Syllable boundaries in Kammu

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Abstract
In this note I report on a small investigation of the phonetic correlates of the boundary between the major and minor syllables in Kammu words.

Introduction
The Kammu language is spoken by some 500,000 people in northern Laos and in adjacent areas of Vietnam, China and Thailand. It belongs to the Mon-Khmer group of the Austroasiatic language family. A characteristic feature of most Mon-Khmer languages is that many morphemically words are sesquisyllabic, consisting of one unstressed minor syllable followed by a stressed major syllable. The vowel in the minor syllable is an epenthetic schwa, which we do not write in our usual transcription of the language. An example of a sesquisyllabic word is the ethnonym km.mú itself (also meaning ‘human being’, like many other ethonyms). The dialect of Kammu dealt with here is a tone language with two tones, high (denoted ’]) and low (’). See Svantesson (1983) for more details on this language.

Syllable boundaries
The problem dealt with here is the signalling of the boundary between the minor and the major syllable. Because of various restrictions on the structure of minor and major syllables, the place of the syllable boundary is unambiguous in most cases. The phonological representation of a minor syllable consists of one or two consonants, and usually an epenthetic schwa vowel is pronounced after the first vowel. Examples are k.má [kámá] ‘rain’ and km.mú [kámímu] ‘Kammu’ with the minor syllables k- [k]- and km- [kím-], respectively. A major syllable onset can consist of one consonant or it can be a cluster of two consonants. Only the clusters pl-, pr-, tr-, cr-, kl-, kr-, kw- are allowed as major syllable onsets. If a word begins with a three-consonant combination consisting of a consonant which may be a minor syllable onset (p, t, c, k, s, l, r) and a cluster which may be a major syllable onset, the place of the syllable boundary may be either after the first or after the second consonant. For example, rkl- is a cluster of this kind, so the phoneme string rklàk can be parsed into syllables in two ways: r.klàk or r.klàk. Both of these are phonotactically possible words in Kammu, but only the first one, rk.làk ‘name of an evil spirit’ has been attested.

We have not been able to find any minimal pair of words distinguished only by the place of the syllable boundary, but several near-minimal pairs exist, where the initial consonant cluster and the major syllable vowel are the same:

rk.làk  ‘name of a spirit’
r.klàk  ‘expressive of many round things’
rk.làák  ‘expressive of turned away’
r.klàák  ‘expressive of many floating things’
s.klák  ‘expressive of bare neck’
pc.ràap  ‘pig mesentery’
p.cráap  ‘fix with a fork’

There is no doubt that a phonological syllable boundary is situated at the indicated place in these words (see the Discussion below). It is, however, not entirely clear if the place of the syllable boundary is signalled phonetically, and since no minimal pair has been found, this question could not be decided by a perception test. Instead, I made a small acoustic investigation. The four near-minimal pairs given above were read by Damrong Tayanan (Kàm Raw), a native speaker of Kammu, approximately 65 years old. He read the words six times in isolation. The recordings were made at the Dept. of Linguistics, Lund, and they were analysed in Praat.

Results
For the first three pairs, the contrast involves the major syllable onset cluster kl- vs. a single consonant onset l-. The most salient difference between these pairs is the duration of the [l] segment, shown in Table 1. This is significantly shorter when the [l] is part of an onset cluster kl- than when it forms the whole onset. Thus the place of the syllable boundary is signalled by this duration. This is also illustrated in
Table 1. Duration of the segment [l] as an entire major syllable onset or as a part of an onset cluster. The durations of [l] in the six readings of each word are shown as well as mean values, standard deviations and the results of t-tests.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Mean (ms)</th>
<th>SD (ms)</th>
<th>t (10)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>rk.làk</td>
<td>95</td>
<td>85</td>
<td>77</td>
<td>79</td>
</tr>
<tr>
<td>r.klàk</td>
<td>66</td>
<td>62</td>
<td>63</td>
<td>56</td>
</tr>
</tbody>
</table>

Figure 1. Waveform and spectrogram for rk.làk (top) and r.klàk (bottom). The duration of the frame is 0.6 s.

Discussion

As mentioned above, there are good phonological reasons for dividing the syllables in the way done above. One kind of proof for this comes from a certain type of Kammu singing, called hr.[l] where each syllable is sung with approximately the same duration, so that the syllable division is in a sense exaggerated and can be observed more clearly. Another property that can be utilized is that certain minor syllable codas, including the stops p, t, c, k, occur only in words where the major syllable has the same coda; this implies, for instance, that the syllable division pc.ràap is ill-formed, since the minor syllable coda -c would require the same consonant c as the major syllable coda (as in the well-formed word pc.ràac). Most such words are formed morphologically by infixation of the word-final consonant as the coda of the minor syllable; see Svantesson (1983) and Svantesson and Karlsson (2004) for more information on Kammu minor syllables. Other arguments for the syllabification used here come from the reduplicative morphology of Kammu, see Svantesson (1994).

Conclusion

The results of this study show that the syllable boundary is signalled phonetically. The most obvious correlate is in the duration, where [l] (and probably the other liquid [r] as well) is significantly longer when it forms the entire major syllable onset than when it is part of an onset cluster such as kl- or cr-. Other phonetic boundary signals were found as well.

The results of this investigation indicate that the place of the syllable boundary is phonologically contrastive and signalled on the
 phonetic surface in Kammu, although the functional load of this distinction is low. In this way Kammu differs from most other languages, where syllable division is not contrastive, at least not in underlying representations (see e.g. Blevins 1995:221ff.), but can be derived by rules from the segment string. To mention two examples from my favourite languages, this is the case in Mongolian, where syllabification is decided by sonority relations (Svantesson et al., 2004), and also in southern variants of Swedish, where the syllable division can be inferred from the influence of /r/ on a preceding vowel in the same syllable, proving that obligatory rule-based resyllabification takes place in inflected or derived words as well as in compounds and even longer phrases (Svantesson, 2003).

References