Vowel Contrast and Vowel Harmony Shift in the Mongolic Languages*

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This paper explores the synchrony and diachrony of the Mongolic vowel systems within the framework of contrastive hierarchy theory (Dresher 2009). First it establishes contrastive hierarchies for modern Mongolic varieties, based on which it attempts to reconstruct an RTR-based vowel system for Old Mongolian. Then it proposes a vowel shift hypothesis which claims that the basis of vowel harmony has shifted from an RTR contrast in Old Mongolian to a palatal contrast in the modern Kalmyk/Oirat variety (contra Svantesson 1985). It is shown that this shift not only conforms to all the basic criteria of the comparative methods in historical linguistics, but also corresponds to typological expectations from an Altaic perspective. The result supports the idea that RTR was the original harmonic contrast in Altaic (Vaux 2009).

Keywords: Mongolic languages, vowel shift, vowel harmony, contrastive hierarchy, Altaic

1. Introduction

It had long been assumed that the Mongolic languages including Proto-Mongolic have a palatal harmony system, until Svantesson's (1985, 1995) acoustic studies proved that Khalkha and other Mongolian dialects have a 'pharyngeal'(=[Retracted Tongue Root]), not a palatal, harmony system. Faced with this discrepancy between the modern RTR systems and the assumed-to-be pre-modern palatal systems, Svantesson (1985) proposed a vowel shift hypothesis which holds that the basis of vowel harmony has shifted from a palatal to an RTR contrast (except for Kalmyk/Oirat which retains the old palatal contrast). In this paper, I challenge this idea by a care-

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ful examination of the synchrony and diachrony of the Mongolic vowel systems within the framework of the *contrastive hierarchy* theory (Dresher 2009) and propose a reverse shift from RTR to palatal harmony.

The organization of the paper is as follows. Section 2 introduces the theoretical framework. Section 3 explores a variety of modern Mongolic vowel systems and classifies them into four types based on their contrastive hierarchies. Section 4 revisits the Mongolic vowel shift hypothesis and Section 5 concludes the paper.

2. Framework

The contrastive hierarchy theory I adopt here for the analysis of Mongolic has been successfully applied to other Altaic languages: Tungusic (Zhang 1996, Dresher & Zhang 2005) and Korean (S Ko 2010a, 2010b). The theory holds in its core that "the contrastive specifications of phonemes are governed by language-particular feature hierarchies" (Dresher 2009). Thus, it allows for variability (Avery et al. 2008): for instance, two languages with the same inventory /i, a, u/ and the same set of features [high] and [labial] can be differentiated by their contrastive hierarchies, [high] > [labial] vs. [labial] > [high], to the extent that the difference in the ordering is supported by the difference in the phonological patterning. This means that we must scrutinize all the relevant phonological patterns in the given languages to identify the contrastive features and their relative scopes.

In this regard, the theory is crucially based on the following assumption:

(1) Contrast and phonological activity (Dresher 2009: 74)
Only contrastive features are *active* in the phonology.
System-redundant features are *inert*.

We next apply the Successive Division Algorithm (SDA) which ensures that we exhaustively assign all and only contrastive feature values in a principled way.

(2) Successive Division Algorithm (SDA) (Dresher 2009: 16)

a. Begin with *no* feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.

b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.

c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

In addition to these core principles, I assume that 'minimal contrast' plays a decisive role in the phonology.

(3) Minimal contrast and phonological merger: a hypothesis (S Ko 2010a)
A phonological merger operates on minimal contrast which is defined as a contrast between any two segments differing only in the value of the lowest-ranked contrastive feature.

In particular, I assume that vowel merger is a loss of 'minimal contrast' conditioned by the language-particular feature hierarchy. To put it reversely, a certain merger pattern provides us with an important clue as to what the contrastive hierarchy of the language in question looked like at an earlier stage.

3. Vowel Contrast in Mongolic

In this section we investigate a wide variety of vowel inventories and vowel-related phonological patterns found in the modern Mongolic languages and propose a contrastive hierarchy analysis for each language based on major phonological processes such as palatalization, umlaut, vowel harmony, and vowel merger. The result shows that the seemingly diverse Mongolic vowel systems fall into one of the four different types depending on their contrastive hierarchies. This will serve in Section 4 as the basis of the reconstruction of the Old Mongolian (OM) vowels as well as the revision of the Mongolic vowel shift hypothesis.

3.1. Type I: Khalkha Type Languages

Khalkha, Standard Mongolian spoken in the Republic of Mongolia, has 7 vowel phonemes.

(4) Khalkha vowel system (Svantesson 1985, Svantesson et al. 2005)

i		u
		ʊ
e		o
	a	ɔ

A thorough investigation reveals that four features are active in the phonology of Khalkha vowels: [coronal], [RTR], [labial], and [low]. First, the contrastive status of [coronal] is evidenced by the distinction between plain vs. palatalized consonants in (5), historically conditioned by /i/ (e.g., OM *ami/n* > *am*^{j} 'life'). Thus, /i/ must be contrastively [+cor].

(5) Evidence for [coronal]: palatalized consonants (Svantesson et al. 2005: 26ff)

Palatalized Cs		***Non-palatalized Cs***	
p^{j}aʦ	'plate'	paʦ	'splash!'
ag^j	'wormwood'	ag	'tight'
am^j	'life'	am	'mouth'

The contrastive status of [RTR] and [labial] are evidenced by the vowel harmony patterns illustrated in (6): RTR harmony in (6a & b) and labial harmony in (6c).

(6) Evidence for [RTR], [labial], [low]: RTR and labial harmony

	Nominative	Instrumental	Ablative	Gloss
a.	ed	ed-e:r	ed-e:s	'article, item'
	ad	ad-a:r	ad-a:s	'evil spirit; devil'
b.	ud	ud-e:r	ud-e:s	'noon, midday'
	ʊd	ʊd-a:r	ʊd-a:s	'willow'
c.	od	od-o:r	od-o:s	'feather'
	ɔd	ɔd-ɔ:r	ɔd-ɔ:s	'star; fortune'

Evidence for the contrastive status of [low] also comes from the labial harmony pattern. Note that only low rounded vowels (/o, ɔ/) trigger labial harmony (6c), which indicates that these vowels are contrastively [+lab]. By contrast, high 'rounded' vowels (/u, ʊ/) do not trigger labial harmony (6b). Thus, we cannot be sure whether /u/ and /ʊ/ are phonologically [+labial] or not.

Interestingly, /u/ and /ʊ/ block [+labial] spreading, as illustrated in (7). Kaun (1995) ascribes this blocking effect to the difference in height between high (/u, ʊ/) and low rounded vowels (/o, ɔ/).[1] This is another piece of evidence that a height feature, [low], plays an active role in Khalkha. More specifically, /u/ and /ʊ/ must be specified for [-low].

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1 Alternatively, we might simply assume that the Khalkha labial harmony is a "height-stratified" harmony (Mester 1986). If this alternative view is correct, the roundedness of high vowels has nothing to do with the blocking effect. See S Ko (to appear) for further discussion.

(7) High 'rounded' vowels, /u/ and /ʊ/, block labial harmony (Svantesson et al. 2005: 51)

DIRECT PAST	CAUSATIVE-DIRECT PAST	GLOSS
og-ʤo:	og-u:ʤ-ʤe: (*og-u:ʤ-ʤo:)	'to give-CAUS-DPST'
ɔr-ʤɔ:	ɔr-ʊ:ʤ-ʤa: (*ɔr-ʊ:ʤ-ʤɔ:)	'to enter-CAUS-DPST'

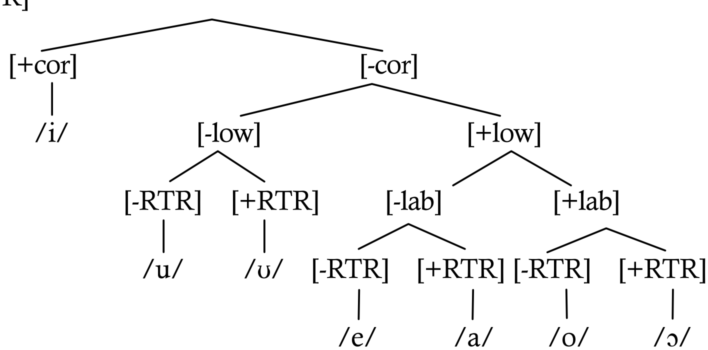
Unlike the opaque vowels (/u, ʊ/), /i/ is transparent to labial harmony as well as RTR harmony (8). I take this as evidence that /i/ lacks contrastive [low] and [RTR] specifications.

(8) /i/ is transparent to RTR & labial harmony (Svantesson et al. 2005)

	ACCUSATIVE-REFLEXIVE	GLOSS
a.	de:ʤ-ig-e:	'gown-ACC-REFL'
	ʧa:s-ig-a:	'paper- ACC-REFL'
b.	bi:r-ig-e:	'brush- ACC-REFL'
c.	su:ʤ-ig-e:	'tail- ACC-REFL'
	mʊ:r-ig-a:	'cat- ACC-REFL'
d.	bo:r-ig-o:	'kidney- ACC-REFL'
	xɔ:ʤ-ig-ɔ:	'food- ACC-REFL'

Based on the evidence so far, I propose the following contrastive hierarchy for Khalkha.

(9) Contrastive hierarchy for Khalkha: [coronal] > [low] > [labial] > [RTR][2]



[2] Although I adopt Clements and Hume's (1995) constriction-based feature theory, the proposed analysis should be compatible with any other feature theories. Note also that I assume equipollent rather than privative features for expository purposes. If we assume privative features, we would need some additional machinery to distinguish unmarked contrastive values from system-redundant values. Refer to Dresher (2009: 32ff) for further discussion.

The first cut by the feature [coronal] makes a distinction between /i/ and all the other vowels. Since there is only one [+coronal] vowel, we do not need any further specification for /i/. This explains the transparency of /i/: /i/ lacks a contrastive [-RTR] specification, thus is transparent to RTR harmony; similarly, /i/ lacks a contrastive [-low] specification, and is thus transparent to labial harmony.[3] The second cut is made by [low] and the third cut is made by [labial]. Therefore, the high rounded vowels, /u/ and /ʊ/, are specified for [-low], but not specified for [+labial]. This is consistent with our observation that there is no positive phonological evidence in support of the roundedness of these vowels. The last cut is made by [RTR], which ensures that minimal contrast holds between the RTR harmonic pairs, /u/~/ʊ/, /e/~/a/, and /o/~/ɔ/.

Note that the proposed contrastive hierarchy predicts exactly the same vowel classes attested in the suffix alternations: (i) coronal vowel /i/ as in, e.g., the accusative marker *-ig-* in (8), non-low vowels /u/~/ʊ/ as in, e.g., the causative marker *-u:ʤ-/-ʊ:ʤ-* in (7), and (iii) low vowels /e/~/a/~ /o/~/ɔ/ as in, e.g., the instrumental/ablative markers in (6).

All other varieties of Mongolian Proper, e.g., Chakhar and Baarin, fall under the same contrastive hierarchy, despite the difference in vowel inventory (S Ko in preparation).

3.2. Type II: Monguor Type Languages

Monguor type languages (Type II) include most Mongolic varieties spoken in the Gansu-Qinghai complex such as Monguor, Santa (Kim 2003), and Bonan (Hugjiltu 2003),[4] and the Western Mongolic language, Moghol (Weiers 1972), spoken in Afghanistan.

These languages have undergone the merger between RTR harmonic pairs (merger by RTR neutralization), **u, *ʊ > u, *o, *ɔ > o*, which resulted in the 5-vowel system exemplified by Monguor in (9) (Svantesson et al. 2005, Janhunen 2003).

(10) Monguor vowel system (Slater 2003a, 2003b, Georg 2003)

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i     u
e     o
   a
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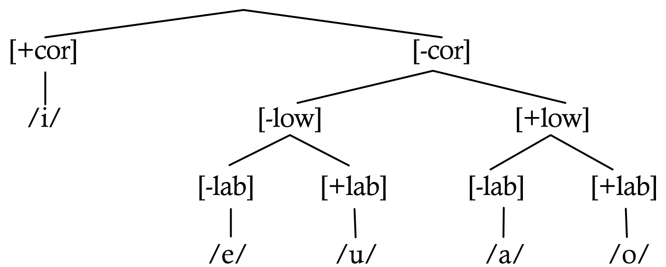
[3] Unlike Mongolic /i/, Tungusic /i/ (as well as /u, ʊ/) is opaque to labial harmony (van der Hulst & Smith 1988). See S Ko (to appear) for a solution to this minimal difference within the contrastive hierarchy framework.

[4] Other 'Gansu-Qinghai' varieties, Shira Yughur and Kangjia, seem to hold an intermediate position between Type I and Type II languages (Nugteren 2003).

The contrastive hierarchy I propose for Monguor (and other Type II languages) is given in (11). Due to insufficient data and description on the relevant phonological patterns, I assume the same contrastive hierarchy as for Khalkha, except for the lost [RTR] feature.

(11) Contrastive hierarchy for Monguor: [coronal] > [low] > [labial]



It should be noted that, as a result of the loss of vowel contrast based on [RTR], the original allophonic distinction between velar vs. uvular consonants became phonemic (Svantesson et al. 2005). The existence of velar and uvular consonants, however, indicates that [RTR] was indeed a contrastive feature at an earlier stage.

3.3. Type III: Dagur Type Languages

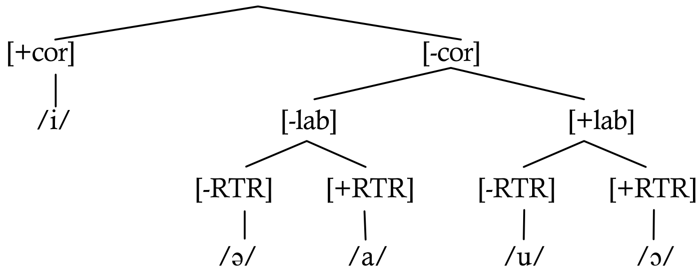
The representative of the third type is Dagur, which has 5 vowel phonemes.

(12) Dagur vowel system (Chuluu 1996, B-I Seong 1983, Tsumagari 2003)

i u
ə
a ɔ

However, the contrastive hierarchy I propose for Dagur is quite different from what I have proposed for Monguor. The hierarchy is given in (13), with three contrastive features: [coronal], [labial], and [RTR].

(13) Contrastive hierarchy for Dagur: [coronal] > [labial] > [RTR]



The first cut is made by [coronal] which is evidenced by palatalization in (14). The second cut is by [labial], evidenced by labial harmony in (15) and labialization in (16).

(14) Evidence for [coronal]: palatalized consonants (Chuluu 1996, Engkebatu 1988)

Palatalized Cs		***Non-palatalized Cs***	
am^j	'life'	am	'mouth'
k^jɔr	'honey'	kɔr	'poison'

(15) Evidence for [labial] (i): labial harmony triggered only by /ɔ/ (Chuluu 1996)

	NOM	INST	ABL	REFL. POSS	GLOSS
a.	ʃar	ʃar-aːr	ʃar-aːs	ʃar-aː	'face'
	nər	nər-əːr	nər-əːs	nər-əː	'name'
	xukur	xukur-əːr	xukur-əːs	xukur-əː	'cow'
b.	mɔːd	mɔːd-ɔːr	mɔːd-ɔːs	mɔːd-ɔː	'tree'
	ɔr	ɔr-ɔːr	ɔr-ɔːs	ɔr-ɔː	'luggage'

(16) Evidence for [labial] (ii): labialized consonants (Chuluu 1996, Engkebatu 1988)

Labialized Cs		***Non-labialized Cs***	
m^wəːr	'shaft of a cart'	məːr	'eat'
s^war	'flea'	sar	'moon'

Note that, as illustrated in (17), both high and low rounded vowels trigger labialization. Therefore, in contrast to Khalkha type languages, all rounded vowels in Dagur must be contrastively specified with respect to [labial] regardless of their height specification.

(17) Labialization triggered by both high and low vowels (Chuluu 1996, Engkebatu 1988)

a. ***High rounded vowels***

DAGUR	WRITTEN MONGOLIAN	GLOSS
s^war	sula	'flea'
k^wal	kula	'light black'

b. ***Low rounded vowels***

DAGUR	WRITTEN MONGOLIAN	GLOSS
m^wə:r	möger	'shaft of a cart; rim'
t^wa:l	togal-a	'to account'

The last cut is made by [RTR] which is evidenced by the so-called "lowness" harmony in (18). The transparency of the vowel /i/ in (19) confirms the ranking [cor] > [RTR].

(18) [RTR] (or [low]): "Lowness" harmony: /a/ vs. /ə, u/ (Chuluu 1996)

	NOM	ALLATIVE	INST	GLOSS
a.	xad	xad-da:	xad-a:r	'cliff'
	nas	nas-da:	nas-a:r	'age'
b.	gər	gər-də:	gər-ə:r	'house'
	xukur	xukur-də:	xukur-ə:r	'cow'

(19) [cor] > [RTR]: /i/ is neutral to "lowness" harmony

a.	maŋgil-ʧa:r	'forehead-TERMINATIVE'
	bəslə:r-ʧə:r	'waist-TERMINATIVE'
b.	x^wain-da:	'north-ALLATIVE'
	əmil-də:	'south-ALLATIVE'

Instead of [RTR], the more commonly-used feature [low] might look preferable. However, there are two pieces of evidence in favor of [RTR] over [low]: (i) B-I Seong's (1983) description that /u/ and /ɔ/ are distinguished by the "tenseness of pharynx" (as well as height) and (ii) the merger by height neutralization in (20).

(20) Merger in Dagur: **u, *o* > *ɔ* and **ü, *ö* > *u* (modified from Tsumagari 2003)

***u* < *ü**	***u* < *ö**
xund 'heavy'< *kündü	duc 'forty' < *döci/n
xukur 'cattle' < *küker	udur 'day' < *ödür

ɔ < *u	***ɔ < *o***
gɔc 'thirty' < *guci/n	mory 'horse' < *mori/n
ɔs 'water' < *usu/n	oboo 'heap' < *obuxa/n

In this merger pattern, what is lost is the height contrast, not the RTR contrast. The same pattern is found in other languages to varying degrees: loss of short /o/ in non-initial syllables in Western Buriat, loss of short /o/ in general in Eastern Buriat, loss of both short and long /o/ in Khamnigan, and loss of /ʊ/ as well as /o/ in Dagur (Svantesson et al. 2005, S Ko in preparation).[5]

3.4. Type IV: Oirat Type Languages

The last type of Mongolic language with respect to vowel systems is the Oirat type, which includes Kalmyk and Oirat proper. Apparently, Kalmyk/Oirat has a vowel system based on front-back contrast, as confirmed by the acoustic data for Kalmyk in Svantesson (1995).

(21) Kalmyk/Oirat vowel system (Bläsing 2003, Birtalan 2003)

i	y	u
e	ø	o
æ[6]	a	

The vowels /y, ø, u, o/ in Kalmyk/Oirat correspond to /u, o, ʊ, ɔ/ in Khalkha respectively.

(22) Vowel correspondence between Kalmyk/Oirat and Khalkha

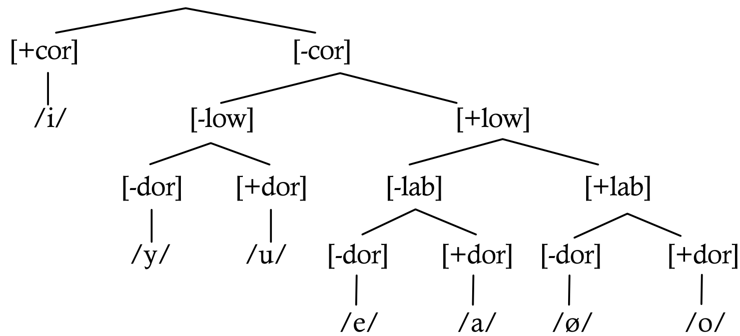
Kalmyk/Oirat	/i/	/e/	/a/	/y/	/u/	/ø/	/o/
Khalkha	/i/	/e/	/a/	/u/	/ʊ/	/o/	/ɔ/

The contrastive hierarchy I propose for Kalmyk/Oirat is given in (23).

[5] Interestingly, this direction of change coincides with the geographical distribution of the languages.

[6] This vowel is mainly the product of vowel umlaut of /a/ conditioned by /i/, and thus will not be considered in the contrastive hierarchy.

(23) Contrastive hierarchy for Kalmyk/Oirat: [coronal] > [low] > [labial] > [dorsal]



The contrastive status of [coronal], [labial], and [dorsal] is evidenced by vowel umlaut in (24), labial harmony and regressive labial assimilation in (25), and palatal harmony in (26), respectively.

(24) Evidence for [coronal]: vowel umlaut (Birtalan 2003; see Bläsing 2003 for Kalmuck)

OLD MONGOLIAN	SPOKEN OIRAT	GLOSS
**kari*	xær	'alien'
**mori/n*	mør/n	'horse'

(25) Evidence for [labial]: labial harmony and regressive assimilation

a. Labial harmony in Written Oirat (and maybe some spoken dialects) (Birtalan 2003)
e.g., **jiluxa* 'rein/s' > WO joloo > SO jola

b. Regressive labial assimilation (Svantesson et al. 2005: 194ff)

OM	KALMYK	GLOSS
**emüs*	øms	'to wear'
**t^hemür*	t^hømr	'iron'

(26) Evidence for [dorsal]: palatal harmony (Bläsing 2003: 232)

ykr-æs 'cow-ABL'	uul-as 'mountain-ABL'
ykr-yr 'cor-DIR'	uul-ur 'mountain-DIR'

Note that we have two distinct features for the front-back dimension, [dorsal] for palatal harmony and [coronal] for umlaut. On the one hand, /i/ should not be specified for the harmonic feature, since it is neutral to palatal harmony (27a), although it patterns as a front vowel when it is the only stem vowel (27b).

(27) /i/ is neutral to palatal harmony

a. Written Oirat (Birtalan 2003: 213)

Front		***Back***	
shikür	'umbrella'	ghuci/n	'thirty'
ceriq	'army'	shidar	'close'

b. /i/ patterns as a front V if it is the only vowel in a stem (Kaun 1995: 45)

jirh-læ:	'live happily-DPST'	ir-læ:	'come-DPST'
bič-læ:	'write-DPST'	ičr-æ:s	'shame-ABL'

On the other hand, however, /i/ must be specified for the umlaut feature since it has the phonological effect of changing vowel harmony class (28). Note that the fronted back vowels in (c) take front vowel suffixes instead of back vowel suffixes.

(28) Change of vowel harmony class due to umlaut (Svantesson et al. 2005: 212ff)

	OM	KALMYK	BAARIN	KHALKHA	GLOSS
a.	front vowel				
	*ker	ger-ær	kɤr-ɤr	ger-er	'house-INST'
	*mør	mør-ær	mor-or	mor-or	'path-INST'
	*üke	yg-ær	uk-ɤr	ug-er	'word-INST'
b.	back vowel				
	*aman	am-ar	am-ar	am-ar	'mouth-INST'
	*motun	mod-ar	mɔt-ɔr	mɔt-ɔr	'tree-INST'
	*sur	sur-la	sʊr-la	sʊr-la	'to learn-DPST'
c.	fronted back vowel[7]				
	*amin	æm-ær	ɛm-ar	am^{j}-ar	'life-INST'
	*morin	mør-ær	mœr-ɔr	mɔr^{j}-ɔr	'horse-INST'
	*uri	yr-læ	ʏr-la	ʊr^{j}-la	'invite-DPST'

The interim summary given below shows that all 11 Mongolic languages belong to one of the four subtypes differentiated from one another on the basis of the contrastive hierarchy analysis proposed so far.

[7] 'Violation' of vowel harmony (Birtalan 2003: 213): "In Spoken Oirat, exceptions are also conditioned by palatal umlaut, which has introduced front vowels into originally back-vocalic words. Harmonizing suffixes follow the original harmonic class of the stem, e.g., SO ääl 'camp' : instr. ääl-ar < *a(y)il-aar, SO öört- 'to come closer' : caus. öört.ul-."

Type I	*Khalkha type (or RTR harmony) languages* [coronal] > [low] > [labial] > [RTR]	Mongolian Proper (Shira Yughur, Kangjia)
Type II	*Monguor type (or RTR neutralization) languages* [coronal] > [low] > [labial] > ~~[RTR]~~	Santa, Bonan, Monguor, Moghol
Type III	*Dagur type (or height neutralization) languages* [coronal] > [labial] > [RTR] > ~~[low]~~	Dagur, Buriat, Khamnigan
Type IV	*Oirat type (or palatal harmony) languages* [coronal] > [low] > [labial] > [dorsal]	Kalmyk-Oirat

4. Vowel Harmony Shift

In Svantesson's scenario, the changes in the Monguor type languages are accounted for by the merger of front rounded vowels **y* and **ø* with their harmonic pairs **u* and **o* triggered by *velarization* of **y* and **o*. The Khalkha type languages are assumed to have experienced a chain shift consisting of *pharyngealization* and *velarization*, and as a result, the palatal-to-RTR harmony shift. The Dagur type languages are assumed to have taken one step further than the Mongolian type by undergoing *polarization* which resulted in the merger of the original back rounded vowels (**u > ʊ > ɔ; *o > ɔ*) and the merger of the originally front rounded vowels (**y* > u; **ø > o > u*). The Oirat type languages are regarded as retaining the Old Mongolian vowel system.

However, as pointed out by Vaux (2009), the proposed shift from palatal to RTR harmony not only lacks phonetic support but also is unattested elsewhere. In contrast, the reverse shift from RTR to palatal is phonetically well grounded, as tongue root retraction entails tongue body movement (Archangeli & Pulleyblank 1994). Furthermore, the shift from tongue root to palatal harmony is also well attested in, e.g., Somali. Thus, Vaux (2009) proposes to reconstruct an RTR system for Proto-Altaic and derive the Turkic palatal system from it. I pursue this idea on the Mongolic level.

4.1. Old Mongolian: An RTR Analysis

Old Mongolian is defined in Svantesson et al. (2005) as the immediate ancestor language that can be reconstructed from documents written in four different scripts, Uyghur, Chinese, Arabic, and 'Phags-pa, in the thirteenth to the fifteenth centuries. The reconstructed OM vowel system is given in (29).

(29) OM vowel system: a palatal analysis (Svantesson et al. 2005: 111)

	Front		Back	
High	i	y		u
Nonhigh	e	ø	a	o

However, there appears to be no evidence in the documents which decisively identifies the phonetic quality of the vowels (J Kim 1993: 40, Hattori 1975: 14ff). Rather, if we apply the comparative method to the modern Mongolic varieties based on spoken languages rather than written sources, the result is quite different. Notably, we reconstruct OM **o* and **u* instead of **ø* and **y*, simply following the 'majority-wins' guideline (Campbell 2004: 131ff).

(30) The comparative method applied to the modern Mongolic languages

a. **Sound correspondence** (cf. Svantesson et al. 2005: 180)

Khalkha	a	ɔ	ʊ	e	o	u	i
Chakhar	a	ɔ	ʊ	ə	o	u	i, ɪ
Baarin	a	ɔ	ʊ	ə	o	u	i
Monguor	a	o	u, o	i, e	o, u	u	i
Bonan	a	o	u	ə	o	u	i
Santa	a	o	u	ie, ə	o	u	i
Moghol	a, o	o	u	e	o	u	i
Buriat	a	ɔ	ʊ	e	u	u	i
Khamnigan	a	ɔ	ʊ	e	u	u	i
Kalmyk	a	o	u	e	ø	y	i

b. **Reconstruction**

Old Mongolian	*a	*ɔ	*ʊ	*ə	*o	*u	*i

Thus, I propose the following RTR-based 7-vowel system for OM.

(31) OM vowel system: an RTR analysis (proposal)

i		u
		ʊ
	ə	o
	a	ɔ

There is external evidence in support of (31) as well. The Middle Korean (MK) transcription for 13th~14th century Mongolian loanwords in (32) seems to support this RTR analysis of the OM vowels (cf. J Kim 1993).

(32) MK transcription of 13th century Mongolian vowels (K-M Lee 1964)

OM	i	e	a	ü	ö	u	o
MK	ㅣ	ㅓ	ㅏ	ㅜ	ㅝ	ㅗ	

(33) shows the vowel correspondence between OM and MK is better explained by the RTR-RTR analysis (a) than the palatal-RTR analysis (b), assuming the values for the MK vowels argued for by S Ko (2010) and references cited therein.[8]

(33) Correspondence between OM and MK vowels

a. **RTR-RTR analysis: My view**

OM (RTR system)		MK (RTR system)	
<i>	i	i	<ㅣ>
<e>	ə	ə	<ㅓ>
<a>	a	a	<ㅏ>
<ü>	u	u	<ㅜ>
<u>	ʊ	o	<ㅗ>
<ö>	o	wə	<ㅝ>
<o>	ɔ	o	<ㅗ>

b. **palatal-RTR analysis: Unlikely**

OM (palatal system)		MK (RTR system)	
<i>	i	i	<ㅣ>
<e>	e	ə	<ㅓ>
<a>	a	a	<ㅏ>
<ü>	y	u	<ㅜ>
<u>	u	o	<ㅗ>
<ö>	ø	wə	<ㅝ>
<o>	o	o	<ㅗ>

(Shaded area indicates mismatches.)

MK /o/ is the RTR counterpart to /u/. Thus, it should be understood as the closest equivalent to OM /ʊ/(= <u>) as in (a). OM /ɔ/(= <o>) is also transcribed in MK /o/, the only rounded RTR vowel in MK. The transcription of OM /o/(= <ö>) with /wə/ in MK in (a) is also understandable: OM /o/ is the labial counterpart of /ə/(= <e>) but is missing in the MK inventory.

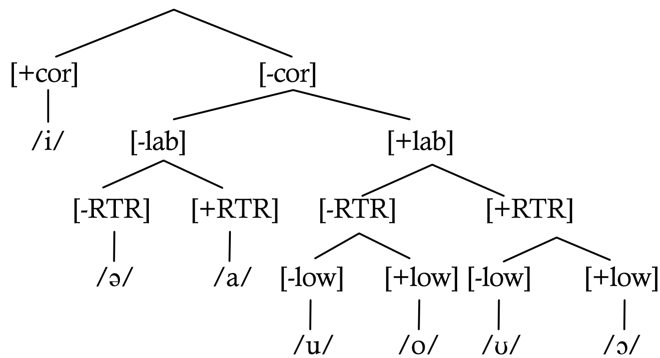
[8] The Middle Korean vowel system is as follows (S Ko 2010):

<ㅣ> i	<ㅡ> ɨ	<ㅜ> u	[-RTR]
	<·> ʌ	<ㅗ> o	[+RTR]
	<ㅓ> ə		[-RTR]
	<ㅏ> a		[+RTR]

Thus, /w/ is added to MK /ə/ to denote the labiality of the original OM vowel. By contrast, under the palatal-RTR analysis in (b) the correspondence between OM /u/(= <u>) and MK /o/ is hard to explain because MK has /u/.[9]

Based on the RTR analysis in (31), I propose the following contrastive hierarchy for OM.

(34) Contrastive hierarchy for OM: [coronal] > [labial] > [RTR] > [low]



Evidence for the contrastive status of the proposed features is summarized in (35).

(35) Evidence for OM (from Svantesson et al. 2005)

a.	[coronal]	palatalization and/or umlaut pervasive in all Mongolic languages
b.	[labial]	labial attraction (also known as *round licensing*)
c.	[RTR]	RTR harmony
d.	[low]	labial attraction is restricted to low vowels

There is no labial harmony affecting suffix alternations in OM (Svantesson et al. 2005: 115). However, OM does have a licensing distribution for rounded vowels, called *labial attraction*, according to which low rounded vowels occur in a non-initial syllable of a root only when the initial syllable also contains a low rounded vowel (Walker 2001: 837, Svantesson et al. 2005: 114-5). There is also a regressive rounding assimilation process whereby an initial **ə* is rounded by a following **u*. The reflexes of this process are found in Kalmyk, Mongolian Proper (e.g., Khalkha), Buriat, and Khamnigan.

[9] A third option, a palatal-palatal analysis (cf. K-M Lee 1964, 1972), which is not considered here, would not have this problem. However, see Hattori (1975), J Kim (1993), S-s Oh (1998), Vovin (2000), and S Ko (in preparation) among many others for criticisms of this view.

(36) Regressive labial assimilation in Old Mongolian (modified from Svantesson et al. 2005: 194ff)

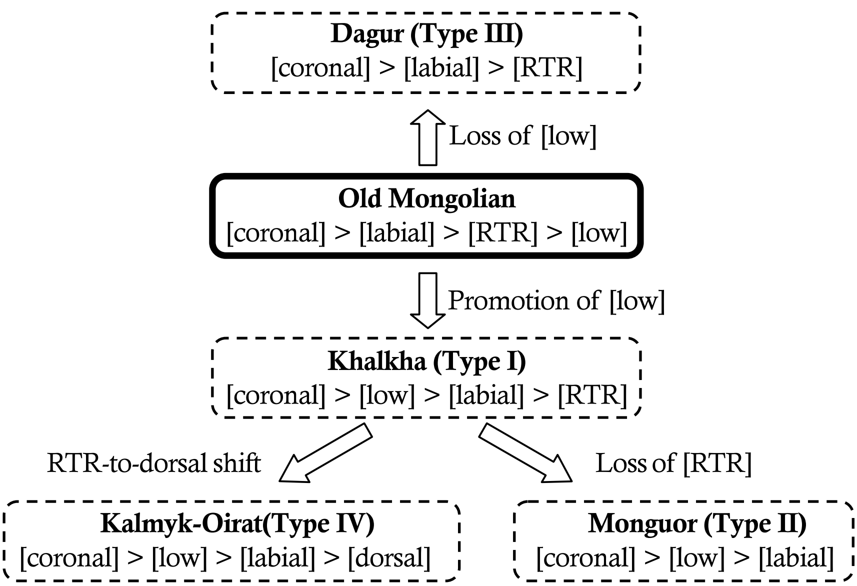
OM	KALM	KHAL	BURIAT	KHAM	GLOSS
*əmus	øms	oms	umdə	umut	‘to wear’
*t^həmur	t^hømr	t^homor	t^humər	t^humur	‘iron’

This gives us a clue as to the relative scope between [low] and [labial]. Since the regressive labial assimilation is triggered by a high rounded vowel **u*, it should be the case that **u* had the contrastive value with respect to [labial] specification. In order for **u* to receive [+labial], [labial] should take scope over [low], thus [coronal] > [labial] > [RTR] > [low]. This ordering is supported also by the writing system: Uyghur Monglian (and ’Phags-pa scripts for non-initial vowels as well) does not distinguish the high and low rounded vowel pairs.

4.2. Towards a New Mongolic Vowel (harmony) Shift

Now that we analyze OM as having an RTR vowel system, the overall picture of the Mongolic vowel shifts should be revised. This can be formalized in terms of changes in the contrastive hierarchies as in (37).

(37) Historical development of the Mongolic vowel systems



Type III (Dagur) languages retain the OM contrastive hierarchy, but are losing (Buriat and Khamnigan) or have already lost (Dagur) the lowest-ranked feature [low] via vowel merger by height neutralization. All the other types (I, II, and IV) underwent a promotion of [low], thus the contrastive hierarchy became [coronal] > [low] > [labial] > [RTR] as in Khalkha above. There was no further change in the contrastive hierarchy in Type I (Khalkha), whereas Type II (Monguor) and Type IV (Oirat) underwent further changes. Type II (Monguor) lost the lowest-ranked feature [RTR] via vowel merger by RTR neutralization. This particular change is also well-attested in other Altaic languages such as Manchu (Dresher & Zhang 2005) and Middle Korean (S Ko 2010a, 2010b).

Type IV (Kalmyk/Oirat) experienced a shift of the basis of vowel harmony from [RTR] to [dorsal], maybe due to the Turkic influence through areal contact (cf. Kögjiltü 1982).[10] Recall that this change is also phonetically grounded and well-attested (Vaux 2009), thus satisfying the criterion of directionality/naturalness (Campbell 2004). Also, this reverse shift is economical in the sense that it necessitates only one single change (RTR-to-palatal shift) in Kalmyk/Oirat instead of 10 independent changes (palatal-to-RTR shift) in all the other Mongolic varieties. The result also seems to be desirable considering the closest affinity between Oirat and Monglian Proper discovered in Rybatzki's (2003) intra-Mongolic taxonomy.

5. Conclusion

In this paper we first investigated a wide variety of modern Mongolic languages and identified four different types of vowel systems corresponding to one of the four attested historical paths for this family. Then we attempted a reconstruction of the Old Mongolian (OM) vowels to show that OM had an RTR, not a palatal, system. Finally we challenged Svantesson's (1985) palatal-to-RTR vowel shift hypothesis by proposing a reverse, RTR-to-palatal shift. We have seen that this reverse shift meets the various standard criteria of comparative reconstruction such as directionality, 'majority wins', and economy (Campbell 2004). It is consistent with typological expectations as well, taking other Altaic languages such as Tungusic and Korean into consideration. This implies an answer to the important question: Was RTR the original harmonic contrast in Altaic? The answer seems to be positive (Vaux 2009).

[10] It may not be just a coincidence that the residential areas of Oirats are populated largely by Turkic people, the Uyghurs and the Kazakhs (Indjieva 2009: 28-32). Interestingly, to my best knowledge, Kazakh is the only Turkic language which has been claimed in the literature to have an RTR harmony system (Vajda 1994).

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