Chapter 58

Vowel harmony in Sino-Tibetan languages

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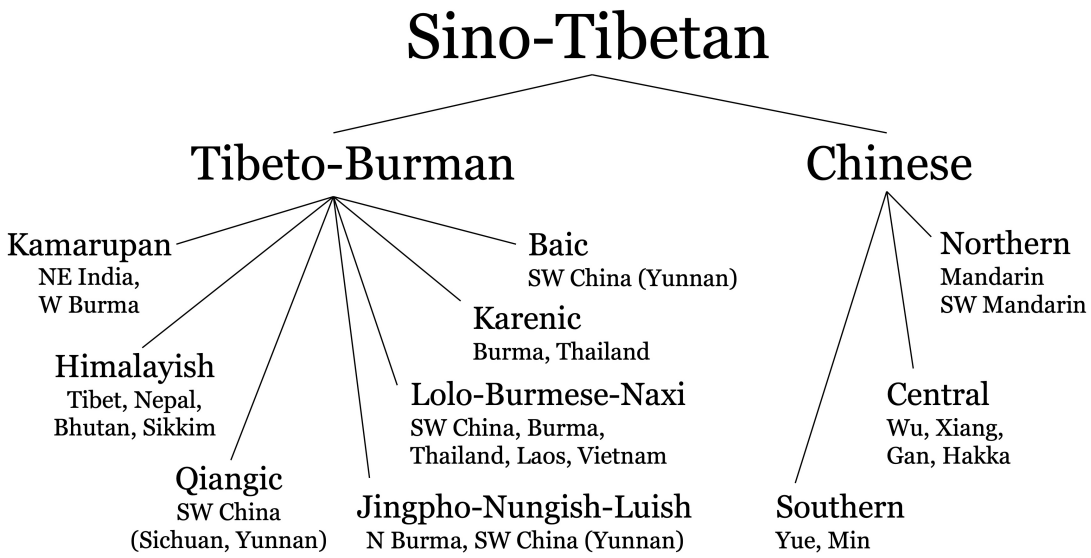
58.1 Introduction

This chapter provides an overview of vowel harmony (VH) systems, as reported for some languages of the Sino-Tibetan [ST] language family (see Chart 58.1, adapted from Matisoff 2003: 3).

Chart 58.1: Sino-Tibetan languages



VH is marginal in ST, especially in view of the extensive distribution of this language family (from Northeast India to the Southeast Asian peninsula) and the large number of ST languages (approximately 250, see Matisoff 2003: 3). VH is consistently reported only for Qiangic, a small subgroup in Southwest China. A few isolated cases have also been reported for languages of two more subgroups: (i) Na (aka Naxi) languages of the Lolo-Burmese-Naxi subgroup, which are located immediately south of Qiangic languages, and (ii) Tibetic languages of the Himalayish subgroup,[1] spoken in West China, which are more remote neighbors of both Qiangic and Na languages.

[1] The term "Tibetic" refers to a group of languages derived from Old Tibetan, which was spoken in the Yarlung valley at the time of the Tibetan empire (7-9th centuries) (Tournadre 2014).

VH in Tibetic languages, particularly in the *lingua franca* Lhasa Tibetan, has been systematically investigated (see Sprigg 1961; Chang & Shefts Chang 1964: 46–53; 1968; Dawson 1980: 59–87; 1985; Denwood 1999: 78–84; 304–306; Tournadre & Dorje 2003: 401–402; DeLancey 2017: 387), and is already incorporated in cross-linguistic studies on VH (see Salting 1998; 2005; van der Hulst 2018: 271–274). Conversely, information about VH in Qiangic and Na languages is mostly limited to descriptive statements in reference grammars, and is virtually unknown in the literature on VH. VH in these two groups is therefore the main focus of this chapter.

58.2 Qiangic and Na

The grouping of little-studied TB languages of Southwest China as "Qiangic" is based on exploratory work by Chinese linguists between the 1960s and the 1990s (H. Sun 1983; 2001; Huang 1991). Qiangic comprises twelve languages that are still spoken (Qiang or Rma, rGyalrong, Khroskyabs, Horpa, Muya, Prinmi, Choyo, Zhaba, Guiqiong, Ersu, Shuhi, Namuyi), and one extinct language (Tangut). The genetic classification of Qiangic languages is controversial, because the supporting evidence is limited to typologically common features (such as the presence of numeral classifiers) (cf. Chirkova 2012). In the last two decades, important progress has been made in the exploration of various Qiangic languages. New clusters have been identified on the basis of morphological criteria, such as (i) rGyalrongic, including rGyalrong proper, Khroskyabs, and Horpa (J. Sun 2000a; b); and (ii) Qiang (see Evans & Sun 2015; Sims 2016). At the same time, some southern Qiangic languages (such as Shuhi and Namuyi) have been argued to have a closer affinity to Na languages (see Jacques & Michaud 2011), which are traditionally seen as transitional between the Qiangic and Lolo-Burmese groups (e.g., Bradley 1997; Matisoff 2003).

Qiangic languages are phonetically and phonologically complex. They are characterized by (i) large consonant inventories, including uvular consonants; (ii) large vowel inventories, typically including eight to ten vowels, which may be lengthened, nasalized, and rhotacized; and (iii) complex prosodic systems, ranging from stress languages in the north to tone languages in the south. Morphemes in Qiangic languages are generally monosyllabic, but words are mostly disyllabic. Tonal Qiangic languages commonly have two contrastive tones on free morphemes, whereas in disyllabic words, there is tone reduction in non-initial syllables, resulting in a limited number of possible tone patterns (e.g., Evans 2008; 2018: 245–249).

Overview studies of Qiangic languages describe VH as a characteristic feature of the Qiangic subgroup (e.g., H. Sun 2001: 166). However, while surface patterns of vowel assimilation are readily attestable in various Qiangic languages, individual harmony systems differ rather markedly throughout the area of their distribution. Mixed systems with several distinct harmony types per language are found in northern Qiangic languages, which are stress-timed, and simpler systems with oftentimes just one harmony type have been reported for southern Qiangic languages, which are tonal. Despite this diversity, VH in various Qiangic languages is associated with the same set of these three domains:

1. verbs with affixal morphemes, including:
(a) several types of ST derivational affixal morphology, such as the preverbal negative particle **ma-j* and the prohibitive particle **ta* or **da* (cf., LaPolla 2017)
(b) independently innovated derivational affixal morphemes, such as directional prefixes[2]
2. kinship terms formed with the ST kinship prefix **a-*
3. combinations of the numeral 'one' with numeral classifiers[3]

Harmonic domains are typically equal to or shorter than a (phonological and morpho-syntactic) word. VH is root-controlled in affixal structures and regressive in combinations of the numeral 'one' with classifiers. VH reported for some adjacent Na languages, which are tonal and typologically close to southern Qiangic languages, is broadly similar to that in southern Qiangic languages in terms of harmony types and domains.

The following case studies illustrate variation in VH systems across Qiangic and adjacent Na languages. The Yadu variety of Qiang, a northern Qiangic stress language, boasts one of the most complex VH systems in the area. As analyzed in Evans & Huang (2007), Yadu has five VH processes: Front, Low, ATR, Round, and Rhotic (see Chapters 4–7, 10, this volume). In addition to the aforementioned harmonic domains, VH in Yadu also occurs in compounds. Front, Low, ATR harmonies are found in root-affix combinations and those of the numeral 'one' or the demonstratives and a classifier, whereas Round and Rhotic harmonies are typically found in compounds.

[2] Directional prefixes in Qiangic languages mark the direction of the action, denoted by the verb; they are also used to encode aspect.
[3] Numbers are mostly bound morphemes in Qiangic and Na languages, which are only used in combination with a classifier.

Yadu has eight basic vowels: /i y e a ə u o ɑ/. All vowels except for /ə/ show a phonemic contrast in length; and all vowels may be rhotacized. Table 58.1 (adapted from Evans & Huang 2007: 154) summarizes feature specifications for Yadu vowels:

Table 58.1 Feature specifications for Yadu vowels (unary features "Round" and "Rhotic" are marked by "•")

	i	y	e	a	ə	u	o	ɑ	rhotic vowel
Front	+	+	+	+	−	−	−	−	
Low	−	−	−	+	−	−	−	+	
ATR	+	+	−	−	+	+	−	−	
Round		•				•	•		
Rhotic									•

Front and Low harmonies are argued to be the most basic of the five VH processes. Vowels in affixes, such as the first singular suffix in example (1) (Evans & Huang 2007: 155), agree with the root vowel for the specification for [front]:

(1) a. 'pʰi-a [pʰja]
sow-1SG
'I am sowing'

b. 'pʰu-ɑ [pʰwɑ]
run-1SG
'I am running'

Front harmony further interacts with Low harmony. Vowels in some morphemes, such as the numeral 'one' in example (2) (Evans & Huang 2007: 156), take on values that combine the features [front] and [low] of the root vowel. Accordingly, 'one' has four allomorphs, including (i) [e] with the features [+front]/[−low], (ii) [a] with the features [+front]/[+low], (iii) [o] with the features [−front]/[−low], and (iv) [ɑ] with the features [−front]/[+low].

(2) a. e-'pi
one-dollar
'one dollar'

b. a-'kwa
one-place
'one place'

c. o-'tsu
one-group
'one group'

d. ɑ-'lɑ
one-CLF.elongated
'one stick-like thing'

Yet some other morphemes (such as directional prefixes) are inherently specified for ATR. When such morphemes undergo VH, the morpheme's specification for ATR combines with

the features [front] and [low] of the root vowel. Vowels belonging to the [+ATR] set have the realizations [i~ə~u], whereas vowels belonging to the [−ATR] set have the realizations [e~a~o~ɑ], as illustrated in example (3) (Evans & Huang 2007: 157–158):

(3)			push	drive	run, flee	chase
	+ATR	upward	ti-ˈɕtɕi	ti-ˈwaʁ	tu-ˈpʰu	tə-ˈdzɑ
	−ATR	downward	ɦe-ˈɕtɕi	ɦa-ˈwaʁ	ɦo-ˈpʰu	ɦɑ-ˈdzɑ

Rounding harmony operates bidirectionally so that vowels across syllable boundaries agree in terms of [round]. It is commonly observed in morphemes with the vowel [ə], such as /pə/ ‘do’ in example (4) (Evans & Huang 2007: 162).

(4) /ʁwɑ.ˈkʰu-pə/ [ʁwɑ.ˈkʰu-pu] ‘be sarcastic’

Finally, rhotic harmony occurs before a rhotic vowel, as in (5) (Evans & Huang 2007: 165):

(5) a. /ʁuɑ/ ‘five’ + /kʰeˇ/ ‘hundred’ > [ʁuɑˇ.ˈkʰeˇ] ‘five hundred’
b. /me-/ ‘not’ + /weˇ/ ‘reduce’ > [meˇ-ˈweˇ] ‘unceasingly’

The tonal southern Qiangic languages Guiqiong and Ersu exemplify simpler VH systems. Guiqiong (Rao 2015: 63–67) has eight basic vowels: /i y ɯ u ə ɛ ɔ ɑ/. All vowels but /y/ and /ɔ/ have nasal counterparts. In addition, there is one nasal vowel without an oral counterpart, /æ̃/. In Rao’s analysis, all vowels can be divided into three classes, characterized by the features [±front] and [±high]. The primary division is based on the feature [±front]; non-front vowels are further differentiated on the basis of the feature [±high]. Depending on the feature(s) of the stem vowel, the vowel of the prefix or that of the numeral ‘one’ may have one of the following realizations: [ɛ~ə~ɑ]. Table 58.2 summarizes the three vowel classes in Guiqiong, their features, and the corresponding alternant realizations. These are exemplified by combinations of the negative prefix with verbs (Rao 2015: 85). Monosyllabic verbs in Guiqiong have two tones: 35 and 55. The tone of the prefix shows some variation depending on the tone of the verb, but the underlying processes are not yet fully understood (Rao 2015: 72–73, 83–86).

Table 58.2 VH in Guiqiong

Feature		Vowel set	VH form	Example
[+front]		i, ɛ, y, ĩ, ɛ̃, æ̃	ɛ	mɛ^{35}-dæ̃^{55} ‘not hit’
[−front]	[+high]	u, ə, ɯ, ũ, ə̃	ə	mə^{35}-pɯ^{55} ‘not move’
	[−high]	ɔ, ɑ, ɑ̃	ɑ	mɑ^{33}-ʐɔ^{55} ‘not help’

Ersu presents an even simpler system with only one process: Low harmony (e.g., Chirkova et al. 2015 for the Ganluo variety of Ersu). Ganluo Ersu has eight vowels, of which four are plain (/i ɛ o a/), two are fricativized (/ʐ ʮ/), and two are rhotacized (/əˠ aˠ/). All vowels can be divided into low (/a aˠ/) and non-low (all remaining vowels). Corresponding vowel realizations in verbal prefixes and the numeral ‘one’ are [a~ɛ], as detailed in Table 58.3 (ibid., 204).[4] Ganluo Ersu monosyllabic words have two contrastive tones: H(igh) and L(ow). In combinations of verbs with prefixes or those of the numeral ‘one’ and classifiers, the tone of the prefix or the numeral ‘one’ assimilates to the tone of the verb or the classifier. It is H, if the tone of the verb or the classifier is H; and L, if the tone of the verb or the classifier is L.

Table 58.3 VH in Ganluo Ersu

Feature	Vowel set	VH form	Example
[−low]	i, ɛ, o, ʐ, ʮ	ɛ	tɛ́ pʰó ‘one set’ nɛ̀-ndzɛ̀ ‘have soaked’
[+low]	a, aˠ	a	tá ká ‘one strip’ nà-ɖʐà ‘fall down’

Yongning Na has a mixed VH system, where front-back harmony and height harmony are differentiated by affix (Lidz 2010: 96–105). Yongning Na has 10 basic vowels: /i ɛ æ æ̃ ə ɯ u ʮ ɤ, ɔ ɑ/ (ibid., 37). It is described as having two basic tones (33 and 13) and a complex tone sandhi system (ibid., 14, 109), the workings of which have yet to be precisely discovered. The interrogative prefix *a^{33}-* has two allomorphs, which agree with the root vowel for the specification for [front], as illustrated in (6) (Lidz 2010: 99):

(6) a. [æ^{33}-tsʰɛ^{33}] ‘what, how’ b. [ɑ^{33}-tsɔ^{33}] ‘what’

[4] /əˠ/ mostly occurs in isolation and is not found in harmonic domains.

The accomplished prefix *lə³³*-, on the other hand, harmonizes in height. It has three allomorphs, of which [lɛ³³-] is used with verbs with a high vowel (/i ɯ u ɣ/, as in [lɛ³³-ɲi³³ zɛ³³] 'be full'); [lə³³-] is used with verbs with a mid vowel (/ɛ ɤ ɔ/, as in [lə³³-sɛ³³] 'finish'), and [læ³³-] attaches to verbs with a low vowel (/æ ɑ/, as in [læ³³-qæ¹³] 'burn up') (Lidz 2010: 100–101).

The case studies above represent a diverse set of harmonic patterns, all of which share a common set of domains. At first blush, that set of patterns does not relate straightforwardly to cross-linguistically common types of VH (see Chapter 46, this volume). One noteworthy development in this regard is the recent reanalysis of vowel systems in some varieties of northern Qiangic languages (rGyalrong, Khroskyabs, Horpa, Qiang). This reanalysis may provide a missing link to tie the diverse set of harmonic patterns together and link it to a cross-linguistically identifiable type.

In this reanalysis, all vowels in a language fall into two harmonic sets, of which one is plain (hereafter Set 1) and the other is marked, and associated with auxiliary articulatory gestures involving a constriction in the vocal tract (hereafter Set 2). Vowels in Set 2 have been variably described as velarized, uvularized, and pharyngealized.[5] In all described cases they share the same set of acoustic correlates. Specifically, they are characterized by raised F1 and lowered F2 values, as compared to their counterparts in Set 1 (Evans 2006; Lin et al. 2012; J. Sun & Evans 2013; Evans et al. 2016; Van Way 2018: 103–127; Chiu & J. Sun 2020), hence suggesting a greater retraction and lowering of the tongue for vowels in Set 2.

In relation to different varieties of the Qiang language, where this phenomenon has been most extensively studied, the contrast may have escaped earlier descriptions, because vowels in Set 2 are acoustically quite distant from their counterparts in Set 1 (e.g., Evans et al. 2016: 18). This is illustrated in Table 58.4 in relation to the eight basic vowels in the Mawo variety of Qiang. The table combines phonetic transcriptions, which correspond to the inventory of basic vowels in Mawo, as presented in the first description by Liu Guangkun (1998: 38), and phonological transcriptions, which are based on the reanalysis of the Mawo vowel system in J. Sun & Evans (2013: 139):[6]

[5] Vowels in Set 2 are analyzed as velarized in Zbu rGyalrong (J. Sun 2000b: 215) and Puxi Lavrung (J. Sun 2004: 272; Lin et al. 2012); as pharyngealized in Hongyan Qiang (Evans 2006) and Rtsangkhog and Yunasche Horpa (Chiu & J. Sun 2020); and as uvularized in several varieties of Qiang (Evans & Sun 2015; Evans et al. 2016) and in Nyagrong Minyag (Van Way 2018).

[6] J. Sun & Evans (2013: 139) note that /iᵚ/ has multiple correspondences in Liu's (1998) data, most notably [ɐ].

Table 58.4 Harmonic vowel pairs in Mawo Qiang

Set 1	i [i]	u [y~ui]	ə [ə]	a [a]
Set 2	iᵏ [e]	uᵏ [u]	əᵏ [ɤ]	aᵏ [ɑ]

Important phonological evidence for the underlying contrast comes from phonotactic constraints, whereby vowels from Set 2 tend to occur in contexts with a uvular consonant. For example, in Yunlinsi Qiang (Evans et al. 2016: 19–20), in syllables with simple (not cluster) onsets, a uvular onset can only be followed by a vowel from Set 2, e.g., /quᵏ/ ‘fear’; whereas a velar onset is mostly followed by a vowel from Set 1, e.g., /ku/ ‘turnip’. Vowels from both sets occur with labial and coronal initial consonants. In syllables with cluster onsets (C1C2), the nucleus agrees in uvularity with C1, if C1 is velar or uvular, and C2 is not an oral stop or affricate. Examples include: /gzə/ ‘set out’, /ʁzəᵏ/ ‘fish’. VH, found in the common set of harmonic domains, is said to be an important aid in the identification of vowel pairs. For example, in prefix-verb combinations, prefix vowels alternate between Set 1 and Set 2 in agreement with the vowel of the root. This is illustrated in Table 58.5 with examples from Hongyan and Mawo (Evans 2006: 946; J. Sun & Evans 2013: 142):

Table 58.5 VH in Hongyan and Mawo Qiang

Set 1	Gloss	Set 2	Gloss
/nu-ˈla/	‘bring (in upstream direction)’	/nuᵏ-ˈstaᵏ/	‘pull out (in upstream direction)’
/da-ˈsu/	‘have studied’	/daᵏ-ˈsuᵏ/	‘have hibernated’

In most studies, it is argued that the marked property associated with Set 2 is a property of vowels rather than consonants (e.g., Evans et al. 2016: 21–22). However, in a few cases, an unambiguous assignment is problematic. Nyagrong Minyag (Horpa), as described in Van Way (2018), is a case in point. Uvularization in Nyagrong Minyag exists in two forms. As a consonantal feature, uvular segments pass the feature of uvularization to neighboring vowels in both directions, as in /qa/ [qaᵏ] ‘crack’, /xaχpə/ [xaᵏχpə] ‘friend’ (Van Way 2018: 95). As a vowel feature, some vowels have properties of uvularization in contexts where no uvular consonant is present, as in [zyᵏ] ‘appearance’, [laᵏwaᵏ] ‘lungs’ (ibid., 101). As a result, in some cases, it may be difficult to decide whether a certain uvularized vowel is a phoneme or an allophone. In addition to uvulars, other consonants that play a role in VH by blocking the spread of uvularization include velars and /j/, as in [qwaᵏɣwa] ‘rake’, [qʰaᵏji] ‘boiled flour’

(ibid., 99). Inventories of plain and uvularized vowels in Nyagrong Minyag are provided in Table 58.6 (Van Way 2018: 101):

Table 58.6 Harmonic vowel pairs in Nyagrong Minyag

Set 1	i	y	ɛ	ə	u	ɔ	a
Set 2	iᵸ	yᵸ	–	əᵸ	uᵸ	–	aᵸ

The analyses of Nyagrong Minyag and the varieties of Qiang above primarily focus on the phonetic and phonological opposition in vowels and only evoke VH as an aid in the identification of vowel pairs. Interestingly, the analysis of Stau (Horpa) by Gates & Won (2018), which concentrates on VH, reveals a similar organization of vowels in harmonic pairs, with one vowel being more retracted and lowered than the other (see Table 58.7, Gates & Won 2018: 263).[7]

Table 58.7 Harmonic vowel pairs in Stau

Set 1	i	e	u	æ
Set 2	ə	ɛ	o	ɑ

Gates & Won (2018) notice that lexicalized words in Stau show a strong tendency toward harmonic forms with identical vowels (such as [eCe], [oCo] or [æCæ], as in /veqe/ ‘rabbit’, /fɛoro/ ‘scrape’, /nc^{h}æræ/ ‘play’, ibid., 268–269), and lacking disharmonic forms (such as [*eCɛ], [*oCu], or [*ɑCæ]). A similar tendency is also found in compounds and combinations of verb stems with negative, prohibitive and directional prefixes, as in [mæ-rgæ] NEG-like.3 ‘[he] did not like [it]’, [mɑ-ʁɑ] NEG-problem ‘no problem’ (ibid., 270–271). Similar to other northern Qiangic languages with two sets of vowels, the occurrence of vowels in Set 2 is correlated with the presence of uvulars. Specifically, the high vowels /i u/ (Set 1) do not occur after uvular consonants. Hence, VH involving the pairs /i-ə/ and /u-o/ is blocked if the onset of the first syllable is uvular. Examples include: [ʁəci] ‘top’ (instead of *[ʁici]), [ʁoɲu] ‘behind’ (instead of *[ʁuɲu]) (ibid., 277). Other consonants blocking VH include affricates and consonant clusters in the middle of the root, as in [k^{h}ə-tsi] ‘conduit’ (instead of *[k^{h}i-tsi]), [pə-xsi] ‘bladder’ (instead of *[pi-xsi]) (ibid., 278).

[7] Gates & Won (2018: 269–270) note that evidence for the vowel pair /i-ə/ is less straightforward than for the other three vowel pairs, because attested cases of [iCi] are often in free variation with [əCi].

Assuming that all languages analyzed as having harmonic vowel pairs represent one and the same type of contrast, the related harmony pattern is one in which vowels from each harmonic pair cannot co-occur within the same domain. This harmony pattern manifests itself in disyllabic words and compounds (Stau, Nyagrong Minyag), and it also extends to combinations of roots with prefixes (Yunlinsi, Mawo, Stau), which belong to the set of common Qiangic harmonic domains. This represents a rather prototypical pattern of vowel harmony, in which all vowels in a word agree for some feature, with affixes displaying alternations. However, what complicates the analysis of this pattern is that, on the one hand, across the languages with harmonic vowel pairs, the phonetic nature of the underlying distinction is unclear and, on the other hand, it is uncertain whether the underlying harmonic feature is vocalic (as argued for Mawo and Yunlinsi) or both vocalic and consonantal (as in Nyagrong Minyag), and hence, perhaps related to stretches that are larger than one segment (whether vowel or consonant).[8]

The remainder of the section examines how the opposition in vowels (organized in harmonic pairs) and the related harmony pattern, found in some northern Qiangic languages, correspond to vowel systems and diverse VH patterns in other Qiangic languages across the common set of harmonic domains.[9] The goals of the comparison are (i) to seek further evidence on the nature of the feature underlying the opposition between harmonic vowel pairs, and (ii) to examine the role of consonants in harmony processes. The proposed analysis is necessarily preliminary and tentative, because our knowledge of most Qiangic languages is still very incomplete and much information relevant to the comparison is not available.

Across Qiangic languages, correspondences vary depending on whether compared languages have stress or tone. In closely related varieties, which have stress, the opposition between harmonic vowel pairs in some varieties, such as Mawo (see Table 58.4), appears to correspond to that in vowel quality in some other varieties, such as Yadu (see Table 58.1). Put differently, the harmony pattern based on the spreading of a single marked feature, such as uvularization in Mawo (see Table 58.5), corresponds to a set of patterns, whereby vowels

[8] Another piece of evidence that vowel assimilation in Qiangic languages may relate to both vowels and consonants comes from rhotic assimilation in Qiang. In some varieties of Qiang, such as Yonghe, described in Sims (2014), r-coloring in verbal prefixes occurs not only when they precede a root with an r-colored vowel, but also when preceding a root with a plain vowel and a retroflex consonant initial, as in the following example: /hə-/ directional.prefix + /tʂɑ/ ‘draw out’ > [hɑˈ-ˈtʂɑ] ‘draw out (lots)’ (ibid., 46).

[9] Given that rounding and rhotic harmony attested in some northern Qiangic languages (such as Yadu Qiang) occur in compounds, which do not belong to the set of harmonic domains found in all Qiangic languages, they are not included in the comparison, and may represent unrelated processes.

come to agree across several dimensions, such as Low, Front, ATR in Yadu. The number of harmonic allomorphs in Yadu (up to four, see examples (2) and (3)) tentatively suggests that all harmonic vowel pairs that are phonologically contrastive in Mawo likely remain phonologically contrastive in Yadu.

In more distantly related southern Qiangic languages, which are tonal, the opposition between harmonic vowel pairs corresponds to a combination of oppositions in vowel quality and tone. The number of features for which vowels agree across harmonic domains reduces and so does the number of allomorphs in affixes (see Tables 58.2–4 for Guiqiong, Ersu, and Yongning Na). This tentatively suggests that some of the original phonological oppositions between paired vowels may be lost. The restructuring of the original system of contrasts and the accompanying reduction of VH patterns may be further correlated with the loss of uvulars. This can be illustrated by comparing Ersu, which does not have uvulars, with its closely related language Lizu, which has phonemic uvulars. Lizu has eight basic vowels: /i y e æ ə u o ʁ/, which in contrast to Ersu, feature a distinction between front *a* (/æ/) and back *a* (/ʁ/). Uvulars in Lizu are only found before back and low vowels (/o/ [ɔ] and /ʁ/ [ɑ]) (Chirkova & Chen 2013). Lizu has no VH, but in verbs and classifiers with the root vowel /ʁ/, the vowel in prefixes and the numeral 'one' commonly assimilates to /ʁ/ in lowness and backness, as in /dè-qʰʁ̀/ [dɑ̀-qʰɑ́] 'bitter'. To compare, Ersu has Low harmony before /a a˗/ (see Table 58.3), which after the merger of the front and back *a*, found in Lizu, become the only two open vowels in the vocalic system of Ersu.[10] Finally, VH patterns in common harmonic domains are accompanied by tone assimilation (as in Ersu, see Table 58.3). However, in many cases, underlying patterns are not yet fully understood (as in Guiqiong, Yongning Na).

One mechanism that would account for the diversity of correspondences of the opposition in harmonic vowel pairs, as found in some northern Qiangic languages, to those in vowel and/or tonal quality across various Qiangic languages is the engagement of the laryngeal constrictor, controlling larynx opening, larynx height, and lingual retraction (Esling 1996; 2005; Esling et al. 2019; Moisik et al. 2021). This complex combination of articulatory events involves sets of correlated phonetic properties associated with vowel, phonatory, and tonal quality, hence providing a viable mechanism for sound change. The underlying feature that would incorporate all laryngeal constrictor events is [+constricted], yielding a binary

[10] A complex correlation between the presence and absence of VH and that of uvulars is also observed in Na languages. Uvulars are only attested in varieties with productive VH, such as Yongning Na (see Lidz 2010: 80–82; Michaud et al. 2015).

distinction between two contrastive categories or registers (cf., Esling et al. 2019: 166–178). While vowel and tonal quality are among correspondences of the presumably original register-type contrast in various Qiangic languages, phonation is not, which requires an explanation. One possibility is that phonation contrasts have been described in other terms (e.g., tense/lax distinction in vowels in Namuyi and Muya, e.g., H. Sun 1983: 165; Huang 1991: 262–266; Gao 2015: 19–28; Gao & Rao 2016: 88–89; Bai 2020: 52–54), or have been overlooked. The latter possibility is increasingly plausible, as more and more phonation contrasts are being discovered, with more in-depth work now being possible (see J. Sun et al. 2017; Chirkova et al. 2021).

Currently available data are inconclusive as to the implementation of the laryngeal constrictor being primarily vocalic or consonantal. In northern Qiangic languages, various consonants (uvulars, velars, palatal segments, affricates, consonants clusters) appear to play a role in harmony processes, being either affected by or themselves affecting (blocking) VH (on the role of consonants in VH, see Chapter 2, this volume). In southern Qiangic languages, whose vowel systems may be considerably restructured, uvulars and velars are perhaps the only consonants correlated with VH processes.

Overall, the current state of our knowledge of Qiangic and Na languages leaves many questions unanswered. Future descriptive and analytic work needs to focus in greater detail on the structure of vowel and tonal systems, the possibility of phonation contrasts, the role of consonants in harmony processes in various languages, and the relationship of harmonic processes in Na languages to those in Qiangic. Until that time it can be tentatively concluded that diverse patterns traditionally described as vowel harmony in Qiangic and Na languages likely represent vestiges of an earlier register-type contrast.

58.3 Tibetic

Unlike Qiangic and Na languages, VH in Tibetic represents a more canonical VH system, which spreads from vowel to vowel without affecting or being affected by intervening consonants. Seen in the context of Tibetic languages (estimated in number of over 200, see Tournadre 2014), VH is not a typical feature of this group and has only been reported in Lhasa Tibetan (see references above), Balti (Sprigg 1966; 1980), Ndzorge (J. Sun 1986: 73–84), Dingri (Herrmann 1989), and Shigatse (Haller 2012). All but Ndzorge represent similar

patterns of regressive raising in the context of high vowels.[11] As there is no clear-cut evidence of VH in Classical Literary Tibetan (see Miller 1966; Ulving 1972), which has preserved a very archaic orthography, VH is likely an independent development in those varieties where it is attested.

The main type of VH in Lhasa Tibetan, which is in focus of this section, is conventionally described as height harmony (or assimilation of the vowel aperture, Tournadre & Dorje 2003: 201, footnote 174). The basic principle is that all vowels in a harmonic domain should agree in height. The eight basic vowels of Lhasa Tibetan can be divided into two classes: (a) high vowels and (b) non-high vowels, as in Table 58.8 (Haller 2012: 45). Note that the schwa does not have a phonemic status in Lhasa Tibetan, being the result of a raising process.

Table 58.8 High and non-high vowels in Lhasa Tibetan

High vowels	i		y	u	[ə]
Non-high vowels	e	ɛ	ø	o	a

VH applies in sequences of two syllables, which include (i) compounds, (ii) combinations of adjectival roots with positive and superlative suffixes (in the Written Tibetan orthography, *-pa*, *-mo*, *-po*, *-shos*), (iii) combinations of nouns and verbs with enclitics (analytical case markers, verbal particles). VH is dominant/recessive, applying both progressively and regressively within compounds and from affixes to stems and vice versa. This is illustrated in examples (7)–(9) (adapted, respectively, from Denwood 1999: 79; Dawson 1980: 69; and DeLancey 2017: 387). Examples are provided in the Written Tibetan orthography, followed by phonetic transcriptions.[12]

(7) Progressive VH in compounds

[11] Ndzorge (Eastern Amdo) displays vowel lowering and dissimilation (J. Sun 1986: iv, 73–84; Denwood 1999: 304–306). As analyzed in J. Sun (1986), the nine vowels of Ndzorge (/i e ɛ æ u ɤ o ɔ a/) can be divided into three groups: (a) dominant: /i u ɤ/, (b) recessive: /e æ o/, (c) neutral: /ɛ a ɔ/. VH affects the recessive vowels before a syllable containing either the dominant vowels or a velar coda, converting them into corresponding neutral vowels. Dominant vowels only trigger changes without being subject to change themselves. Recessive vowels only undergo change. Neutral vowels neither cause nor undergo change. Examples include (J. Sun 1986: 75–76): *dred* [ʈʂet] 'brown bear' > *dred phrug* [ʈʂɛʈʂɤɣ] 'brown bear cub'; *dred* [ʈʂet] 'brown bear' > *dred mo* [ʈʂemo] 'female brown bear'.

[12] Lhasa Tibetan has two tones: high and low (e.g., Tournadre & Dorje 2003: 35). In disyllabic words, the two contrastive tones are realized on the first syllable, whereas the second syllable is assigned a default high tone.

a. *rgya* [gjà] ‘Chinese’ + *bod* [pʰɔ̀ː] ‘Tibet’ > [gjàbɔ́ː] ‘Sino-Tibetan’
b. *dbyin (ji)* [ʔɪ̋(dʑí)] ‘England’ + *bod* [pʰɔ̀ː] ‘Tibet’ > [ʔíbʏ́ː] ‘Anglo-Tibetan’

(8) Regressive VH in compounds
a. *bod* [pʰɔ̀ː] ‘Tibet’ + *lug* [lùː] ‘sheep’ > [pʰʏ̀ːlúː] ‘Tibetan sheep’
b. *bsnyal* [ɲèː] ‘sleep’ + *gur* [kʰùː] ‘tent’ > [ɲìːgúː] ‘mosquito tent’

(9) Progressive (a–b) and regressive (c) VH in affixal structures
a. *dkar po* [káːpó] ‘white’
b. *zhim po* [ɕi̱mpú] ‘delicious’
c. *'gro* [ʈʂò] ‘go’ > *'gro=gyi yin* [ʈʂù=gì jɪ̋] ‘go=FUT’

VH in Lhasa Tibetan has numerous parallels with ATR harmony in African languages (see Chapter 7, this volume), as several scholars have argued (e.g., Dawson 1980; Salting 2005; Casali 2008; van der Hulst 2018). These include: (i) the main vowel opposition being based on vowel height, that is, a consistent difference in F1 between vowels of the two harmonic sets; (ii) dominance of [+ATR] vowels; (iii) presence of dominant [+ATR] suffixes; (iv) an asymmetrical vowel system with a missing phonemic low [+ATR] vowel. However, differences in the length of harmonic domains (VH applying in sequences of two syllables in Tibetan) do not allow to assess the behavior of the unpaired vowel in Tibetan with respect to neutrality (that is, its ability to co-occur word-internally with both [+ATR] and [−ATR] vowels).

58.4 Concluding remarks

Given the general absence of VH in ST, the exceptional presence of VH patterns in some ST languages may represent independent developments or be borrowed through language contact (see Chapter 46, this volume). The area where languages with VH systems are attested is historically multiethnic and multilingual. For centuries it served as a migration corridor for groups belonging to Southeast Asian language families (such as TB, Tai-Kadai, Mon-Khmer, and Hmong-Mien) and Northeast Asian language families (Mongolic, Tungusic). In addition, speakers of Mongolic languages swept through Southwest China during the Mongol conquest of China in the 13th century (e.g., Haw 2014).

In the vast areas where ST languages are spoken, Southwest China, home to Qiangic and Na, is one of the most complex areas, yet also one of the least explored. More in-depth experimental and instrumental phonetic work on Qiangic, Na, but also Tibetic languages is clearly needed to get a better understanding of their vowel harmony systems and how they relate to other cases of vowel harmony, as discussed in this Handbook. The steady increase in descriptive and analytic work will likely translate into a better understanding of patterns traditionally described as vowel harmony in this language family.

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