Untangling the Word-Tone System: The Basic Tonal and Prosodic Patterns in Choca-ngaca

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Choca-ngaca is a Tibetan language, under the Bodic subfamily of Tibeto-Burman languages [1, 2]. The language has a word-tone system that has been widely recognized in many Tibetan [3, 4], Tamangic [3, 5, 6, 7], Magaric [3] and East Bodish languages [8]. However, even within the word-tone system, patterns run differently across languages, such as the four types discussed in [4]. But due to relatively smaller speaking population, word-tone languages are often understudied, compared to the syllable-tone languages like Sinitic, which can pose biases to the construction of tone typology. Choca-ngaca is such an underdocumented language, spoken by only about 20,000 speakers in the east of Bhutan, with only one descriptive work [1], not to mention any work with a focus on its tone and prosody.

The current study will thus make a descriptive contribution to this underdocumented language by demonstrating a basic profile of its tone and prosody, and also to a more complete typological picture of the tone systems by examining how tone works in a word-tone language with only two tonal contrasts. The results showed that tone in Choca-ngaca falls on the initial syllable of a word, and the high or low category leads the prosodic pattern of the entire word or phrase in the disyllabic context and beyond. Consonantal laryngeal categories also come into interaction with tone to distinguish morphemes.

The data comes from Tongshan dialect in Trashi Yangtse district, as spoken by one female native speaker. Words and phrases were recorded both in isolation and carrier phrase. Due to time limitation, only isolated tokens were checked for acoustic results. The high and low-level tones, as the mere two tonal contrasts of Choca-ngaca, were both found to be able to fall on the vowels following sonorant consonants. On the contrary, voiced vs. voiceless obstruct consonants are found to be followed by different types of tone. The voiced initials are generally identified with low tone, and the voiceless with high tone.

For disyllabic words, the whole prosodic pattern is determined by the initial syllable. As displayed in Figure 1. (1) and 1. (2), the high-toned disyllabic mono- and di-morphemes (e.g., kíli, ‘elbow’) have a higher register in overall than the low-toned ones (e.g., kúto, ‘head’). And the initial syllables of the high-toned words all carry a distinctively higher pitch than that of the low-toned words. However, the pitch contrast between the second syllables of high- and low-toned words is neutralized – very similar registers were attained on the second syllables of all disyllabic words.

Trisyllabic words perform very similar to the disyllables. Figure 2. (1) shows that the words with high tones (e.g., khó-rang-ya, ‘himself also’) have a higher register than those with low tones (e.g., mò-rang-ya, ‘herself also’). Higher pitch is overwhelmingly applied to the initial syllables of the former than that of the latter. But again, a neutralization effect is imposed on the following syllables in all trisyllabic words. Pulling the prosodic performance of di- and tri-syllabic words together, the overall pattern is supposed to depend on the prosody of the first syllable.

Similarly, in multisyllabic noun phrases, the overall prosodic pattern is primarily determined by the tone type of the initial words, as illustrated in Figure 2. (2). The phrases with a ‘H+H’ (e.g., chó-i nyúgu) and ‘H+L’ tone sequence (e.g., chó-i kúto) start at a higher pitch than those with a ‘L+H’ (ngā-i nyúgu) and ‘L+L’ sequence (e.g., ngā-i kúto). The former all has a high-toned word at the onset (e.g., chó-i), and the latter with a low-toned word (e.g., ngā-i).

Moreover, the tone type of the second words, especially their initial syllable, also affects the prosodic pattern. Whether the words are high- or low-toned, they retain the same tonal pattern in a phrasal context as they are alone. This is revealed by the higher pitch on the third syllable of the ‘H+H’ and ‘L+H’ sequences than that of the ‘H+L’ and ‘L+L’ sequences, which is also the initial syllable of the second constituent of the whole noun phrase (e.g., nyúgu vs. kúto in chó-i ngā-i nyúgu and chó-i ngā-i kúto). The neutralization effect has also fallen on the second syllable of the second constituent, i.e., the last syllable of the phrases.
However, the ‘neutralization’ phenomenon for word-tone system need to be further checked by comparing the acoustic performance of isolated vs. unisolated tokens, given the possible interpretation as ‘boundary tone’.

Figure 1: Disyllabic tone patterns in Choca-ngaca.

(1) Disyllabic monomorphemes

![Disyllabic monomorphemes diagram]

Notes:
- A /ó-tówa/: ‘stomach’;
- /kíli/: ‘elbow’;
- /dòwa/: ‘stone’;
- /kùto/: ‘head’

(2) Disyllabic dimorphemes

![Disyllabic dimorphemes diagram]

Notes:
- A /khómto/: ‘roof’;
- /jàŋko/: ‘chest’

Figure 2: Multiyllabic tone patterns in Choca-ngaca.

(1) Trisyllables

![Trisyllables diagram]

Notes:
- A /tɕʰó-tɕʰa-ɪ/: ‘yours (pl.)’;
- /ŋà-tɕʰa-ɪ/: ‘ours’
- /khó-raŋ-ja/: ‘himself also’;
- /khó-raŋ-ɡi/: ‘it is him only’;
- /mò-raŋ-ja/: ‘herself also’;
- /mò-raŋ-ɡi/: ‘it is her only’

(2) Multisyllabic noun phrases

![Multisyllabic noun phrases diagram]

Notes:
- H+H: /tɕʰó-ɲúgu/, ‘your pen’;
- /kʰó-ɲúgu/, ‘his pen’
- L+H: /ŋà-ɲúgu/, ‘my pen’;
- /mò-ɲúgu/, ‘her pen’
- L+L: /ŋà-ɲúgu/, ‘my head’;
- /mò-ɲúgu/, ‘her head’

References