

## Vowel contrast in endangered Northeast Asian languages: a case study of Buriat and Ewen

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Mongolian and Tungusic languages are characterized as ‘tongue root harmony’ languages (Novikova 1960, Ard 1981, Kim 1989, Li 1996, Zhang 1996 for Tungusic and Qinggertei 1959, 1963, Svantesson 1985 for Mongolic), along with West-African languages (Ladefoged 1964, Stewart 1967, Lindau 1974 *inter alia*). While there have been relatively many acoustic studies on the vowel contrasts in West–African languages (Lindau 1979, Hess 1992, Fulop et al. 1998 for Niger-Congo and Jakobson 1980, Guion et al. 2004 for Nilo-Saharan), phonetic studies of the tongue root contrast in Altaic languages are rarely attempted, partially because many Altaic languages are far to reach and in danger of extinction. The ASK REAL (Altaic Society of Korea Researches on the Endangered Altaic Languages) project team (cf. Kim *et al.* 2008) has been devoted to the preservation of spoken data of the endangered Altaic languages, which enabled us to attempt this study.

In this study, three pairs of vowel phonemes in Buriat ( $\partial$ - $a$ ,  $u$ - $\mathcal{U}$ , and  $o$ - $\mathcal{o}$ ), a Northern Mongolic language, and four pairs in Ewen ( $\partial$ - $a$ ,  $u$ - $\mathcal{U}$ ,  $o$ - $\mathcal{o}$ , and  $i$ - $\mathcal{I}$ ), a Northern Tungusic language are analyzed to find the acoustic correlates of the tongue root contrast in Altaic languages. We analyzed 2309 (Buriat) and 908 (Ewen) word-initial short vowels extracted from basic words recorded by two Buriat speakers with different dialects and one Ewen speaker. The frequency, amplitude, and bandwidth of the first three formants were measured at the middle of the steady state of each vowel. One-way ANOVA was performed on the ‘tongue root contrast’ factor (ATR, Advanced Tongue Root, vs. non-ATR), for each pair of vowels for each speaker.

The results show that F1 (Halle and Stevens 1969) is the most reliable acoustic cue. As in West-African languages (Fulop *et al.* 1998, Guion *et al.* 2004), ATR vowels have significantly lower F1 than their non-ATR counterparts (for each pair,  $p < .01$ ). However, F1 does not distinguish ATR mid back vowel ( $o$ ) from non-ATR high back vowel ( $\mathcal{U}$ ) in Buriat. F2 was significantly higher in ATR vowels for Buriat speaker 1, but not so reliable for Buriat speaker 2 and for the Ewen speaker, especially for the distinction between rounded back vowels.

The normalized A1-A2 (Fulop *et al.* 1998), which represents ‘spectral slope’, is also a reliable cue in both languages, except for  $o$ - $\mathcal{o}$  pair of Buriat speaker 2 (for each pair excluding the exception,  $p < .05$ ). In Buriat, however, ATR vowels show significantly *lower* A1-A2 values (‘creakier’ voice) than their non-ATR counterparts (‘breathier’ voice), which is exactly the *opposite* of what is found in the West-African tongue root contrast. This suggests that Buriat may employ a different articulatory mechanism for tongue root contrast from Ewen and West-African languages.

### Selected References

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