

The phonetic realization of voice quality in Louma Uishui

- Language:

Southern Lolo, Akoid, Louma, spoken in Laos, Phongsali district. Three clans: Pala, Muitoe, Uishui.

- Community:

Farmers. Monolingual women and children; men can speak some Lao, some also Kmhmu', most can speak Louma Pala (biggest of the three clans).

Rough comparison with other Akha languages

- Native speakers call themselves Louma Uishui. Called Rshi Akha by Gregerson (2011).
- Akha, Hani, Rshi/Uishui preserve proto *a where other Southern Lolo languages develop a rounded back vowel (Hansson 1989).
- Akha and Hani have fricatives where Rshi/Uishui has plosives, and plosives where Rshi/Uishui has fricatives.
- Rshi/Uishui often has compounds for Akha and Hani monosyllables; similar to but not identical with Akha or Hani which is why Gregerson postulates a separate branch of the Southern Lolo Akoid tree.
- Since Rshi or Uishui is a Louma variety, it probably would be Louma that should occur in this tree.
- 80% shared cognates with Akheu.

Data collection

- March 26 – April 2, 2012, using Lao, Akheu, Akha, Louma Pala, a little Thai, a little English...
- ...major communication problems: many Lao words in the word list were unknown, and meaning of Uishui translation not always clear.
- 1148 items recorded.

Recording procedure

- Four native speakers in their late thirties to mid forties discussed how to translate the Lao word list into Uishui (often supported by curious visitors).
- Two of the speakers were recorded.
- One speaker actually felt comfortable being recorded and knew how to use the carrier phrase. ('I didn't say (last recorded word), it is (new word) I said. (new word) (new word)')
- The analysis is based on this speaker who was available for the whole word list. Age 44, knows some Lao, and Pala.

The Aim

- Conducting a phonological analysis in order to develop a Lao-script based orthography for a bilingual education project.
- An assumption: Laryngeal settings in Akoid languages comprise of three contrastive pitches with two phonation types:
 - -constricted: lax voice (modal to breathy)
 - +constricted: tense voice (creaky voice) and possible final glottal closure

The Challenge

- Differentiating the expected tense and lax voice was difficult because the male speakers interviewed for the data collection generally spoke with creaky voice.
- An observation: Tense or creaky voice and optional final glottal stops may occur on lax voice syllables in partially conditioned, partially free allophonic variation.

The Reason

- The majority of the men smoke opium.
- Or perhaps: It is not just creaky voice that makes a difference.

The Solution:

A close look at phonetic details:

Constricted syllables may have

- implosive, preglottalized or tense onsets,
- tense or creaky vowels,
- a final glottal stop,
- or a combination of any of these features.

Linguistic Background: Akoid Syllable Structure

- * (C)V syllables if final or syllabic nasals are interpreted as vowels (Hansson 2003, Dellinger (1969) 2009). Vowel sequences are individual syllables, not diphthongs. The second vowel is always /a/, possibly representing topic particles or inactive classifiers like the one found with kinship terms and plants (Hansson 2003).
- * Grammaticalization of tone and phonation: verb stem alteration manifested in phonation and vowel quality for directional aspects, tone change for tense marking. → good example for the syllable playing a crucial role in the phonological organization of Sino-Tibetan languages (cf. DeLancy 1992).

Akoid Phonology: Tone

- * Two contrastive voice qualities (Bradley 1977), traditionally is seen as part of the tone system. Five or six tones:
- * High, Mid, Low on unconstricted or lax syllables; Mid, Low on constricted or tense, i.e. creaky or glottalized syllables (Katsura 1970, Bradley 1977).
- * Lewis (1973): High on creaky vowels, especially in borrowed words and personal names. Hansson (2003): Three tones for both registers.

Akoid Phonology: Consonants

- * Voicing distinction for plosives, affricates and fricatives (Lewis 1968, Dellinger 1968)
- * Aspiration redundant, only occurs with lax syllables. In names, aspirated stops occur in constricted syllables (Bradley 1977).
- * General contrast of voiced, voiceless, and aspirated plosives in constricted syllables (Hansson 2003).
- * Postpalatal nasal interpreted as palatalized alveolar nasal by Hansson (2003), alveolopalatal nasal by Hu/Dai 1964 (Bradley 1977).

Akoid Phonology: Vowels

- * Three unrounded front and three rounded back vowels /i e ε u o ɔ/, two rounded front and two unrounded back vowels /y ø ɯ ɤ/, and an open central vowel /a/.
- * Syllabic nasals /m̩, ŋ̩/ are interpreted as vowels. Predictable vowel transition after consonantal onsets: closed central vowel for /m̩/, and an open central vowel for /ŋ̩/ (Hansson 2003, Dellinger 1968).
- * Lewis (1968, 1973): nasalized open central vowel. Dellinger (1968): /ɯ/ can be followed by /m/, and /a, ɤ/ can be followed by a nasal adjusting its place of articulation to the following consonant which indicates nasalization in this context.

LOUMA UISHUI CONSONANTS

/b/ bì ‘give’	/d/ dì ‘pay’	/ɖ/ ɖú ‘shave’	/g/ gák ^h á ‘fall down’
/p/ papá ‘cheek’	/t/ tù ‘hit, beat’	/ɸ/ ɸù ‘suckle’	/k/ kaŋɣ ‘work’
/p ^h / p ^h á ‘exchange’	/t ^h / t ^h ù ‘one’	/ɸ ^h / mɛ̀ɸ ^h ò ‘arrow’	/k ^h / k ^h àlé ‘ashes’
/m/ maló ‘betelnut’	/n/ ná ‘hurt’	/ɳ/* sìɳá ‘know’	/ŋ/ ŋà ‘five’; ŋ ‘two’
/b ^j / lɔ̀b ^j ó ‘kapok’	/d ^j / d ^j amó ‘yg. sibling’	/g ^j / pég ^j á ‘rib’	*The alveolo-platal nasal is not interpreted as a palatalized alveolar nasal since only voiced plosives occur palatalized, not any other nasals.
/dz/ mìdza ‘fire’	/z/ buuzà ‘burn’	/ʒ/ ʒítò ‘gums’	
/ts/ tsá ‘stab’	/s/ masù ‘banana’	/ç/ açi ‘blood’	
/w/ wapó ‘bamboo’	/l/ lámɛ ‘tongue’	/j/ jámø ‘grass’	
/v/ -vé verb affix	/h/ huɖà ‘rat’		

VOWELS AND SUPRASEGMENTALS

- 11 distinctive vowel qualities, syllabic velar nasal (no /m/). Vowel /a/ can be followed by a nasal of the same place of articulation as the following plosive (cf. Dellinger (1968) for Akha), e.g. [nambé?] ‘crest’. Interpreted as prenasalization because there are prenasalized stops in syllable-initial position.
- Suprasegmentals: Interpretation I: six tones: three with lax voice and three with tense voice. Interpretation II: register system with three tones and two phonation types (phonation independent of pitch contrast). The two phonation types will be referred to as lax and tense. In the transcriptions, lax syllables are unmarked, tense syllables are marked with a subscript tilde (cf. Terrell 2009).
- Tone: Pitch is contrastive on the three levels High, Mid, Low.
- Phonation: Each tone is found with both tense and lax voiced vowels.
- Lax voice: Ranging from modal over lax to breathy; Tense voice: ranging from modal over stiff to creaky, pre- and postglottalization.

- A. Examples for phonologically lax voiced syllables with and without creaky voice:

(1) Lax syllable /lo/ found in the words for day, morning, noon.

[ɲɕɯ^lomaʔ] ‘morning’

[ɲulo^lɔ̀iʔ ~ ɲ:ulo^lɔ̀iʔ] ‘noon’

[ɲlo^lɔ̀iʔ] ‘noon’

The following syllable is tense/constricted (final glottal stop) but the preceding syllable isn't → modal voice on /-lo/.

Assimilation of phonation:

[ɲkɔ̃^lomaʔ] ‘day’

Both preceding and following syllable have tense voice (creaky voice or final glottal stop), assimilation of phonation type → creaky voice alone is unlikely to be contrastive.

- More examples for phonologically lax voiced syllables with and without creaky voice:

(2) Syllabic nasal in other ‘sky’-related words:

[ɲɕɹlomaʔ] ‘morning’ ▶

[ɲuloɕìʔ ~ ɲ:uloɕìʔ] ‘noon’ ▶

[ɲloaɕìʔ] ‘noon’ ▶

[ɲkekemɣʔ ~ ɲg̊eg̊emə̀ʔ] ‘mist, fog’ ▶

Modal voice preceding modal (or non-tense) voice.

[ɲkìʔ ~ ɲg̊ì] ‘night’(8) ▶

[ɲkɔ̌lomàʔ] ‘day’(9) ▶

Modal voice preceding creaky voice.

[ɲt̚hú] ‘rain’(7) ▶

Creaky voice preceding creaky voice.

Next

The process of assimilation appears to vary: sometime conditioned, when both preceding and following syllable have tense voice, sometimes free, as in [ɲt̚hú] ‘rain’ assimilated to the following tense syllable, and [ɲkìʔ] where the phonation on the nasal is not assimilated to the following tense syllable.

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- B. Examples for constricted syllables with and without creaky voice:

(1) ñṭà ~ ñṭaʔ ‘sky’

The syllabic nasal (usually velar, sometimes assimilated to the place of articulation of the following consonant), is interpreted as modal since this morpheme always occurs with modal voice in the ‘sky’-related compounds for sun, day, night, different day times, and fog. Phonation is assimilated to the second syllable realized with creaky voice, or creaky voice and final glottal constriction.

(2) ηm̩àʔ ~ ηm̩àʔ ‘sun’

Tense syllable realized with

(a) tense onset, tense to modal vowel, and a final glottal stop, or

(b) creaky vowel with final glottal closure.

C. MORE EXAMPLES FOR THE PHONETIC REALIZATION OF CONSTRICTED SYLLABLES

/p̣at ^h ɔ̣/	[[?] ḅa.t ^h ɔ̣? ~ p̣á.t ^h ɔ̣?]	‘outside’
/ḅìɣ̣/	[[?] ḅì?̣.ɣ̣? ~ [?] ḅì.ɣ̣?]	‘to give’
/çíma _̣ ma _̣ /	[çí.ma.ma?]	‘long’
/ṭále/	[ṭá?̣.le ~ ṭá.le]	‘sharp’
/da _̣ ɲé/	[da.ɲé ~ da?̣.ɲé]	‘short in length’
/tzyṃama _̣ /	[dzy. [?] ma.ma?]	‘tall’
/j̣òç̣i /	[j̣ò.ç̣i? ~ [?] j̣ò.ç̣i?]	‘urine’
/j̣òk ^h ì/	[j̣ò?̣.k ^h ì ^h ~ j̣ò.k ^h ì ^h]	‘excrement’
/g̣ù.ɣ̣/	[g̣ù.ɣ̣? ~ [?] g̣ù.ɣ̣?]	‘to sew’
/ɲḍùḍù/	[[?] ɲ̣.ḍù.ḍù ~ ɲ̣ [?] .ḍu.ḍù]	‘to swim’

*Tense voice marked with subscript quotation marks

Constricted nasal-initial syllables

tense voice [+ constricted]		
/m̩à/ ‘sun’	/m̩a/ ‘body part’	/m̩á/ ‘female’
[bŋ.m ^w à? ~ ŋ.m̩à?] ‘sun’	[ʔm̩a.bu ^h ~ m̩a.bu ^h] ‘pus’	[a.m̩á?] ‘mother’
[ŋ.k̩.ɿ̩.m̩à?] ‘day’	[ʔù.ma? ~ ʔù.m̩a] ‘belly’	[k ^h ̩a.m̩á?] ‘wife’
[ŋ.ɕ̩.ɿ̩.m̩à?] ‘morning’	[nuŋ.ma? ~ nũ.ma?] ‘heart’	[m̩ǎ.m̩á?] ‘older sister’
[ŋ.m̩à.d̩.k ^h ̩] ‘east’	[ɕí.m̩a.m̩a?] ‘long’	
[ʔŋ.m̩à.g̩.k ^h ̩] ‘west’	[d̩zy.ʔm̩a.m̩a?] ‘tall’	

→ Preglottalized/tense/modal onsets

→ Creaky/tense/postglottalized nuclei

PHONETIC REALIZATIONS OF CONSTRICTED VOICE

- Creaky voice (C)
- Tense voice (T)
- Laryngeal constriction realized as tense or glottalized onsets (ʔ-)
- Final glottal stop as another form of laryngeal constriction (-ʔ).
- Modal voice (M) and tense/preglottalized onsets or final glottal closure.

Possible combinations:

C + ʔ

T + ʔ

M + ʔ

ʔ + C + ʔ

ʔ + T + ʔ

ʔ + M + ʔ

ʔ + C

ʔ + T

Context: no clear patterns

LARYNGEAL SETTINGS

MADDIESON/LADEFOGED 1996, WATKINS 1997, ESLING ET AL. 2005, MOISIK 2013, KUANG/KEATING 2013 AND MANY MORE

Parameters:

(1) Larynx height, (2) glottal aperture, (3) glottal stricture, (4) partial vocal fold vibration, (5) epiglottal involvement.

- Raised larynx with stiff vocal folds, lowered larynx with slack vocal folds.
- Voiced/voiceless, tense/lax.
- Tense phonation: more overall vocal fold contact with briefer but slower changes than modal or lax voice. Lax phonation more symmetrical than tense (but not a sinus wave).*
- Closed and relaxed: modal. Back abducted: creaky. Front abducted: breathy.
- Combination of glottal and epiglottal constriction: harsh voice.

* Kuang, Jianjing, and Patricia Keating. 2013. Glottal articulations in tense vs lax phonation contrasts. *The Journal of the Acoustical Society of America* 134.5: 4069-4069.

FINDINGS FROM YI

Kuang/Keating 2013 “**The articulatory differences between these tense and lax phonations, involving glottal aperture and how glottal closure is made, are not extreme, but apparently they are consistent enough, and perceptually robust enough, to support this linguistic contrast.**”

- Sharing of properties for tense and creaky voice, and for lax and breathy voice:
- Tense and creaky: more vocal fold contact (CQ), and/or vocal fold contact increases more slowly than modal voice (DECPA/PIC).
- Lax and breathy: less vocal fold contact and/or vocal fold contact increases faster than modal voice.

APPLICATION TO LOUMA UISHUI

- Impact on the onset:
 - constricted larynx → tense voice
 - tense vocal folds → preceding glottal stop instead of smooth opening (voiceless onsets) or start of vibration (voiced onsets).
- Impact on vowel: tighter vocal fold closure during vibration → tense or creaky voice.
- Adding phonetic final:
 - (1) constricted larynx, vocal folds less abducted, more vocal fold contact, slower change → less momentum, “choke”; natural reflex of tense register.
 - (2) utilized as redundant feature to make identification of phonation type easier (→ Mon-Khmer sonorant-finals)

CONCLUSION

- Different realizations of 'constricted' voice add redundancy to help identify contrastive feature;
- Contrast involves the whole syllable, not only the vowel.
- Segmental-syllabic interface of phonological organization (Henderson's feature shuffling)

BENEFITS

- Hearing: transcription and analysis, application in language development
- Raised awareness of laryngeal settings other than the better known and easily identifiable phonation types breathy, modal, and creaky voice