prinmi is difficult to perceive by ear, even to native speakers of the same dialect, in the citation forms of monosyllables.

Figures 1 and 2, taken from Ding 2001, present a simple pitch track of two pairs of words, both of which are identified as minimal pairs in Ding (1998; 2001), but as pairs

<sup>1</sup> I am grateful to all my Prinmi friends and acquaintances who have helped me in one way or another on my field trips in northwestern Yunnan for this study. I have benefited enormously from comments and critiques from Alexis Michaud, Katia Chirkova, and two reviewers. Thanks also go to Angela Cheater for proofreading the manuscript. Of course, I take sole responsibility for any residual errors and problems in the paper. Finally, I acknowledge the support of research funding from Macao Polytechnic Institute (PR/ESLT-3/2003) for the study’s fieldwork expenses.

Nonstandard abbreviations in glosses include: CLT=clitic and to.SPK=(of directional prefix) towards the speaker.

of homophones in Lu 1983 and Matisoff 1997. With fine details available from acoustic analysis, pitch and duration differences for each pair are discernible in terms of a few hertz and milliseconds, but the subtle acoustic difference does not constitute a contrast between the two tonal categories. When the minimal pairs occur in connected speech, where the prosodic domain is extended to disyllables, the intended contrast between them becomes transparent, as in Tokyo Japanese (McCawley 1968). Based on this sensitivity to the prosodic domain, this paper reports on an experimental study conducted with perception tests by a number of Prinmi speakers from a wide range of villages, with the aim of explaining or reconciling the different descriptions of tones in Prinmi dialects.

FIGURE 1: Suprasegmental contrast between the minimal pair ‘name’ and ‘hair’

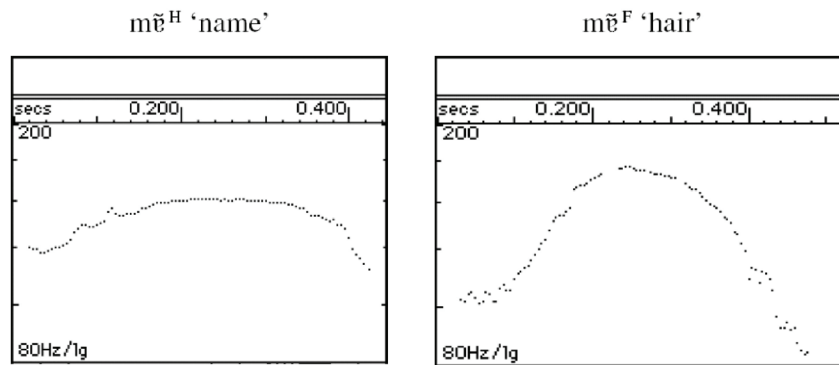
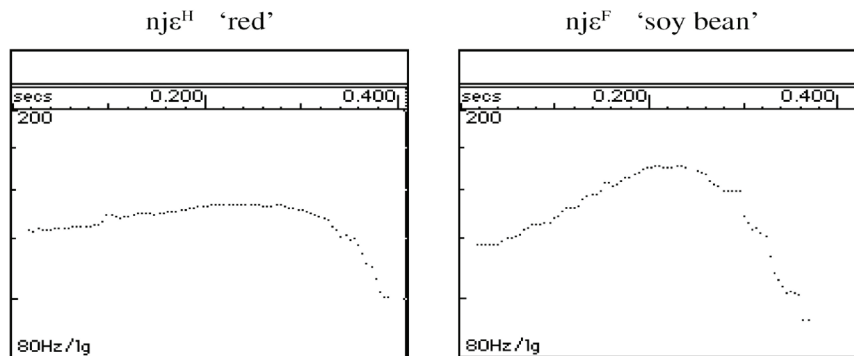


FIGURE 2: Suprasegmental contrast between the minimal pair ‘red’ and ‘soybean’



Hyman (2006, and elsewhere) has pointed out the problem of using the rubric “pitch-accent” to refer to a variegated set of prosodic phenomena. To avoid unnecessary confusion from this terminology, the kind of tonal system found in Prinmi and Japanese will be referred to below as “melody-tone.”

The paper is organized as follows. Section 2 provides some background information on the Prinmi language, and a basic analysis of the tonal system of Xinyingpan Prinmi is presented in section 3. Section 4 lays out the design and methodology adopted in this study. Results of the perception tests will be examined in section 5, and discussed in section 6. Finally, the paper will conclude with findings from this experimental study in section 7.

**2. BACKGROUND: THE PRINMI LANGUAGE.** Prinmi is a Tibeto-Burman language unique to southwestern China. It is generally regarded as belonging to the Qiangic group (Matisoff 1991; Bradley 1997, *inter alia*). The official minority nationality status of its speakers has been split into two groups: the *Pĩmĩ* nationality in Yunnan and the Tibetan nationality in parts of Sichuan. On the borders of Sichuan and Yunnan provinces, Prinmi speakers (alongside the Mosuo, speakers of a Tibeto-Burman language probably of the Yi-Burmese group, cf. Bradley 1997 and Thurgood 2003) have been settled for hundreds of years. Thus this area can be regarded as the present homeland, but not the ultimate place of origin, of Prinmi speakers.<sup>2</sup>

The pilot study of the Prinmi language started in the 1950s, when the central government in Beijing launched an unprecedented survey of minority languages in China<sup>3</sup>. Standard questionnaires and word lists were used as the primary means to elicit linguistic data by scholars working in small groups, many of whom were responsible for surveying more than one language. The outcome of the linguistic project is outstanding, taking into account the limited resources in terms of time and technology. Based on Lanping Prinmi, Lu (1983) produced the first monograph on the language. Prinmi data collected under this survey were partially included in Sun et al. (1991) and Huang et al. (1992), mainly in the form of word lists. The complete set of data was not published until 2001.

Lu (2001) consists of seven Prinmi varieties in different localities: Qinghua (Lanping, Yunnan), Ludian (Yulong, Yunnan), Xinyingpan (southern Ninglang, Yunnan), Taoba (Muli, Sichuan), Tuoqi (northern Ninglang, Yunnan), Zuosuo (Yanyuan, Sichuan), and Sanyanlong (Jiulong, Sichuan). These varieties are classified into two dialectal groups: Southern Prinmi (for the first three localities, all in Yunnan) and Northern Prinmi (the remaining four, predominantly in Sichuan, but also in northern Ninglang in Yunnan). No criteria for this division nor distinctive dialectal features are explicitly discussed, however. All three dialects of Southern Prinmi are described to have two tonemes: the high tone <sup>55</sup> (with <sup>53</sup> as its free variant) and the rising tone <sup>13</sup>; whereas the four dialects of Northern Prinmi all have three tonemes: the high tone <sup>55</sup>, the falling tone <sup>53</sup>, and the rising tone <sup>35</sup> (Lu 2001:9). The difference in the number of tonemes has turned out to be the only clear-cut distinction between the two geographically-based dialect groups of Prinmi.

As noted in Ding 1999, the discovery that Xinyingpan Prinmi has a melody-tone system was made accidentally about halfway through my first field trip between 1994 and

<sup>2</sup> According to their oral tradition, the ancestors of the Prinmi people led a nomadic life in the northwestern part of present-day China.

<sup>3</sup> Lu (2001:607) provides details of field research as follows: Lu Shaozun and Luo Bingfen undertook field trips to a number of villages in Sichuan and Yunnan (excluding Lanping) between 1956 and 1957. Lu Shaozun and Sun Hongkai conducted subsequent fieldwork in Lanping (Yunnan) in 1964 and in Muli (Sichuan) in 1980.

1995. In eliciting words using questions like ‘What is this?’ or ‘What do you call that in Prinmi?’, consultants typically supplied a single-word answer in citation form. When I uttered words such as  $m\tilde{e}^H$  ‘name’ and  $m\tilde{e}^F$  ‘hair’ (which would later turn out to be in contrast) under the high tone, the homophonous pronunciation was accepted by native speakers. Nobody corrected my confusion of the tones of these words in citation form. I was caught getting it all wrong by the main consultant when I failed to differentiate the tonal patterns between  $m\tilde{e}^H$  ‘name’ and  $m\tilde{e}^F$  ‘hair’ in connected speech. Consequently my intention to ask “Where did this name of the god come from?” (read from a transcribed text) was interpreted as “Where did this hair of the god come from?” With the help of the consultant, I worked out a three-way suprasegmental contrast—quasi-falling, high, and rising tones—in monosyllabic words, and collected a number of minimal pairs involving the quasi-falling and high tones.<sup>4</sup> However, I did not grasp the overall tonal system until after my second field trip in early 1997. An analysis of tonal patterns in a large number of words and phrases shows that the patterns, with few exceptions, fall into seven categories.

**3. THE TONAL SYSTEM OF XINYINGPAN PRINMI.** About an hour’s drive south of the county seat of Ninglang, Niuwozi is the largest Prinmi village under the jurisdiction of the Xinyingpan Administrative Village (see Ding 2003 for a sketch of Prinmi grammar based on this dialect). Outside Niuwozi in Xinyingpan, Prinmi families are typically situated in villages dominated numerically by members of the Yi nationality, who speak a Tibeto-Burman language from the Yi-Burmese group. Even though listed among Southern Prinmi in Lu (2001), Xinyingpan Prinmi, according to my own fieldwork data, shows three-way tonal distinctions for monosyllabic words. A comparison of the minimal tonal contrast in monosyllabic words between Xinyingpan Prinmi and the four Northern Prinmi dialects in Lu (2001) reveals that the three-way tonal distinctions among these dialects are essentially identical.

In this section I will address the nature of the tonal system of Xinyingpan Prinmi. Readers are referred to Ding (2001) for an in-depth description and analysis of this tonal system. Shown in table 1 are seven distinctive tonal patterns observed in Xinyingpan Prinmi, with

TABLE 1: Distinctive tonal patterns in Xinyingpan Prinmi

| Tone       | Parameters                 | Tetrasyllabic  | Trisyllabic   | Disyllabic  | Monosyllabic |
|------------|----------------------------|----------------|---------------|-------------|--------------|
| <b>I</b>   | [1 <sup>st</sup> ] [–SPRD] | <b>H-L-L-L</b> | <b>H-L-L</b>  | <b>H-L</b>  | <b>H(L)</b>  |
| <b>II</b>  | [1 <sup>st</sup> ] [+SPRD] | <b>H-H-L-L</b> | <b>H-H-L</b>  | <b>H-H</b>  | <b>H</b>     |
| <b>III</b> | [2 <sup>nd</sup> ] [–SPRD] | <b>L-H-L-L</b> | <b>L-H-L</b>  | <b>L-H</b>  | <b>LH</b>    |
| <b>IV</b>  | [2 <sup>nd</sup> ] [+SPRD] | <b>L-H-H-L</b> | <b>L-H-H</b>  | <b>L-H</b>  | <b>LH</b>    |
| <b>V</b>   | [3 <sup>rd</sup> ] [–SPRD] | <b>L-L-H-L</b> | <b>L-L-H</b>  | <b>L-LH</b> |              |
| <b>VI</b>  | [3 <sup>rd</sup> ] [+SPRD] | <b>L-L-H-H</b> | <b>L-L-H</b>  |             |              |
| <b>VII</b> | [4 <sup>th</sup> ] [SPRD]  | <b>L-L-L-H</b> | <b>L-L-LH</b> |             |              |

<sup>4</sup> The quasi-falling, high, and rising tones correspond to tones I, II, and III in table 1, respectively.

their realization in the prosodic domain varying from tetrasyllabic to monosyllabic.

As can be seen from the table, these patterns are generated through specification of the two parameters [ $n^{\text{th}}$ ] and [ $\pm\text{SPRD}$ ]: the first one specifies the locus of H (the high tone) in the prosodic domain, and the other determines a potential spreading of H to the next syllable. Note that Tone VII has an unspecified value for the parameter [ $\text{SPRD}$ ]. This kind of underspecification also occurs in some polysyllabic words that have a rising tone on the final syllable.

The basic tonal pattern, as specified by the parameters, remains consistent throughout, although the nonmarked tonal components (those not in bold type) are subject to truncation when the actual domain available in a particular utterance is shorter. As will be discussed further below, the truncation of the default tone L in Tone I is responsible for the neutralization of tones I and II in monosyllabic words.

The principles for structuring the tonal system in Xinyingpan Prinmi are essentially identical to those found in a variety of Japanese: Tokyo, Kyoto, Nagoya, Narada, Shizukuishimachi, and Kagoshima (see Ding 2006 for details). These dialects cover all three major types of suprasegmental system of Japanese (Shibatani 1990:181). Taking the underlying domain of lexical tones as the “melody,” the melody-tone system can be defined as follows (adapted from Ding 2006:10):

A language possesses a MELODY-TONE SYSTEM if, and only if, its lexical tonal patterns are generated by placing a marked tone on the first, the second, the third, ... , and the  $n$ th positions, respectively (or in the opposite order), in the underlying domain of melody, independent of the word and the syllable, of  $n$  moras/syllables (where  $n \geq 2$ ), irrespective of the syllable weight.

Thus defined, the melody-tone system has three distinctive features: (a) it lacks a direct contrast between high and low pitch, making it not possible to form monosyllabic minimal pairs with the level pitch; (b) the “melody” domain is not based on the grammatical word; and (c) strict succession for the occurrence of the marked tone in the melody to generate different tonal patterns is compulsory.

The three-way suprasegmental contrast in monosyllabic words in Xinyingpan Prinmi corresponds to three tonal categories: tones I, II, and III. The contrast is elusive in citation form between tones I and II, in the sense that even speakers of the same dialect may not be able to distinguish minimal pairs involving these two tonal categories when given in isolation. In order to demonstrate the underlying distinct patterns of these tonal categories, they will be accompanied by a disyllabic melody in the examples below. For the sake of convenience, all syllables in Prinmi data are marked for tone: H for “high,” F for “quasi-falling” (not to be taken literally as a perceivable contour), R for “rising,” and L for “low.” The following triplets are contrastive minimally under the three tonal categories:

| (1) | <b>Tone I</b> [H.L] <sub>melody</sub> | <b>Tone II</b> [H.H] <sub>melody</sub> | <b>Tone III</b> [L.H] <sub>melody</sub> |
|-----|---------------------------------------|----------------------------------------|-----------------------------------------|
| a   | ʃi <sup>F</sup> ‘louse’               | ʃi <sup>H</sup> ‘hundred’              | ʃi <sup>R</sup> ‘new’                   |
| b   | nje <sup>F</sup> ‘soybean’            | nje <sup>H</sup> ‘red’                 | nje <sup>R</sup> ‘you (singular)’       |
| c   | bjɛ <sup>F</sup> ‘urine’              | bjɛ <sup>H</sup> ‘busy’                | bjɛ <sup>R</sup> ‘to fly’               |

Although the suprasegmental contrast between tone I and tone II is difficult to perceive in monosyllabic words, the opposition, however, is unambiguous when the words

are followed by clitics such as /g'e/, which inherently lack lexical tones, as shown in (2). A similar kind of neutralization between two tonal categories is also found in Tokyo Japanese (cf. Akamatsu 1997). The tonal contrast, however, is manifested in what McCawley (1968) refers to as a “minor phrase.” The “minor phrase,” not fully explicated by McCawley, is probably comparable to the basic domain of “melody” discussed above, for a new term would be unnecessary if it referred to the syllable or the word.

|     |                                       |            |                                            |
|-----|---------------------------------------|------------|--------------------------------------------|
| (2) | <b>Tone I</b> [H.L] <sub>melody</sub> |            | <b>Tone II</b> [H.H] <sub>melody</sub>     |
| a   | ʃi <sup>H</sup> g'e <sup>L</sup>      | ‘louse’    | ʃi <sup>H</sup> g'e <sup>H</sup> ‘hundred’ |
| b   | nje <sup>H</sup> g'e <sup>L</sup>     | ‘soy bean’ | nje <sup>H</sup> g'e <sup>H</sup> ‘red’    |
| c   | bjẽ <sup>H</sup> g'e <sup>L</sup>     | ‘urine’    | bjẽ <sup>H</sup> nō <sup>H</sup> ‘busy’    |

To a nonnative speaker, the remarkable properties of the tonal systems of Tokyo Japanese and Xinyingpan Prinmi lie in their sensitivity to change of prosodic domain: the tone on a particular syllable of the same morpheme is prone to frequent sandhi, and, as discussed above, a minimal pair of words may be subject to neutralization when their contrastive tonal patterns cannot be realized in citation form. In the melody-tone system, the constitution of tonal categories is based on underlying suprasegmental patterns, irrespective of the number of syllables in a word.

**4. DESIGN OF THE CROSS-DIALECTAL EXPERIMENT.** Taking the syllable-tone as the assumed model, Lu (2001) describes the tonal system of all Southern Prinmi, including Qinghua and Xinyingpan, in terms of two tonemes: a high tone and a rising tone (over the syllable). Matisoff’s (1997) phonological account of Dayang Prinmi, which is linguistically and geographically close to the Qinghua dialect, also describes Dayang in terms of two syllable-tones, albeit with rampant unpredictable tone sandhi. The discrepancy in the number of tonal categories between Lu 1983; 2001 and Matisoff 1997 on the one hand, and Ding 1998; 2001, on the other, then centers on the pairs of words in (3): could the minimal pairs evidenced as having an elusive tonal contrast in Xinyingpan Prinmi also hold the same kind of minimal contrast in other dialects? Or might these pairs of words have changed to homonyms in other dialects?

|     |                   |                  |                                                        |
|-----|-------------------|------------------|--------------------------------------------------------|
| (3) | Qinghua Prinmi    |                  | Xinyingpan Prinmi                                      |
|     | (Lu 1983; 2001)   |                  | (Ding 1998; 2001)                                      |
| a   | nɯ <sup>55</sup>  | ‘soybean’; ‘red’ | nje <sup>F</sup> ‘soybean’      nje <sup>H</sup> ‘red’ |
| b   | dzẽ <sup>55</sup> | ‘wet’; ‘drum’    | dzẽ <sup>F</sup> ‘wet’      dzẽ <sup>H</sup> ‘drum’    |

Although the example in (3a) contains some segmental variations in the words for ‘soy bean’ and ‘red’, the words could still form a minimal pair in Qinghua Prinmi if they show a contrast between tones I and II. Lu (1983:11; 2001:17) commented that these pairs of words seemed to have some sort of contrast, with the first meaning of the “homonyms” (corresponding to those under tone I) suspected to have a “laryngealized” vowel. Since

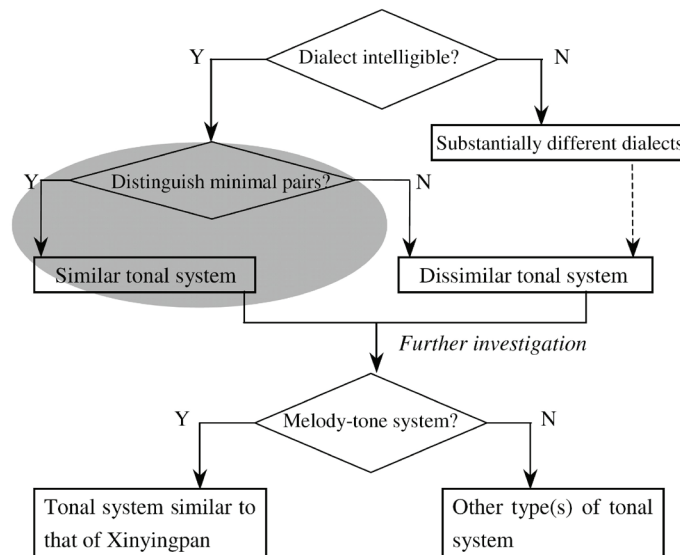
there was no independent evidence for the existence of “laryngealized” vowels in Prinmi, Lu eventually regarded these pairs of words as ‘homophones’.

Recall also that Lu (2001:9) considered the falling tone<sup>53</sup> a free variant of the high tone<sup>55</sup> in Qinghua Prinmi. What has prompted his treatment of the falling tone as a free variant of the high tone? I would imagine that when words were read back to the consultant under the two tones, they were accepted as the same. This puzzle can be resolved in the light of the crucial characteristic of the melody-tone system: potential neutralization of tonal categories in citation form. Another possibility would be the merger of two erstwhile tonal categories into one, with their tone values in free variation. Such a possibility suggests that the tonal system of Prinmi may not be as uniform as previously thought, with melody-tone for some dialects like Xinyingpan and syllable-tone for others (see Donohue 1997; Fox 2000 or Ding 2005a; 2006 for differences between these tone systems, where the melody-tone was termed “pitch-accent”).

Facing the crux of homophone versus minimal-pair, which (as noted above) cannot be grappled with under an acoustic approach, this cross-dialectal study employed perception tests to find out the actual status of such minimal pairs of words in other dialects of Prinmi. If Prinmi speakers of another dialect were able to recognize consistently the different meanings of a minimal pair of words attested in Xinyingpan Prinmi, it would signal that the minimal pair of words with contrast between tones I and II has maintained its tonal contrast in both dialects.

The Prinmi dialects involved in this study are all spoken in Yunnan. The majority of them fall within Lu’s (2001) grouping of Southern Prinmi. Nonetheless, they are widely spread over three counties, and Prinmi speakers from different counties (or even within a single county in some cases) do not have regular contact with one another because of geographic barriers. As such, a high degree of mutual intelligibility was not presumed at the outset of the study.

FIGURE 3: Perception testing in cross-dialectal comparison of Prinmi tones



Considering potential dialectal variations, the hypothesis underpinning this dialectal study can be presented in figure 3.

Since it is unclear to what extent Prinmi speakers may be able to understand dialects from other regions, an independent comprehension test was included in the study. Native speakers from various Prinmi villages were first asked to listen to a short story and/or a brief narration recorded in different dialects. Results from the comprehension test provided some indication of the degree of difference between a particular dialect and the controlled dialects. Unless the interviewee found the controlled dialects to be totally beyond his/her comprehension, s/he was asked to participate in the perception test involving minimal pairs of words.

The perception tests consist of two parts: a word list containing isolated minimal pairs of words, and a set of sentences with an identical frame for each word from the minimal pairs. Based on Xinyingpan Prinmi, the minimal pairs of words are all monosyllabic, with either tone I or tone II. Given that neutralization of tonal contrast between monosyllabic words in citation form is possible only in the melody-tone system, but not in the syllable-tone system, those dialects that share the same minimal pairs with Xinyingpan are likely to possess a similar tonal system. This issue, of course, requires further studies in meticulous examination of dialectal data, which is beyond the scope of this paper (as indicated by the grayed area in figure 3). Therefore, as a first step towards the dialectal study of tonal systems in Prinmi, I am only exploring the likelihood of sharing of the elusive minimal pairs between Xinyingpan Prinmi and other dialects, without pinpointing the precise type of tonal system in other dialects.

As explained above, the experiment did not assume great similarity nor mutual intelligibility between varieties of Prinmi, even though most of them belong to Lu's "Southern Prinmi" grouping. Publications on various dialects of Southern Prinmi (Lu 1983; Matisoff 1997; and Ding 2003) indicate that considerable segmental variations can be found between the two Lanping varieties and the Xinyingpan dialect. For instance:

| (4) | Qinghua Prinmi<br>(Lu 1983) | Dayang Prinmi<br>(Matisoff 1997) | Xinyingpan Prinmi              | Meaning |
|-----|-----------------------------|----------------------------------|--------------------------------|---------|
| a   | zdĩ <sup>55</sup>          | zdĩ <sup>55</sup>               | dĩ <sup>H</sup>               | 'cloud' |
| b   | βbjẽ̃ <sup>55</sup>         | βbĩ <sup>55</sup>               | bjẽ̃ <sup>F</sup>              | 'urine' |
| c   | dzə̃ <sup>13</sup>          | dĩ <sup>13</sup>                | g <sup>r</sup> ə̃ <sup>R</sup> | 'star'  |
| d   | də̃ <sup>13</sup>           | dĩ <sup>55</sup>                | dzĩ <sup>F</sup>              | 'to be' |

A well-documented feature of Lanping Prinmi is the rich consonant clusters at the syllable-initial position, shown in (4a) and (4b), which start with a fricative homorganic to the consecutive plosive. This is lacking, with a couple of known exceptions, in Prinmi dialects in Ninglang (Ding 2005b) and outside Yunnan (Lu 2001).<sup>5</sup> To a historical linguist, the seg-

<sup>5</sup> Indeed, if prenuclear rhoticity were regarded as a secondary articulation of plosives, 'star' in Xinyingpan, given in (4c), would not involve a consonant cluster, and Xinyingpan Prinmi could be



mental variations exemplified in (4) may look trivial, for they represent common development of sound change through time. However, speakers of different Prinmi dialects tend to have difficulty recognizing a word with more than one instance of segmental variation. Under this general rule, only the words for ‘cloud’ and ‘to be’, with their various forms, are likely to be understood between Lanping and Xinyingpan Prinmi. A bold assumption about minimal pairs of words used in perception tests was that the kind of segmental variation that might exist would not cause severe difficulty in the interviewee’s recognition of the words.

Knowledge of tonal variation between Prinmi dialects is scanty, limited to the general comparison mentioned in section 2. Studies of Chinese dialectology show that tonal categories are liable to split, merge, and vanish in the course of the development of a language. Yan (2006) discusses such tonal change in a variety of Mandarin dialects. Consequently, major dialects of Mandarin differ from one another in terms of the number of tonal categories and the pitch value of these categories, as shown in the partial reproduction from Yan (2006:84) below.

| Tonal category | <i>Middle Chinese</i> | <i>Level Tone</i> |          | <i>Rising Tone</i> | <i>Departing Tone</i> | <i>Entering Tone</i> |
|----------------|-----------------------|-------------------|----------|--------------------|-----------------------|----------------------|
|                | M. Chinese            | First T           | Second T | Third T            | Fourth T              | Entering T           |
| Beijing        |                       | 55                | 35       | 214                | 51                    | --                   |
| Xi’an          |                       | 21                | 24       | 53                 | 55                    | --                   |
| Yantai         |                       | 31                | --       | 214                | 55                    | --                   |
| Nanjing        |                       | 31                | 24       | 11                 | 44                    | 5                    |

TABLE 2: Tone values and number of tones in selected major Mandarin dialects

Without going into the details of the development of tonal categories in Mandarin, it will suffice to note that tonal categories of a language may vary substantially across even mutually intelligible dialects. Therefore the cross-dialectal experiment with the tonal categories in Prinmi makes no assumption of intact contrast among Prinmi dialects. There could be many possible perceptions of the minimal pair of words found in Xinyingpan Prinmi. On one extreme, it could be the case that not a single word is recognized; or the intended meanings of a pair of words could be perceived as expressed in a homonym. At the other extreme, the pair of words could be distinguished successfully.

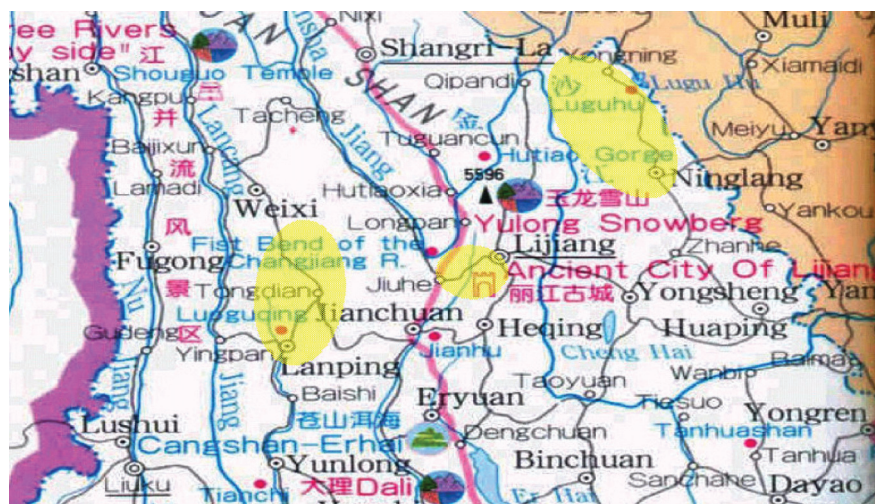
As for tonogenesis, it is clear that the tonal system of Prinmi is not triggered by the voice quality of consonants. It has been shown, in syllable-tone languages such as Mandarin, Cantonese, Vietnamese (cf. Weidert 1987; Matisoff 2001, *inter alia*) and word-tone languages such as Shanghai (cf. Zhu 2006), Tibetan (cf. Duanmu 1992) and Tamang (cf. Mazaudon 2003), that a low tone can (historically) be conditioned by a voiced consonant at the onset of a syllable through laryngeal gestures accompanying breathy phonation (Thurgood 2002).

described as having no consonant clusters (treating the affricate also as a single unit).

In Shanghai, which has retained voiced obstruents from Old Chinese, a breathy low tone never comes into minimal contrast with a high tone, because the initials in the near-minimal pair always differ in voicing.<sup>6</sup> This is not the case in Prinmi: voicing of initial consonants is irrelevant to tonal categories; the three-way tonal distinction may occur as the sole phonemic contrast in monosyllabic words regardless of the type of initial in the syllable.

On the other hand, a low tone may also be incorporated into the phonological system of a language as a compensation for the loss of the voiced feature of obstruents, as in Lhasa Tibetan and Tamang. In terms of voicing, Prinmi consonants are remarkably symmetric: most consonants (including nasals) have a counterpart with an opposing voicing feature. The prime example of this is Xinyingpan Prinmi, where all consonants, but for two fricatives, show voicing contrasts (see Ding 2003).

**5. RESULTS OF THE PERCEPTION TESTS.** The fieldwork for this empirical study was conducted largely in three counties in northwestern Yunnan in the summer of 2003. Laping Bai and Pumi Autonomous County was my first stop in the Prinmi area, followed by Lijiang Naxi Autonomous County (which has, after the establishment of the Ancient City of Lijiang, been renamed Yulong Naxi Autonomous County), and finally Ninglang Yi Autonomous County. Map 1 demarcates the approximate distribution of Prinmi-speaking areas in these counties with the yellow circles. As a starting point, materials were first recorded in Kunming by two native speakers of different dialects, who had grown up and lived in the traditional *Pĩmĩ* area for two decades.



MAP 1: Distribution of Prinmi-speaking areas in northwestern Yunnan

<sup>6</sup> Zee (2003:131) points out that words with voiced initial obstruents in Shanghai carry a low tone, whereas words with voiceless counterparts bear a non-low tone.

**5.1 THE PERCEPTION TESTS.** The perception tests used in this study targeted minimal pairs of words from tones I and II in two different environments: in citation form and in connected speech. For the former, several minimal pairs of words were made into a word list in random order with a few of them repeated; no words in a minimal pair occurred in immediate sequence. For the latter, each pair of words was rendered in an identical sentence frame, which supplied no hint to the meaning of the target word. Each pair of sentences was adjacent, but the order of tonal categories of the target words varied among pairs of sentences. The two environments differed in regard to the prosodic domain available to the target words. While the isolation of citation form confined the phonological domain of a word to a monosyllable, the use of clitics in connected speech could extend its prosodic domain to bisyllables.

Recordings of the word list and list of sentences were made in Kunming with the help of two native Prinmi speakers: one from Dayang (Lanping county) and the other from Jinmian (Ninglang county). Shown in (5) are the minimal pairs selected from commonly used words, based on Xinyingpan Prinmi; segmental variations in Dayang Prinmi, where they may occur, are also indicated (with tonal information omitted). Note that the list contains some genuine homophones.

| (5) | <b>Tone I</b> [H.L] <sub>melody</sub> | <b>Tone II</b> [H.H] <sub>melody</sub>    | Variation in Dayang |
|-----|---------------------------------------|-------------------------------------------|---------------------|
| a   | njɛ <sup>F</sup> ‘soy bean’           | njɛ <sup>H</sup> ‘red’                    | nø                  |
| b   | mẽ <sup>F</sup> ‘hair’; ‘lower-part’  | mẽ <sup>H</sup> ‘name’;<br>‘ten-thousand’ | --                  |
| c   | bɪ <sup>F</sup> ‘honey’; ‘thin’       | bɪ <sup>H</sup> ‘sun’                     | --                  |
| d   | dzẽ <sup>F</sup> ‘wet’                | dzẽ <sup>H</sup> ‘drum’                   | --                  |
| e   | ʃɪ <sup>F</sup> ‘louse’               | ʃɪ <sup>H</sup> ‘hundred’                 | --                  |
| f   | bjẽ <sup>F</sup> ‘urine’              | bjẽ <sup>H</sup> ‘busy’                   | βbĩ; bĩ             |

In studying the word-tone system of Tamangic languages, Hari (1971) and Glover and Glover (1972) elicited the suprasegmental pattern of a word by placing it in a phrase to yield an extended prosodic domain. Inspired by this technique, I used a general sentence frame to render a target word in connected speech in Prinmi. Shown in (6) is the general frame for the minimal pairs of words, where each target word occurs at the position marked as “X.” Note that a prosodic domain in the sentence is indicated by an unbroken line under the entire domain.

- (6)  $\frac{\text{‘X’ } g^j e}{X \text{ CLT}}$   $\frac{m j e^H \text{ tʃi}^L \text{ ɬəw}^L ?}{\text{what say N-PFV}}$  [for Test 1 & 2]  
 ‘What does “X” mean?’

This sentence frame was revised after the perception test had been conducted with several Prinmi speakers in the county seat of Lanping. Some commented that the sentences would be too abstract and unnatural when played to speakers in villages. With their help, the new sentence frame shown in (7) was recorded in Yushi Prinmi. In this version, a minimal pair of words, rendered as “X” and “Y,” appeared in the same sentence.

- (7)  $\frac{\text{tʰ}^{\text{H}}}{\text{this}} \frac{\text{tʃ}^{\text{L}} \text{gwe}^{\text{H}}}{\text{child CLT}} \text{ ‘X’ } \frac{\text{gə-tʃ}^{\text{L}}}{\text{out-say}} \text{ ‘Y’ } \frac{\text{tʃ}^{\text{H}} \text{ɿ}^{\text{L}} \text{ɿ}^{\text{L}}}{\text{say N-PFV}} .$  [for Test 3]

‘The child pronounces “X” as “Y.”’

This revised version contained a total of twenty sentences, with some minimal pairs of words switching their order of appearance in the additional sentences. The drawback was that it did not introduce a clitic after the target word, although the phonological domain of the word was extended by the merging of the adjacent verb that would lose its original tone. Furthermore, the revised list retained the pair of words,  $b\tilde{i}^{\text{H}}$  ‘busy’ and  $\beta b\tilde{i}^{\text{F}}$  ‘urine’, which no longer contrasts merely in terms of tonal categories in Lanping Prinmi (but also through the difference in the initials).

To exclude nonminimal pairs of words, a new list of sentences was recorded with a speaker of Sanjie Prinmi, another Lanping dialect. In this final version, where possible, separate sentence frames were tailored for each pair of words; see (8).

- (8) [Sentence frames used in Test 4]

- a  $\frac{\text{tʰ}^{\text{H}}}{\text{this}} \left\{ \frac{\text{m}\tilde{\text{e}}^{\text{H}} \text{g}^{\text{H}} \text{e}^{\text{H}}}{\text{name/hair CLT}} \right\} \frac{\text{h}^{\text{H}} \text{z}^{\text{H}} \text{k}^{\text{H}} \text{i}^{\text{L}} \text{n}\tilde{\text{o}}^{\text{L}}}{\text{where from}} \frac{\text{d}\tilde{\text{e}}^{\text{H}} \text{-z}^{\text{H}} \text{i}^{\text{L}}}{\text{to.SPK-come}} \frac{\text{si}^{\text{L}}}{\text{PFV}} ?$

‘Where did this name/hair come from?’

- b  $\left\{ \frac{\text{n}\tilde{\text{o}}^{\text{H}} \text{g}^{\text{H}} \text{j}^{\text{L}}}{\text{soy bean/red CLT}} \right\} \frac{\text{z}^{\text{H}} \text{m}\tilde{\text{a}}^{\text{L}} \text{z}^{\text{H}} \text{z}^{\text{R}}}{\text{I NEG like}} .$

‘As for the soy bean/red color, I don’t like (it).’

- c  $\left\{ \frac{\text{b}^{\text{H}} \text{i}^{\text{H}}}{\text{honey/sun CLT}} \right\} \frac{\text{n}^{\text{H}} \text{i}^{\text{R}} \text{tʃ}^{\text{H}} \text{e}^{\text{H}} \text{m}\tilde{\text{e}}^{\text{H}} \text{s}^{\text{H}} \text{i}^{\text{F}}}{\text{you see know}} ?$

‘The honey/sun, have you ever seen (it)?’

d             $\frac{t\text{ʂ}\tilde{\text{a}}^{\text{L}} \text{gwe}^{\text{H}}}{\text{child CLT}} \quad \frac{\text{dz}\tilde{\text{e}}^{\text{H}} \text{tʂi}^{\text{L}}}{\text{wet say}} \quad \frac{\text{dz}\tilde{\text{e}}^{\text{H}} \text{tʂi}^{\text{H}} \text{ɹ}\tilde{\text{a}}\text{w}^{\text{L}}}{\text{drum say N-PFV}} .$

‘The child pronounces “wet” as “drum.”’

e             $\frac{t\text{ʂ}\tilde{\text{a}}^{\text{L}} \text{gwe}^{\text{H}} \text{ʃi}^{\text{H}}}{\text{child CLT hundred}} \quad \frac{\text{tʂi}^{\text{L}} \text{ʃi}^{\text{H}} \text{tʂi}^{\text{L}} \text{ɹ}\tilde{\text{a}}\text{w}^{\text{L}}}{\text{say louse say N-PFV}} .$

‘The child pronounces “hundred” as “louse.”’

A minor defect was found in (8e), where the speaker might have made a slip of tongue for ‘hundred’, although there is a slight lengthening of the word, compared with ‘louse’. Another defect was that the prosodic domain of ‘honey’ had remained monosyllabic in (8c). In spite of these weaknesses, I decided to leave the minor faults intact, as they could serve as serendipitous variants in the perception test.

**5.2 EMPIRICAL RESULTS.** The perception test experiment began with two men, both aged well over 40 in 2003, interviewed separately in Lanping. The first man was a native of Qinghua, and the second a native of Dayang. Results from comprehension tests indicated that they were unable to achieve a full comprehension of the short passage recorded in Jinmian Prinmi, but had a thorough understanding of the same passage recorded in Dayang Prinmi. With great concentration, they could recognize some words in citation form from Jinmian and nearly all words from Dayang. However, the assumed minimal pairs (such as ‘soybean’–‘red’, ‘honey’–‘sun’, and ‘drum’–‘wet’) were not distinguished when listening to their isolated citation form recorded in Dayang Prinmi. Often both meanings were supplied for a word, as if they were homonyms. This was in sharp contrast to their successful recognition of these and other minimal pairs in a sentence frame (see under test session #1 and #2 in table 4). Given the intense concentration required from these interviewees and the less useful results, I decided to take the advice of these men and dispense with the perception test on isolated words so that other interviewees would not feel intimidated and withdraw in the middle of the interview session. Therefore, this section will present results exclusively from the perception test on minimal pairs of words situated in sentences.

As noted in the previous section, sentences for the perception test were prepared in Ninglang Prinmi and Lanping Prinmi, respectively, with the latter having three versions of sentence frames in different subdialects. Because of time constraints and the common set of target words involved in the test, no interviewee was asked to listen to all these materials. Instead, first, sentences recorded in a geographically more remote dialect were played to the interviewee, and then sentences in a dialect closer to his/her home village. Unless the interviewee requested replays, the materials were played only once. I recorded answers from each interviewee, and they did not need to write anything. The interviewee could change a given answer during the course of the test. A few people did change their minds after listening to both sentences for a minimal pair of words. Intended meanings of the sentences were not revealed to the interviewee, even after completion of the perception test, unless recording of these sentences in a new dialect was deemed desirable. No interviewees were given access to the written records of their answers made at the test.

Most sessions were conducted with a single interviewee per session, but a few involved more people when several speakers happened to be present together and the field-work environment made it difficult or impolite to insist on individual interviewing. A total of approximately 30 speakers of Prinmi, from Ninglang, Lanping, and Yulong counties, participated in the perception tests. The background of these speakers varied considerably regarding their age, sex, education, and occupation.

Results of the perception tests are quantified and presented in tables 3–6 below, according to the different test versions. To yield a quantitative result, numeral values have been assigned to elicited answers as follows: “2” for a correct recognition of intended meaning (including those known to be homophonous with the target word), “-2” for confusing words within a minimal pair, “1” for showing an acceptable partial recognition (for words with similar pronunciation under the same tonal category of the target word), and “0” for providing an irrelevant word. When an interviewee indicated that s/he could not catch a target word or a sentence, this is marked with the stroke “/,” with a value of zero in the calculation of results. Under this scheme, the recognition rate can be obtained by dividing the average of the answers into 2; the full recognition is thus “1.00.” It is, in principle, possible for the figure to fall anywhere between “-1.00” and “1.00.”

Tables 3–6 each consist of three main parts. The first column shows the target words, usually according to the order in which they occur on the tape. The body of the table contains results in numeral value from different dialects, which are grouped into Lanping, Yulong (if applicable), and Ninglang. For each of these dialectal groups, word recognition rates are calculated for every item. Below the dialectal group names are abbreviated names of villages, and at the top are the test session numbers. The final column of the table provides the total recognition rate of words across dialects in the test. Moreover, at the very bottom of the table interviewees’ performance is also calculated individually and collectively within a dialectal group. Above this, the number of valid responses (neither marked with “0” nor “/”) from each interviewee is provided; this information is irrelevant to calculation of the word recognition rate and interviewees’ performance in the four tables, but beneficial to the refinement condition to be discussed in the next section. Finally, the overall recognition rate of a particular set of sentences is presented at the bottom right corner.

Cy=Cuiyu, Dmj=Damaijiechang, Dy=Dayang, Hq=Hongqiao, Lb=Labo, Mdq=Mudiqing, Pmp=Paomaping, Qh=Qinghua, Wq=Wenquan; Rcg=Recognition.

| Test Session:                    | #1             | #7    | #11  |       |                 |      |      |      |      |      |      |      | Total: 10               |
|----------------------------------|----------------|-------|------|-------|-----------------|------|------|------|------|------|------|------|-------------------------|
|                                  | <b>Lanping</b> |       |      |       | <b>Ninglang</b> |      |      |      |      |      |      |      | <i>Word Recognition</i> |
|                                  | Qh             | Qh,Dy | Dmj  | Rcg   | Hq              | Lb   | Wq   | Cy   | Cy   | Pmp  | Mdq  | Rcg  |                         |
| 1 soy bean                       | 0              | 2     | -2   | 0.00  | 0               | 0    | 0    | 0    | 1    | 2    | -2   | 0.07 | <b>0.050</b>            |
| 2 red                            | 1              | 2     | 2    | 0.83  | 1               | 1    | 0    | 1    | 2    | 2    | 1    | 0.57 | <b>0.650</b>            |
| 3 hair/lower-part                | 2              | 2     | 2    | 1.00  | 1               | 2    | -2   | 1    | 2    | 1    | 1    | 0.43 | <b>0.600</b>            |
| 4 name/10,000                    | -2             | 2     | 2    | 0.33  | 2               | 2    | 2    | 2    | 2    | 2    | 2    | 1.00 | <b>0.800</b>            |
| 5 honey/thin                     | 2              | -2    | -2   | -0.33 | 2               | 0    | 0    | 0    | 2    | 0    | 0    | 0.29 | <b>0.100</b>            |
| 6 honey/thin*                    | 2              | 2     | 2    | 1.00  | 0               | 0    | 0    | 2    | 2    | 2    | 1    | 0.50 | <b>0.650</b>            |
| 7 drum                           | 2              | 2     | 2    | 1.00  | 2               | -2   | 2    | 2    | 2    | 2    | 0    | 0.57 | <b>0.700</b>            |
| 8 be wet                         | 2              | 2     | 2    | 1.00  | 0               | 0    | -2   | 2    | 2    | 2    | 0    | 0.29 | <b>0.500</b>            |
| 9 hundred                        | 0              | 0     | 0    | 0.00  | 0               | 2    | 0    | 2    | 2    | 0    | /    | 0.43 | <b>0.333</b>            |
| 10 louse                         | 0              | 0     | 2    | 0.33  | 0               | 2    | 0    | 2    | 2    | 0    | /    | 0.43 | <b>0.444</b>            |
| 11 be busy                       | 2              | /     | 2    | 0.67  | 0               | 2    | 0    | 2    | 2    | 2    | /    | 0.57 | <b>0.750</b>            |
| 12 urine                         | 2              | /     | 0    | 0.33  | 0               | 2    | 0    | 2    | 2    | -2   | /    | 0.29 | <b>0.375</b>            |
| Valid Responses                  | 9              | 8     | 10   |       | 5               | 8    | 4    | 10   | 12   | 9    | 5    |      | <b>Overall</b>          |
| <i>Interviewee's Performance</i> | 0.54           | 0.50  | 0.50 | 0.51  | 0.33            | 0.46 | 0.00 | 0.75 | 0.96 | 0.54 | 0.13 | 0.47 | <b>0.471</b>            |

\* The speaker from Jinmian did not make a distinction between 'sun' and 'honey/thin'. As a result, 'sun' was rendered under the same tonal category as 'honey/thin', i.e. 'sun' and 'honey/thin' became homophonous on the tape.

TABLE 3: Test 1 – the perception test on Jinmian (Ninglang) Prinmi

Dy=Dayang, Qh=Qinghua, Rh=Renhe, Ta=Taian, Xyp=Xinyingpan; Rcg=Recognition.

| Test Session:                        | #1             | #2   | #3   |            | #17           | #18  |            | #16             | #27  | #30  | Total: 8   |                                   |
|--------------------------------------|----------------|------|------|------------|---------------|------|------------|-----------------|------|------|------------|-----------------------------------|
|                                      | <b>Lanping</b> |      |      |            | <b>Yulong</b> |      |            | <b>Ninglang</b> |      |      |            | <i>Word<br/>Recog-<br/>nition</i> |
|                                      | Qh             | Dy   | Dy   | <i>Rcg</i> | Ta            | Rh   | <i>Rcg</i> | Xyp             | Xyp  | Xyp  | <i>Rcg</i> |                                   |
| 1 soy bean                           | 2              | 2    | 0    | 0.67       | 0             | 0    | 0.00       | 0               | 2    | 0    | 0.33       | <b>0.375</b>                      |
| 2 red                                | 2              | 2    | 0    | 0.67       | 0             | 0    | 0.00       | 0               | 2    | 0    | 0.33       | <b>0.375</b>                      |
| 3 name/10,000                        | 2              | 2    | 2    | 1.00       | 0             | 2    | 0.50       | 2               | 0    | 0    | 0.33       | <b>0.625</b>                      |
| 4 name/10,000*                       | 2              | 2    | 2    | 1.00       | 0             | 2    | 0.50       | 2               | 0    | 0    | 0.33       | <b>0.625</b>                      |
| 5 honey/thin                         | 2              | 2    | 2    | 1.00       | 2             | 2    | 1.00       | 2               | 2    | 0    | 0.67       | <b>0.875</b>                      |
| 6 sun                                | 2              | 2    | 2    | 1.00       | -2            | 0    | -0.5       | 2               | 2    | 0    | 0.67       | <b>0.500</b>                      |
| 7 drum                               | 2              | 2    | 0    | 0.67       | 0             | 0    | 0.00       | 2               | 2    | 2    | 1.00       | <b>0.625</b>                      |
| 8 be wet                             | 2              | 2    | 0    | 0.67       | 2             | 0    | 0.50       | 2               | 2    | 2    | 1.00       | <b>0.750</b>                      |
| 9 hundred                            | 0              | 2    | 0    | 0.33       | 1             | 1    | 0.50       | 0               | 1    | 1    | 0.33       | <b>0.375</b>                      |
| 10 louse                             | 2              | 2    | 2    | 1.00       | 1             | 1    | 0.50       | 0               | 2    | 0    | 0.33       | <b>0.625</b>                      |
| 11 be busy                           | 2              | 2    | 2    | 1.00       | 0             | 2    | 0.50       | 2               | 2    | 2    | 1.00       | <b>0.875</b>                      |
| 12 urine                             | 2              | 0    | 2    | 0.67       | 2             | 2    | 1.00       | 0               | 0    | 0    | 0.00       | <b>0.500</b>                      |
| Valid Responses                      | 11             | 11   | 7    |            | 6             | 7    |            | 7               | 9    | 4    |            | <b>Overall</b>                    |
| <i>Interviewee's<br/>Performance</i> | 0.92           | 0.92 | 0.58 | 0.81       | 0.25          | 0.50 | 0.38       | 0.58            | 0.71 | 0.29 | 0.53       | <b>0.594</b>                      |

\* The speaker from Dayang did not make a distinction between 'hair' and 'name/ten-thousand'. As a result, 'hair' was rendered under the same tonal category as 'name/ten-thousand', i.e. 'hair' and 'name/ten-thousand' became homophonous on the tape.

TABLE 4: Test 2 – the perception test on Dayang (Lanping) Prinmi



Dmj=Damajiechang, Ds=Desheng, Dy=Dayang, Jp=Jinpu, Qh=Qinghua, Qsj=Qingshuijiang, Xyp=Xinyingpan; Rcg=Recognition.

| Test Session:                        | #6             | #7    | #11  | #14  | #15  | #19  | #22           | #16  | #30  | #31             | Total: 10 |      |      |                          |
|--------------------------------------|----------------|-------|------|------|------|------|---------------|------|------|-----------------|-----------|------|------|--------------------------|
|                                      | <b>Lanping</b> |       |      |      |      |      | <b>Yulong</b> |      |      | <b>Ninglang</b> |           |      |      | Word<br>Recog-<br>nition |
|                                      | Qsj            | Qh.Dy | Dnj  | Ds   | Qh   | Rcg  | Jp            | Jp   | Rcg  | Xyp             | Xyp       | Xyp  | Rcg  |                          |
| 1 soy bean                           | -2             | 2     | 2    | 2    | 2    | 0.60 | -2            | 2    | 0.00 | 0               | 0         | 0    | 0.00 | <b>0.300</b>             |
| 2 red                                | 2              | 2     | 2    | 2    | 2    | 1.00 | 0             | 2    | 0.50 | 0               | 0         | 0    | 0.00 | <b>0.600</b>             |
| 3 hair/lower-part                    | 2              | 2     | 2    | 2    | 2    | 1.00 | -2            | 2    | 0.00 | 2               | 0         | 2    | 0.67 | <b>0.700</b>             |
| 4 name/10,000                        | 2              | 2     | 2    | 2    | 2    | 1.00 | -2            | 2    | 0.00 | 2               | 0         | 2    | 0.67 | <b>0.700</b>             |
| 5 honey/thin                         | 2              | 2     | 2    | 2    | -2   | 0.60 | 2             | -2   | 0.00 | 2               | -2        | 2    | 0.33 | <b>0.400</b>             |
| 6 sun                                | 2              | 2     | 2    | 2    | -2   | 0.60 | 2             | -2   | 0.00 | 2               | 0         | 2    | 0.67 | <b>0.500</b>             |
| 7 drum                               | 0              | 2     | 2    | 2    | 2    | 0.80 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>0.900</b>             |
| 8 be wet                             | 0              | 2     | 2    | 2    | 2    | 0.80 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>0.900</b>             |
| 9 hundred                            | 0              | 2     | 2    | 1    | 0    | 0.50 | 1             | 0    | 0.25 | 1               | 1         | -1   | 0.17 | <b>0.350</b>             |
| 10 louse                             | 2              | 2     | 2    | 1    | 0    | 0.70 | 1             | 0    | 0.25 | 1               | 1         | -1   | 0.17 | <b>0.450</b>             |
| 11 be busy                           | 0              | 2     | 2    | 2    | 0    | 0.60 | 2             | 0    | 0.50 | 0               | 2         | 2    | 0.67 | <b>0.600</b>             |
| 12 urine                             | 0              | 0     | 2    | 2    | 0    | 0.40 | 0             | 0    | 0.00 | 0               | 0         | 0    | 0.00 | <b>0.200</b>             |
| 13 name/10,000                       | 2              | 2     | 2    | 2    | 2    | 1.00 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>1.000</b>             |
| 14 hair/lower-part                   | 2              | 2     | 2    | 2    | 2    | 1.00 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>1.000</b>             |
| 15 sun                               | 2              | 2     | 2    | 2    | -2   | 0.60 | 2             | -2   | 0.00 | 2               | 2         | 2    | 1.00 | <b>0.600</b>             |
| 16 honey/thin                        | 2              | 2     | 2    | 2    | -2   | 0.60 | 2             | -2   | 0.00 | 2               | 2         | 2    | 1.00 | <b>0.600</b>             |
| 17 red                               | 2              | 2     | 2    | 2    | 2    | 1.00 | 2             | 2    | 1.00 | 0               | 2         | 0    | 0.33 | <b>0.800</b>             |
| 18 soy bean                          | -2             | 2     | 2    | 2    | 2    | 0.60 | 0             | 2    | 0.50 | 0               | 2         | 0    | 0.33 | <b>0.500</b>             |
| 19 be wet                            | 0              | 2     | 2    | 2    | 2    | 0.80 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>0.900</b>             |
| 20 drum                              | 0              | 2     | 2    | 2    | 2    | 0.80 | 2             | 2    | 1.00 | 2               | 2         | 2    | 1.00 | <b>0.900</b>             |
| Valid Responses                      | 13             | 19    | 20   | 20   | 16   |      | 17            | 16   |      | 14              | 14        | 15   |      | <b>Overall</b>           |
| <i>Interviewee's<br/>Performance</i> | 0.45           | 0.95  | 1.00 | 0.95 | 0.40 | 0.75 | 0.50          | 0.40 | 0.45 | 0.65            | 0.55      | 0.60 | 0.60 | <b>0.645</b>             |

TABLE 5: Test 3 – the perception test on Yushi (Lanping) Prinmi

Cy=Cuiyu, Dmj=Damajiechang, Lb=Labo, LGQ=Luguqing, Mdq=Mudiqing, Rh=Renhe, Xyp=Xinyingpan; Rcg=Recognition.

| Test Session:                    | #8      | #11  | #18  |        | #16  | #24      | #26  | #40  | #42  | Total: 8 |                  |                |
|----------------------------------|---------|------|------|--------|------|----------|------|------|------|----------|------------------|----------------|
|                                  | Lanping |      |      | Yulong |      | Ninglang |      |      |      |          | Word Recognition |                |
|                                  | Lgq     | Dmj  | Rcg  | Rh     | Rcg  | Xyp      | Lb   | Cy   | Mdq  | Cy       | Rcg              |                |
| 1 name                           | 2       | 2    | 1.00 | 2      | 1.00 | 2        | 2    | 2    | 2    | 2        | 1.00             | <b>1.000</b>   |
| 2 hair                           | 2       | 2    | 1.00 | 2      | 1.00 | 2        | 2    | 0    | 2    | 2        | 0.80             | <b>0.875</b>   |
| 3 soy bean                       | 0       | 2    | 0.50 | 0      | 0.00 | 2        | 0    | 0    | /    | 2        | 0.50             | <b>0.375</b>   |
| 4 red                            | 2       | 2    | 1.00 | 2      | 1.00 | 2        | 1    | 0    | /    | 1        | 0.50             | <b>0.625</b>   |
| 5 honey*                         | 2       | 2    | 1.00 | 2      | 1.00 | 2        | /    | /    | 0    | /        | 0.50             | <b>0.500</b>   |
| 6 sun                            | 2       | 2    | 1.00 | 2      | 1.00 | 2        | 0    | 0    | /    | 2        | 0.50             | <b>0.625</b>   |
| 7 be wet                         | 2       | 2    | 1.00 | 0      | 0.00 | 2        | 2    | 0    | 2    | -2       | 0.40             | <b>0.500</b>   |
| 8 drum                           | 2       | 2    | 1.00 | 0      | 0.00 | 2        | 0    | 0    | 2    | 0        | 0.40             | <b>0.500</b>   |
| 9 hundred*                       | -2      | 2    | 0.00 | 0      | 0.00 | 1        | 0    | 0    | 1    | 1        | 0.30             | <b>0.188</b>   |
| 10 louse                         | 1       | 2    | 0.75 | 0      | 0.00 | 1        | 0    | 0    | 1    | 0        | 0.20             | <b>0.313</b>   |
| Valid Responses                  | 9       | 10   |      | 5      |      | 10       | 4    | 1    | 6    | 7        |                  | <b>Overall</b> |
| <i>Interviewee's Performance</i> | 0.65    | 1.00 | 0.83 | 0.50   | 0.50 | 0.90     | 0.35 | 0.10 | 0.50 | 0.40     | 0.45             | <b>0.550</b>   |

\* The prosodic domain of the word remained monosyllabic on the tape.

TABLE 6: Test 4 – the perception test on Sanjie (Lanping) Prinmi

**6. FINDINGS AND GENERAL DISCUSSION.** Before discussing findings from the perception tests, it is worth commenting on the unexpected loss of contrast in two minimal pairs of words in the recording made in Kunming for tests 1 and 2. This occurred in the speech of a married couple. They were born in the early 1970s, one in Jinmian (Ninglang county) and the other in Dayang (Lanping county), and grew up in the *Pūmĩ* area, where Prinmi is used in daily life. Besides their own mother tongue, the couple, holding bachelor's degrees from Chinese universities, have a near-native command of Mandarin Chinese. Furthermore, the husband also speaks Nosu (a Yi language of Sichuan and Ninglang), and the wife, Bai (another Tibeto-Burman language). Thus the couple is fully trilingual, but Mandarin has become their dominant language since they left for higher education in large cities. The couple do not speak Prinmi between themselves; their native language is used only when necessary, e.g. talking to an older person whose Mandarin is not very fluent.

As it turns out, the husband merged *bĩ<sup>H</sup>* 'sun' with *bĩ<sup>F</sup>* 'honey' during the recording. Upon reflection, he regarded this pair of words as homophones, but not the other pairs. On the other hand, the wife commented, after a separate recording session, that she was not sure whether *mẽ<sup>H</sup>* 'name' and *mẽ<sup>F</sup>* 'hair' are homophones, but the other pairs definitely are not. Since fieldwork results from the perception test conducted in the *Pūmĩ* area point

to consistent differences between words in these minimal pairs (to be discussed further below), it suggests that confusion between a minimal pair of words is possible, even in the speech of otherwise competent speakers of Prinmi, as a result of extralinguistic factors.<sup>7</sup>

The partial loss of minimal tonal contrast (*vis-à-vis* cross-the-board neutralization of tones I and II) can be considered a sign of linguistic attrition. Linguistic attrition in terms of a large number of loans from Mandarin or other languages has been observed among younger generations even in villages where Prinmi is spoken. How this general trend has affected or may have an impact on the tonal system of Prinmi is unclear.<sup>8</sup> Attempts to elicit data with the perception test from two pre-teen brothers in Lanping were not successful. Failing to distinguish the different tonal patterns in sentences, they simply regarded a minimal pair of words as identical; or they were altogether unable to recognize the target words in the sentences.

We will now turn to the results of the perception tests. For convenience, the recognition rates from table 3–table 6 are summarized in table 7. Parenthesized figures following the recognition rate represent the number of interviewees involved in the calculation of the rate. Note that the overall rate makes reference to the total number of interviewees involved in a test, rather than the average of the recognition rates for different regions. At first glance, the recognition rates from the four tests do not look impressive. As would be expected, interviewees from Lanping scored better than speakers from other counties for tests 2, 3, and 4 (all of which were recorded in varieties of Prinmi spoken in Lanping). Surprisingly, interviewees from Lanping also fared better than those from Ninglang on test 1, although sentences in this test were recorded in a Prinmi dialect of Ninglang. This is attributed, in the main, to the competence of individual interviewees.

| Interviewees from     | Lanping  | Ninglang | Yulong   | Overall Rate |
|-----------------------|----------|----------|----------|--------------|
| 1. Jinmian [Ninglang] | 0.51 (3) | 0.47 (7) | n/a (0)  | 0.471 (10)   |
| 2. Dayang [Lanping]   | 0.81 (3) | 0.53 (3) | 0.38 (2) | 0.594 (8)    |
| 3. Yushi [Lanping]    | 0.75 (5) | 0.60 (3) | 0.45 (2) | 0.645 (10)   |
| 4. Sanjie [Lanping]   | 0.83 (2) | 0.45 (5) | 0.50 (1) | 0.550 (8)    |
| <b>Average</b>        |          |          |          | <b>0.565</b> |

†Figures in parentheses indicate number of interviewees.

TABLE 7: Summary of results of the perception tests†

<sup>7</sup> One may question whether the couple are good consultants for providing Prinmi data, given their partial confusion of tones I and II. As far as I can tell, the female speaker, even though no longer an active speaker, has maintained much of her competence in Prinmi. She has also worked with renowned linguists and provided enormous amounts of Prinmi data.

<sup>8</sup> While there is much literature about contact-induced changes on minority languages, e.g. Evans 2001, Thurgood and Li 2003, Noonan 2003, Matisoff 2001, etc., there has been as yet little discussion on the impact of one tone language on another tone language.

Recall that the possible range for the recognition rate runs between “-1.00” and “1.00.” In an individual dialect, the rate “1.00” signifies a full recognition of all target words and the rate “-1.00” indicates a switch of tonal categories between members in the minimal pairs of words. If all pairs are perceived as homonyms, the recognition rate will stand at “0.00.”

However, the rate “0.00” may also arise from competence problems among interviewees in the perception tests. Competence can be construed in two senses in this context: linguistic competence and performance competence. If an interviewee had difficulty in understanding the sentences in a different dialect or even in his/her own dialect, the score for his/her performance would approach “0” (for the elicited answers were likely to have fallen outside the target words). On the other hand, it is possible that linguistically competent speakers may have had difficulty in fathoming the idea of a perception test. They may have found it so peculiar that they were unable to provide valid responses.

Given details of actual responses from interviewees presented in the last section, distinguishing the causes of a recognition rate approaching zero is straightforward. Complications arise when dialectal factors are taken into consideration. The average recognition rate for all tests is to be interpreted with an additional reference to the tendency of an increase in the number of dialects from the median rate of zero toward both extremes of the possible range. That is, the higher the absolute value of the rate is, the more dialects a reading of the rate is applicable to. Interpretation of the average recognition rate for all perception tests is summarized in figure 4.

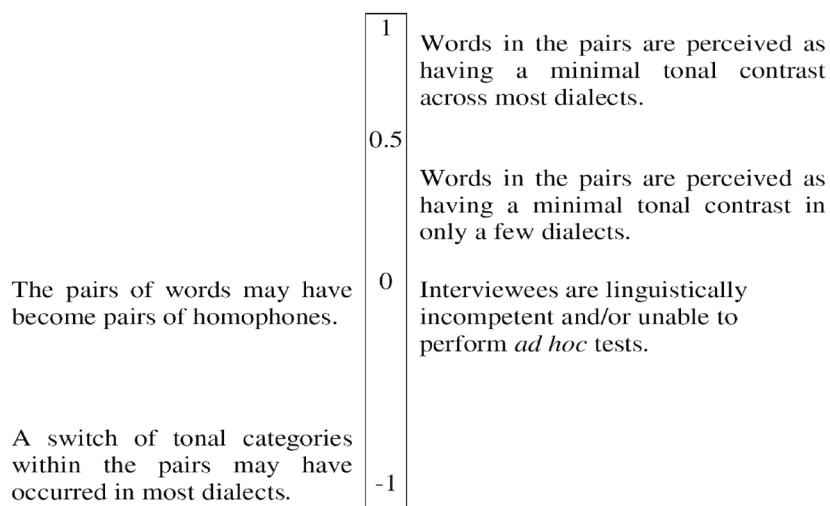


FIGURE 4: Interpretation of the average recognition rate for all perception tests

As shown earlier in table 7, the average for recognition rates in the four tests stands at 0.565, which falls within the top quarter of the possible range. Thus the overall results of the perception test reveal that the status of minimal contrast among the pairs of target words can be discerned in most Prinmi dialects involved in the study.

It should be pointed out that the quantified data from the perception tests are not intended to represent a statistical study. A statistical analysis would have to assume that all Prinmi speakers interviewed are competent not only in the language, but also in their interview performance. These assumptions cannot be taken for granted in studying minority languages that have gradually undergone language shift. Furthermore, a statistical approach is suitable for measuring variables in sociolinguistics, but not for determining phonemic contrast. As explained above, the purpose of calculation of the quantified data is to indicate the phonological relationship between a pair of words: homophone or minimal pair.

The results of the perception tests are also revealing in other respects. Moving to the microlevel of intradialect, the relatively low value of the recognition rate by any interviewee speaking the same dialect may be questioned, as in the case of Dayang in test 2, partially replicated in table 8 from table 4. All three interviewees are close relatives to the Dayang speaker who recorded the sentences. The first two speakers were middle-aged, and the third one was a college student returning home from Kunming for the summer holidays. Results from these interviewees suggest that no target words in the test form homophonous pairs, even with the odd repetition of item 3 in 4, which could have prompted some interviewees to think of other possible meanings. Instead, no one was “tricked” by the accidental homophony. The youngest interviewee failed to recognize five words, which may be taken as indicating degeneration in her linguistic competence as a result of the language shift to Mandarin. Independent evidence for the decline in her Prinmi was observed when she showed difficulty in understanding a short story told in Dayang Prinmi, which the other speakers found perfectly intelligible. Although Dayang Prinmi is the family’s first language, still spoken by her parents but also limited to the parental generation, the preferred language for the younger generation in her family, even when speaking to the parents, has shifted to Mandarin.

To a large extent, the linguistic (in)competence of interviewees, in addition to possible dialectal variation, is responsible for the low recognition rate in the perception tests. The recognition rate in these tests increases significantly if the following condition is applied: interviewees are disqualified and their answers discarded if over 50% of their responses are irrelevant to the target words. Under this refinement, interviewees for session #23, #25, and #33 should be excluded from calculation of the recognition rate in test 1; likewise, results from #30 should be disregarded in test 2, and results from #24 and #26 ignored in test 4. The refined recognition rates for these three tests, alongside the intact result from test 3, are presented in table 9. The original rates are given in parentheses, where applicable.

As can be seen from table 9, the refined calculation of the recognition rate narrows down the range of variation for the overall rates in the different tests. I argue that this figure represents a more valid indicator of the existence of minimal pairs of words contrasting between tone I and tone II across major Prinmi dialects because it excludes interference factors related to incompetence discussed above. This generalization can also be extended to those dialects spoken in Sichuan, according to Lu’s (2001) description of their tonal

|                                              | <b>Lanping</b> |           |           | <i>Word Recognition</i> |
|----------------------------------------------|----------------|-----------|-----------|-------------------------|
|                                              | #1 Qinghua     | #2 Dayang | #3 Dayang |                         |
| 1 n <sub>o</sub> ø <sup>F</sup> soy bean     | 2              | 2         | 0         | <b>0.67</b>             |
| 2 n <sub>o</sub> ø <sup>H</sup> red          | 2              | 2         | 0         | <b>0.67</b>             |
| 3 mē <sup>H</sup> name/<br>10,000            | 2              | 2         | 2         | <b>1.00</b>             |
| 4 mē <sup>H</sup> name/<br>10,000            | 2              | 2         | 2         | <b>1.00</b>             |
| 5 b <sub>i</sub> <sup>F</sup> honey/<br>thin | 2              | 2         | 2         | <b>1.00</b>             |
| 6 b <sub>i</sub> <sup>H</sup> sun            | 2              | 2         | 2         | <b>1.00</b>             |
| 7 dzē <sup>H</sup> drum                      | 2              | 2         | 0         | <b>0.67</b>             |
| 8 dzē <sup>F</sup> be wet                    | 2              | 2         | 0         | <b>0.67</b>             |
| 9 j <sub>i</sub> <sup>H</sup> hundred        | 0              | 2         | 0         | <b>0.33</b>             |
| 10 j <sub>i</sub> <sup>F</sup> louse         | 2              | 2         | 2         | <b>1.00</b>             |
| 11 b <sub>i</sub> <sup>H</sup> be busy       | 2              | 2         | 2         | <b>1.00</b>             |
| 12 βb <sub>i</sub> <sup>F</sup> urine        | 2              | 0         | 2         | <b>0.67</b>             |
| Valid Responses                              | 11             | 11        | 7         | <b>Overall</b>          |
| <i>Interviewee's Performance</i>             | 0.92           | 0.92      | 0.58      | <b>0.81</b>             |

TABLE 8: The perception test by speakers of Lanping Prinmi on Dayang (Test 2)

| Interviewees from     | Lanping | Ninglang    | Yulong | Overall Rate         |
|-----------------------|---------|-------------|--------|----------------------|
| 1. Jinmian [Ninglang] | 0.51    | 0.68 (0.47) | n/a    | <b>0.625</b> (0.471) |
| 2. Dayang [Lanping]   | 0.81    | 0.65 (0.53) | 0.38   | <b>0.637</b> (0.594) |
| 3. Yushi [Lanping]    | 0.75    | 0.60        | 0.45   | <b>0.645</b>         |
| 4. Sanjie [Lanping]   | 0.83    | 0.60 (0.45) | 0.50   | <b>0.658</b> (0.550) |
| <b>Average</b>        |         |             |        | <b>0.641</b>         |

†Figures in parentheses indicate the original recognition rates.

TABLE 9: Refined recognition rates of the perception tests†

categories. This means that it will be possible to trace the origin of these minimal pairs to Proto-Prinmi.

We will now take a further look into details of the minimal pairs in the perception tests. As mentioned above, the number of assumed minimal pairs has been reduced from six to five, after assurance that  $b\tilde{i}^H$  ‘busy’ and  $\beta b\tilde{i}^F$  ‘urine’ do not constitute a minimal pair in Lanping Prinmi. Excluding this pair, table 10 presents recognition rates on the five minimal pairs in the tests, based on the refined calculation. Except for the pair (e), the other four

|     |                            |                 | Test 1 | Test 2 | Test 3 | Test 4 | Overall     |
|-----|----------------------------|-----------------|--------|--------|--------|--------|-------------|
| (a) | $m\tilde{e}^F$             | hair/lower part | 0.86   | n/a    | 0.85   | 1.00   | <b>0.90</b> |
|     | $m\tilde{e}^H$             | name/10,000     | 0.71   | 0.71   | 0.85   | 1.00   | <b>0.82</b> |
| (b) | $dz\tilde{e}^F$            | be wet          | 0.86   | 0.71   | 0.90   | 0.50   | <b>0.74</b> |
|     | $dz\tilde{e}^H$            | drum            | 0.71   | 0.57   | 0.90   | 0.67   | <b>0.71</b> |
| (c) | $b\tilde{i}^F$             | honey/thin      | 0.43   | 1.00   | 0.50   | 0.67   | <b>0.65</b> |
|     | $b\tilde{i}^H$             | sun             | n/a    | 0.57   | 0.55   | 0.83   | <b>0.65</b> |
| (d) | $n\emptyset/nj\tilde{e}^H$ | red             | 0.79   | 0.43   | 0.70   | 0.75   | <b>0.67</b> |
|     | $n\emptyset/nj\tilde{e}^F$ | soy bean        | 0.21   | 0.43   | 0.40   | 0.50   | <b>0.39</b> |
| (e) | $j\tilde{i}^F$             | louse           | 0.57   | 0.71   | 0.45   | 0.42   | <b>0.54</b> |
|     | $j\tilde{i}^H$             | hundred         | 0.43   | 0.36   | 0.35   | 0.25   | <b>0.35</b> |

TABLE 10: Recognition rates of minimal pairs of words

pairs each appear twice in test 3 (see table 5), and the rates provided in table 10 are the average results of the two tokens.

Shown in the descending order of their recognition rates, table 10 indicates that the degree of retention of the minimal pair status varies considerably, probably on account of individual perceptions rather than dialectal differences. The status of minimal pair is considered valid only if the recognition rates of both words in the pair reach the upper quarter of the possible range. According to this, only the pairs in (a)–(c) can be regarded as having retained their minimal pair status among the various dialects included in the perception tests. The unsatisfactory results from the other two pairs can be explained, in part, in terms of segmental variation and morpheme boundness. As noted in example (3), the pair of words in (d) has developed a slight segmental variation in Lanping Prinmi, and this may cause difficulty in recognition for speakers outside Lanping. As for the pair in (e), the first reaction from some interviewees upon hearing the word for ‘louse’ (and especially for ‘urine’) was to laugh, which would suggest they recognized the word. However, when asked what it means, a few declined out of embarrassment. Furthermore, ‘hundred’ is a bound morpheme in Prinmi, so it may have escaped some interviewees’ efforts to match it to a word.

A final remark I would like to make concerns those interviewees disqualified under the refinement condition, as all six are from Ninglang county. Several factors should be noted here. Regionally, more interviewees from Ninglang than other places were involved in this

study. Second, Prinmi-speaking villages in Ninglang are rather widespread, in contrast to those in Lanping, which are geographically quite close to one another, and where middle-aged speakers generally commented that other varieties of Lanping Prinmi were intelligible to them. Speakers from various parts of Ninglang seldom have opportunities for contact with other Prinmi speakers. Their lack of exposure to different varieties of Prinmi has, to some extent, impeded mutual intelligibility of the language even between fluent speakers of Ninglang Prinmi. Being from different villages, well-educated speakers in their 30s tend to use Mandarin for conversation, although they speak Prinmi fluently with their fellow villagers. As such, materials recorded in Lanping Prinmi pose a great challenge to them. Third, in an attempt to increase the “pool” of interviewees, I was not selective in inviting interviewees to participate in the perception tests. Occasionally I was told afterward that someone who had completed the test was only a semispeaker of Prinmi.

**7. CONCLUSION.** Through the perception test, I have answered the question of how other dialects may treat the minimal pairs of words found in Xinyingpan Prinmi: three pairs of words—‘hair/lower part’ and ‘name/ten-thousand’, ‘be wet’ and ‘drum’, and ‘honey; thin’ and ‘sun’—in major Prinmi dialects of Yunnan have been shown to contrast minimally under the same kind of tonal patterns as in Xinyingpan. The overall results of the experiment indicate that the tonal contrast in these minimal pairs of words evinced across a number of dialects cannot arise from coincidence. This finding is significant in several respects: (a) it provides strong evidence for determining the contrastive status of the “homophonous” pairs mentioned in Lu (1983:11; 2001:17); (b) it suggests that the tonal contrast in monosyllabic words is consistent among Prinmi dialects, now that the elusive contrast between tone I and tone II has been captured; (c) it reconciles the discrepant number of tonemes in Prinmi by different linguists, considering the “unstable” phonemic status of tone I vis-à-vis tone II in citation form and connected speech; and (d) it reveals that the melody-tone system is unlikely to be an innovation of one or a few dialects. Of course, conclusive analysis of the tonal system of Prinmi will be feasible only after more substantial fieldwork on more dialects is carried out. The finding of this survey can only serve as a pointer to tonal studies in Prinmi dialectology.

This study has also brought out other findings. The experiment with perception testing unavoidably involved the participation of a number of Prinmi speakers. Being novices to this kind of test, speakers perform better in the company of other participants, when they can discuss or argue about what has been played from the tape. While absolute results cannot be expected from such subjective studies, it is interesting to learn from some speakers, after the perception test, that they knew what these sentences are about. They did not speak of linguistic concepts such as “minimal pair,” but they volunteered to record these words in more natural sentence frames. In this connection, these speakers provided unsolicited, but solid, opinion on the nature of the target words: their native intuition about these pairs of words is that they are not homophones, although they sound very similar to each other within a pair. This spontaneous insight itself is more powerful and valuable than the results gained from the quantitative study.

In working with a number of *Pǔmǐ*, one can feel the effect of language shift noticeably. I encounter people who, being ethnically *Pǔmǐ*, are bilingual but speak no or little Prinmi. This has happened not only to individuals, but also to an entire village in the extreme case.



Moreover, linguistic attrition is also found unexpectedly in otherwise competent speakers of Prinmi, which is reminiscent of structural changes in endangered languages discussed by Tsunoda (2005). All these alarming signs point to eventual death of the language in the foreseeable future, if no intervention is taken. While the total number of Prinmi speakers may appear sizable, some dialects are severely endangered, and some aspects of its grammatical system have started to undergo simplification and/or assimilation to dominant languages.

Finally, it is worth noting that many otherwise separate languages have been regarded as dialects of languages spoken by officially recognized minority nationalities under the sociopolitical culture of China (cf. Bradley 2006), where over one billion people are claimed to be speakers of a single language—Chinese. More research should be conducted on Prinmi and other minority languages/dialects of China so that holistic knowledge about them can be attained while the languages/dialects are still in a relatively viable stage. This is undoubtedly a daunting challenge in the rapidly changing China of today.

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