Prominence and Mora in Mongolian

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Published in:
Proceedings of International Conference on Speech Prosody 2004

2004

Prominence and Mora in Mongolian

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Introduction

Different opinions about Mongolian prominence structure can be found in the literature. The most puzzling problem is the nature of lexical stress in this language, and neither its placement nor its phonetic nature have been given any final description.

We have earlier performed an acoustic investigation of vowel durations, quality and f0 to find if any of these three parameters functions as signalling one particular syllable as the most prominent one. Basing ourself on this investigation we reject the existence of lexical stress in Mongolian and find prominence as functioning only at the phrasal level [1, 7].

In the present article two problems are investigated. Firstly, phrasal accentuation is analysed as signalled by tonal means, and we show that the timing of the tonal gestures is best described within a mora analysis of Mongolian. Secondly, we argue for an analysis where nasals in the syllable coda have a moraic function.

1. Phonological features of Mongolian

Mongolian uses vowel duration phonologically. Among several analyses of vowel length proposed in the literature, we adopt the one which assumes that long vowels are found only in initial syllables, and that non-initial vowels either are phonologically short (phonemic) vowels or epenthetic (non-phonemic) vowels; see e.g. [6]. Under this analysis, the opposition between long and short vowels is found only in initial syllables. Non-phonemic vowels are acoustically centralised variants of the corresponding initial vowels. We will refer to them as schwas in the following discussion. Mongolian has vowel harmony of the pharyngeal (or [ATR]) type [4].

Schwa epenthesis is governed by syllabification rules. The syllable structure is (C)V(V)(C)(C)(C). The "sonority law" applies, so that syllable rhymes have decreasing sonority. Basically, voiced consonants have higher sonority than voiceless ones, although there are some additional rules; see [5] for details. Ill-formed consonant clusters are resolved by inserting schwas. For example, /pugt/ "all", where the final consonant cluster /gt/ has decreasing sonority, surfaces as [pugt], while /atg/ "end", whose final consonant cluster /tg/ has increasing sonority, needs a schwa and is realised as [a.təg].

2. Focal accentuation

Tonal courses are found to function on the phrasal level in Mongolian. Focus is signalled by a rising gesture on the focused word [7]; see Figure 1.

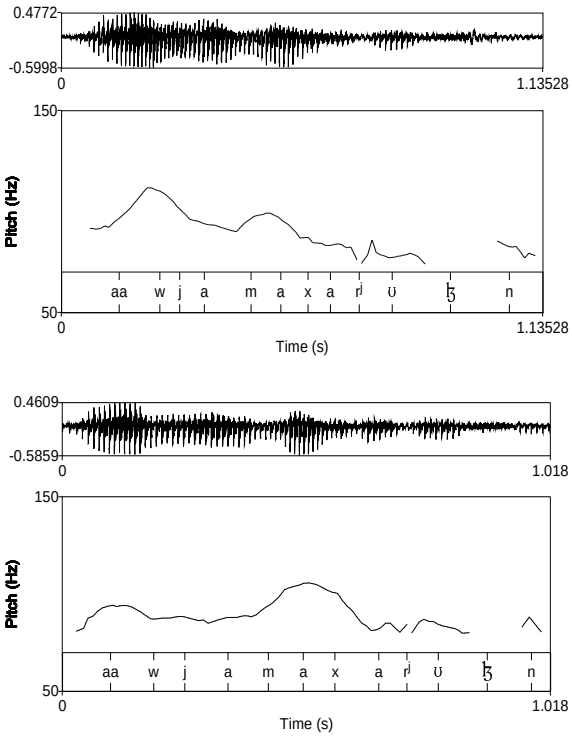

Figure 1: *Tonal courses of the sentences aaw jama xarʲʊɮn "Father herds goats" uttered with focal accent on the first word (top) and on the second word (bottom).*

Within the framework of autosegmental phonology, we analyse the focal gesture as bitonal LH. The synchronisation of this gesture with the segmental level is:

```
  L  H                L     H
  |  |                |     |
C V V. C V          C V. C V/ə
```

Introducing mora counting for Mongolian gives us a more systematic analysis of the timing of the focal gesture. If long vowels are counted as two morae and short and epenthetic vowels as one mora we get the following representation:

```
  L  H                L     H
  |  |                |     |
C V V. C V          C V. C V/ə
  |  |                |     |
  μ  μ                μ     μ
```

Under this analysis, the focal gesture is placed on the first two morae, and no consideration of syllable structure is needed. The H often spreads over the whole focused word, and it is the timing of the beginning of the gesture which is constant. Even non-focused words can get a LH gesture, which we call accentuation beside focal accentuation. With stronger focus the H in the LH gesture changes, getting higher f0 values (see Figure 1), and therefore we regard it as the most important part of the focal gesture. The second mora, with which the H is synchronised, is then the anchor point for phrasal prominence.

3. Moraic segments

From the analysis above it is clear that vowels have moraic status. We performed further investigations to see if any other segments function moraically, as e.g. nasals do in Japanese (see e.g. [3]).

Schwa epenthesis determined by the sonority law as described above applies to careful lexical pronunciation, but is often lacking in actual speech. For the sake of convenience we will refer to this as "schwa deletion", although it would be more exact to describe it as lacking application of schwa epenthesis. In our (so far unpublished) previous study we found that non-phonemic, and even phonemic, vowels can be deleted despite the resulting violation of the sonority law. For phonemic vowels, this is most often found before or between aspirated obstruents (which are phonetically preaspirated [2]) or /s/, and in this environment we analyse it as devoicing of the vowel. Non-phonemic vowels are deleted more frequently than phonemic vowels. In our material, schwas in word-internal syllables are deleted in 40% of the cases, while schwas in final syllables are deleted only in 27% of all cases.

In words with the phonetic structure [CV.CəC], the deletion or retention of the schwa is connected with the mora structure. The deletion of the moraic schwa in words with this structure leads to realignment of the focal H. Two alternatives are possible (Figure 2): (b1) the H is moved to the preceding vowel, and both tones of the gesture are realised within it; (b2) the final consonant has a moraic function and the H is moved to it.

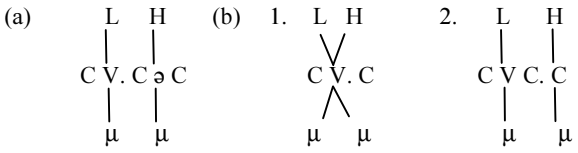

Figure 2: *Possible alignments of the focal LH gesture before (a) and after (b) schwa deletion in a [CVCəC] word.*

3.1. Investigation and results

In order to investigate which of the strategies in Figure 2 was used, we analysed schwa epenthesis in read speech recorded from six speakers of the Halh dialect. The acoustical analysis was performed using the PRAAT program.

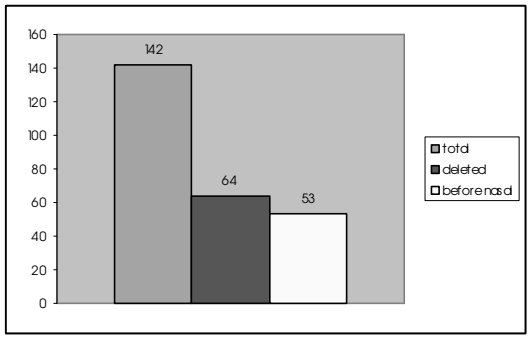

Figure 3: *Proportion of deleted epenthetic vowels in words with [CV.CəC] structure.*

Totally we analysed 142 words with the word structure [CV.CəC] (i.e. words with the phonological representation /CVCC/, where the final consonant cluster violates often the sonority law, so that a schwa vowel is present in careful pronunciation of isolated words). Schwa deletion was found in 64 of these words (45%), and 53 (83%) of these 64 words have a final nasal (Figure 3). Therefore we chose to investigate words with the structure [CV.CəN] (where N is a nasal) in more detail. In our material there were 88 words with final nasal, and schwas were deleted in 53 of them, i.e. in 60%. In contrast, schwa deletion took place only in 20% (11 cases of 54) of the words with the structure [CV.CəC], where the final consonant is not a nasal.

Another decisive factor controlled in the study is the focused or non-focused status of the [CV.CəN] words. As Figure 4 shows, there is a strong correlation between the accentuation status of a word and schwa deletion. Somewhat unexpectedly, schwa deletion took place in 47 out of 66 (71%) focused words with this structure, but only in 6 out of 22 (27%) non-focused words.

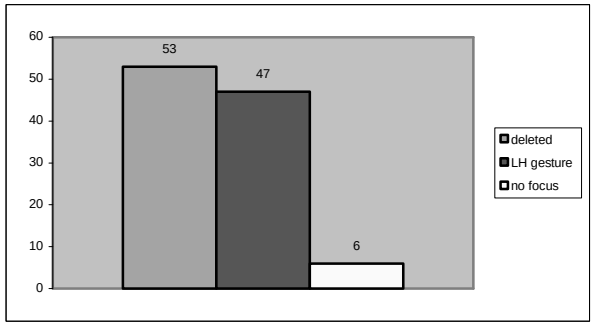

Figure 4: *Proportion of deleted epenthetic vowels in words with [CV.CəN] structure. Totally 88 words were analysed.*

4. Discussion

Epenthetic schwa vowels occur in careful lexical pronunciation of Mongolian in order to satisfy syllable wellformedness conditions, which can be analysed in terms of

a sonority law. In actual speech these schwas are frequently deleted although this leads to violations of the sonority law. In addition to this, we found reduction or deletion of short phonemic vowels, which we analyse as the result of vowel devoicing.

In words with the structure [CV.CəC], where the final consonant is non-nasal, the second mora is carried by the schwa vowel, and these words show a strong tendency to retain the schwa. The schwa is often deleted before a nasal, however, and this event is conditioned by the focal status of the word, as seen above. The H of the focal gesture is placed on the nasal (as shown in Figure 2:b2), and this is a strong argument for analysing certain nasals as having a moraic function.

Mongolian has five nasal phonemes [6]: /m, m^j, n, n^j, ŋ/. The velar nasal occurs only in syllable codas, but the others occur both in onsets and codas. As is the case in Japanese as well, moraic nasals are found only in the coda position. Our data indicates that only the dental and velar nasals have moraic function. This is illustrated in a striking way by the behaviour of final nasals when they are assimilated to a following consonant. An example is the question word /xitŋ/ "how much" in our material. This word is always in a focused position, but the deletion or retention of the schwa vowel depends on the quality of the final nasal after assimilation to the following segment. When the nasal has dental or velar articulation, the schwa is always deleted. When the nasal gets bilabial articulation by assimilation to the following segment, the schwa is retained (Figure 5).

We found also opposite cases where a final /m/ is assimilated to a dental place of articulation. In these cases the schwa is always deleted (in focused position).

Although we accept a mora analysis, we do not reject the syllable as a phonologically relevant unit in Mongolian. We assume that the mora is relevant for rhythmical and prosodic counting. Morae are grouped into syllables, that become the domains within which some phonological processes apply (e.g. the application of the sonority law).

How can we then explain that a schwa is inserted in [CV.CəC], but not in (focused) [CV.CəN] words? One explanation could be that a Mongolian word has to contain at least two morae. The epenthetic vowel is an articulatorily underspecified element with vocalic features, and it is inserted into the /CVCC/ structure to satisfy the two morae requirement. In non-focused words with /CVCN/ structure the two morae condition is satisfied, but not the sonority law (any CN coda is ill-formed). Because the LH gesture is not relevant in non-focused words, the sonority law gets priority, and a schwa is inserted: [CV.CəN]. In focused words with the same structure the assignment of the LH gesture has the highest priority. The moraic N gets the H tone and also becomes syllabic. Resyllabification takes place in these cases: [CVC.N], and the sonority law is not violated.

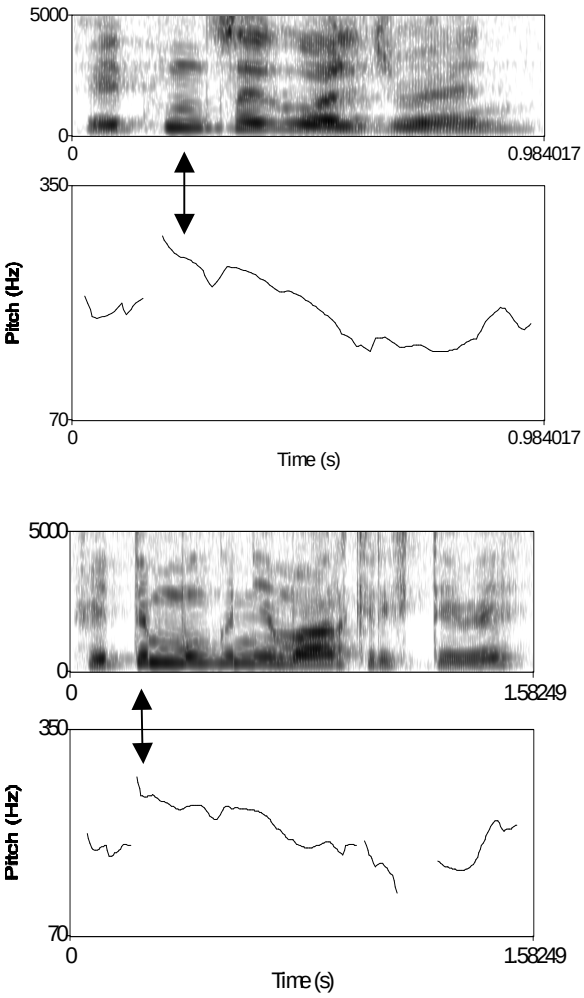

Figure 5: *Spectrogram and F0 courses of the utterances xitŋ ts^{h}ag^{h}t pɥltʃ pain? (above) and xitŋ moŋgni mark xirgt^{h}e wee? (below). /xitŋ/ is realised as [xitŋ] and [xitəm], respectively. The arrow shows the focal H, timed with [ŋ] in the first utterance and with [ə] in the second one.*

5. Conclusions

We regard Mongolian as mora counting. Mora structure is relevant in describing rhythmic and prosodic features of Mongolian. It is the second mora position that is important in its role as anchor point for prosodic gestures, so the H tone of the focal LH gesture is aligned with the second mora. Vowel deletion can be explained by the mora structure. The second mora position in a bimoraic word is retained except before the coda nasals [n ŋ] in focal position. This suggests that not only the vowels, but also the two nasals [n ŋ] have moraic function in Mongolian.

References

[1] Karlsson, A.M. 2003. Rhythmical and accentual structure of Mongolian. In *Proceedings of the 15th International congress of phonetic sciences*, Solé, M.-J.; Recasens, D.; Romero, J. (eds.). Barcelona: Universitat Autònoma de Barcelona, 2465-2467.

[2] Karlsson, A.M.; Svantesson, J.-O. 2002. Preaspiration in Halh Mongolian. Paper presented at the Workshop on Mongolic languages, Taibei, September 2002.

[3] Nagano-Madsen, Y. 1992. *Mora and Prosodic Coordination.* Lund University Press.

[4] Svantesson, J.-O. 1985. Vowel harmony shift in Mongolian. *Lingua* 67, 283-327.

[5] Svantesson, J.-O. 1995. Cyclic syllabification in Mongolian. *Natural language and linguistic theory* 13, 755-766.

[6] Svantesson, J.-O. 2003. Khalkha. In *The Mongolic languages*, J. Janhunen (ed.). London: Routledge, 154-176.

[7] Svantesson, J.-O.; Tsendina, A.; Karlsson, A.M.; Franzén, V. forthc. *The phonology of Mongolian.*