

Minor Syllable Tones in Kammu

Jan-Olof Svantesson & Anastasia Mukhanova Karlsson

Department of Linguistics
Lund University

{jan-olof.svantesson; anastasia.karlsson}@ling.lu.se

Abstract

The existence of sesquisyllabic words consisting of one ‘minor’ and one ‘major’ syllable is often mentioned as a characteristic property of the Mon-Khmer language group, but the existence of contrastive tones on minor syllables has been described only for (Northern) Kammu. In this article we investigate the acoustic properties of the the minor syllable tones, and also give a brief overview of their morphology and their historical development.

1. Background

Kammu belongs to the Mon-Khmer branch of the Austroasiatic language family. It has some 500,000 speakers, most of them in Northern Laos, but there are also some in adjacent parts of Thailand, Vietnam and China. This article deals with the Yùan dialect spoken in Nam Tha province in Laos, in the northern part of the Kammu area. Northern Kammu is a tone language with two tones, high and low. Other dialects spoken to the east and south of the the Yùan area are non-tonal.

Tones were not original in Austroasiatic, but have developed especially in the northernmost languages [12], and also in Vietnamese (as shown in a classic article by Haudricourt [2]). Other Mon-Khmer languages (such as Lamet (Rmeet), Parauk (Wa), Mon and varieties of Khmer) have developed a “register” contrast involving different voice qualities or phonation types [5].

The existence of tones in Northern Kammu is a fairly recent innovation. The high and low tones have developed from an earlier contrast between syllable initial voiceless and voiced consonants [10, 12]. For example, Northern Kammu *kláaŋ* ‘eagle’ (with high tone) corresponds to Eastern Kammu *klaaŋ*, while *klàaŋ* ‘stone’ (low tone) corresponds to Eastern Kammu *glaaŋ*. Another example is Northern Kammu *ráaŋ* ‘tooth’ and *ràaŋ* ‘flower’, which correspond to *raaŋ* and *raaŋ* in Eastern Kammu. As these examples show, voiced and voiceless initial consonants have merged in Northern Kammu, the reflex being the unmarked consonant in the voiceless ~

Table 1: Northern Kammu consonants.

p	t	c	k	ʔ
p ^h	t ^h	c ^h	k ^h	
ɓ	ɗ			
	s			h
m	n	ɲ	ŋ	
	l			
	r			
w		j		
ʔw		ʔj		

voiced pair (voiceless for stops and voiced for sonorants). Except for this development, the dialects differ only marginally, and they are mutually comprehensible without any difficulty. This kind of tonogenesis is phonetically motivated [4, 6], but is seldom attested in this clearly documented form. The same mechanism has caused a split of the tone systems in many East and Southeast Asian languages [3, 7, 13].

The Northern Kammu consonant system is given in Table 1 for reference; see [10] for more details on the phonology. Eastern Kammu has plain voiced unaspirated stops and voiceless sonorants in addition to the consonants in Table 1.

2. Minor syllables

As is well known, a sizeable part of the vocabulary of many Mon-Khmer languages consists of ‘sesquisyllabic’ [7] words which have one stressed ‘major syllable’ preceded by an unstressed ‘minor syllable’. The phonological representation of a Kammu minor syllable consists of either one or two consonants, and in addition there is a vowel nucleus which is not phonemic, but can be regarded as an epenthetic schwa vowel. The actual pronunciation of this schwa in Kammu differs between different dialects and speech styles, but is in the [a ~ ə ~ i] area. An example is the ethnonym /kṁ.múʔ/ [kə̀m.múʔ] ~ [kəm.múʔ] ~ [k̄m.múʔ]. For the sake of

Table 2: Minor syllables in Northern Kammu.

p	pn	pŋ	pl	pr		
t	tm	tn	tŋ	tl	tr	
c	cm	cn	cŋ	cl	cr	
k	km	kn		kl	kr	
		thn		thl	phr	
c ^h						
k ^h			k ^h ŋ		k ^h r	
s	sm	sn	sŋ	sl	sr	
h	hm	hn	hŋ	hl	hr	
l	lm	ln	lŋ		lr	
r	rm	rn	rŋ	rl	rr	
	pt	pc	pk	ps	pŋ	pj
tp	tt	tc	tk	ts	tŋ	tw
cp	ct		ck	cs		cw
kp	kt	kc	kk	ks	kŋ	kw
			c ^h k			
k ^h p						
sp	st	sc	sk		sŋ	sw
	ht				hŋ	hw
lp	lt	lc	lk	ls	lŋ	lw
rp	rt	rc	rk	rs	rŋ	rw
						rj

Table 3: *Minor syllable tone contrasts.*

km̌.nòh	‘cutting-board’ (<kóh ‘to cut’)
km̌.nòh	‘weeding period’ (<kòh ‘to weed’)
p̌j.kà?	‘to wear by the ear’
p̌j.kà?	‘shy’
p̌r.nò?	‘broom’ (<pò? ‘to sweep’)
p̌r.nò?	‘carrying-sling’ (<pò? ‘to carry in a sling’)
ťr.nàŋ	‘warp’ (<tàŋ ‘to warp’)
ťr.nàŋ	‘bridge’
ǩr.nèp	‘tongs’ (<kéep ‘to grasp’)
ǩr.nèp	‘belt’ (<kèep ‘to carry in a belt’)
ǩr.lis	‘to break a taboo’
ǩr.lis	‘trigger’ (<klis ‘to release’)
ǩr.wèj	‘unsown field’ (<kwéj ‘to leave unsown’)
ǩr.wèj	‘food for guests’ (<kwéj ‘to invite’)
p̌r.là?	‘wedge’ (<plá? ‘to split with a wedge’)
p̌r.là?	‘name of a stream’
p̌r.nàn	‘thrifty’
p̌r.nàn	‘tying’ (<pàn ‘to tie’)
ťr.nàp	‘stick for piercing’ (<tàp ‘to pierce’)
ťr.nàp	‘cover’ (<tàp ‘to cover’)

convenience we use the spelling *Kammu* when writing in English. (The form *Khmu*, which is common in the literature is due to Smalley’s (in our opinion unsatisfactory) analysis of the Eastern Kammu form /km̌.m̌u?/ [9]).

In a minor syllable whose phonological representation is just one consonant, this consonant is the onset and is followed by the schwa, e.g. /ř.wàaj/ [ř.wàaj] ‘tiger’.

There are two types of minor syllables, which differ in the phonotactics: they can have ‘bound codas’ and occur only when the major syllable has the same coda, e.g. *c^hk.bík* ‘expressive for blue’. Most sesquisyllabic words of this type are formed by morphological processes, as is the case for expressives, words which denote how the speaker perceives something with the senses. Obstruents, glides, and the palatal nasal form bound codas. Minor syllables with other codas can combine with any major syllable.

3. Minor syllable tones

Most Mon-Khmer languages with a high proportion of sesquisyllabic words are non-tonal, either with a “register” contrast (such as Lamet) or with the original voiceless ~ voiced consonant contrast preserved (e.g. Mlabri [8]).

Vietnamese, the best known tonal Mon-Khmer language, has lost all sesquisyllabic words, which became monosyllabic, and similar developments took place in some of the northern Mon-Khmer tone languages as well [11]. Northern Kammu has, however, preserved its sesquisyllabic words, and also developed tones. There is even a tone contrast on minor syllables, a phenomenon that has not been reported for any other language as far as we are aware. In the rest of this article we will give acoustical evidence for this, and also discuss the relation of the minor syllable tones to the morphology and the historical development.

The functional load of the minor syllable tone contrast is low, only ten minimal pairs (Table 3) have been found. As seen in Table 3, many of these words are nouns derived from verbs by the infix *-rn-* (or its phonologically conditioned variants *-r-* and *-mn-*); see § 6 below.

Table 4: *F0 values in minor syllables.*

	mean	standard deviation	t-value
km̌.nòh	139.5	4.04	8.54
km̌.nòh	121.8	3.06	$p < 0.001$
p̌j.kà?	132.4	2.07	8.22
p̌j.kà?	108.4	6.19	$p < 0.001$
p̌r.nò?	133.5	3.45	9.62
p̌r.nò?	111.8	4.31	$p < 0.001$
ťr.nàŋ	130.8	4.83	6.05
ťr.nàŋ	113.2	5.27	$p < 0.001$
ǩr.nèp	129.5	3.27	7.38
ǩr.nèp	110.5	5.39	$p < 0.001$

4. Acoustic investigation

In order to investigate the acoustic properties of the minor syllable tones, the words of the first five pairs in Table 3 were recorded with a male Northern Kammu speaker (Kàm Ràw (Damrong Tayanin), age 64). The recordings were made at the Dept. of Linguistics in Lund using a DAT recorder. The speaker read the words in isolation from a list where they were presented in random order. The list was read six times (for the second pair, only five recordings could be analysed). The acoustic analysis was made in the *Praat* speech analysis program designed by Paul Boersma and David Weenink.

The highest F0 value in the schwa vowel of the minor syllable (e.g. of [ə] in [kóm.nòh]) was measured for each recording of each word. The mean values and standard deviations as well as the results of *t*-tests within each pair are shown in Table 4. Since the means are based on 6 words, except for the second pair with only 5, the degree of freedom for the tests was 10 (8 for the second pair).

The difference between the high and low minor syllable tones is very clear; it is significant at the 0.001 level for all five pairs. The difference is about 20 Hz, comparable to the difference between the two tones in major syllables [14].

An example is shown in Figure 1, which shows the F0 curves of *ťr.nàŋ* ‘warp’ and *ťr.nàŋ* ‘bridge’. In this figure, the F0 difference is seen in the minor syllable [tər] and it also spreads into the onset [n] of the major syllable [nàŋ]. The vowel [a] and coda consonant [ŋ] of the major syllable have similar F0 values in the two words, however. In some cases, the higher F0 of a high-tone minor syllable increases F0 even in the major syllable vowel (whose tone is phonologically low in all words in Table 3; cf. also § 6 below)

5. Tonal phonology of minor syllables

All minimal pairs in Table 3 have a minor syllable of the type /CC/, where the onset consonant is a voiceless unaspirated stop; furthermore, the major syllable tone is low. This is no coincidence; in fact, minor syllable tones are contrastive only under these circumstances, and they can be determined by rules in all other cases.

The rules for the minor syllable tones should be seen in the light of the historical development of tones in Northern Kammu in general. Major syllables have an onset consisting

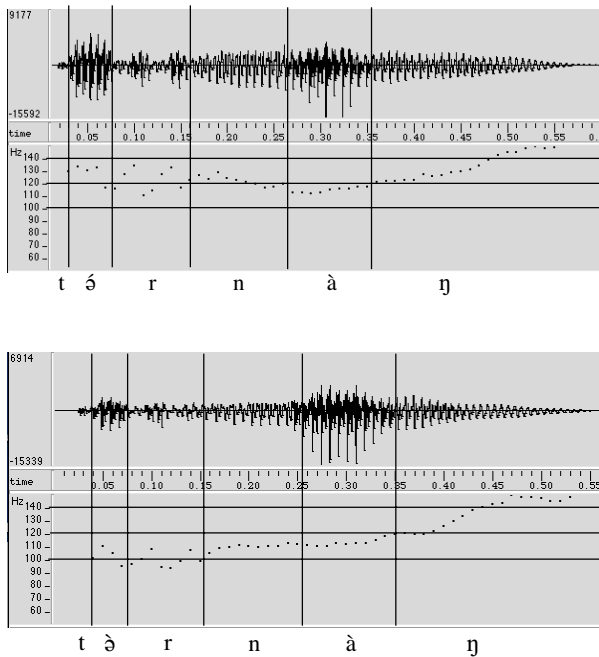


Figure 1: F0 curves for *tr.naŋ* (top) and *tr.naŋ* (bottom)

of one or two consonants. Any single consonant (Table 1) can be an onset, but the only allowed onset clusters are *pr*, *tr*, *cr*, *kr*, *pl*, *kl*, *kw*, *k^hw*. In a monosyllabic word, the tone is determined by the first consonant of the onset. If this consonant is a voiceless unaspirated (non-glottal) stop (i.e. *p*, *t*, *c*, *k*) or a (non-glottalized) sonorant (*m*, *n*, *ɲ*, *l*, *r*, *w*, *ʃ*) the tone can be either high (*kláaŋ* ‘eagle’) or low (*klàaŋ* ‘stone’), corresponding to voiceless (*klaaŋ*) or voiced (*glaaŋ*) versions of these consonants in non-tonal Kammu dialects (and in Proto-Kammu). If the onset is an aspirated stop (*p^h*, *t^h*, *c^h*, *k^h*), a voiceless fricative (*s*, *h*), a (slightly implosive) voiced stop (*ɓ*, *d*) or a glottalized glide (*ʔw*, *ʔj*), the tone is always high (*p^háan* ‘to kill’; *sɔʔ* ‘dog’), and if the onset is the glottal stop, the tone is, somewhat unexpectedly, always low (*ʔəm* ‘water’). Those consonants that decide the tone completely correspond to only one consonant in non-tonal Kammu (and consequently in Proto-Kammu).

The possible combinations of minor and major syllable tones are summarized and exemplified in Table 5. Minor syllables consisting of only one obstruent consonant influence the major syllable tone so that sesquisyllabic words with these minor syllables always have the same tone on the minor and the major syllable. When the minor syllable consists of a voiceless unaspirated stop, the two tones can be either high or low, but when it consists of a voiceless fricative or an aspirated stop, both syllables must have high tone. The two remaining minor syllables consisting of only one consonant, *r* and *l*, do not influence the major syllable tone; they always have low tone, and the major syllable tone can be either high or low.

Minor syllables consisting of two consonants have their own tone and do not affect the major syllable tone. If the minor syllable onset is a liquid, the minor syllable tone is low, and the major syllable tone can be either high or low. If the

minor syllable onset is a voiceless fricative or an aspirate, the minor syllable tone is high, and the major syllable tone can be either high or low. Finally, if the minor syllable onset is a voiceless unaspirated stop, both the minor and major syllable tones can be either high or low, but due to a dissimilation process, the combination high–high does not occur (see below).

6. Minor syllable morphotonology

Kammu is inflectionally isolating but has a derivational morphology which uses prefixes and infixes. Morphological processes are often accompanied by tone changes which can be predicted from the (original) types of consonants involved. We will illustrate this with some examples.

As mentioned above, many of the words given in Table 3 illustrating the minor syllable tone contrasts are nouns formed from a verb by an infix, e.g. *pɛ.nɔʔ* ‘broom’ from *pɔʔ* ‘to sweep’ vs. *pɛ.nɔʔ* ‘carrying-sling’ from *pɔʔ* ‘to carry in a sling’. In such cases, the tone contrast on the (monosyllabic) verb has been moved to the minor syllable of the derived noun. In non-tonal Eastern Kammu (and thus in Proto-Kammu), the exemplified verbs are *pɔʔ* ‘to sweep’ vs. *bɔʔ* ‘to carry in a sling’, and the original voiceless ~ voiced contrast is reflected as a high ~ low tone contrast in Northern Kammu. The Proto-Kammu forms of the derived nouns are **prnɔʔ* and **brnɔʔ*, and by the tonogenesis rules, the major syllable **nɔʔ* beginning with a voiced sonorant, gets low tone in Northern Kammu in both words, while the minor syllables **pr* and **br* get high and low tone, respectively. In Eastern Kammu, the contrast between voiced and voiceless stops in minor syllable onsets has been lost, so that the words ‘broom’ and ‘carrying-sling’ are homonymous, both being pronounced *pr.nɔʔ* [1].

As seen above, a minor syllable consisting of a single obstruent must have the same tone as the major syllable; in effect, a minor syllable of this kind imposes its tone on the following major syllable. For example, words derived by the causative prefix *p-* always have high tone, irrespective of the tone of the base: *p.kían* ‘to take up’ < *kían* ‘to go up’; *p.cúur* ‘to take down’ < *cúur* ‘to go down’.

A final important process in Kammu morphotonology is the dissimilation of high tones: If a minor syllable consisting two consonants begins with a voiceless unaspirated stop and the major syllable tone is high, the minor syllable tone must be low, irrespective of its ‘etymological’ tone. Thus the causative prefix *pn-* gets high tone if the major syllable is low, but, against expectations, it gets low tone if the major syllable tone is high: *pɛ.lèep* ‘to make (sth) fine’ (< *lèep* ‘fine’); *pɛ.lèep* ‘to make a pack’ (< *lèep* ‘pack’). This is one (lexically determined) variant of the causative prefix, and its onset is identical to the prefix *p-* which, as seen above, always causes high tone.

This dissimilation rule is the reason for the distribution of high and low tones on sesquisyllabic words of this type (Table 5), and also one reason why all minimal pairs for minor syllable tones have low tone on the major syllable. The non-existence of a contrast between high–low and high–high tone sequences in this type of words may also explain why, as mentioned in § 4 above, the high minor syllable tone in the pairs in Table 3 sometimes spreads phonetically over the (phonologically low) major syllable.

Table 5: Combinations of minor and major syllable tones

minor syllables	tones	examples
p, t, c, k	H–H L–L	<i>k.múul</i> [kə.múul] ‘silver’ <i>č.mə̀</i> [cə.mə̀] ‘rope’
s, h, c ^h , k ^h	H–H	<i>ś.cáaŋ</i> [sə.cáaŋ] ‘elephant’
l, r, lC, rC	L–H L–L	<i>ř.háaŋ</i> [rə.háaŋ] ‘bamboo’ <i>lṁ.pò</i> [ləm.pò] ‘cow’
pC, tC, cC, kC	H–L L–H L–L	<i>pṛ.kà?</i> [pəŋ.kà?] ‘to wear by the ear’ <i>kṁ.mú?</i> [kəm.mú?] ‘person’ <i>pṛ.kà?</i> [pəŋ.kà?] ‘shy’
sC, hC, p ^h C, t ^h C, c ^h C, k ^h C	H–H H–L	<i>c^hk.ḃík</i> [c ^h ək.ḃík] ‘expressive for blue’ <i>hm.ràŋ</i> [həm.ràŋ] ‘horse’

7. Minor syllables consisting of one stop

Basically, all Kammu dialects have the minor syllables given in Table 2, and even the non-tonal dialects lack a voiced ~ voiceless contrast in minor syllable onsets (unlike the case in major syllable onsets). The tones in Northern Kammu prove that a voiced ~ voiceless (unaspirated) stop contrast existed in minor syllable onsets in Proto-Kammu, however. We saw one example of this in § 6, and another case will be shown here. In Northern Kammu there is a contrast between high and low tone in sesquisyllabic words where the minor syllable consists only of an unaspirated stop: e.g. *k.né?* ‘rat’ vs. *k.má?* ‘rain’. Eastern Kammu has voiceless stops in both cases (*k.ne?* vs. *k.ma?*), but Proto-Kammu must have had **k.ne?* vs. **g.ma?*. This is confirmed by forms from other Mon-Khmer languages, such as Semelai *gmaa* (G. Diffloth, p.c.). In this case as well, Northern Kammu minor syllable tones have preserved a contrast that has been lost in non-tonal Kammu dialects.

8. References

- [1] Ferlus, Michel, 1977. L’infixe instrumental *rn* en khamou et sa trace en vietnamien. *Cahiers de linguistique Asie Orientale* 2, 51-55.
- [2] Haudricourt, André-Georges, 1954. De l’origine des tons en vietnamien. *Journal Asiatique* 242, 69-82.
- [3] Haudricourt, André-Georges, 1961. Bipartition et tripartition des systèmes de tons dans quelques langues d’Extrême-Orient. *Bulletin de la Société de Linguistique de Paris* 56, 163-180.
- [4] Hombert, Jean-Marie; Ohala, John J.; Ewan, William G., 1979. Phonetic explanations for the development of tones. *Language* 55, 37-58.
- [5] Huffman, Franklin, 1976. The register problem in fifteen Mon-Khmer languages. In *Austroasiatic studies*, P. Jenner; L. Thompson; S. Starosta (eds.). Honolulu: University Press of Hawaii, vol. 1, 575-589.
- [6] Löfqvist, Anders; Baer, Thomas; McGarr, Nancy S.; Story, Robin Seider, 1989. The cricothyroid muscle in voicing control. *The Journal of the Acoustical Society of America* 85, 1314-21.
- [7] Matisoff, James A., 1973. Tonogenesis in Southeast Asia. In *Consonant types and tone*, L. Hyman (ed.). Los Angeles: University of Southern California, 71-95.

- [8] Rischel, Jørgen, 1995. *Minor Mlabri: a hunter-gatherer language of Northern Indochina*. Copenhagen: Museum Tusulanum Press.
- [9] Smalley, William, 1961. *Outline of Khmu? structure*. New Haven: American Oriental Society.
- [10] Svantesson, Jan-Olof, 1983. *Kammu phonology and morphology*. Lund: Gleerup.
- [11] Svantesson, Jan-Olof, 1988. U. *Linguistics of the Tibeto-Burman Area* 11, 64-133.
- [12] Svantesson, Jan-Olof, 1989. Tonogenetic mechanisms in Northern Mon-Khmer. *Phonetica* 46, 60-79.
- [13] Svantesson, Jan-Olof, 2001. Tonogenesis in Southeast Asia – Mon-Khmer and beyond. In *Proceedings of the Symposium Cross-linguistic studies of tonal phenomena*, Sh. Kaji (ed.). Tokyo: Tokyo University of Foreign Studies, 45-58.
- [14] Svantesson, Jan-Olof; House, David. Tone production, tone perception and Kammu tonogenesis. unpublished ms.