

Chapter 44

On *how* and *why* vowel harmony decays

Adam G. McCollum

44.1 Introduction

Phonetic coarticulation as well as misperception have been linked to the emergence of vowel harmony (Öhman 1966; Ohala 1981, 1994a, b; Przedziecki 2005; Chapters 40,41, and 43, this volume). This link, however, does not explain all the ways that phonological vowel harmony may change; this chapter focuses on the diachronic decay of harmony. Drawing on data from a range of language families, this chapter discusses both the mechanisms by which harmony decays, as well as the internal and external pressures that appear to drive decay.

44.2 How: The mechanics of decay

There are at least four pathways along which harmony may decay. The first is lexically-specific change. Lexical diffusion has been extensively researched as a pathway for sound change (e.g., Wang 1969, 1977; Labov 1994), and harmony provides one form of decay. During this type of decay, successively fewer morphemes are subject to harmony.

In Middle Korean (isolate or Altaic), tongue root harmony operated within polysyllabic morphemes as well as across morpheme boundaries (Ko 2012). However, in Contemporary Korean, a much smaller set of morphemes participate in the harmony pattern. Harmony is observed among ideophones, as well as in suffixes with initial /ə/~a/ (cf. Chapter 63, this volume), but has been lost in other contexts. Thus, harmony in Contemporary Korean affects a smaller set of morphemes than in Middle Korean.

Another instance of lexically-specific decay is seen in the Kwa language, Avatime, spoken in southeastern Ghana. Tafi and Tutrugbu, sister languages spoken in neighboring towns, both exhibit prefix-initiated progressive rounding harmony, e.g., Tafi [ɔ-zɔ-kpasā] ‘3SG-REP-

move’ and [ɔ̌-bɔ̌-vɪ] ‘2SG-FUT-go’ (Bobuafor 2013; Essegbey 2019; McCollum & Essegbey 2019). In Avatime though, only vestiges of this pattern are observable. Specifically, the only morpheme that alternates for rounding is the repetitive prefix, and only for older speakers, compare, [ɔ̌-zě-wa] (younger speakers) with [ɔ̌-zǎ-wa] (older speakers) ‘SM-REP-work’ (based on Defina 2016: 56). Thus, of the set of the morphemes that alternate for rounding harmony in Tafi and Tutrugbu, only a subset do in Avatime. The fact that related languages outside of this small subgroup of the Ghana-Togo Mountain languages exhibit the same pattern of prefix-initiated rounding harmony suggests the difference between Avatime and its sister languages, Tafi and Tutrugbu, is not due to a difference in innovation, but rather retention of the pre-existing grammatical pattern. For more discussion of lexical specificity in decay, see Sandstedt (2020; also Chapters 63, 65, and 67, this volume). It is important to note that in many of these cases, the relevant class of alternating morphemes may often be at least partially definable in terms of phonological properties, suggesting that phonological factors may still be relevant for lexically-specific decay.

Additionally, harmonic decay may result in the reduction of the harmonic domain. In Southern Crimean Tatar (Turkic), rounding harmony affects all non-initial high vowels, which is consistent with the pattern recorded for all dialects of the language in Radlov (1896). In contrast, in the Central dialect, harmony obtains only in the syllable immediately following an underlying round vowel (cf. Chapter 12, this volume). Moreover, in the Northern dialect rounding harmony is completely absent, and in many cases, high rounded vowels in the initial syllable are optionally unrounded (Kavitskaya 2010). These dialectal differences are evident in forms like [burun-lu] (Southern), [burun-lu] (Central), and [burun-lu] ~ [burun-lu] (Northern) ‘nose-ADJ’. Domain contraction is also attested in Proto-Uralic and Proto-Finnic; both have been reconstructed with robust, iterative vowel harmony, but harmony is now reduced or absent in some modern Finnic languages (Janhunen 1982; Binnick 1991). In Southern Veps for instance, frontness harmony applies to second- and optionally to third-syllable vowels only, and in Central and Northern Veps, harmony is completely lost. Compare the disyllabic frontness domain in Southern Veps [kýzy-ma-ha] ‘ask-INF-ILL’ with the monosyllabic domain in Central/Northern Veps [kýzu-ma-ha]. (Zaiceva 1981). Like in Finnic, domain contraction has been reported in a number of Uralic languages, including Sami and Estonian, as discussed in Chapters 4 and 67, this volume.

This type of domain contraction results in a pattern where the extent of harmony is definable in terms of syllables or feet. No phonologically-motivated domain is definable when decay follows a lexical pathway. Imagine a language with suffixes x, y, and z, which may also occur in that order when attached to a root. If harmony may affect x and y, but not z, then when attached to a root bearing the feature [+F], we expect harmonic [root-x]_[+F], [root-y]_[+F], [root-x-y]_[+F], but disharmonic [root]_[+F]-[z]_[-F], [root-x]_[+F]-[z]_[-F], [root-y]_[+F]-[z]_[-F], [root-x-y]_[+F]-[z]_[-F]. Harmony may thus span one, two, or three syllables, depending on the morphemes that occur within a word. This is distinct from the kind of domain contraction found in Crimean Tatar, where a given token of [+rd] may affiliate with a maximum of two vowels. No such limit is definable for lexically-specific decay apart from enumerating the lexical items that undergo harmony and their morphotactics.

A contracting domain of application is also closely connected to increased variability. I use the term *variability* here to encompass optionality as well as phonetic gradience. Optionality as a symptom of decay is widely attested in Uralic (see Chapter 67, this volume), as in the optional assimilation of third-syllable vowels reported in Southern Veps. Interestingly, Sandstedt (2020) contends that optionality is the most salient characteristic of the process of height harmony loss in Old Norwegian.

In tandem with optional, categorical alternations, decaying harmonies may exhibit incomplete subphonemic assimilation of a target vowel. Recently, backness harmony in Kazakh and Uyghur (Turkic) has been shown to be gradient (McCollum 2019a,b). I found that in these languages vowel backness in forms like the Kazakh word [qus-um-duu] ‘winter-POSS.1SG-ACC’ diminishes monotonically, resulting in successively more anterior vowels in non-initial syllables. In contrast, vowel frontness shows no comparable shifts by position; the phonetic frontness of a non-initial, front vowel is equivalent to that of an initial trigger, as in, e.g., [tɪs-im-di] ‘tooth-POSS.1SG-ACC’ (see Dzhunisbekov 1972 for a similar pattern in Kazakh rounding harmony).

Finally, decay may result in increased featural restrictions on harmony. Hyman (1999) provides extensive description and analysis of height harmony in Bantu. The most widespread pattern is asymmetric, as seen in (1). When the target vowel is front, like the applicative suffix in (1a-d), any mid vowel triggers lowering (1b,d). Yet, when the target vowel is back, like the reversive suffix in (1e-h), only the mid back vowel conditions lowering (1h).

(1) Height harmony in Kisa (Sample 1976)

a.	/βis-il-a/	βisila	‘hide-APPL-FV’
b.	/rek-il-a/	rekela	‘set.trap-APPL-FV’
c.	/fu:ng-il-a/	fu:ngila	‘lock-APPL-FV’
d.	/tsom-il-a/	tsomela	‘pierce-APPL-FV’
e.	/βis-ul-a/	βisula	‘hide-REV-FV’
f.	/rek-ul-a/	rekula	‘set.trap-REV-FV’
g.	/fu:ng-ul-a/	fu:ngula	‘lock-REV-FV’
h.	/tsom-ul-a/	tsomola	‘pierce-REV-FV’

However, in Lozi (Gowlett 1967), as well as some other Southern Bantu languages, height harmony only applies when the target is underlyingly /u/ and the trigger is /o/ (2). In (2), the only alternation occurs in (2h), when the reversive suffix is preceded by a stem /o/; in all other instances, harmony does not obtain.

(2) No height harmony if the target is front in Lozi

a.	/bil-is-a/	bilisà	‘boil-CAUS-FV’
b.	/fel-is-a/	fèlisà	‘finish- CAUS-FV’
c.	/hupul-is-a/	hùpùlisà	‘remember- CAUS-FV’
d.	/ŋol-is-a/	ŋòlisà	‘write- CAUS-FV’
e.	/tib-ul-a/	tibùlà	‘punch-REV-FV’
f.	/pek-ul-a/	pèkùlà	‘cure- REV-FV’
g.	/pumb-ul-a/	pùmbùlà	‘unearth- REV-FV’
h.	/tom-ul-a/	tòmòlà	‘take.out.of.water- REV-FV’

In short, the lowering of high front vowels has been lost in Lozi. In Kisa, any mid vowel can condition the lowering of /i/, and /o/ can condition the lowering of /u/. However, in Lozi, /i/ does not lower, leaving only /u/ to lower after /o/.

44.3 Why: The causes of change

In the previous section I surveyed some ways in which a harmony pattern may decay, but in this section lay out some of the reasons why a pattern may erode. I group these forces into two categories, external and internal.

44.3.1 External factors

One commonly encounters the claim that harmony decay is directly related to the influx of loans. As Harrison et al. (2002) discuss, even in a language saturated with loans, this effect does not necessarily compel decay. Similarly, Binnick (1991) observes that in the majority of cases, loans do not drastically affect the operation of harmony in Uralic and Turkic, since the final vowel of the loan controls the realization of following suffixes, just like the native pattern. For instance, after the loan [mikrop] ‘microbe’ backness and rounding harmony proceed as usual from the root-final vowel to following suffixes in Turkish, e.g., [mikrop-lar] ‘microbe-PL’ and [mikrob-u] ‘microbe-POSS.3SG’. If loans, in and of themselves, do not motivate harmonic decay, how can we understand their role in this process? Thomason & Kaufman's (1988) borrowing scale provides a helpful framework; the types of loans and the general contact-induced effect depend on the nature of the contact, specifically the amount of pressure on the borrowing speech community. As the intensity of contact and cultural pressure increase, so does the degree of structural change. The effects of contact may be symmetrical, as Dawkins & Halliday (1916) attribute the emergence of vowel harmony in varieties of Greek spoken in Turkey to cultural pressure from neighboring Turkish speakers.

One case where the influx of loans has significantly contributed to the demise of the harmony pattern is found in Itelmen (Chukotko-Kamchatkan; spoken around the Kamchatkan peninsula). Despite centuries-long contact with Russian, forced linguistic assimilation, boarding schools, and even the razing of Itelmen villages, Bobaljik (2018) notes that the introduction of a large number of Russian loans during the 20th century contributed to the demise of the harmony pattern. Bobaljik contends that, in tandem with cultural and social forces, the resilience of harmony in the face of loans may also depend on the nature of the harmony pattern. Phonologically, harmony in Itelmen is distinct from those in Uralic and Turkic because in

Chukotko-Kamchatkan, both roots and affixes may assimilate in the presence of a dominant morpheme. Thus, the fundamental alternation of affixes is unchanged by a new content word in a root-controlled language like Turkish, but in a language like Itelmen, where roots as well as affixes alternate, a new lexical item may serve as either the trigger or target of harmony. In addition to the harmony pattern itself, other grammatical properties may interact with loanwords. Bobaljik (2018) observes that harmony in the related language Chukchi has not eroded to the same degree as Itelmen, despite intense language contact and a shared dominant-recessive harmony system (see Chapter 65, this volume). To account for this difference, Bobaljik suggests that independent phonological forces, namely vowel merger and the concomitant lexicalization of the harmonic feature, conspire with Russian loans to induce decay.

In some cases, like Itelmen, the decay of harmony has occurred among speakers from a subordinate group as a result of a dominant contact language. In Itelmen, it is not obvious that any structural features of Russian, apart from a lack of harmony, exacerbated the loss of tongue root harmony. However, in other cases, structural aspects of the dominant language appear to interfere with, and shape the harmony pattern. For instance, contrastive palatalization in Slavic has affected the backness harmony patterns in a number of languages. In Erzya (Uralic; Chapter 67, this volume) and Crimean Tatar (Turkic; Kavitskaya 2010), palatalization is contrastive, although palatalization of consonants in most related languages is only an allophonic byproduct of vowel harmony. Nevins & Vaux (2004) argue that the development of contrastive palatalization is the path through which the original harmonic feature is transphonologized onto consonants as in Karaim (Turkic; Csató 1999; Németh 2015), where vowel harmony has largely been replaced by consonant harmony in the form of palatalization. Relatedly, Pajusalu (2012) speculates that the development of fusional morphology and prosodic restructuring from intense contact with Germanic languages led to the loss of harmony in Estonian and Livonian (Uralic).

Although contact-induced loss of harmony among subordinated speech communities is more commonly discussed, in some cases, vowel harmony in the dominant language is eroded by contact with languages from subordinate groups. Dombrowski (2013) argues that vowel harmony in West Rumelian Turkish (Turkic) was lost due to the influence of subordinate Indo-European languages in the Balkans. Notably, Dombrowski rejects the claim that incremental adoption of loans drove this change, contending that this arose rather from a more abstract structural

preference for fully-specified suffixes. Dombrowski's analysis relates fairly directly with Binnick's (1991) argument that vowel harmony is necessarily volatile.

44.3.2 Internal factors

Although external factors may shape the diachronic trajectories of harmony systems, Binnick (1991:38) rejects the primacy of these, arguing instead that "vowel harmony is inherently unstable." He further contends, "[w]hile foreign influence may accelerate or even trigger certain changes, it does not dictate the nature or sequence of such changes." One possibility is that harmony is unstable because it relies on a variety of structures and independent grammatical patterns, including morphology, the structure of the vowel inventory (see Chapter 15, this volume), and non-reduced phonetic outputs; in the absence of these, the likelihood of initiating or maintaining a harmony system diminishes.

Among internal factors that may contribute to harmony's decay, it is clear that harmony is most evident as a set of morphophonological alternations, which require certain types of morphology, e.g., agglutination rather than stem modification, to display the pattern. The critical role morphology plays is manifest in the history of Nilotic (Andersen 1990). In Nilotic languages where agglutinative morphology has been preserved, e.g., Mayak (Andersen 1999), harmony persists, but in those where suffixation has been replaced by stem-internal changes, e.g., Nuer and Dinka (Remijsen & Gilley 2008), evidence for any active harmony pattern has been lost.

In addition, vowel mergers may erode the harmony system. If one facet of decay is the expansion and diminution of the featural space subject to harmony, then mergers may reduce the effective featural space exploited by harmony. For instance, Yul-Ifode (2003) notes that the vowels /i i u u/ have merged to /i u/ in Agoi (Cross River; Nigeria). Harmony used to operate over vowels of all heights but now, as a result of the loss of the ATR contrast among high vowels, ATR harmony operates on non-high vowels only. Similar mergers are noted in other languages, reducing the number of vowels subject to harmony (see, e.g., Stewart 1971 for Kwa; Li 1996 for Tungusic; as well as Chapters 61, 65, and 67, this volume).

Language-internal disharmony may also disrupt or erode the larger harmony system. Disharmony may exist either as the simple co-occurrence of vowels from distinct harmony sets or derive from the interaction of other phonological processes. Independent phonological patterns obscuring or undermining harmony may arise via consonant-vowel interactions, and may produce the basic disharmony, as in the Kyrgyz (Turkic) case described by Wurm (1949: 101), e.g., /dʒuɟurma/ [dʒi:ɾma] ‘twenty.’ In Kyrgyz, the presence of the palatal glide fronts the two flanking /u/ vowels to [i], yielding a disharmonic surface form. In Uyghur (Turkic), the low vowels are raised and fronted preceding /i/, e.g., /al-ip/ [elip] ‘take-CVB’. In Uyghur, the underlying backness of the root vowel spreads despite umlaut, yielding opaque forms like /al-in-mAK/ [elinmaq] *[elinmæk] ‘take-PASS-INF’ (Nadzhip 1971; Lindblad 1990; Hahn 1991; cf. McCollum 2021 on the status of /i/).

Additionally, vowel reduction in unstressed/weak positions may obscure the harmony pattern. Drawing on data from Kera (Chadic), Pearce (2008; 2012; Chapter 48, this volume) contends that harmony and reduction are mutually exclusive. Binnick (1991: 45-47) argues that reduction contributed to the erosion of harmony in languages like Khalkha Mongolian (Mongolic), where the reduction of non-initial vowels to a very central, schwa-like quality conceals the propagation of the harmonic feature from the initial syllable. Further, Shiraishi & Botma (2017) argue that unstressed vowel reduction, in tandem with mergers, were major contributors to the erosion of harmony in Nivkh (isolate; cf. Chapter 62, this volume). This same scenario has been sketched out for Sanjiazi Manchu (Tungusic) by Li (1996), whereby the crucial opposition between /a/ and /ə/ was lost. Then reduction of final, unstressed /a/ to /i/, the modern reflex of historical *ə, resulted in widespread disharmony. Now, harmony obtains only between a stem-final vowel and the following suffix (cf. Chapter 61, this volume).

Note that arguments concerning the relationship between unstressed vowel reduction and the emergence of harmony differ sharply with previous claims concerning reduction and the emergence of harmony. For instance, Hyman (2002) suggests that reduction makes the inception of harmony possible. In conformity with Pearce’s observations, in the harmonies that I am familiar with, the degree of reduction affecting

alternating morphemes is relatively small (McCollum 2020) and seems implausible as a precondition for harmony (see Barnes 2006: 193-202 for extended discussion).

In sum, a variety of language-internal factors appear to play an important role in the decay of harmony systems. As such, cases of decay cannot simply be attributed to external factors without further examination of language-internal forces that have likely influenced the trajectory of the harmony system. Furthermore, the critical role that independent morphological and phonological patterns play in the maintenance of harmony lends credence to Binnick's claim that vowel harmony is inherently unstable – the maintenance of harmony depends on the maintenance of numerous supporting grammatical structures.

44.4 Conclusion

In conclusion, extant evidence supports the role of a wide range of factors in the decay of vowel harmony systems. Both language-internal and external factors may undermine the existence of harmony, which is realized at the lexical, morphological, and phonological levels of the grammar. In decay, general patterns may become lexically-specific, the domain of harmony may be reduced, harmony may become optional or gradient in its effect, and harmony may dictate the realization of a smaller portion of the feature space.