

2

The rise and fall of rounding harmony in Turkic

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2.1 Introduction

It has been proposed that vowel harmony in general arises through the phonologization of vowel-to-vowel coarticulation (e.g. Ohala 1994; Hyman 2002; Przeddziecki 2005; Barnes 2006). In a similar manner Johanson (1979a) argues that the evolution of rounding harmony in Turkish is attributable to the reduced phonetic quality, [ə], of [+high] suffixes. Given these claims, the null hypothesis is that the loss of phonological harmony would affect the domain of harmony as a whole, resulting in phonetic vowel-to-vowel coarticulation. More generally, this predicts three kinds of languages relevant for vowel harmony, (1) those with coarticulation, which sows the seeds for harmony, (2) those with harmony, and (3) those with coarticulation as the residue of lost vowel harmony. In this chapter, drawing on nineteenth-century texts and our own fieldwork, we argue that both the emergence and decay of rounding harmony in numerous Turkic languages crucially involves stages between these endpoints.

In fact, if harmony is lost via a one-step change from iterative harmony to phonetic coarticulation we can collapse (1) and (3) above, predicting that there should only be two types of languages—those with harmony and those without. However, this claim is immediately falsified by the dialects of Crimean Tatar, which exhibit three different stages of the decline of rounding harmony. In the southern dialect, rounding harmony iterates throughout the word, in the central/standard dialect, rounding harmony affects a single syllable after a triggering round vowel, and in the northern dialect, harmony is absent, and rounded vowels are licensed only in the first syllable, with the occasional loss of rounding even there (Samoilovich 1916; Sevortjan 1966; Kavitskaya 2010). These dialects suggest the need for intermediate stages between fully functioning harmony and coarticulation.

In tandem with the differences in the harmonic domain seen in Crimean Tatar, the literature on Turkic rounding harmony has repeatedly noted the lexically specific nature of harmony in the family (Johanson 1978–1979b; Anderson 1996;

Erdal 2004). Herein we demonstrate that the emergence as well as the decay of harmony are marked by lexical diffusion. As an example, in Radlov's (1896) Crimean Tatar texts, the accusative and genitive suffixes regularly alternate for harmony but in modern Crimean Tatar these two affixes are immune to rounding harmony. Similar patterns are evident in the transition from lexically specific harmony in Chaghatay to no harmony in modern standard Uzbek (Sjoberg 1963; Eckmann 1966; Bodrogligeti 2001). Thus, there is a need to motivate intermediate stages between no harmony and robust harmony, and these intermediate stages must reference both phonological and lexical information.

The chapter is structured as follows. In Section 2.2, we discuss the emergence of rounding harmony from Old Turkic to its various instantiations in contemporary Turkic languages. In Section 2.3, we describe the decay of rounding harmony in some Turkic languages. This general description is followed by a corpus analysis of Radlov's (1896) Crimean Tatar texts, and the discussion of recent changes across Crimean Tatar dialects. Finally, in Section 2.5 we discuss the general implications of the history of rounding harmony in Turkic for general diachronic work on vowel harmony.

2.2 The emergence of harmony

Research on the runiform inscriptions in the Orkhon tablets, as well as Buddhist and Manichaean texts from Central Asia, indicates that rounding harmony was not robustly represented in Old Turkic, a classification that roughly spans from the seventh to the tenth century (see Erdal 2004 for a more inclusive definition). Two general constraints on rounding harmony in Old Turkic have been noted. First and most significantly, the alternation of non-initial high vowels was governed by lexical factors. As Anderson (1996) observes, there appear to be three classes of suffixal high vowels in Old Turkic. One class consisted of vowels that were invariantly [+round], another consisted of vowels that were invariantly [-round], and a third class alternated for rounding (see also Erdal 2004: §2.2). We can thus conclude that the application of harmony was delimited by lexical specification. Anderson (1996: 126) observes that the same type of lexeme-specific harmony attested in Old Turkic is present in some of the modern Turkic languages spoken in southern Siberia, specifically Khakas, Shor, and Altai. Moreover, the suffixes that fail to undergo harmony in these languages are direct inheritances from non-alternating morphemes in Old Turkic, further supporting the significance of lexical information for the emergence of harmony. Note that the fact that the non-alternating suffixes in these languages are a subset of the non-alternating suffixes in Old Turkic suggests that rounding harmony in these languages is likely still emerging, not decaying.

In addition to these lexical forces, phonological factors also affect the application of harmony in Old Turkic. It is well known that the class of alternating vowels

did not include any CV suffixes, that is, alternating vowels did not appear in CV suffixes (Tekin 1967; Kondrat'ev 1981: 19), and some modern Turkic languages still exhibit restrictions on the application of rounding harmony in word-final open syllables (e.g. Nadzhip 1971: 52). Along with the syllable structure of the target morpheme, Kondrat'ev (1981: 19) observes that the application of harmony may fail if two consonants intervene between trigger and target, a fact also observed in Modern Ili Turki (Xiāngrú & Hahn 1989: 273). Thus, the segmental distance between trigger and target influences the application of harmony in Old Turkic and in Ili Turki. Variation is also conditioned by distance from the original trigger. Tenishev (1984: 446) notes that the rate of harmony in Old Turkic diminishes as distance between the initial trigger increases. This sort of optionality is also reported in a number of contemporary Turkic languages, such as Shor, Karakalpaq, and Khakas (e.g. Dyrenkova 1941: 15; Menges 1947: 61–62; Baskakov 1975: 25; Kirchner 1998: 320–321).

Work on the development of rounding harmony in Ottoman and modern Turkish supports the role of lexical and phonological factors. Johanson's analysis (1978–1979b, 1979a) of the time course of the emergence of harmony in Turkish explicitly relies on these two forces to motivate the multiple stages in the emergence of robust rounding harmony (see also Kerlake 1998). First, he argues that despite the existence of a class of alternating suffixes in Old Turkic, no such coherent class exists in Anatolian texts from the thirteenth century. He thus concludes that harmony decayed from a lexically specific pattern in Old Turkic to the non-harmonic pattern in these later Anatolian texts. From this disharmonic stage, he suggests that harmony evolved due to the reduction of suffix vowels, making them susceptible to influence from the lip rounding of the preceding vowel.¹ Johanson (1978–1979b) suggests that the current emergence of rounding harmony in Turkish occurred after the seventeenth century.

However, Jankowski (2012) contends that harmony developed earlier in colloquial Turkish, but later in literary Turkish. Indeed, drawing on data from Viguier's compendium (1790), Duman (1999) argues that rounding harmony was operative in colloquial Turkish, although it was less entrenched in the written language. Observe the differences between the two. First, Viguier (1790: 287) reports pairs like *olduđi ičün* (literary) vs. *olduđu ičin* (colloquial), and *vücüdi* 'his/her body' (literary) vs. *vücüdü* (colloquial). In the literary version, harmony extends to the second syllable only in *olduđi*, while in the colloquial version harmony iterates throughout the word. In addition, some forms show evidence for more conservatism in the literary language, specifically invariantly round non-initial vowels both within roots e.g. *ičün* 'for' (literary) vs. *ičin* (colloquial), and in suffixes, e.g.

¹ Whether harmony decayed and then emerged again, or simply continued evolving from Old Turkic is immaterial for our purposes. Regardless of the specific path taken, all extant evidence suggests that its development follows lexical and phonological lines.

san-ur ‘count-AOR’ (literary) vs. *san-ır* (colloquial). Finally, Viguier’s data supports the existence of morpheme-specific restrictions on harmony, e.g. the possessive suffix *ın* in *özinde* ‘in essence’ (literary) vs. *ün* in *özünde* (colloquial). Viguier’s data suggests that colloquial Turkish was more innovative than the literary language, which is not in and of itself surprising. Interestingly though, the more conservative literary variants in these texts suggest an older form of the language, which exhibits morpheme-specific harmony and a larger number of invariantly round non-initial high vowels. In sum, evidence from Viguier’s texts supports the existence of both non-iterativity, or at minimum optionality, as well as lexeme-specific harmony in eighteenth-century Turkish. As such, this is the first evidence supporting a potential non-iterative stage in the development of rounding harmony in a Turkic language.

Despite the tenuousness of our current understanding of rounding harmony’s emergence in Turkic, we can make a few generalizations. One, there is no evidence for an incremental, syllable-based emergence of harmony. There are no cases where harmony affects a second syllable only, and then at some later stage affects second and third syllables, and at a later stage affects second, third, and fourth syllables. Two, the development of harmony appears to involve some degree of lexical diffusion, as more and more suffixes began to alternate. This would explain the change from the highly lexically specific pattern in Old Turkic to the more common contemporary pattern, which assimilates all (or almost all) non-initial high vowels. As an aside, there is another development in the emergence of rounding harmony in the family, rounding of non-high suffixes. In most Turkic languages, rounding harmony affects high vowels only, but in some Siberian and Central Asian members of the family, e.g. Yakut, Altai, Kyrgyz, harmony produces alternations on non-high vowels, too. We leave the development of this particular pattern for future discussion, noting only that McCollum (to appear) proposes that these patterns are likely the product of extended contact with Mongolic languages, in which rounding harmony operates only on non-high vowels.

2.3 The decay of harmony

Generally, there is very little work on the diachronic decay of vowel harmony (cf. McCollum 2015, 2019; Sandstedt 2018, 2020). In Turkic, there is comparatively more, although the notable lack of research in this vein is striking. Extant work in Turkic argues that the decay of vowel harmony, both backness and rounding, depends on sociolinguistic and phonological factors (e.g. Laude-Cirtautus 1977; Binnick 1991; Johanson 1998; Harrison et al. 2002; Dombrowski 2013). Most work discussing the loss of harmony in modern standard Uzbek argues that long-term contact with Persian contributed significantly to the erosion of the pattern, and Dombrowski (2013) argues that the loss of harmony in West Rumelian

Turkish similarly derives from contact-induced change. However, Binnick (1991) challenges the primacy of sociolinguistic factors, suggesting that vowel harmony may be inherently unstable and that diachronic loss of harmony may be the cumulative effect of smaller, often phonetic tendencies in the family rather than the result of external forces.

Binnick's proposal does not distinguish, however, triggers from pathways of decay. Independent of the forces that trigger the loss of harmony, it is crucial to understand the ways in which harmony is lost. McCollum (2015) argues that the weakening of harmony in Kazakh is associated with a contraction of the harmonic domain. This is evident in the variable contraction of the harmonic domain within and across Noghay dialects. Baskakov (1940: 11) describes three domains of rounding in Noghay, exemplified by /kyn-lAr-ImIz-GA/ 'day-PL-POSS.1P-DAT': the first syllable only [kynlerimizge], the first two syllables [kynlørimizge], and all syllables [kynlørzymzgø]. These three types of rounding harmony are not just characteristic of Noghay, but of the larger family. Iterative harmony patterns are attested in many languages (e.g. Turkish, Kyrgyz). Non-iterative patterns are attested in a number of the Kipchak subfamily (e.g. Kazakh, Karakalpak). As an example, the Kazakh described in Radlov (1870) involves very consistent rounding of all non-initial high vowels and non-high front vowels (/qol-ImIz-GA/ [qol-umuz-βɑ] 'hand-POSS.1P-DAT' (p. 64). In contrast, Balakaev (1962: 102) observes that harmony in contemporary Kazakh extends rightward only one syllable, e.g. /qol-ImIz-dIŋ/ [qol-umuz-duŋ] 'hand-POSS.1P-GEN' (see Menges 1947: 610–662 for Karakalpak). As such, one can characterize the change in Kazakh as being from iterative to non-iterative harmony.

In addition to domain contraction, McCollum (to appear) indicates that harmony may decay via several other pathways, notably lexeme-specificity and optionality. Lexeme-specific behavior is evident in Chaghatay, the written language of fifteenth- and sixteenth-century Central Asian Turkic (Boeschoten & Vandamme 1998). In Chaghatay, approximately half of [+high] suffixes alternate for rounding harmony (Eckmann 1966; Bodrogligeti 2001), but in the modern language most closely related to Chaghatay, standard Uzbek, there is only sporadic rounding harmony (Sjoberg 1963: 54).² In the Osh dialect of Uzbek, preliminary fieldwork suggests that harmony targets a relatively small set of suffixes. If some Uzbek dialects exhibit differing restrictions on the morphemes that alternate for harmony, lexical diffusion is a reasonable speculation as to *how* harmony has decayed in Uzbek. In tandem with lexeme-specificity, there is variation attested in Chaghatay, e.g. /jyz-IŋIz/ [jzyŋjyz] ~ [jzyŋjiz] 'face-POSS.2PL' (Eckmann 1966:36). Variation is also reported for other languages (Korn 1969; Kirchner 1998; McCollum 2018).

² There is, however, more widespread rounding harmony in various Uzbek dialects (Jarring 1937; Ibrohimov 1967; Reshetov & Shoabdurahmanov 1978; Razhabov 1996).

2.4 Crimean Tatar: A case study

2.4.1 Radlov (1896)

In this section we describe the pattern of rounding harmony in Radlov’s (1896) corpus of Crimean Tatar texts. Radlov transcribed texts from 11 different towns in Crimea over the course of his stay in the region. Contemporary work on Crimean Tatar (Samoilovich 1916; Sevortjan 1966; Kavitskaya 2010, 2013) describes three main dialect groups—northern, central, and southern—and we adopted these three, along with the dialect borders roughly equivalent to those in Kavitskaya (2013: 89) to classify each text. We manually recorded all instances of a round vowel followed by a high vowel ($N = 5,809$). For each instance of (dis)harmony, we recorded the region, text, page number, trigger vowel, and syllable number. Words of up to five syllables in length were recorded, but only five pentasyllabic words were present, so these were excluded, and only words from two to four syllables in length are reported here.

Consider Table 2.1, which shows the aggregated counts of harmony. First, note that the rate of harmony is exceedingly high in all syllables. Second, observe that the rate of application does not decrease in any meaningful way in later syllables.³ In all three positions, the rate of harmony exceeds 94%, suggesting that the harmony pattern was robust in the late nineteenth century.

As a further examination of the aggregated data, consider the counts of harmony by preceding vowel (Table 2.2). While McCollum (2018) argues that trigger vowel quality affects the application of harmony in Kazakh, there is no obvious effect of trigger vowel here, as rates of harmony exceed 94% regardless of preceding vowel

Table 2.1 Counts of harmony and disharmony aggregated over the entire Crimean Tatar corpus in Radlov (1896)

	Syllable 2	Syllable 3	Syllable 4	Total
[+high, +round] after [+round]	4,559	946	105	5,610
[+high, –round] after [+round]	134	54	6	194
Total	4,693	1,000	111	5,804
Percent [+high, +round] after [+round]	97.1	94.6	94.6	

³ We conducted chi-square as well as regression analyses. Statistically, there is a significant effect of syllable number on the likelihood of harmony, but we believe this difference is not linguistically meaningful, or comparable to Tenishev’s (1984: 446) description of reduced rates of harmony in later syllables.

Table 2.2 Percent harmony by preceding vowel aggregated over the entire Crimean Tatar corpus in Radlov (1896)

Preceding vowel	Syllable 2	Syllable 3	Syllable 4
o	97.7		
ø	96.4		
u	95.0	95.6	94.5
y	98.9	94.0	94.7

and syllable number. Also, mid round vowels [ø o] are absent in non-initial syllables, a widespread distributional restriction in the majority of Turkic languages. Thus, the data here supports the case that harmony in late nineteenth-century Crimean Tatar was neither affected by syllable number or trigger vowel quality, further suggesting the robustness of the pattern at this point in the dialects of Crimean Tatar.

Additionally, one might expect significant differences across the different locations where Radlov recorded these texts. Rates of harmony by location and syllable number are presented in Table 2.3. Across all towns and regions, there is consistent application of harmony in all syllables. Like the data in Tables 2.1 and 2.2, the data presented here provides strong support for the pervasiveness of rounding harmony in Radlov's data. Moreover, Radlov's texts provide evidence for a uniformity in the application of rounding harmony across all three major dialect groups in the language in the late nineteenth century.

This subsection has demonstrated quite clearly that rounding harmony in Radlov's texts is consistent. Neither syllable number, preceding trigger, nor geographical location appears to systematically affect the application of harmony. The robustness of the pattern during Radlov's visit will be contrasted to the application of harmony in each of the three main dialect groups in the contemporary language in the next section.

2.4.2 Contemporary Crimean Tatar

Contemporary Crimean Tatar exhibits three stages of the decay of rounding harmony (Sevortjan 1966; Kavitskaya 2010, 2013). In the southern dialect, rounding harmony affects all high vowels in the word (1)a, just like in closely related Turkish and many other Turkic languages. The example in (1)b shows that in order to undergo the rounding harmony, the high vowel has to be preceded by a

Table 2.3 Counts and percent harmony for each town and syllable number in Radlov (1896)

Town	Region	Syllable 2		Syllable 3		Syllable 4	
		Counts	Percent harmony	Counts	Percent harmony	Counts	Percent harmony
Asau	Southern	128/167	76.6	35/35	100	4/4	100
Baqčisarai	Central	587/604	97.2	145/155	93.5	9/10	90
Biyük lambat (Malyı Mayak)	Southern	428/439	97.5	104/107	97.2	16/16	100
Biyük xojalar (Dolinnaya)	Northern	737/762	96.7	141/153	92.2	9/9	100
Deir (Yantarnoe)	Northern	47/48	97.9	6/6	100		
Istıle (Lesnikovo)	Central	345/351	98.3	64/69	92.8	4/4	100
Kefe (Feosodia)	Central	300/301	99.7	50/54	92.6	8/8	100
Közleve (Kezlev; Evpatoria)	Northern	181/184	98.4	45/49	91.8	4/4	100
Mıxor	Southern	435/446	97.5	75/80	93.8	6/7	85.7
Özen-baş (Schastlivoe)	Central	193/199	97.0	44/44	100	5/5	100
Qaralez (Zalesnoe)	Central	395/397	99.5	86/90	95.6	15/15	100
Qarasu bazar (Belogorsk)	Central	621/628	98.9	121/127	95.3	18/18	100
Üsküt (Privetnoe)	Southern	162/167	97.0	30/32	93.8	7/7	100

rounded vowel. We therefore consider the southern pattern the most conservative, operating in the same manner as in Radlov's texts.

(1) Rounding harmony: southern Crimean Tatar

- | | | |
|----|--------------|------------------------|
| a. | dost-um | 'friend-1SG.POSS' |
| | tuzluy-um | 'salt shaker-1SG.POSS' |
| | syrgyn-lyk | 'deportation-ADJ.SUF' |
| | tykyr-yn-mek | 'spit-PASS-INF' |
| b. | dost-lar-uum | 'friend-PL-1SG.POSS' |

In the northern dialect, rounding harmony is lost, with rounding licensed in initial syllables only (2) and with optional unrounding of high vowels in these syllables as well (2)b.

(2) Rounding harmony: northern Crimean Tatar

- | | | | |
|----|-------------------|--------------------|----------------------------------|
| a. | bojun | 'neck' | (cf. southern/central [bojun]) |
| | dost-uum | 'friend-1SG.POSS' | (cf. southern/central [dost-um]) |
| b. | burun ~ buurun | 'nose' | (cf. southern/central [burun]) |
| | bulamuq ~ buলামuq | 'a type of cereal' | |

While southern and northern dialects represent the stages with the presence vs. the absence of harmony, there is also an attested intermediate stage in the central/standard dialect, where rounding harmony operates only in the first two syllables of a word (Samoilovich 1916; Sevortjan 1966; Kavitskaya 2010).

When a monosyllabic suffix with a high vowel is added to a monosyllabic stem in the central dialect, its vowel agrees in rounding (and backness) with the vowel of the stem (3)a. When such a suffix is added to a polysyllabic stem, rounding harmony does not target the vowel in the suffix while backness harmony affects all vowels in the word, as in (3)b. This shows that the domain of rounding harmony is indeed the first two syllables of a word, regardless of its morphological composition (cf. the presence of rounding in the 1sg. possessive suffix attached to the monosyllabic root 'friend' in (3)a vs. the absence of rounding in the same suffix attached to a disyllabic root 'nose' in (3)b).

(3) Rounding harmony: central Crimean Tatar

- | | | | |
|----|--------------|------------------------|-------------------------------|
| a. | dost-um | 'friend-1SG.POSS' | |
| | kyz-lyk | 'autumn-ADJ.SUF' | |
| | bul-un-maq | 'find-PASS-INF' | |
| b. | burun-uum | 'nose-1SG.POSS' | (cf. southern [burun-um]) |
| | tuz-luy-uum | 'salt shaker-1SG.POSS' | (cf. southern [tuz-luy-um]) |
| | syrgyn-lik | 'deportation-ADJ.SUF' | (cf. southern [syrgyn-lyk]) |
| | tykyr-in-mek | 'spit-PASS-INF' | (cf. southern [tykyr-yn-mek]) |

Given that harmony is fully operative in all of Radlov's texts, the contraction of the harmonic domain in the central dialect must be construed as a recent

development. When the three dialects are compared, we see three stages in the decay of harmony: full harmony, non-iterative harmony, and no harmony. In addition to this domain-based effect, Kavitskaya (2010) reports that several high vowel suffixes systematically fail to undergo rounding harmony in the central dialect, including the accusative and genitive case suffixes, as seen in (4).

(4) Suffixes with invariant rounding in contemporary Crimean Tatar

- | | |
|-------------|--------------|
| a. o-nu | ‘3s-ACC’ |
| b. suv-nu | ‘water-ACC’ |
| c. sɔz-ni | ‘word-ACC’ |
| d. dost-nuŋ | ‘friend-GEN’ |
| e. suv-nuŋ | ‘water-GEN’ |
| f. sɔz-niŋ | ‘word-GEN’ |

In contrast, these same suffixes alternate for rounding harmony in Radlov’s data, indicating that the invariance of these particular affixes is a recent innovation. In other words, the invariance of these suffixes is due to decay, not incomplete development of harmony (cf. Anderson’s (1996) proposal for several southern Siberian languages).

(5) Alternating accusative and genitive suffixes in Radlov’s texts (with text and page number)

- | | | |
|-------------|--------------|-----------------------------|
| a. o-nu | ‘friend-ACC’ | (Kefe, p. 134) |
| b. su-nu | ‘water-ACC’ | (Suliman paigambar, p. 191) |
| c. sɔz-ny | ‘word-ACC’ | (Qarasu bazar, p. 166) |
| d. dost-nuŋ | ‘friend-GEN’ | (Közleve, p. 235) |
| e. su-nuŋ | ‘water-GEN’ | (Čorba batır, p. 127) |
| f. kyn-nyŋ | ‘sun-GEN’ | (Čora batır, p. 174) |

2.5 Discussion

Let us now return to the claim that vowel harmony arises from vowel-to-vowel coarticulation (e.g. Ohala 1994; Hyman 2002; Przeddziecki 2005; Barnes 2006). Based on the evidence from Turkic, this claim appears to be an oversimplification of how harmony emerges, as well as how it decays, representing only a single step in a potentially more complex development. In between coarticulation and pervasive harmony one sees a variety of intermediate possibilities—lexically specific harmony, as in Old Turkic and Chaghatai, non-iterativity, as in Central Crimean Tatar and Karakalpak, optionality, as in Kazakh, as well as contextual, phonological restrictions on harmony, as in Uyghur and Ili Turki. We propose that these

possibilities form various pathways for the emergence and decline of harmony, and further, infer from the history of Turkic that the transition from coarticulation to pervasive harmony must proceed via these pathways. In other words, we argue that harmony does not transition directly from coarticulation to full-fledged harmony, or from full-fledged harmony to coarticulation, but changes via the pathways sketched out above.

Relatedly, if harmony may develop and decline along these lines, one expects to find many harmony patterns in these intermediate states. From a typological point of view, one can investigate the relative frequency of lexically specific, non-iterative, and optional harmonies to examine which intermediate stage is most likely. Typological research, in tandem with experimental research and formal analysis, should provide a fuller understanding of the life cycle of iterative phonological patterns.