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Mongolian Vowel Harmony in a Eurasian Context

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Abstract

The paper discusses the controversy that has arisen concerning the origin and nature of vowel harmony in Mongolian, as well as in a number of other Eurasian languages. In contrast to the conventional understanding according to which Proto-Mongolic had a palatal-velar harmony of the same type as is attested in the Turkic and Uralic languages, it has been claimed recently that the harmony was actually of the tongue root type, involving, in particular, tongue root retraction in the pronunciation of certain vowels. However, while tongue root harmony is indeed prevalent in many modern Mongolic languages, including standard Mongolian, there are several arguments that can be made in support of the conventional reconstruction. There are serious reasons to assume that Mongolic has undergone a process of vowel rotation, which has turned the originally palatal-velar harmony to tongue root harmony. In this process the originally horizontally organized harmonic pairs have become verticalized. A typical result of the verticalization has been the rapid reduction of the original vowel paradigm as well as the development of new palatal vowels to complement the losses.

Keywords

Mongolic languages – vowel systems – vowel harmony – vowel shift – areal typology

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1 Introduction

Over the past several years, increasing attention has been paid to the systems of vowel harmony in Eurasia, an issue that has become the source of considerable controversy. Vowel harmony in Eurasia is a macroscopic areal-typological feature that is particularly typical of the agglutinative languages of what we will refer to as the Ural-Altaic belt, a complex of several structurally similar though genetically unrelated language families extending from Uralic and Turkic in the west to Mongolic, Tungusic, Koreanic and Japonic in the east. In this complex, only Japonic lacks any traces of vowel harmony. Vowel harmony is, however, also attested in some other languages of the North Pacific Rim, notably in Amuric (Ghilyak or Nivkh) and Chukotic (Chukchi-Koryak), two small "Palaeo-Siberian" families. Typologically similar and possibly areally related phenomena are encountered also in the American Pacific Northwest, especially in the Salishan languages (Kiparsky 1968 *passim*).

The controversy is connected with the fact that the languages of Eurasia are areally divided between two types of vowel harmony. The languages in the western half of the continent—mainly Uralic and Turkic—have palatal-velar harmony (PVH), in which the harmonizing vowels are arranged in pairs comprising a palatal (front) and a velar (back) vowel. We may also call this type of harmony *horizontal*, since the members of each pair are located on the same level of opening. Turkish is a prototypical example of such a language, oriented around a primary opposition between the front vowels /i/, /e/, /y/, /ø/ and the back vowels /ɯ/, /a/, /u/, /o/. The languages in the eastern half of the continent—notably Tungusic and Koreanic, but also Amuric and Chukotic—have a system that has been identified as tongue root harmony (TRH), in which the harmonizing vowels are distinguished by the position of the tongue root, with one member in each pair being pronounced with "retracted" tongue root, while the other member is pronounced with "non-retracted" or "advanced" tongue root. The vowels pronounced with retracted tongue root are in some languages accompanied by pharyngealization, but more often they are simply lower (more open) than their harmonic counterparts, which, then, have higher (more closed) qualities. We may also call this type of harmony *vertical*, since the members of each pair are located on different levels of opening.[1] Dagur

1 Although this use of the terms *horizontal* and *vertical* is logically rather obvious, it has also been argued that harmony of the palatal-velar type should be called *vertical*, since the different harmonic *pairs* are located on different levels of opening (see the discussion between Itkonen 1975 and Rédei 1975).

can be classified as this type, featuring a primary opposition of the advanced vowels /e/, /u/ and the retracted vowels /a/, /o/.

In this paper we will focus on one particular Eurasian language family, Mongolic, since in this family both types of vowel harmony are present and well documented. The Mongolic family comprises some 12 to 17 different languages spoken from the Caspian region and Jungaria in the west to Mongolia and Manchuria in the east (for a comprehensive survey, see Janhunen ed. 2003). The varieties spoken in the west, notably Oirat (mainly in Jungaria, but including also Kalmuck in the Caspian region) have a typical horizontally organized palatal-velar harmony with the front vowels /e/, /y/, /ø/ contrasting with the back vowels /a/, /u/, /o/, while the varieties spoken in the east, especially Dagur (in Manchuria), but also the eastern dialects of Mongolian proper (in Inner Mongolia) have a typical vertically organized tongue root harmony. The varieties spoken in the middle (in Mongolia) are transitional and are characterized by a harmony in which both the front/back and the high/low dimension play a role, with the high-front vowels somewhat centralized and the low-back vowels somewhat pharyngealized. This means that the Mongolian advanced vowels /u/, /ɵ/ are often notably centralized while the retracted vowel /ʊ/ and to a lesser extent /ɔ/ show pharyngealization.

It has to be added that vowel harmonies in Eurasia are often affected by various other complications. For instance, the principal manifestations of vowel harmony in Amuric and Chukotic are regressive in type, meaning that the dominant (root) vowel determining the harmonic status of the word affects the vowels of the previous syllable(s). In most other Eurasian languages, vowel harmony operates progressively, meaning that the dominant (root) vowel is located in the initial syllable of the word and affects the vowels of the following syllables, including those belonging to suffixes. This difference is mainly connected with the prosodic patterns and direction of agglutination in the languages concerned (regressive in primarily prefixing languages and progressive in primarily suffixing languages). A feature often accompanying progressive vowel harmony is labial harmony, which adjusts suffixal vowel qualities in terms of rounding (rounded/unrounded) and can affect both high vowels and low vowels (cf. e.g. Hahn 1991: 74–77). Labial harmony, as a co-occurring harmony type is present in both Turkish and Mongolian proper, as well as in a number of other languages, but its phonemic status varies. In some languages, like Nganasan (Uralic), historical processes in both the initial and non-initial syllables have led to even much more complicated synchronic systems, wherein, for example, vowel harmony only applies to particular morphemes and only under particular circumstances (Várnai & Wagner-Nagy 2003).

2 The Vowel Harmony Controversy

It may be concluded that vowel harmony has varying manifestations in Eurasia, ranging from the palatal-velar type in the west through a transitional zone in the middle to the tongue root type in the east. The question then arises if any one of these types is diachronically ancestral, and if so, which type it is in each individual language or language family. We might also argue that the question is irrelevant as long as the size of the vowel paradigm (the number of qualitatively distinct vowel phonemes in the system) is constant, for the systematic correlation of a front/back opposition in one idiom with a high/low opposition in another idiom could also be seen as a case of mere phonetic adjustment as long as no paradigmatic mergers take place. This is, in fact, how many Mongolian speakers feel about the issue when they communicate using different types of vowel harmony without paying much attention as to how the vowels are pronounced in each given idiom. Altogether, the question is in many respects a chicken-or-egg dilemma, which has no simple answer.

Even so, the comparative method requires us to take a stand as to what type of vowel harmony was present in the protolanguage underlying each given language family in Eurasia. The procedure is normally straightforward, as the protolanguage may be assumed to have had the same type of vowel harmony as is present synchronically in all or a majority of the modern languages belonging to the family. For this reason, Proto-Uralic and Proto-Turkic are standardly reconstructed as having had a palatal-velar harmony, while Proto-Chukotic seems to be an unambiguous example of an ancestral tongue root harmony. The decision is, however, more difficult to make for the other protolanguages involved, especially for Proto-Mongolic, but also for Proto-Tungusic and the early forms of Koreanic and Amuric. There is reason to look into the situation in each language family separately.

Although the phonetic details have long been well known, the issue of vowel harmony has not been problematized until relatively recently. The conventional view used to be that most languages in the Ural-Altaic belt have originally had palatal-velar harmony, which, however, has undergone a rotation towards tongue root harmony in the eastern part of the Eurasian realm, possibly under the influence of some eastern languages that ancestrally had a harmony of the tongue root type. The families for which a secondary rotation has been postulated include Mongolic, Tungusic and Koreanic, as well as, possibly, Amuric (Janhunen 1981). This view has been challenged by the opposite hypothesis that these families had an ancestral tongue root harmony, which

only in some individual languages, as in Western Mongolic (Oirat), has been secondarily adapted to the palatal-velar type, an adaptation that would have taken place under the influence of the neighbouring Turkic languages (Ko 2011, 2013, 2018, Ko & Joseph & Whitman 2014, see also Li 1996). A similar case of adaptation would also be present in some western dialects of Ewen (Northern Tungusic, as documented in Sotavalta 1978), which, unlike all other Tungusic idioms, have a palatal-velar harmony. In the latter case, the adaptation must also have taken place under the secondary influence of a Turkic language (Yakut), with which Ewen has been in close historical contact.

Both points of view have been supported by some general arguments, some of which are valid, while others are not. In the context of the so-called Altaic Hypothesis, recently revived under the name "Transeurasian" (Robbeets 2017: 4–6), most of the language families of the Central Eurasian zone are assumed to be genealogically related, which means that they would descend from a common protolanguage, for which a certain single type of vowel harmony would have to be reconstructed. Irrespective of what type of vowel harmony we would prefer to reconstruct for the "Altaic" or "Transeurasian" protolanguage, we would have to assume that the synchronic diversity goes back to an originally uniform system. However, the Altaic Hypothesis, including its Transeurasian pendant, has been proved to be false (cf. e.g. Vovin 2005), for which reason there is no basis to assume that the vowel harmonies in the different language families of the region would necessarily have to be of a single original type.

On the other hand, in the context of general language typology it has been argued that palatal-velar harmony is rare in the languages of the world, being mainly confined to the western part of Central Eurasia, while tongue root harmony is attested in many regions, including, for instance, Africa (Johanna Nichols, p.c.). For this reason, tongue root harmony would be likely to be original also in Eurasia, at least in the eastern part of the continent, while palatal-velar harmony would be more of an exception involving, perhaps, a secondary development even in families like Uralic and Turkic. Against this it has to be remarked that the homelands of both Uralic and Turkic lie far in the east, and yet there is nothing that would suggest that Proto-Uralic or Proto-Turkic would ever have undergone a reorientation with regard to vowel harmony. In fact, the presence of languages—such as Finnish, Hungarian and Turkish—with a palatal-velar harmony in the west of Eurasia is the result of a rather recent geographical expansion of languages featuring this type of harmony (Janhunen 2007).

3 The Proto-Mongolic Vowel System

Before examining the Mongolic case, we may take a look at the Proto-Turkic vowel system, which is conventionally assumed to have had 8 members, organized symmetrically in a matrix of 4 front and 4 back vowels, 4 high and 4 low vowels, as well as 4 rounded and 4 unrounded vowels (Table 1).[2] This system is still synchronically attested in many modern Turkic languages, and it was also present in the historical forms of Turkic, including Old Turkic, spoken in Mongolia and adjacent regions in the 1st millennium AZ.[3]

TABLE 1 Proto-Turkic vowel system (Johanson 1998a: 30)

	FRONT		**BACK**	
	–round	**+round**	**–round**	**+round**
+high	*i	*y	*ɯ	*u
–high	*e	*ø	*a	*o

On the basis of a number of unexplained correspondences it has occasionally been proposed that Pre-Proto-Turkic may have had up to two additional vowels, in which case each of the vowels *e and *a would represent two original segments, a lower (*æ *a) and a higher (*e *ə) (cf. e.g. Hansen 1957). The original vowel system would, then, have had three levels of opening, with 4 high (*i *y *ɯ *u), 4 mid-high (*e *ø *ə *o), and 2 low vowels (*æ *a). Some modern Turkic languages have secondarily introduced a similar distinction between low and mid-high vowels, especially in the front column (/e/ vs. /æ/). This detail is, however, irrelevant for the functioning of the palatal-velar harmony. It may be noted that Proto-Uralic, a language of considerably greater chronological depth but otherwise typologically similar to Proto-Turkic, seems

2 For the notation of the vowels we use the IPA symbols for all languages. In most sources on, especially, Turkic and Mongolic, the convention of Altaic Studies prefers other symbols based on the German tradition of scholarship. The relationship between the two systems is simple and straightforward: IPA y ø ɯ ə æ = conventional ü ö ï ë ä. Note, however, that neither of these systems is phonetically precise.

3 For datings, we use the abbreviations BZ (Before Zero) and AZ (After Zero) for what are also termed BCE (Before Common Era) and CE (Common Era), respectively.

to have had 8 vowels divided between 3 levels of opening, that is, 4 high vowels (*i *y *ɯ *u), 2 mid-high vowels (*e *o), and 2 low vowels (*æ *a).

The history of Mongolic may likewise be approached at two levels of reconstruction, Proto-Mongolic and Pre-Proto-Mongolic. Proto-Mongolic, by definition, was the language from which the modern Mongolic languages descend. It was also a language that was recorded in a corpus of written documents dating to the first half of the 2nd millennium AZ and collectively known as Middle Mongol. Proto-Mongolic had a system of 7 vowels. The conventional view is that these vowels were organized in terms of the same type of oppositions as those of Proto-Turkic (Table 2). It may be seen that the Proto-Mongolic system had a gap, in that it lacked an unrounded high back vowel (*ɯ). In view of this, the vowel system could also be synchronically assumed to be organized in terms of three levels of opening, with 3 high vowels (*i *y *u), 3 mid-high vowels (*e *ø *o), and one low vowel (*a). The vowels formed three harmonic pairs: *a—*e, *o—*ø and *u—*y, leaving the vowel *i as harmonically neutral.

TABLE 2 Proto-Mongolic vowel system (Janhunen 2003: 4–5)

	FRONT		**BACK**	
	–round	**+round**	**–round**	**+round**
+high	*i	*y		*u
–high	*e	*ø	*a	*o

However, the fact that *i could be combined not only with the palatal vowels *e *ø *y (as well as *i itself), but also with the velar vowels *a *o *u, suggests that this vowel had two sources, a front *i and a back *ɯ. This means that Pre-Proto-Mongolic is likely to have had a symmetrical system with 8 vowels (Table 3), that is, a system fully identical with that of Proto-Turkic. If so, any items containing Proto-Mongolic *i in combination with the vowels *a *o *u, would in Pre-Proto-Mongolic have involved the high unrounded back vowel *ɯ, e.g. *mika/n[4] 'meat' < *mɯka/n, *koni/n 'sheep' < *konɯ/n, *nitug 'homeland' < *nɯtug.

4 The notation /n indicates an unstable nasal stem component, which is not always present in the paradigm. See Janhunen (2012: 66) for further details.

TABLE 3 Pre-Proto-Mongolic vowel system (Poppe 1955: 24–25)

	FRONT		**BACK**	
	–round	**+round**	**–round**	**+round**
+high	*i	*y	*ɯ	*u
–high	*e	*ø	*a	*o

This reconstruction is based on the assumption that Proto-Mongolic, like Proto-Turkic, had a palatal-velar harmony. The implication is that the phonetic qualities of the vowels *y *ø *e were clearly palatal, not velar, nor centralized. In fact, to stress the role of *e as the palatal counterpart of *a, the symbol ⟨ä⟩ = [æ] has occasionally been used in Mongolic studies (Hambis 1945: viii–xii; a similar notation has also been applied for Turkic). If, however, we reconstruct tongue root harmony for Proto-Mongolic, the vowel qualities will be very different: instead of [e] or [æ] we have to reconstruct [ə], and the front rounded vowels [y ø] will have to be rewritten as the corresponding back vowels [u o]. In this system the back vowels will take the lowered and possibly pharyngealized values [ʊ ɔ ɑ] (Table 4).[5] Such values are indeed reconstructed for Proto-Mongolic by those arguing that Proto-Mongolic had harmony of the tongue root type.

TABLE 4 Proto-Mongolic vowel system (Ko 2011: 36)

	–RTR		**+RTR**	
	–round	**+round**	**–round**	**+round**
+high	*i	*u		*ʊ
–high	*ə	*o	*ɑ	*ɔ

5 It has to be noted that the IPA symbol [ʊ], though used in specialist literature on Mongolian (e.g. Svantesson & al. 2005: 1–8 *passim*), is a poor approximation of the actual value of the vowel concerned. The notation [ʊ] gives the false impression of laxness, as suggested by the use of [ʊ] in the phonetic notation of English. The Mongolian vowel is, however, not lax: rather, it is a slightly lowered and often rather strongly pharyngealized tense vowel, which, moreover, has also a distinctive long (double) counterpart.

It may be noted that the proponents of this new reconstruction of the Proto-Mongolic vowel system invariably operate with the concept of "retracted tongue root" (RTR), as if it was only "retraction" that makes the difference in the vowel system (±RTR). This is terminologically misleading, for it would be equally justified to talk of "advanced tongue root" (ATR) for those vowels that do not involve the feature of "retraction". Both classes of vowels are opposed to each other by a difference in the position of the tongue root. This difference has several types of phonetic manifestations, among which vowel height and pharyngealization are the most important—but not the only ones. In fact, the opposition between front and back vowels is also ultimately due to a difference in the position of the tongue root.

Unfortunately, the proposed reconstruction of tongue root harmony for Proto-Mongolic introduces several significant problems, and fails to explain a number of observable phenomena from both the historical stages of Mongolian and today's Mongolic languages. This is why we argue that the well-established conventional model for the Proto-Mongolic vowel system is the correct one. The reasons will be elaborated below. It happens that the conventional understanding of the Proto-Mongolic vowel system has been such a long-established one that, until now, no paper has covered why it is so.

4 Determining the Direction of Change

The question is, then, how the variation among the modern Mongolic languages with regard to vowel harmony arose: was an original palatal-velar harmony "rotated" to tongue root harmony in the majority of the modern languages, or was an original tongue root harmony adapted in Western Mongolic to the palatal-velar harmony of the neighbouring Turkic languages? In the following discussion the analysis will be focused on two of the four branches of Mongolic: Common (or Central) Mongolic and Dagur. Of these, Dagur (spoken primarily in Manchuria) is basically a single language with a number of mutually intelligible regional dialects, while Common Mongolic (spoken in and around Mongolia, including Jungaria and parts of Manchuria and Siberia), comprises at least five distinct, though closely related, languages: Oirat (with Kalmuck), Buryat (Western and Eastern, with Bargut), Khamnigan Mongol, Mongolian proper (Khalkha, Khorchin, and several other dialects), as well as Ordos. The two other branches of Mongolic, Shirongolic (in the Kuku Nor region of northeastern Tibet) and Moghol (in Afghanistan) have undergone various types of phonological restructuring not directly connected with the current topic, but conditioned by contact with the neighbouring regionally dominant non-Mongolic languages (Tibetan, Northwest Mandarin, Iranian).

We claim that the vertical or tongue root type of vowel harmony, as synchronically attested in both Dagur and most of the Common Mongolic languages (with the exception of Oirat), is the result of a relatively recent innovation which reached Mongolic from the east or southeast after the Proto-Mongolic period, starting with the later stages of Middle Mongol. This interpretation is supported by the following six key arguments:

(1) **Phonetic**: The phonetic characteristics of a vowel system with TRH involve more perceptual challenges than a system with PVH and are therefore less likely to be original.
(2) **Paradigmatic:** The synchronic vowel systems based on TRH are typologically unlikely and diachronically unstable, which typically leads to the restructuring of the paradigm.
(3) **Phonotactic**: The distribution of the feature of consonantal palatalization in the dialects of Mongolian proper can only be explained in the context of PVH.
(4) **Historical**: Early field observations from Mongolian proper suggest that the transition from PVH to TRH has still been in process during the last few generations.
(5) **Orthographic**: The Mongol script involves a graphemic distinction between velars and back velars, which can only be explained by assuming the presence of PVH.
(6) **Etymological**: The lexical borrowings of Mongolic with, in particular, Turkic suggest that all these languages originally shared a vowel system congruent with PVH.

These arguments are examined more closely below. As will be shown, some of them can also be applied to other languages which synchronically have a tongue root harmony. Altogether, it seems that Northeast Asia is a region where the two types of vowel harmony have interacted for a considerable time. In this context, palatal-velar harmony may be seen as a regional Inner Asian feature, which has spread westwards together with linguistic expansions in the Central Eurasian belt, while tongue root harmony seems to be an ancient feature of the North Pacific Rim, which has been secondarily spreading to languages with an original palatal-velar harmony. Since the network of interaction comprises several language families, of which Mongolic is only one, we are dealing with a major areal phenomenon and typological transformation, which may also be called "the Northeast Asian Vowel Shift".

4.1 *The Phonetic Argument*

The contemporary evolution of Mongolic vowel systems has been rather tumultuous, with widespread mergers of some vowels, thereby reducing the system's overall size, followed up by the creation of new vowels in some

instances. The synchronic vowel systems of the modern Mongolian dialects show a high degree of diversity. The claims according to which Mongolic originally had a tongue root harmony are mainly based on data from an idealized form of modern Khalkha, the dominant dialect of Mongolian in the Republic of Mongolia. It is, consequently, Khalkha that has served as the principal basis for the reconstruction of tongue root harmony for Proto-Mongolic. The Khalkha synchronic system has 7 vowels arranged in 3 pairs of a higher and a lower vowel plus the single unpaired front vowel /i/ [i]. In slight deviation from a fully developed tongue root system, the harmonic counterpart of the unrounded back vowel /a/ can be realized as a mid-high front vowel [e] (Table 5), although dialectally and idiolectally it can also have the centralized value [ə].

TABLE 5 Khalkha Mongolian vowel system (Svantesson et al 2005: 22)

	−RTR		**+RTR**	
	−round	**+round**	**−round**	**+round**
+high	i	u		ʊ
-high	e	o	ɑ	ɔ

It has to be stressed that this system is only valid for idealized normative Khalkha. In the Ulan Bator dialect, which is the modern prestige form of speech, the short vowels /i/ and /e/ have merged into the quality [ɪ], leaving the system with only 6 vowels. The full system of 7 distinctive qualities is, however, preserved in the long (double) vowels, which are realized as the long counterparts of the corresponding short (single) segments.

In the Khalkha system, tongue root retraction is particularly clearly observable in the vowels [ʊ ɔ], which are pronounced with a varying degree of pharyngealization, while the corresponding segments [u o], which lack tongue root retraction, are pronounced as more or less regular back vowels. With this in mind, the following two tables show regularized formant data (F1 and F2) for these four vowels as well as for the low back vowel [a] ~ [ɑ] from both Khalkha Mongolian (M: Table 6) and standard Turkish (T: Table 7).[6]

6 The formant data are from initial syllable vowels (long, for Khalkha Mongolian) from multiple speakers, averaged, and rounded to the nearest non-decimal number.

TABLE 6 Khalkha Mongolian F1-F2 values (Svantesson et al 2005: 5)

	u_M[a]	o_M	ʊ	ɔ	a_M
F1	331	378	429	561	709
F2	912	1041	903	1005	1369

a A subscript M or T indicates that the preceding vowel is either Mongolian or Turkish, respectively.

TABLE 7 Turkish F1-F2 values (Maniwa & Kabak 2007)

	y	ø	u_T	o_T	a_T
F1	300	417	353	465	529
F2	1749	1557	1389	1156	1445

What is interesting here is that the vowels with basically similar segmental values in the two languages, that is [u o a], have nevertheless relatively different acoustic characteristics (cf. Mongolian u_M o_M a_M vs. Turkish u_T o_T a_T). At the same time, the Mongolian rounded vowels [ʊ ɔ], pronounced with retracted tongue root and a varying degree of pharyngealization, form a class of their own, with very low formant values. Similarly, the Turkish vowels [y ø], pronounced as fully fronted rounded vowels, form a distinct class. Altogether, the Turkish and Mongolian vowels occupy different areas on the vowel chart, and especially the four Mongolian vowels [u o ʊ ɔ] are located very close to each other (Figure 1). Not surprisingly, the perceptual differences between some of these segments are very slim. As a result, to the untrained ear, these qualities are often scarcely distinguishable from each other.

The phonetic data suggest that the acoustic characteristics of a vowel system based on tongue root retraction are perceptually more challenging than those of a system based on the front/back opposition. This is clearly a problem that affects not only second-language learners, but also the native users of the language. A system that does not maximize the possible phonetic distinctions is likely to be unstable, which ultimately leads to its restructuring.

4.2 *The Paradigmatic Argument*

General information from the vowel systems of the languages of the world (Maddieson 2013) suggests that the presence of the front/back opposition in a

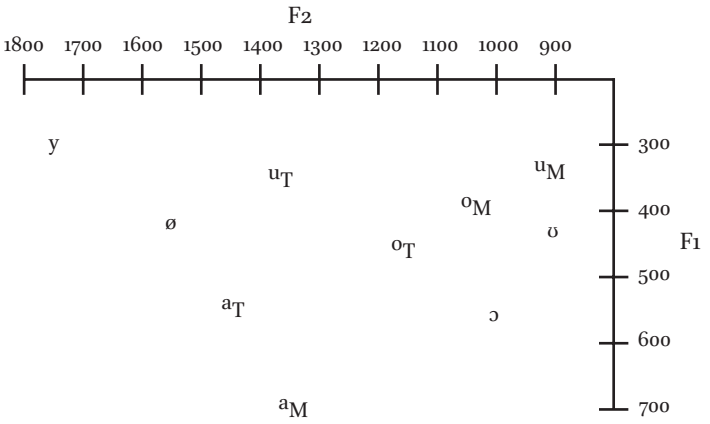

FIGURE 1 Turkish and Khalkha Mongolian vowel chart

language, especially in the rounded vowels, tends to correlate with a relatively large size of the vowel paradigm. In Eurasia, large vowel paradigms, with oppositions such as [u o] vs. [y ø], prevail in the western part of the continent and comprise languages both with and without vowel harmony. Western Mongolic (Oirat) features such a vowel system.

It may be assumed that large vowel paradigms involving effective use of the front/back opposition are also relatively stable, as the acoustic and perceptual differences are sufficiently clear to support the stability of the paradigm. By contrast, there is evidence suggesting that systems exploiting tongue root retraction and/or advancement as a distinctive feature are unstable and tend to undergo reduction in size. This is particularly clearly demonstrated by the Mongolic case. Apart from the merger of the vowels *e and *i in Ulan Bator Khalkha, many other forms of Common Mongolic show various types of mergers between the vowel qualities (Janhunen 2012: 33–35). In the Mongoljin dialect, for instance, [u] and [o] have merged with each other, as well as, positionally, with [ə], yielding a vowel system that still contains 6 vowels, but with additional phonotactic restrictions. In Dagur, the paradigm has been reduced to a simple 5-vowel system (Table 8), in which [u] normally corresponds to Khalkha [u] and [o], while [o] corresponds to Khalkha [ʊ] and [ɔ]. In terms of vowel harmony, the Dagur vowels /a/—/ə/ and /u/—/o/ form two vertically organized harmonic pairs. However, phonetically there is no tongue root retraction involved in the Dagur system, nor does pharyngealization play any notable role. The Dagur system may be regarded as having reached relative stability.

The Dagur system is, not coincidentally, identical to that of (Spoken) Manchu, a Tungusic language that was formerly regionally dominant over Dagur. The

TABLE 8 Dagur vowel system (Tsumagari 2003: 131)

	FRONT		BACK	
	–round	**+round**	**–round**	**+round**
+high	i		ə	u
–high			a	o

Manchu vowels participate synchronically in a vertically organized harmony (cf. Ard 1984, Li 1996: 42–47).[7] In the Tungusic context, vertical harmony is most clearly manifested in the mainstream dialects of Ewen, which have a complete system with 8 vowels organized in four harmonic pairs: [i—ɪ], [ə—ɑ], [u—ʊ], [o—ɔ] (Table 9). However, this should not be mistaken to mean that Proto-Tungusic also had a vertical (tongue root) harmony.

TABLE 9 Ewen vowel system (Novikova 1960: 32–34)

	–RTR		+RTR	
	–round	**+round**	**–round**	**+round**
+high	i	u	ɪ	ʊ
–high	ə	o	ɑ	ɔ

It should also be noted that the Manchu vowel [u] corresponds to three different vowels in Ewen (and the other Ewenic or Northern Tungusic languages): [u], [o] and [i]. The correspondence of [u] to [i] would be difficult to explain by assuming an original rounded back vowel of the type *u. This is why the conventional reconstruction of Proto-Tungusic operates with the quality *y, from which both [u] and [i] can be derived by the change of a single feature (either frontness or roundedness). This is a rather strong argument in favour of the assumption that Proto-Tungusic originally had a palatal-velar harmony, which was secondarily rotated into tongue root harmony (Figure 2). In most Tungusic

7 Early Manchu may have had a sixth vowel of the type [ʊ], as reflected in Written Manchu (cf. Zhang & Dresher 2004). This question is beyond the scope of this paper and will not be addressed here.

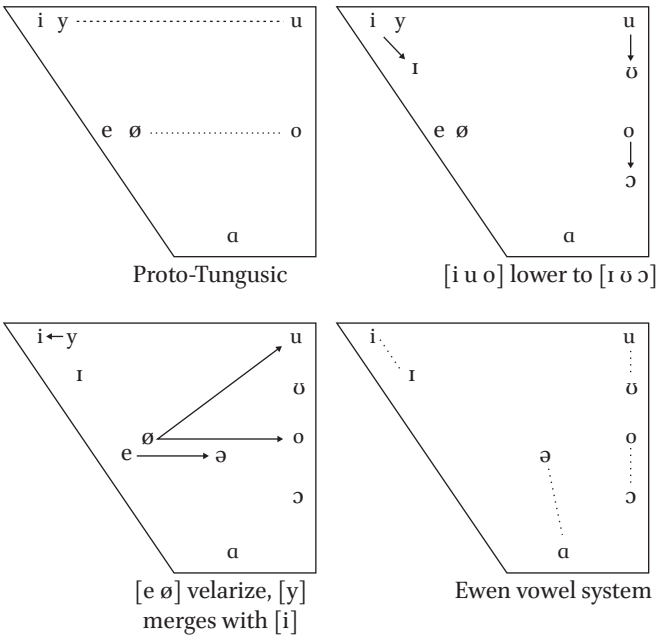

FIGURE 2 Tungusic vowel rotation

languages, the rotated system was subsequently reduced due to mergers, with the simple 5-vowel system of Manchu as the extreme result.

A peculiarity of all the languages that seem to have a synchronic vertical or tongue root system is that the relationship between palatal (front) and velar (back) vowels is seriously asymmetrical. In most of these languages, only the high unrounded front vowel [i] has a clearly palatal quality, while all the other vowels, whose number ranges from 4 (as in Manchu and Dagur) to 7 (as in Ewen) are realized with velar (including pharyngealized) qualities. This is both universally uncommon and acoustically disturbing, and it is clearly one of the reasons why systems of this type tend to be unstable and diachronically short-lived. It must be noted, however, that Ewen seems to be a rare example of a tongue root harmonic language that has reached relative stability despite maintaining eight phonemic vowels. Nevertheless, the clear tendency for tongue root harmonic languages is to reduce the size of their vowel inventories over time. The simplification of the paradigm by mergers is, however, not the only way to solve the problem. In many Mongolic dialects spoken in Inner Mongolia, the stability of the vowel paradigm has been increased by introducing new front vowels of the types [æ ø y], which contrast with both [ɑ ɔ ʊ] and [o u]. The new front vowels are typically the result of metaphony (Janhunen 2012: 44–46), which, in turn, is connected with the role of palatalness in the phonemic system, a topic which will be addressed in the following section.

4.3 *The Phonotactic Argument*

Phonemic palatalness is an important feature of all modern Mongolic languages. Within Mongolian proper, palatalness surfaces in three forms, distributed differently in the different dialects: (1) a set of inherent palatal consonants, phonetically located between the dentals and velars and present in all dialects, (2) a set of palatalized consonants, present in Khalkha and a few other dialects spoken mainly in the Republic of Mongolia and (3) a set of palatal vowels, present in most dialects spoken in Inner Mongolia. Unlike inherent palatalness, which is a primary feature of the segments concerned, palatalization involves a secondary articulation, which, moreover, is incompatible with inherent palatalness. Palatalized consonants and palatal vowels are also phonemically mutually exclusive in the Mongolian dialects, though phonetically both can be present in a single idiom.

The rise of palatalized consonants in Khalkha, like the rise of palatal vowels in the Inner Mongolian dialects, is due to the effect of the high front unrounded vowel *i. In the most simple case, a Proto-Mongolic and Middle Mongol *i in the second syllable of a word had a palatalizing effect on the vowel of the initial syllable as well as on the consonant(s) at the syllable boundary. The original *i is still segmentally preserved in some conservative forms of Mongolic, notably Khamnigan Mongol, but in the more innovative forms, including Mongolian proper, it has been either reduced to a qualitatively indistinct vowel of the type [ə] (in medial position before a syllable-final consonant) or lost altogether (in all syllable-final positions), a process which is shared by all short vowels of non-initial syllables. As a result, the palatalness of the segments preceding an *i was transformed from a mere combinatory effect to a phonologically relevant property, with either palatal vowels or palatalized consonants as the result.

To take a closer look at Khalkha, the palatal trace of a lost *i is often phonetically present both in the consonant and in the preceding vowel, though the phonemic distinction is located in the consonant. Thus, for instance, the conventional Proto-Mongolic reconstructions *bari 'to hold', *koni 'sheep', and *kubi 'share' yield the modern Khalkha pronunciations [pærʲ], [xœnʲ], and [xywʲ], respectively. As can be seen, the vowels that would be normally pronounced with the retracted values [ɑ ɔ ʊ] undergo fronting to [æ œ y] when preceding a palatalized consonant.[8] Ultimately, the phonetic qualities of both the vowel and the consonant are due to the palatalizing effect of the lost *i that was originally present in the following syllable. However, this effect of *i is only present in words with retracted harmonic status (+RTR). By contrast, no

8 Our transcriptions use the IPA symbol for the front version of a given back vowel; however, other authors have applied different conventions, including the use of the IPA's advanced or centralized diacritics ([ą ɔ̟ ʊ̟] or [ä ɔ̈ ö]), to represent the same palatalizing effect.

palatalization takes place in words with non-retracted harmonic status (–RTR), as in [xiɬ] 'border', [er] ~ [ər] 'to search', [on] 'long ago', [xureː] 'enclosure', corresponding to the conventional reconstructions *kili, *eri, *øni, *kyrixen, respectively.

Palatalized consonants can also occur due to other diachronic developments, including the breaking of an *i of the initial syllable (Janhunen 1990), as in [mʲaŋɢ] 'thousand' (< *miŋga), and the merger of an *i of the second syllable with a following vowel, as in [tsʰaxʲʊːr] ~ [tsʰaçʊːr] 'flint' (< *tɕakiur). In all these cases, the palatalizing effect is, however, confined to words with retracted harmonic status, while no palatalization is present in words with non-retracted harmonic status, as in [nut] 'eye' (< *nidy), [tʰuɬxuːr] 'key' (< *tylkiyr).

The conclusion from such data is that consonant palatalization is combinable only with the vowels synchronically produced with retracted tongue root, while vowels with no tongue root retraction do not permit palatalization. This can be best explained by assuming that the vowels with no tongue root retraction (–RTR) are diachronically inherently palatal (FRONT), which means that they can be confidently derived from the reconstructed values *e *ø *y. If this is the case, the vowels synchronically pronounced with tongue root retraction (+RTR) can be derived from the corresponding velar values *a *o *u (BACK), with no need to specify their status with regard to tongue root movements other than those connected with the front/back opposition. It is, in fact, well known that in many languages distinctive consonant palatalization is not combinable with palatal vowels, a restriction that must be due to the fact that vowel palatalness and consonant palatalization involve ultimately the same phonetic parameter (for the Japanese analogy, see, e.g. Shibatani 1990: 163–166). It would be phonetically much more difficult to justify a link between tongue root movements and the presence or absence of palatalization.

The class of the inherently palatal consonants comprises three sibilant segments—two affricates and a continuant—conventionally reconstructed as *c *j *sh = [tɕ dʑ ɕ].[9] The fact that these segments have a special status with regard to palatalization is shown by examples such as Khalkha [ɑʰtɕ] 'grandchild' (< *atɕi), [xɔdʑəm] 'afterwards' (< *kodʑim), [xʊɕ] 'cedar' (< *kuɕi),

9 We will not go into the question concerning the phonetic realizations of the contrast between the strong and weak obstruents, including the affricates *c vs. *j. In the modern Mongolic languages and dialects this contrast involves variously either voicing (unvoiced vs. voiced) or aspiration (aspirated vs. unaspirated), or both. In some respects, the issue is similar to that of the vowel system, for in the reconstruction of the protolanguage the phonetic details matter less than the fact that there was a contrast. Even so, there are arguments favouring the assumption that the original distinction in the obstruents was phonetically based on voicing.

in which the palatalizing effect of a lost *i is synchronically visible in the "hushing" (laminal, dialectally also alveolopalatal or retroflex) quality of the consonant itself, but not in the preceding vowel. In other words, the inherently palatal consonants are phonologically not palatalized, but only palatal, and they do not cause fronting of the preceding vowel. These consonants can also freely occur in words with non-retracted harmonic status, as in [xuʰtɕ] 'power' (< *kytɕi < *kytɕy), [eːd̥ʒ̊] 'mother' (< *eedʑi), [ɕon] 'night' (< *ɕønø < *ɕinø < *søni).

4.4 *The Historical Argument*

Although research on Mongolian phonology and phonetics is generally very recent, there is actually a competent source which gives us information on how the language was pronounced several generations ago. G. J. Ramstedt, who initiated the study of the modern spoken varieties of Mongolian in the last years of the 19th century, completed a rigorous study of the sounds of the Khalkha dialect as spoken in Urga (today's Ulan Bator) at the turn of the century 1900. Since he was trained in phonetics and had practical knowledge of several other languages he was able to relate the segmental qualities of Mongolian to a standardized base, which allows his data to be used for phonetic reconstructions.

In his published monograph, Ramstedt (1903) presents a detailed survey of the sounds of the Urga dialect of his time and compares the phonetic data with the segmental system underlying Written Mongol, the written language close to Middle Mongol and Proto-Mongolic. Although he worked before the breakthrough of phonological theory, his analysis is focused on the paradigm of functional sound segments and their phonetic manifestations. From his presentation it may be seen that the language as a whole was already quite similar to modern-day Khalkha, especially as the phonotactic system and stress patterns are concerned. Even so, it is obvious that the phonetic qualities of some segments, including several vowels, have undergone changes during the past century. For one thing, the merger of the short vowels /e/ and /i/ had not yet taken place in Urga at the time of Ramstedt's field work, though /e/ already showed a tendency of becoming raised, especially if the following syllable had a long /ii/, as in [ǧer] 'tent' : (genitive) [ǧɪriːŋ].

Ramstedt's back vowel inventory, which corresponds to the vowels pronounced with tongue root retraction in today's understanding, consists of the three segments /a o u/.[10] The phonetic values of these segments are described as

10 The IPA symbols are the present authors' interpretations of Ramstedt's descriptions. In his original work, Ramstedt employed a somewhat idiosyncratic application of the Finno-Ugrian Transcription System (FUT), a system that is still today widely used in Uralic and

lower and more back than their European "normal" values, suggesting that they were compatible with the transcriptions [ɑ ɔ ʊ]. When followed by a palatalized consonant, their qualities were, however, somewhat raised and fronted, especially for the vowels /o a/. The following chart (Figure 3) shows Ramstedt's comparison of the Khalkha back vowels with the corresponding normal values:

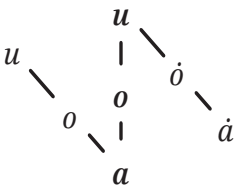

FIGURE 3
Ramstedt's chart for Khalkha back vowels (Ramstedt 1903: 33)

The central column of bold characters in the chart represents the European "norm", as defined by Ramstedt. The characters to the left represent the regular velar values of the corresponding Khalkha vowels, while the dotted characters to the right indicate their umlauted palatal versions. Although Ramstedt does not speak of "pharyngealization" in this context, he describes the non-umlauted vowel qualities as both lowered and highly velarized, pronounced with "strongly lowered larynx". It may be noted that, according to Ramstedt, the regular value of /a/ and the umlauted value of /u/ are in line with the European "norm", while the regular value of /u/ and the umlauted value of /a/ are located off the "norm".

Ramstedt goes on to posit a rather complex array of non-back rounded vowels. Unlike their modern counterparts, these vowels were according to him pronounced as "mixed" or centralized, that is, not fully velarized. Thus, the vowel conventionally reconstructed as *y and today pronounced as [u] is characterized by him as a centralized rounded high vowel ("high-mixed-narrow-round"), similar to Norwegian /u/ in *hus* 'house', while the vowel conventionally reconstructed as *ø and today pronounced as [o] is characterized as having an analogous, but more open quality ("high-mixed-wide-round"), similar to southern Swedish /u/ in *hund* 'dog'. Ramstedt's transcriptions suggest pronunciations like [d̥z̥ʉ̥g̊] 'direction' and [d̥ɵrwə̃] 'four'. The corresponding long vowels are described as having the values [ʉ:] and [œ:], respectively, with the latter being substantially lower and more fronted than its short counterpart. In certain types of palatal environments, as after the palatal glide [j] or before a syllable with a long [œ:], the short rounded vowels could have fully palatal values, as in [jys:ə̃] and [g̊ørœ:s] 'beast', similar to the French vowels in *peu*, *lune*.

Altaic field linguistics. It has to be added that for the notation of minute differences in segmental qualities, the FUT is far superior to the IPA.

It may be concluded that the vowel system that Ramstedt outlines is fairly different from today's Khalkha. Although the short mid-high vowel conventionally reconstructed as *ö (*ø) is even today often described as having the centralized value [ɵ], the corresponding long vowel is definitely more velar and is typically transcribed as [o:] (Svantesson & al. 2005: 4). The high vowels [u] and [u:] have also an unambiguously velar quality in the modern pronunciation. There is only one possibility to explain the discrepancy between Ramstedt's description and the reality of the modern language: the vowel system must have undergone a shift, with front vowels becoming higher and more velar and back vowels becoming lower and pharyngealized. The system that prevailed in Ramstedt's times may be termed Old Khalkha, and in it the phonetic values of the modern non-pharyngealized back vowels were still clearly centralized, positionally even fully fronted (Table 10).

TABLE 10 Old Khalkha vowel system (deduced from Ramstedt 1903)

	−RTR		**+RTR**	
	−round	**+round**	**−round**	**+round**
+high	i	ʉ ~ y		ʊ
−high	e	ɵ ~ ø	ɑ ~ a	ɔ

It may be added that centralized or fronted values for the counterparts of the modern non-pharyngealized back vowels have been attributed to Khalkha vowels also after Ramstedt. Poppe (1936: 8–11) describes Khalkha vowels on very similar terms. Likewise, Róna-Tas (1960: 7–14) divides the vowels of Dariganga, a dialect relatively close to Khalkha (spoken in the southwest of Mongolia at the border to Inner Mongolia), into "front", "back", and "mixed", with the vowels conventionally reconstructed as *ø *y belonging to the "mixed" category and having both front and back realizations. Even more fronted values are quoted for Ordos by Mostaert (1941/1968: VIII–IX), who transcribes these vowels as equivalents of [ø] and [ʉ], respectively.

4.5 *The Orthographic Argument*

Mongolian is today written in two different forms and two different scripts, Cyrillic Khalkha and Written Mongol. Cyrillic Khalkha, as used in the Republic of Mongolia, represents a relatively recent norm created around 1940 on the basis of Russian Cyrillic letters. Some letters are used in an innovative way,

for instance, the letter ⟨ж⟩, which in Russian denotes a voiced alveolopalatal sibilant [ʒ], came to be used for a voiceless or semi-voiced laminal affricate [tɕ ~ d̥ʑ] in Khalkha. For this reason, not too much value should be given to the representation of the vowels in the Cyrillic script. Even so, it is noteworthy that it is the strongly velarized and/or pharyngealized and lowered rounded vowels [ɔ ʊ] that are written with the regular letters ⟨o y⟩, which in Russian stand for the values [o u], while for the Mongolian qualities [o u], the special letters ⟨ө ү⟩ are used. This suggests that the vowel qualities at the time when the Cyrillic norm for Mongolian was created had not yet reached their modern values, but were closer to the values described by Ramstedt.

Written Mongol, as still used today in Inner Mongolia and other Mongolian regions of China, employs the so-called Mongol or Uighur-Mongol script, ultimately based on a Semitic (Aramaic) source. This script was introduced to the Mongols from the Ancient Uighur roughly a millennium ago, shortly before the rise of the historical Mongols, for which reason the Written Mongol orthography codes a segmental structure close to that of Proto-Mongolic. Unfortunately, the Semitic script was from the beginning poorly suited not only for Mongolic, but also for the Turkic language of the Uighur. The greatest challenge presented by both of these languages was their relatively large vowel system, as compared with the Semitic 3-vowel system. Basically, the underlying script had only three vowel letters, corresponding to the values [i u a]. To comply with this situation the Uighur applied the letter ⟨u⟩ (𐽅)[11] also for [o], while the letter ⟨a⟩ (𐽀) received the additional value of [e]. The rest of the distinctions were either left without a graphic expression or were handled by innovative solutions.

Among the solutions introduced by the Uighur was the principle of expressing the rounded front vowels corresponding to the Turkic values [y ø] with the digraph ⟨ui⟩ (𐽆), that is, *waw* + *yodh* in terms of the original Semitic letters. This digraph clearly expresses the two distinctive properties of both vowels: roundedness (𐽅) and frontness (𐽃), in accordance with the fact that Ancient Uighur had a palatal-velar harmony (Hahn 1991: 72–73). This convention was also adopted by the Mongols at face value, meaning that even today the vowels that have the modern qualities [u] and [o] are written with the same digraph ⟨ui⟩ (𐽆), while the corresponding velarized and/or pharyngealized qualities [ʊ ɔ] are written with the single letter ⟨u⟩ (𐽅). Although it could be argued

11 The Uighur-Mongol letters are here written horizontally from right to left in accordance with their Semitic origin. In actual practice the script was turned vertical already in Uighur times (Kara 2005: 31), while in modern Mongolic studies the historically incorrect convention of writing horizontally from left to right is also often applied. For the Romanization of Written Mongol, the Balk-Janhunen Romanization system (BJR), based on the principle of systematic transliteration, is used (on which see, e.g., Janhunen 2003).

that the Mongols—or the bilingual Turkic-Mongolic speakers who first wrote Mongolian—simply adapted the Uighur script to the realities of Mongolian, it would be difficult to understand how they could have done this if the phonetic values of Mongolian had been substantially different from those of Uighur. Certainly, they could have come up with some other solution to represent a totally different phonetic reality.

The assumption that the Proto-Mongolic vowels corresponding to modern [i e o u] had palatal values is corroborated by the distribution of the letters for the velar consonants *k *g *x in the Written Mongol orthography. These three segments are written by two Mongolian graphemes, ⟨g⟩ (ᠭ) and ⟨q⟩ (ᠺ ᠻ), complemented by ⟨qh⟩ (ᠬ) for the weak stop *g and the spirant *x. The grapheme ⟨g⟩ (ᠭ) is used before the letter ⟨i⟩ (ᠢ) and the digraph ⟨ui⟩ (ᠦ), as well as before the letter ⟨a⟩ (ᠠ) in the cases when it stands for the counterpart of modern [e] or [ə]. The graphemes ⟨q⟩ (ᠺ ᠻ) and ⟨qh⟩ (ᠬ), on the other hand, are used before the letters ⟨u⟩ (ᠤ) and ⟨a⟩ (ᠠ) in the cases when they stand for the counterparts of the modern vowels [ɑ ɔ ʊ].[12] It is well known that the Semitic source forms of the letters ⟨g⟩ (ᠭ) vs. ⟨q⟩ (ᠺ ᠻ) originally denote the opposition between a front and a back velar, or a palatovelar vs. a uvular consonant phoneme, that is, /k/ vs. /q/. Neither Ancient Uighur nor Proto-Mongolic had a phonemic contrast between front and back velars, but the conventional understanding is that the resources of the Semitic alphabet were used in the Turko-Mongolic orthographies to indicate an allophonic distinction of a similar type, that is, [k] vs. [q]. This distinction was practically motivated, since it allowed in many cases to distinguish between sequences of the types *ka [ka] ⟨qa⟩ (ᠺᠠ) vs. *ke [ke] ⟨ga⟩ (ᠭᠡ), which otherwise would have been written identically.

There is no doubt that this conventional understanding is correct: the distribution of the letters ⟨g⟩ (ᠭ) vs. ⟨q⟩ (ᠺ ᠻ) or ⟨qh⟩ (ᠬ) clearly implies that the following vowels had a distinction of the front/back type. Front vowels were combined with the front allophones and back vowels with the back allophones of the velar consonants. It would be much more difficult to motivate why a difference in the tongue root movement, or vowel height, could have helped maintain a similar graphemic distinction. Obviously, the vowel system and the accompanying consonant allophony of Proto-Mongolic was closely similar to that of Ancient Uighur.

12 The same distribution of the consonant letters ⟨g⟩ vs. ⟨q⟩ is, in principle, also valid for the corresponding postvocalic positions. The only exception is that the letter ⟨q⟩ can occur after ⟨i⟩ in words which otherwise contain back (or "retracted") vowels, as in ⟨juriq⟩ for *dʑorig < *dʑoruɣ 'goal'.

4.6 *The Etymological Argument*

In the lexical corpus shared by Mongolic and Turkic there are many types of systematic correspondences. Although in the past these correspondences misled scholars to take them as evidence for a genetic relationship, we know today that they are the result of prolonged contacts in both directions (Schönig 2003). The earliest layer of concretely identifiable Turkic borrowings in Mongolic seems to be datable to the so-called Hunnish period (3rd century BZ to 1st century AZ), during which the interacting partners belonged to the proto-historical tribal confederations of Xiongnu (Pre-Proto-Bulgharic, in Mongolia) and Donghu-Xianbei (Pre-Proto-Mongolic, in Manchuria). There followed several other periods of interaction, among which a particularly important one is connected with the historical Mongols, when Mongolic loanwords were transmitted widely over the Turkic languages. In some cases, the interaction between Turkic and Mongolic has continued up to the present day.

Among the systematic correspondences in the Turko-Mongolic lexical corpus there are also those pertaining to the vowel systems. It is indeed remarkable that the vowel systems of the two language families have throughout history been compatible to the extent that each Turkic vowel has almost invariably only one reflex in Mongolic, and vice versa. In the conventional framework this would have been an automatic consequence of the assumption made about the original similarity of the two vowel systems, as it would have been obvious that the Turkic harmonic pairs *u—*y, *o—*ø, *a—*e would systematically correspond to the Mongolic pairs *u—*y, *o—*ø, *a—*e, respectively. In the revised framework, as proposed by those who see tongue root harmony as a primary property of the Mongolic vowel system, it is much less obvious that the Turkic values *u—*y, *o—*ø, *a—*e would be identified as counterparts of the Mongolic values *ʊ—*u, *ɔ—*o, *a—*ə, respectively.

To take the Turkic vowels *y and *ø, for instance, they are consistently represented in modern Mongolian as [u] and [o], respectively, as in Turkic *byt- (< *Pre-Proto-Turkic *byty-) 'to finish' = Khalkha [puʰt-], Written Mongol ⟨buidu-⟩ id., Turkic *kø(ː)k (< Pre-Proto-Turkic *køːke) 'blue' = Khalkha [xox], Written Mongol ⟨guigae⟩ id. Similarly, the Turkic vowels *u and *o are represented in modern Mongolian as [ʊ] and [ɔ], respectively, as in Turkic *tug 'flag' = Khalkha [tʰʊk], Written Mongol ⟨tuq⟩ id., Turkic *jo(ː)l (> ǰol) 'road' = Khalkha [tɛɔɬ], Written Mongol ⟨jul⟩ 'good luck' (for more examples, see Poppe 1960: 98–112). If the Mongolic vowels had had their present phonetic values already when such Turkic items were borrowed, the replacements would very probably have been different, or at least we would expect to see some evidence suggesting a difficult nativization. Since no such evidence is observed, it is likely that the two vowel systems were originally identical, which means that the Mongolic system must have undergone a secondary process of rotation.

The correspondences with Turkic also confirm that Mongolic originally had the distinct high unrounded back vowel *ɯ. This vowel was merging with the corresponding front vowel *i already in Proto-Mongolic, and both vowels have undergone secondary developments such as breaking and prebreaking. Even so, Mongolic *i must derive from earlier *ɯ in items that harmonize with the velar or pharyngealized vowels [ɑ ɔ ʊ], and which in Turkic show *ɯ, as in Khalkha [ɕax-], Written Mongol ⟨siqa-⟩ 'to press' < *sika- < *sɯka- = Turkic *sɯk- id. (Poppe 1960: 112–117). An important indirect trace of the vowel *ɯ in the native word *tɕɯkɯ/n 'ear' > *tɕiki/n, Written Mongol ⟨cigiv⟩, which in Khalkha is represented as [tɕʰix], is preserved in several peripheral Mongolic languages, which show a phonemic medial back velar consonant, as in Santa [tʂʰɭɢəŋ], Bonan [tɕʰəχɑŋ] (Nugteren 2011: 302). Middle Mongol sources also have the form [tɕiqin], suggesting that the paradigmatic merger of *i and *ɯ could lead to a contrast between /k/ and /q/ in the position before [i].

Apart from Turkic, Mongolic has had ancient contacts also with Tungusic. The vowel correspondences at the deepest level of Mongolo-Tungusic contacts suggest that the vowel systems were more or less identical. Most importantly, Mongolic [u] corresponds to two vowels in Northern Tungusic: [u] in recent Mongolic borrowings, as in Ewenki [turgən] 'fast' = Khalkha [tʰurgəŋ], Written Mongol ⟨tuirgav⟩ id., and [i] in old lexical parallels, for which the direction of borrowing cannot be reliably determined, as in Ewenki [tirəːksə] 'bootleg; fish roe' = Khalkha [tʰuriː] 'bootleg', Written Mongol ⟨tuirai⟩ ~ ⟨tuirui⟩ 'bootleg', Khalkha [tʰurs], Written Mongol ⟨tuirisu/v⟩ 'fish roe' (Doerfer 1985: 47–48 no. 110, 82 no. 246, 169–172). This strongly suggests that the original vowel in both languages had the high front rounded quality *[y], which in Northern Tungusic underwent an early merger with *[i].

5 The Northeast Asian Vowel Shift

The above arguments all speak in favour of the conventional assumption that Mongolic, like Turkic, had originally a palatal-velar vowel harmony with 8 vowel phonemes, organized in 4 harmonic pairs: *u—*y, *ɯ—*i, *o—*ø, *a—*e. The perhaps strongest argument comes from the empirical fact that tongue root harmonic systems simply lack the stability required to retain their form over any longer periods of time, a circumstance due to the concentration of many vowels in a small section of the vowel chart. Palatal-velar systems, by contrast, can remain unchanged *ad infinitum* unless they undergo rotation. There is a clear difference in the sizes of the vowel paradigms that the two types of harmony can support: palatal-velar systems typically contain 8 to 10 vowels, as, for instance, in Finnish and Turkish, while tongue root systems are stable

only if they contain no more than 5 or 6 vowels, as in Dagur and Manchu. This is why many original palatal-velar systems are rapidly scaled down if they for some reason undergo a shift to the tongue root type.

We may assume that when a vowel system with the palatal-velar type of harmony is transformed to the tongue root type, the initial result is a system with as many distinctions as before. However, the more distinctions there are in the system, the more likely their number is to be reduced after the transformation has been completed. The presence in a language of a synchronic tongue root harmony with 8 or more vowels suggests that the transformation has taken place very recently and the system has not yet been optimalized in terms of articulatory and perceptional economy. This is exactly the situation we encounter in Ewen, whose synchronic vowel system must be the result of a very recent transformation, for which reason it has not yet been scaled down. The situation is similar in a few other varieties of Ewenic, notably Solon and Orochen (on which see Li 1996: 85–108), while the mainstream varieties of Siberian Ewenki have already cut the number of (short) vowels down to 5. Thus, although a system like that of Ewen may appear stable, its stability is illusionary and temporary (cf. also the classic analysis of Tungusic vowel harmony in Cincius 1949: 116–124).

In the case of Mongolic, the disruption of the system began with the merger of the high unrounded back and front vowels *ɯ & *i > *i, after which rotation turned the direction of the remaining 3 harmonic pairs: *u—*y > [ʊ—u], *o—*ø > [ɔ—o], *a—*e (æ) > [ɑ—ə] (Figure 4). In the rotated system the rounded vowels [u ʊ o ɔ] came to have acoustic and perceptional values very close to each other, which is why the system has been simplified by merging either [u] and [o] or [ʊ] and [ɔ], or both. The new simplified system, with only 5 or 6 vowels, was stabilized as such in some languages, as in Dagur, while in others, as in several forms of Common Mongolic, it has been complemented by a set of new palatal vowels, formed by way of metaphony caused by an original *i of a non-initial syllable.

The question is: Why did the Proto-Mongolic vowel system undergo rotation with all the destructive consequences it had? We argue that the Mongolic languages were secondarily encompassed by an areal innovation—the Northeast Asian Vowel Shift—that was spreading from east to west. The phenomenon was originally a feature of the North Pacific Rim, but it started spreading towards Inner Asia, reaching new languages and language families, including both Mongolic and Tungusic. Turkic was generally not affected, but some Turkic languages that have evolved in close contact with Mongolian show features that may or may not be indicative of an incipient vowel shift. The most

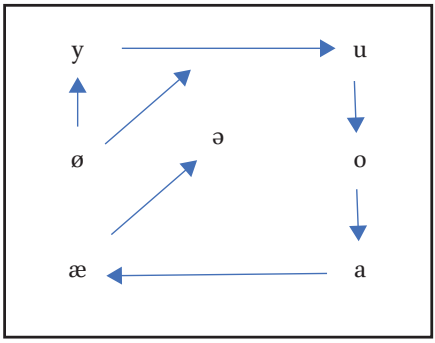

FIGURE 4
Vowel rotation in Mongolian (cf. Janhunen 1981: 131–132)

obvious example is Kazakh, where the Turkic high rounded back vowel *u is pronounced with the lowered and "retracted" quality [ʊ], auditorily very similar to modern Khalkha [ʊ], as in Kazakh [qʊłʊn] 'colt' (< *kulun). At the same time, the counterparts of the original rounded front vowels *y and *ø tend to become somewhat centralized, moving towards the qualities [ʉ̟] and [ɵ], respectively.

It has indeed been suggested that the Kazakh system of vowel harmony is synchronically based on tongue root oppositions (Vajda 1994). A closer look at the data reveals, however, that this may not be quite so. The lowered quality of *u is clearly connected with a more general Kipchak Turkic reduction and lowering of all original high vowels (Johanson 1998b: 92), including also *y *i *ɯ, while the corresponding lower vowels *o *ø *e, are diphthongized, yielding [ᵘo ᵘɵ ⁱe].[13] There is a wide range of opinions concerning the actual synchronic paradigm of vowels in Kazakh, but in a rather conventional analysis a system of 9 distinctive vowel segments can be postulated. The ninth member is the secondary low unrounded front vowel [æ] (Table 11). In addition, there is a new set of phonetic high vowels, including at least [i] and [u], which, however, may be analyzed phonemically as sequences ending in the glides /j w/.

13 Note that the IPA system is particularly awkward when it comes to the transcription of the systematically lowered, reduced and centralized values of the Turkic high vowels in Kazakh and other Kipchak languages. While the lowered counterparts of [u] and [i] can with some exactitude be transcribed as [ʊ] and [ɪ], respectively, there are no symbols in the standard IPA system for the corresponding lowered counterparts of [ʉ̟] and [ɯ]. We will here use the non-standard symbols [ʊ̟] and [ɯ̟], respectively.

TABLE 11 Kazakh vowel system (cf. Muhamedowa 2016: 273–276)

	FRONT		BACK	
	–round	**+round**	**–round**	**+round**
High	ɪ	ʊ̈	ɯ	ʊ
Mid	ⁱe	ᵘɵ		ᵘo
Low	æ		ɑ	

Much of the argumentation that has been quoted against the conventional reconstruction of palatal-velar harmony for Proto-Mongolic and Proto-Tungusic has been based on Korean. Taken at face value, modern Korean would seem to have rudiments of a prototypical tongue root type of vowel harmony with [o]—[u], [a]—[ə], and *[ʌ]—[ɯ] as the harmonic pairs. There is, however, both internal and external evidence suggesting that this system is not original in Korean. Rather, it is the result of a very similar rotation process that we can see still in action in Mongolian. The rotation process seems to have started earlier in Korean than in Tungusic and Mongolic, and was already well underway in Middle Korean (first half of the 2nd millennium AZ) (Table 12). Even so, there is no serious alternative to reconstructing a regular palatal-velar harmony for Early Middle Korean, as well as for Old Korean (second half of the 1st millennium AZ, for a more comprehensive discussion see Lee & Ramsey 2011).

TABLE 12 Early Middle Korean vowel system (Lee & Ramsey 2011 94–95)

	FRONT		BACK	
	–round	**+round**	**–round**	**+round**
High	i	y		u
Low	ɛ/æ	ø	a/ɑ	o

In fact, Korean shows exactly the same trends of phonetic development as those attested historically in Mongolian, including, in particular, the presumable merger of the original high unrounded vowels *i *ɯ and the subsequent centralization and raising of the reflex of the low (or mid-high) rounded front

vowel *ø, which ultimately yields [ɯ] in Korean. Also, the asymmetry of the system caused by the rotation process was subsequently eliminated in Korean by introducing the new front vowels [y] (> [ɥi]), [ø] (> [we]), [e] and [æ] (> [e]) from the original diphthongs *ui *oi *ei *ai. Incidentally, all these developments are still reflected in the Korean alphabetic writing system (Hangeul), dating to late Middle Korean times (1443–1446). An additional development, present only in Korean, is the widespread merger of *o > [ʌ] with [a/ɑ], though this distinction is also originally expressed in the writing system.

Another language that may have undergone a secondary vowel shift is Ghilyak (Amuric). Synchronically, Ghilyak has a 6-vowel system of the same type as the neighbouring Amur Tungusic languages, notably Nanai and Ulcha. Phonetically the harmonic pairs in Ghilyak are realized as [o]—[u], [a]—[ɨ], and [e]—[i], which may be assumed to represent the earlier values *u—*y, *a—*e, and *ɯ—*i, respectively. The fact that the vowel system was originally based on a front/back opposition is suggested by the nearly combinatory distribution of the velar vs. postvelar consonants [k g x ɣ] vs. [q ɢ χ ʁ], of which the postvelars (uvulars) are combined with [o a e] and the velars with [u ɨ i], very much like in Middle Mongol. Due to other processes, such as vowel elision, the velars and postvelars are synchronically distinct phonemes in Ghilyak, though with a very small functional load. Importantly, the Ghilyak system has reached synchronic stability by allowing the original high unrounded back vowel *ɯ to move to the unrounded front value [e], which, in spite of its palatal quality continues to function as a velar vowel in combination with the postvelar consonants.

6 General Conclusions

On the basis of the above arguments, which recapitulate the earlier results of the authors (Janhunen 1981, Barrere 2016), it may be concluded that the Northeast Asian Vowel Shift was a process that affected several languages and language families. Mongolian is the language where the process can be observed still in action, but Tungusic, Korean and Ghilyak were also affected. In all these languages, the vowel paradigm seems to have been originally organized in terms of palatal-velar oppositions, which governed the functioning of the vowel harmony (PVH) as well. Due to the effect of the Northeast Asian Vowel Shift the values of the vowels were rotated so that the original back vowels were lowered and/or pharyngealized, while the original front vowels were raised and centralized or velarized, which ultimately resulted in a vowel harmony of the tongue root type (TRH). The resulting rotated vowel paradigm

was, however, inherently unstable, which has subsequently led either to its reduction in size or to the introduction of new palatal vowels, or both, depending on the language.

Since there is a direct historical interrelationship between the two types of vowel harmony, it is convenient to apply a generally acceptable and phonetically neutral terminology for the vowel categories involved irrespective of their synchronic oppositions, which can be organized either horizontally (palatal vs. velar) or vertically (high/raised vs. low/lowered), or also in terms of secondary features such as centralization and pharyngealization. A suitable terminology is, in fact, offered by the well-established East Asian convention of labelling the palatal/raised/centralized vowels as 'yin' (陰母音 *yin muyin*), that is 'female' or 'feminine', and the velar/lowered/pharyngealized vowels as 'yang' (陽母音 *yang muyin*), that is 'male' or 'masculine', a convention anchored in such well-known semantic pairs as Manchu *haha* 'man, male' vs. *hehe* [həhə] 'woman, female'. This terminology is, in fact, also used in the Mongolian grammatical tradition (Written Mongol ⟨vm e vgasig⟩ 'female vowel' vs. ⟨vr e vgasig⟩ 'male vowel'), and it has occasionally been applied in Western languages as well (cf. e.g. Tsumagari 2003: 134). Other terms that have been used include 'soft' vs. 'hard', 'weak' vs. 'strong', 'lax' vs. 'tense', and 'light' vs. 'dark' (for a complete list, see Li 1996: 83–85).

There remain many aspects of the Northeast Asian Vowel Shift that will require further research. One of them concerns the absolute dating of the phenomenon. There are, for instance, indications, that rotational features were present in the Para-Mongolic languages recorded fragmentarily in the 1st millennium AZ (Shimunek 2017: 163–165, 216–218), although the Proto-Mongolic branch was affected only several centuries later. Even so, rotation, and the consequences it has had on the development of the vowel systems in the languages of Northeast Asia, must be a relatively recent phenomenon. The earliest recoverable linguistic contacts between Turkic and Mongolic, and Mongolic and Tungusic, took place before rotation had affected these languages. This would suggest that tongue root harmony started its westward expansion not much earlier than the early part of the 1st millennium AZ. In what language, or languages, and where, exactly, it was present before that time, remains to be clarified, but the greater areal context was certainly the North Pacific Rim.

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