THE PHONETIC REALIZATION OF VOICE QUALITY IN LOUMA UISHUI

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The Uishui dialect of Louma, an Akoid language is Laos, has one syllabic nasal and 11 distinctive vowels with two contrastive phonation types, lax and constricted. Louma Uishui deviates from Akha in three ways: plosive phonation, contrastive aspiration, and loss of velar fricatives. Since all syllables are open, the slightly breathy or lax voiced vowels can be accompanied by a non-contrastive voiceless glottal approximant [h], whereas tense phonation is realized through creaky vowels, or creaky or tense voiced vowels followed by a glottal stop. These so-called constricted vowels have been described for other Tibeto-Burman languages (Terell 2009, Bradley 1982). A phonological analysis of Louma Uishui reveals that the contrastive feature constricted voice can also be realized through glottalized onsets: constricted syllables in Louma Uishui often have tense, preglottalized or imploded consonant onsets. This means that the auditory cues for this phonation type are not only found in the vowel as the syllable kernel, with a possible non-contrastive but phonation-related coda, but also—and sometimes only—in the consonantal onset. This phenomenon has not been described in literature on Akoid languages yet. The present study seeks to investigate in which way these three phonetic features interact. It will determine the linguistic context of the variation in phonation and examine what the three voice modifications have in common to allow them to form a single contrastive suprasegmental class. The observations suggest that phonation is not a merely segmental feature, providing a good example for the syllable as the underlying unit for phonological organization in this type of language (cf. Terell 2009).

Keywords: Louma phonology, Akoid, phonation, lax voice, tense voice, constricted, glottalized.

Examples:

Realization of constricted syllables (tense voice is marked with subscript quotation marks):

/ɕímama̰/	[ɕí.m̥a.m̥a̰ʔ]	'long'
/da̰n̰ɛ́/	[ɗa̰.n̰ɛ́ ~ ɗaʔ.n̰ɛ́]	'short in length'
/tzy.ma̰.ma̰/	[ɗʑɤ.ʔm̥a.m̥a̰ʔ]	'tall'
/pa.tʰɔ̰́/	[ɓa.tʰɔ̰́ʔ ~pá.tʰɔ̰́ʔ]	'outside'
/bḭ̀.ɤ/	[ɓḭ̀ʔ.ɤʔ ~ ɓḭ̀.ɤʔ]	'to give'
/tá̰.le/	[t̰á̰ʔ.le ~ t̰á̰.le]	'sharp'
/jɔ̰̀.ɕiʔ /	[jɔ̰̀.ɕiʔ ~ ʔjɔ̰̀.ɕiʔ]	'urine'
/gṵ̀.ɤ/	[ɠṵ̀.ɤʔ ~ gṵ̀.ɤʔ/	'to sew'

While conducting a phonological analysis in order to develop a Lao-script based orthography for a bilingual education project[1] in an Akoid language in Laos, differentiating the expected creaky or constricted voice (laryngealized and/or final glottal) and lax voice (modal to breathy) was rather challenging because the male speakers interviewed for the data collection generally spoke with creaky voice. A close look at phonetic details showed that constricted syllables showed final glottal stops or creaky voice, stop onsets often were preglottalized, and sonorant onsets had tense voice preceding tense and modal vowels. The present study investigates how contrastive phonation contrast in Louma Uishui is accomplished. It will determine the linguistic context of the variation in phonation and examine what

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the three voice modifications have in common to allow them to form one phonemic suprasegmental class.

How do we go about identifying phonation? The vocal tract is a resonance chamber (actually a system of chambers, see Esling et al) that can be changed in shape which leads to different signals. Phonation is generated in the larynx, a subsystem of the overall vocal tract. We can measure the glottalic airflow through inverse filtering (extracting the mere glottal airflow from a the combination of glottal and supraglottal airflow). Problem: we need to have access to both instruments and speakers. Another way is measuring harmonics. For this we only need recordings and a computer program. Problem: one needs to know how to do it.This presentation therefore is based on auditory judgement since field workers involved in language development do not have the instruments or technical knowledge for an acoustic analysis. When we assume that the native speakers can identify contrastive phonation, there must be auditory cues that the trained ear can pick up. The problem with a language like Akha is that phonation types can be hard to make out because the vowels can sound pretty much the same, whether they are constricted or lax. Acoustic cues therefore must be given elsewhere in the syllable.

Why is this possible? Phonological explanation: Henderson's feature shuffling → in languages with essentially monosyllabic morphemes, phonological contrast cannot be accomplished based on segments alone, due to the lack of variability. Suprasegmental options have to be explored. Within the phonetic/ phonological domain of suprasegmentals these would be length, pitch, and phonation. Properties of suprasegmental features are (1) they occur simultaneously with a segment, and (b) they may stretch over a whole syllable.
Phonetic explanation: Overall laryngeal settings, i.e. laryngeal tension [+/-constricted] may be employed for a whole syllable (tense onset and vowel), not only for the nucleus (vowel) or the phonetic rime (tense vowel and register-related non-segmental final glottal closure).

What phonetic realizations characterize the phonological feature tense voice in Louma Uishui?

1. Creaky voice (C)
2. Tense voice (T)
3. Laryngeal constriction realized as tense or glottalized onsets (ˀ-)
4. Final glottal stop as another from of laryngeal constriction (-ʔ).
5. Modal voice and tense/preglottalized onsets or final glottal closure.

Possible combinations of the above features:
    C + ʔ
    T + ʔ
    M + ʔ
ʔ + C + ʔ
ʔ + T + ʔ
ʔ + M + ʔ
ʔ + C
ʔ + T

Examples based on compounds including:

/mà̰/ 'sun'	/ma̱/ 'body part'	/má̱/ 'female'

[bŋ.mʷàʔ ~ ŋ.mà̰ʔ] 'sun'	[ˀma̰.bɯ̍ʰ ~ ma̰.bɯʰ] 'pus'	[a.má̰ʔ] 'mother'
[ŋ.kó̰.lo̰.màʔ] 'day'	[ʔṵ̀.maʔ ~ ʔṵ̀.ma̰]'belly'	[kʰa̰.má̰ʔ] 'wife'
[ɲ.ɕɥ.lo.màʔ] 'morning'	[nɯŋ.maʔ ~ nɯ̃.maʔ] 'heart'	[mã́.má̰ʔ] 'older sister'
[ŋ.mà̰.dṵ̀.kʰɛ̰̀] 'east'		
[ˀŋ.mà̰.gà̰.kʰɛ̰̀] 'west'		

In summary, tense voice in Louma Uishui is realized with some form of laryngeal constriction occurring on the onset as preglottalization, or on the kernel as tense or creaky voice, or a final glottal constriction, or a combination of two or even all three of these features. This points at the segmental-syllabic interface of phonological organization which is not a new observation (Henderson's 'feature shuffling'). Louma Uishui data provide another small example for the influence of the syllable on segmental and suprasegmental organization.

What is this observation good for?
- Hearing → transcription & analysis; application in language development.
- Raised awareness of laryngeal settings other than the better known phonation types breathy, modal, and creaky voice;
- The role of the syllable in phonological analysis: tense phonation is not a segmental phenomenon as it manifests on either the coda or the nucleus of the syllable, or both. For the nucleus, too, tense voice can have a suprasegmental realization as voice quality, as well as sequential as final constriction.

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