Non-adjacent phonological dependency effects on Khalkha Mongolian speech perception
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This paper investigates native speakers’ awareness of non-adjacent phonological dependencies, specifically vowel harmony patterns and vowel pattern frequency in Khalkha Mongolian (Khalkha), and provides the first psycholinguistic work on Khalkha. In three experiments, this paper shows that not only is speakers’ behavior affected by the form of non-adjacent phonotactic patterns, but also by their frequency. This is somewhat surprising as previous learnability studies on non-adjacent dependencies using artificial languages and pattern learning experiments have shown that subjects acquire these dependencies only with difficulty (e.g., Cleeremans & McClelland 1991; Gomez 2002; Newport & Aslin 2004; Finley & Badecker 2008). Although much native language work on phonotactic restrictions (e.g., Bailey & Hahn 2001) and phonological pattern frequency also exists, it has focused only on adjacent phonological patterns (e.g., Coleman & Pierrehumbert 1997; Frisch, Large & Pisoni 2000; Pierrehumbert 1994; Vitevitch, Luce, Charles-Luce & Kemmerer 1997). This paper explores this gap in the literature using native language data on non-adjacent dependencies.

Khalkha displays [ATR] vowel harmony: with some exceptions, words must contain either [+ATR] vowels or [-ATR] vowels, but may not have both (e.g., Rialland & Djamouri 1984; Svanessson et al 2005). Specifically, this paper examines whether vowel pattern frequency, the frequency with which non-adjacent vowels appear in CVCVC Khalkha words, has any effect on participants’ familiarity ratings and reaction times. Further, corpus analyses reveal that there are significantly more [-ATR] than [+ATR] words (p<0.005; Corpus: LaCross 2010). Therefore, this paper also examines whether the difference in harmonic class size (as a kind of type frequency) influences the effect of vowel pattern frequency on participants’ ratings and reaction times.

In Experiment 1, 20 adult native Khalkha speakers gave scalar familiarity ratings on 450 CVCVC native words. Items were controlled for word and vowel pattern frequency (4 item categories of the high/low permutations). Mixed design ANOVA results revealed a significant effect of word frequency (p<0.001) and vowel pattern frequency (p<0.005) on familiarity ratings.

Experiment 2 isolated the effects of vowel pattern frequency from the potential influence of word frequency. 40 adult native speakers of Khalkha gave scalar well-formedness ratings of 450 CVCVC nonce words containing high or low frequency vowel patterns. Mixed design ANOVA results revealed a significant effect of vowel pattern frequency on response times (p<0.005) and well-formedness ratings (p<0.001).

Experiment 3 examined how these same variables might be influenced by harmonic class size in Khalkha. 60 adult native Khalkha speakers gave scalar well-formedness ratings on 256 CVCVC nonce words which were controlled for both vowel pattern frequency and harmonic class (4 item categories of the high/low permutations). Mixed design ANOVA results revealed a significant effect of harmonic class size on participants’ well-formedness ratings (p<0.001) and reaction times (p<0.005), as well as a significant effect of vowel pattern frequency on ratings (p<0.001) and response times (p<0.005).
This research increases our understanding of the role of phonotactics in perception, as well as language specific biases on cognition. Furthermore, it has implications for continued inquiries in production and perception, including formal theories of language, in particular theories which propose contiguity between vowels or vowel tiers within representations, as well as speech segmentation, lexical access and lexical organization.

References


