

Voice quality and voice quality change in the Bai language of Yunnan Province

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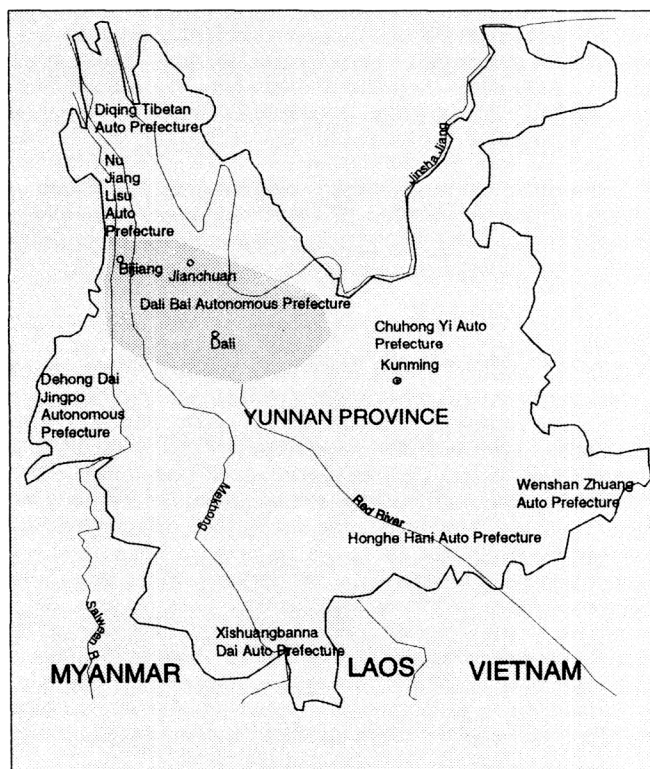
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1. INTRODUCTION. The Bai are one of China's 55 minority nationalities and one of more than twenty in Yunnan Province.¹ Their total population amounts to 1.13 million divided into three vernacular areas, which are found in the extreme west of the province bordering on Burma. The first of these is centered on Dali 大理, where there live 500,000 Bai. The second area is found at Jianchuan 劍川 and the third is at Bijiang 碧江. Jianchuan is representative of the Central Vernacular with a population of 300,000 and Bijiang of the Northern Vernacular with 100,000. They are today called in Chinese *Bai* or *Baizu* 白族, but in the past they have been referred to as the 民家 *Minjia* or 'the minority' in opposition to the Han Chinese. Although the name *Minjia* is mentioned in Scott's *Gazetteer of Upper Burma and the Shan States* (1900), no one is today aware of their presence in Myanmar.

Classification of the Bai language is controversial. The majority opinion states that Bai belongs to the Tibeto-Burman branch of the Sino-Tibetan language family, cf. Matisoff (1991), Fu (1991), Bradley (1993), and Ma et al. (1994:17), though convictions differ about which subgroup it belongs to. There are also conjectures contra a TB affiliation altogether. Paul K. Benedict (p.c.) and recently Sergei Starostin (1994) have suggested that it might, in fact, be a daughter language of Ancient Chinese branching off from it before 200 BC. As Starostin (1994:1) says, "...it turns out that there are virtually no Tibeto-Burman elements in Bai other than those having their counterparts in Chinese, too." Crucial to his argument about the Chinese lineage of Bai are a small number of lexical items. These include: *ne*⁶ 'two'; *ci*⁶ 'four'; *ɲua*⁶ 'outside'; *sua*⁶ 'year'; *phia*⁶ 'lung'. By having these items in Tone 6, he reasons, Bai preserves a correspondence to the Chinese *yinru* category (i.e. syllables of the shape C_iVC_f, where C_i was *voiceless and C_f was a stop). Ancient Chinese possessed a final stop consonant (in his reconstruction) for these words that later (second century BC) changed to a fricative and which subsequently softened and merged with -j (4th c. AD). Contemporary Sinitic forms demonstrate no residues of the original consonant coda for these words.

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MAP 1. Yunnan Province and the Bai Areas

In this paper we will not take a stand on the affiliation question, but note only that the voice quality properties we will describe below may in part be phonologically displaced vestiges of ancient final consonants and perhaps the study of their properties may shed light on this issue. These singular features may suggest for Bai a divergent history arising from an early separation either from Chinese or from TB. And they also suggest that Bai, far from being a bastardized mixture of Chinese and TB, may in fact retain the truest traits of the parental segment inventory in prosodic disguise.

On the descriptive side, notable research contributions to the study of Bai have been made by: Xu and Zhao (1964, 1984), François Dell (1981), Grace Wiersma (1990) and Starostin (1994). Also of relevance are the essays on voice quality in related languages by: Hu and Dai (1964), Ma Xueliang et al. (1981), Maddieson and Ladefoged (1985), and Chen Kang (1988). None of these has treated the richness of voice quality contrasts in Bai.

In our earlier work we have noted systematic voice quality contrasts in both Dali and Jianchuan Bai, cf. Edmondson and Li (1988, 1991). The Dali voice quality contrasts are not as remarkable as those found in Jianchuan. As we will outline below, Jianchuan Bai possesses not only a distinctive set of pitch contrasts, but also four different kinds of voice quality contrasts: (a) *modal voice*, (b) *breathy voice*, (c) *tense voice*, and (d) *harsh voice*. As an aid in this description, we have employed the notion of *setting* as in Laver (1980), according to which various muscle groups are adjusted or *set* to produce different voice-qualities. Jianchuan Bai has an inventory of such *settings* richer to our knowledge than for any other language of China, and equal in complexity (but different in organization) to that found in Chong, a Mon-Khmer language found on the Thai-Cambodian border (Huffman 1985, L-Thongkum 1991, and Edmondson forthcoming).

In Bai the settings can be divided physiologically into:

- (1) *glottal stricture settings*—which result in three types of glottal vibration we will associate with: (a) *modal voice*, (b) *breathy voice*, and (c) *harsh voice*;
- (2) *global settings*—which affect tensing of the speech apparatus from the diaphragm to the lips yielding two types of voice quality, (a) *tense* and (b) *lax* (Hu and Dai 1964);
- (3) *supralaryngeal settings*—which have produced resonance voice-qualities we will associate with the features (a) *nasal* and (b) *oral*.

There are also four pitch trajectories in Bai, contrasting *high level*, *mid level*, *mid to high rising* and *mid to low falling*. Xu and Zhao (1984) distinguish three types of mid-low falling pitch to which they assign values 42, 21, and 31. We did not find differences this large in Jianchuan Bai, cf. Figures 3 and 5.

Indeed, for Jianchuan it is likely that the pitch contours for the mid to low falling tones are not the contrastive feature of the syllable.

In fact, only some but not all of these pitch and voice quality features are combined in actual Bai vocabulary. In particular [±nasal] can combine with both tense and lax voice, with breathy voice, and with harsh voice as well as with three of the four pitch trajectories, thus (3 values of pitch [high, mid, falling] X 2 values [±nasal] X 2 values [±tense]) + 2 [+harsh, ±nasal] + 1 [rising pitch] = 15. Breathy voice quality and harsh voice quality combine only with the mid to low falling pitch trajectory. These combinations are illustrated for a minimal set in Figure 1 using the syllable /tci/.

Pitch Setting	Glottalic stricture setting	Glottalic + Overall setting	Glottalic + Resonance	Glottalic + Overall + Resonance
[high level]	[Modal] jil [tci55] 'much'	[Modal+ Tense] jib [tci55̥] 'to mail'	[Modal + Nasal] jih [tci55] 'gold'	[Modal + Tense + Nasal] jik [tci55̥] 'to perceive'
[mid rising]	jif [tci35] 'restless'			
[mid level]	[Modal] ji [tci33] 'to pull'	[Modal + Tense] jiw [tci33̥] 'leech'	[Modal + Nasal] jim [tci33] 'apricot'	[Modal + Tense + Nasal] jis [tci33̥] 'naughty'
[mid falling]	[Harsh] jid [tci2̥1] 'flag'		[Harsh + Nasal] jit [tci2̥1] 'bracelet'	
[mid falling]	[Breathy] jiq [tci3̥1] 'earth'	[Breathy + Tense] jig [tci3̥1̥] 'to chase'	[Breathy + Nasal] jip [tci3̥1] 'alkali'	[Breathy + Tense + Nasal] jiy [tci3̥1̥] 'arrow'

Figure 1: Pitch and voice quality combinations in Jianchuan Bai

In order to stress the close connection of voice quality and pitch, we have indicated the voice-qualities with diacritics placed under the numerals of pitch contour, instead of writing them under the vowel as is the usual practice. Specifically, we have used two dots under a numeral to signify breathy voice, e.g. 3̥1, a plus sign for tense voice, e.g. 3̥3̥, and a line with two slashes through it, e.g. 2̥1̥ for harsh voice. Laver (1990) employs the plus sign for tenseness in this fashion; Chinese publications usually use a line below a vowel. The symbol for harsh voice is of our own invention.

We are still uncertain about the system of correspondences of Bai tones with traditional tone categories in TB or Chinese. The problem is complicated, as one must tease out originally inherited forms from possibly multiple levels of