Length and gradience in Dolgan rounding harmony

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Vowel harmony (VH) systems are apparently diachronically robust, having been present (in some form) on the order of millennia in language families like Turkic and Uralic (Binnick 1991; Harrison et al. 2006). Nevertheless, a small but significant recent line of work has taken an interest in the breakdown of these systems (Kavitskaya 2013; McCollum 2015; McCollum and Chen 2020; McCollum 2020; Sandstedt 2020; Kavitskaya and McCollum 2023) and, more generally, in the variability, gradience, and non-iterativity that might lead to such decay. Accounts of the loss of VH have proposed a range of necessarily interacting phonological, phonetic, and sociolinguistic causes. Here we highlight (i) the phonologisation of phonetic vowel reduction, and (ii) language contact in the form of the wholesale incorporation into the lexicon of disharmonic foreign loanwords.[1]

Vowel reduction (Binnick 1991; McCollum 2020) has an unstable relationship to harmony. On the one hand, the predictability induced by VH may permit reduction; on the other hand, sufficient vowel reduction may obscure the phonetic effects of VH – especially rounding harmony (RH) – due to crowding in central regions of the acoustic vowel space. In the second instance, attribution to language contact has had to carry substantial weight with regard to both decay and emergence. Kavitskaya and McCollum (2023), for example, attribute the spread of RH to non-high vowels in Siberian and Central Asian Turkic to extended contact with the Mongolic languages, in which only non-high vowels undergo RH; conversely, analyses of Uzbek (Sjoberg 1963; Harrison et al. 2006) invariably ascribe the loss of VH to long-term contact with Persian. Bobaljik (2018) suggests that VH decay in Itelmen (Chukotko-Kamchatkan) depends crucially on both phonological forces (vowel merger and consequent lexicalisation) *and* large-scale borrowing from Russian. In fact, it is both the case that several of the (Turkic, Uralic, Tungusic, Mongolic) languages in which iterative RH is seen have been in considerable contact with one another over a prolonged period, with resultant structural effects, and that the majority of these languages are in the present day in extensive contact with Russian, a language with no VH, lexical stress, and strong vowel reduction in unstressed syllables. Languages of this type therefore offer an ideal test case in both directions: what factors drive harmony *retention*[2] when the acoustic and sociolinguistic conditions for harmony *decay* are present?

In this work (in progress), we offer the first acoustic investigation of vowel harmony in Dolgan, an endangered Turkic language (< 1000 speakers) of the Taimyr peninsula in north-eastern Siberia. Dolgan has received no attention in the phonological literature but, like the other Turkic languages, has systems of both rounding and backness harmony. As with many other languages in the region, it is now spoken almost exclusively by speakers with bilingual competence in Russian, and has a large stratum of both (harmonic) Evenki loans and (disharmonic) Russian ones. Documentary literature (Däbritz 2022) gives the familiar pattern in (1): high vowels can only trigger rounding in other high vowels, non-high vowels can trigger rounding in all targets.

(1)

	High trigger	Non-high trigger
High target	/uː-nI/ [uːnu] ‘water-ACC’ /yŋyː-nI/ [yŋyːny] ‘spear-ACC’	/ogo-nI/ [ogonu] ‘children-ACC’ /bœrœ-nI/ [bœrœny] ‘wolf-ACC’
Non-high target	/uː-lAr/ [uːlar] ‘water-PL’ /yŋyː-lAr/ [yŋyːler] ‘spear-PL’	/ok-lAr/ [oktor] ‘arrow-PL’ /bœrœ-lAr/ [bœrœlœr] ‘wolf-PL’

Our dataset consists of 96,415 vowels[3] extracted from the INEL corpus of Dolgan (Däbritz et al. 2022; Däbritz 2020), segmented using the Montreal Forced Aligner trained for Dolgan, with manual checking currently in progress. 42 speakers are represented in this aligned subset of

[1] Contra Binnick’s (1991) claim that VH is unaffected by lexical borrowing but is inherently unstable.

[2] Bobaljik (2018): Chukchi, though closely related to Itelmen, escapes VH decay for structural reasons.

[3] Currently monophthongs only; the diphthong series is present but not yet analysed.

the INEL corpus: 30 female and 12 male, with birthyears between 1912–2009 (median 1936). F1, F2, and F3 measurements were taken at three points in the vowel (25%, 50%, 75%), and data points for which these measurements differed by more than 25% were removed (due to the predicted high rate of automation error). Values were Lobanov-normalised, and tokens were coded for vowel type (phonemic length, rounding, fronting, and height), syllable count, root v. affix status, and presumed underspecification (i.e. location in an alternating suffix). As in related Crimean Tatar and Kazakh (McCollum and Kavitskaya 2022; McCollum 2015), F2 is the primary acoustic correlate of rounding and F3 shows little signal.

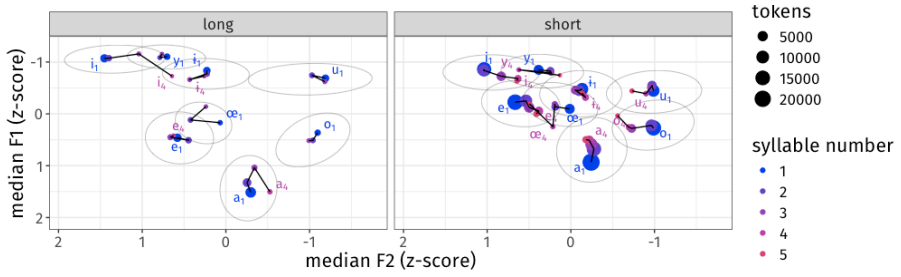

FIGURE 1. F2 × F1 space, showing ellipses corresponding to 50% of the total spread of the data, and points corresponding to the median F1-F2 values by category and syllable number, **in roots**.

Preliminary results suggest that non-initial vowels in Dolgan differ significantly from initial vowels, with positional variation within polysyllabic roots (fig. 1) corresponding to distance from the left edge of the word. An asymmetry arises, however, between the long and short monophthongs: the short vowels show considerable centralisation and, in disharmonic roots (fig. 2) considerably less rounding of unrounded short vowels (understood as F2 differentiation from harmonic unrounded tokens) preceded by an initial round vowel. Disharmonic /œ/ outside the initial syllable, however, is more likely to be preserved. Outside the root (fig. 3), we see a further interaction between positional variation and the pattern in (1).

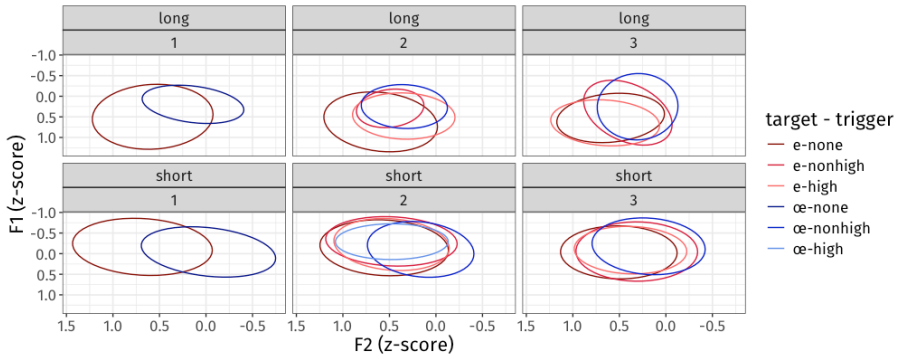

FIGURE 2. F2 × F1 space for /e/, /e:/, /œ/, and /œ:/ **in roots**. Ellipses show 50% of the total spread of the data: 'none' represents either the initial syllable (no preceding trigger), or a non-round trigger; 'nonhigh' represents /œ/, or exceptionally /o/; high represents /y/, or exceptionally /u/.

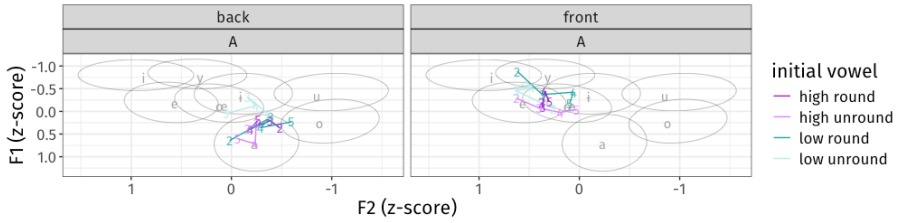

FIGURE 3. F2 × F1 space for **non-high vowel affixes** by RH trigger and morpheme number.