

Tense-Lax Vowels in Tibeto-Burman Languages: A Phonetic Analysis of Lahu

In Tibeto-Burman and Austroasiatic languages, tense-lax vowel distinctions constitute a critical phonological feature, particularly in tonal languages where pitch distinctions are less prominent. These distinctions are intrinsically linked to initial consonants and tonal properties. Despite decades of scholarly attention, the phonetic correlates of "tense" versus "lax" remain contested. Early definitions attributed the distinction to articulatory tension—e.g., tense vowels involve pharyngeal constriction and muscular tension, while lax vowels lack such tension. However, the opposition of tense and lax vowels cannot be simply attributed to the state of tension or relaxation of the tongue muscles during articulation. In fact, tense and lax vowels in different language systems show significant differences in phonetic characteristics. Moreover, the term "tense-lax" has not yet had a strictly defined and widely accepted definition in the field of phonetics at home and abroad.

This study explores the issue of "tense-lax" sounds, taking the Lahu language as a case study. Lahu belongs to the Yi branch of the Tibeto-Burman language family, and is closely related to languages like Lisu and Hani. Previous research indicates that Lahu's tense-lax contrasts involve vowel differences, tonal distinctions, and phonation mechanism variations.

This paper investigates the phonetic features and historical evolution of tense-lax sounds in Lahu and Tibeto-Burman languages from the perspective of experimental phonetics, combined with historical comparative linguistics. The investigation focuses on the Lahu Na dialect, and the recorded materials discussed are based on a special investigation of multiple Lahu speakers conducted in Kunming in January 2010. This study carries out a comprehensive acoustic analysis from the aspects of initials, finals, tones, and phonation types. Six speakers (three males and three females) were selected, and the acoustic parameters of 90 pairs of tense-lax contrastive words were measured using Voicesauce software. The measured parameters include the first and second formants of monophthongs, duration and fundamental frequency, harmonic energy difference, harmonic-to-noise ratio, and cepstral peak prominence (CPP), etc.

The results show that the tense-lax contrast in Lahu is reflected not only in vowels and tones but also in initials and the entire syllable. Thus, we conclude that tense-lax is not a distinction of a single segment but a feature of the entire syllable. Therefore, we propose that tense-lax vowels can be understood in combination with the entire syllable. The so-called tense-lax vowels can also be regarded as the opposition between tense and lax syllables, which helps to understand the historical phonetic evolution of Tibeto-Burman languages.