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Vowel contrast and vowel harmony shift in the Mongolic languages

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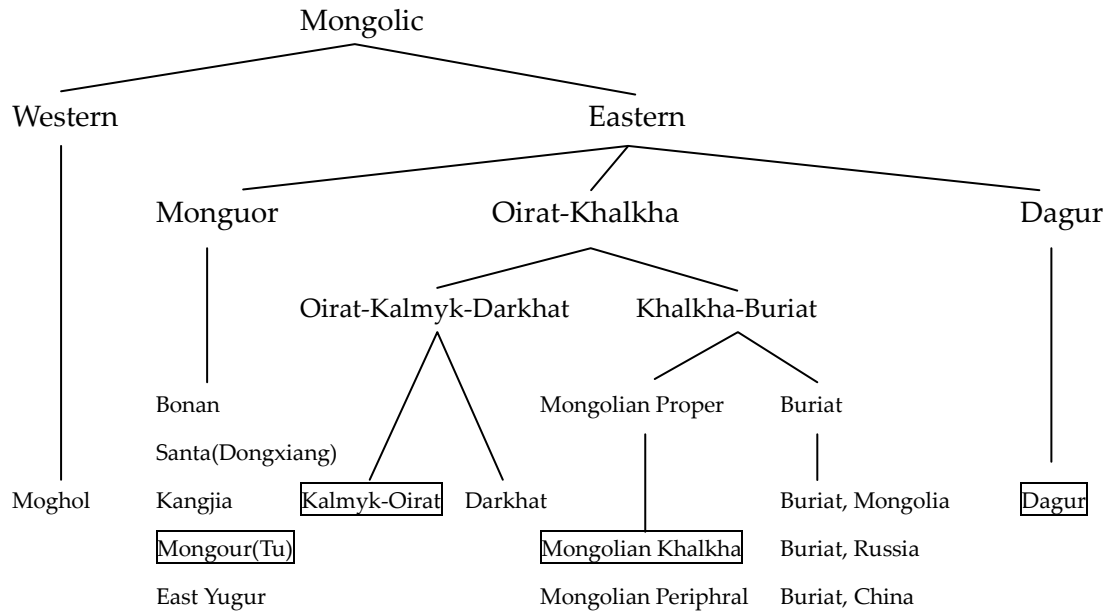
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1. Introduction

- The goal of this talk is to provide:
 - a formal analysis for a variety of modern Mongolic vowel systems
 - a refined account for how the Old Mongolian vowel system has developed into these modern systems (cf. Svantesson 1985)
 - Framework: *Contrastive Hierarchy* (CH) (Dresher 2009; cf. Walker 1993)
 - “the contrastive specifications of phonemes are governed by language-particular feature hierarchies” (Dresher 2009)
- (1) Contrast and phonological activity (Dresher 2009: 74)
Only contrastive features are *active* in the phonology.
System-redundant features are *inert*.
 - (2) The Successive Division Algorithm (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.
 - (3) Minimal Contrast (Ko 2009 ; cf. Campos-Astorkiza 2007)
Minimal contrast is the contrast between any two segments that differ only in the value of the lowest-ranked contrastive feature.
 - (4) Minimal Contrast and Phonological Merger (a hypothesis, Ko 2009)
A *phonological merger* operates based on *minimal contrast*.

- Languages: a subset of the Mongolic languages (Lewis 2009)



- The organization of the talk:
 - §2. CH analysis of Khalkha, Monguor, Dagur, and Oirat
 - §3. Mongolic vowel shifts
 - §4. Conclusion

2. CH analysis of the Mongolic vowel systems

(5) Mongolic vowel systems:

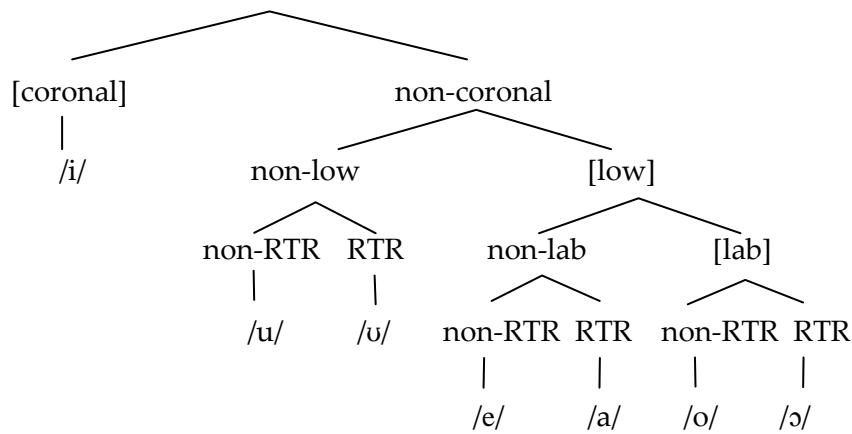
	<i>Contrastive hierarchy</i>	<i>Language</i>
Type I	[coronal] > [low] > [labial] > [RTR]	Khalkha
Type II	[coronal] > [low] > [labial]	Monguor
Type III	[coronal] > [labial] > [RTR]	Dagur
Type IV	[coronal] > [low] > [labial] > [dorsal]	Kalmyk-Oirat

2.1. Type I: Khalkha type languages

(6) Khalkha Mongolian vowel system (Svantesson 1985; Svantesson et al. 2005)

i	u
	ʊ
e	o
a	ɔ

- (7) Contrastive hierarchy for Khalkha Mongolian
 a. SDA: [coronal] > [low] > [labial] > [RTR]



b. Output specifications

/i/ = [+cor]	/u/ = [-cor, -low, -RTR]	/ʊ/ = [-cor, -low, +RTR]
	/e/ = [-cor, +low, -lab, -RTR]	/a/ = [-cor, +low, -lab, +RTR]
	/o/ = [-cor, +low, +lab, -RTR]	/ɔ/ = [-cor, +low, +lab, +RTR]

Evidence:

- (8) [cor]: palatalized consonants¹ (Svantesson et al 2005: 26ff):

<i>Words with non-palatalized Cs</i>		<i>Words with palatalized Cs</i>	
pal	'splash!'	p ^j al	'plate'
ag	'tight'	ag ^j	'wormwood'
ɬam	'road'	ɬam	'law'
sal	'raft'	ʃal	'floor'
ax	'elder brother'	ax ^j	'to advance'
am	'mouth'	am ^j	'life'

- (9) [RTR] and [labial]: vowel harmony

	<i>NOM</i>	<i>INST</i>	<i>ABL</i>	<i>GLOSS</i>
a.	ad	ad-a:r	ad-a:s	'evil spirit; devil'
	ed	ed-e:r	ed-e:s	'article, item; property'
b.	/i/ is neutral but if it is the only stem vowel non-RTR suffix is selected.			
	id	id-e:r	id-e:s	'strength, energy'

¹ Palatalized and plain consonants contrast only in words with RTR vowels (Svantesson et al. 2005: 28).

c. high rounded vowel: no labial harmony

ud	ud-a:r	ud-a:s	'willow'
ud	ud-e:r	ud-e:s	'noon, midday'

d. low rounded vowel: labial harmony

ɔd	ɔd-ɔ:r	ɔd-ɔ:s	'star; fortune'
od	od-o:r	od-o:s	'feathers'

→ [low]: Only 'low' vowels trigger labial harmony (9c vs. 9d).

(10) [low]: /u/ and /ʊ/ block labial harmony (Svantesson et al. 2005: 51)

<i>DIRECTPAST</i> /-IE/	<i>CAUS-DPST</i> /-UI-IE/	<i>GLOSS</i>
og-lo	og- ul -le (*og-ul-lo)	'to give'
ɔr-lɔ	ɔr- ul -la (*ɔr-ul-lɔ)	'to enter'

→ 'High' (rounded) vowels block labial harmony. (cf. Kaun 1995)

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

<i>non-RTR words</i>	<i>RTR words</i>
a. de:l-ig-e 'gown-ACC-REFL'	ʃa:s-ig-a 'paper-ACC-REFL'
b. bi:r-ig-e 'brush-ACC-REFL'	
c. su:l-ig-e 'tail-ACC-REFL'	mʊ:r-ig-a 'cat-ACC-REFL'
d. bo:r-ig-o 'kidney-ACC-REFL'	xɔ:l-ig-ɔ 'food-ACC-REFL'

Cf. van der Hulst & Smith (1988): Mongolic vs. Tungusic "minimal pair"

(12) Transparency of high vowels to labial harmony in Mongolic vs. Tungusic

	/i/	/u, ʊ/
a. Mongolic	transparent	opaque
b. Tungusic	opaque	opaque

(13) An account for the Mongolic vs. Tungusic minimal pair

- Mongolic: [cor] > [low] > [lab] > [RTR]
- Tungusic: [low] > [cor] > [lab] > [RTR] (Dresher and Zhang 2005)

- Same generalizations for both language families:
 - Only (contrastively) low vowels trigger labial harmony.
 - Only (contrastively) high vowels block labial harmony.
- The difference comes from the different ranking between [cor] and [low]
 - Mongolic /i/ is not contrastive high; but Tungusic /i/ is.
 - High rounded vowels are contrastively high in both language families.

2.2. Type II: Monguor type languages

(14) Monguor type vowel systems

a. Monguor

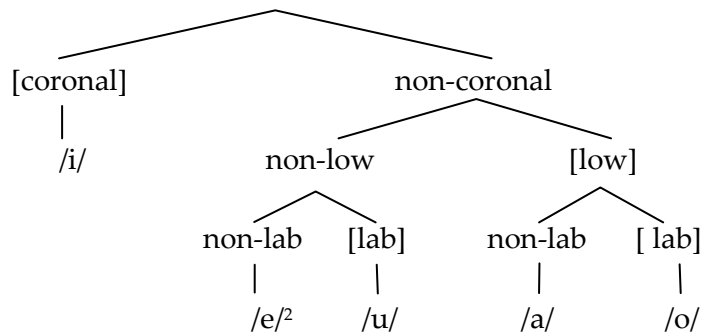
i u
e o
a

Monguor (Slater 2003a,b; Georg 2003; Svantesson et al. 2005), Moghol (Svantesson et al. 2005),

Bonan (Hugjiltu 2003), Santa (Dongxiang) (Kim 2003)

(15) Contrastive hierarchies for Monguor type languages

a. SDA: [coronal] > [low] > [labial]



b. Output specifications:

/i/ = [+cor] /e/ = [-cor, -low, -lab] /u/ = [-cor, -low, +lab]
/a/ = [-cor, +low, -lab] /o/ = [-cor, +low, +lab]

Evidence for the loss of [RTR] ((Svantesson et al. 2005; Janhunen 2003 among others):

- No vowel harmony (Monguor, Bonan, Moghol) or only remnants of vowel harmony (Santa) cf. Shira Yugur, Kangjia retains the vowel harmony pattern.
- Phonemic velar-uvular distinction (Monguor, Santa, Bonan, Moghol):
- conditioned by non-RTR vs. RTR vowel contrast at an earlier stage
- These 5 vowel systems have been achieved by means of the vowel merger between harmonic pairs (Svantesson et al. 2005; Janhunen 2003 among others):

OM *u, *ʊ > /u/ OM *o, *ɔ > /o/

² It may be the case that Monguor /e/ is reinterpreted as a front vowel: /i, e/ act as front vowel with respect to the contrast between palatal vs. retroflex consonants which might be a recent development due to Chinese influence (Slater 2003a,b).

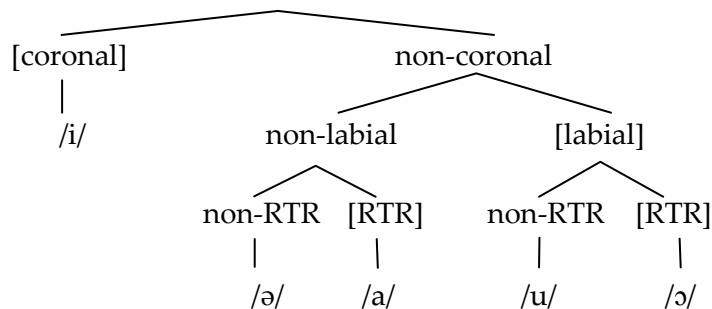
2.3. Type III: Dagur type languages

(16) Dagur vowel system (Chuluu 1996: 7)

i u
 ə
 a ɔ

(17) Contrastive hierarchy for Dagur

a. SDA: [coronal] > [labial] > [RTR]



b. Output specifications

/i/ = [+cor] /ə/ = [-cor, -lab, -RTR] /u/ = [-cor, +lab, -RTR]
 /a/ = [-cor, -lab, +RTR] /ɔ/ = [-cor, +lab, +RTR]

(18) [cor]: palatalized vs. non-palatalized Cs (Chuluu 1996: 5, Engkebatu 1988: 131ff)

<i>Palatalized</i>		<i>Non-palatalized</i>	
bɔd ^j	'prairie'	bɔd-	'think'
am ^j	'life'	am	'mouth'
k ^j ɔr	'honey'	kɔr	'poison'

(19) [lab]: labialized vs. non-labialized Cs (Chuluu 1996: 5ff, Engkebatu 1988: 136ff)

<i>Labialized</i>		<i>Non-labialized</i>	
m ^w ə:r	'shaft of a cart'	mə:r	'eat'
t ^w a:l	'to account'	ta:l	'love'
s ^w ar	'flea'	sar	'moon'

(20) Dagur labialization triggered by hi & low Vs (Chuluu 1996: 5ff, Engkebatu 1988 29-32)

a. low round trigger

*Dagur Mongolian*m^wə:r möger 'shaft of a cart; rim'

b. high round trigger

*Dagur Mongolian*s^war sula 'flea'

- (21) $t^w a:l$ togal-a ‘to account’ $k^w al$ kula ‘light black’
 [RTR] (or [low]): “Lowness” harmony: /a/ vs. /ə, u/ (Chuluu 1996: 12ff)
- | | 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’ |
- (22) [cor] > [RTR]: /i/ is neutral to “lowness” harmony
- | | | |
|----|---|----------------------------------|
| a. | maŋgil-ʃa:r ‘forehead-TERMINATIVE’ | bəslə:r-ʃə:r ‘waist-TERMINATIVE’ |
| b. | x ^w ain-da: ‘north-ALLATIVE’ | əmil-də: ‘south-ALLATIVE’ |

Why [RTR], not [low]?

- The ‘tenseness of pharynx’ in /ɔ/ (Seong 1999)
 - Merger by height neutralization, not by RTR neutralization (23)
- (23) Merger in Dagur: $*u, *o > o$ ($=\text{ɔ}$) and $*ü, *ö$ ($=*y, *ø$) $> u$ (Tsumagari 2003: 131ff)
- | | | | |
|----|---------------------------|----|--------------------------|
| a. | $u < *ü$ | b. | $u < *ö$ |
| | xund ‘heavy’ $< *kündü$ | | duc ‘forty’ $< *döci/n$ |
| | xukur ‘cattle’ $< *xüker$ | | udur ‘day’ $< *ödür$ |
| c. | $o < u$ | d. | $o < o$ |
| | goc ‘thirty’ $< *guci/n$ | | mory ‘horse’ $< *mori/n$ |
| | os ‘water’ $< *usu/n$ | | oboo ‘heap’ $< *obuxa/n$ |

3.4. Type IV: Oirat type languages

- (24) Kalmyk/Oirat vowel phonemes
 (Bläsing 2003, Svantesson 1985, Svantesson et al. 2005 for Kalmyk; Birtalan 2003 for Oirat)

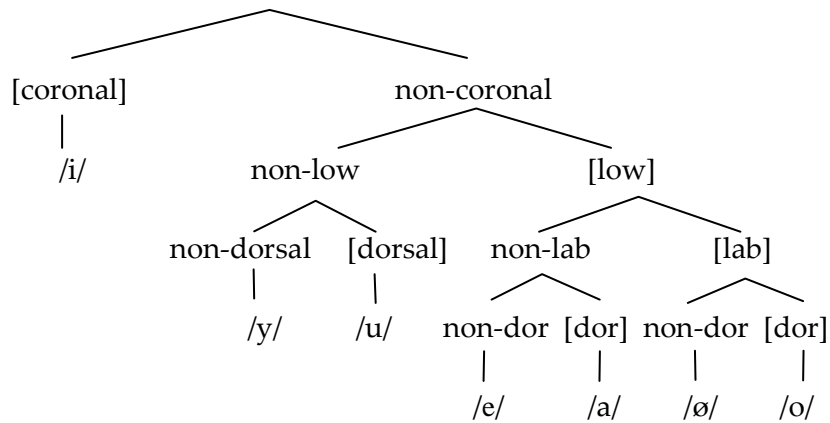
i	y	u
e	ø	o
	a	

- (25) Vowel correspondence between Kalmyk/Oirat and Khalkha

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

(26) Contrastive hierarchy for Kalmuck/Oirat

a. SDA: [coronal] > [low] > [labial] > [dorsal]



b. Output specifications

/i/ = [+cor] /y/ = [-cor, -low, -dor] /u/ = [-cor, -low, +dor]
 /e/ = [-cor, +low, -lab, -dor] /a/ = [-cor, +low, -lab, +dor]
 /ø/ = [-cor, +low, +lab, -dor] /o/ = [-cor, +low, +lab, +dor]

(27) [cor]: vowel umlaut in Oirat (Birtalan 2003:212; see Bläsing 2003 for Kalmuck)

<i>Old Mong</i>	<i>Spoken Oirat</i>	<i>Gloss</i>
* <i>kari</i>	xär	'alien'
* <i>mori/n</i>	mör/n	'horse'

(28) [lab]: labial harmony and regressive assimilation

- a. Written Oirat (and maybe some spoken dialects) labial harmony (Birtalan 2003)
 e.g., **jiluxa* 'rein/s' > WO *joloo* > SO *jola*
- b. Regressive labial assimilation (Svantesson et al. 2005: 194ff)

<i>Old Mong</i>	<i>Kalmyk</i>	<i>Gloss</i>
* <i>emys</i>	øms	'to wear'
* <i>t^hemyr</i>	t ^h ømr	'iron'

(29) [dorsal]: palatal harmony (Bläsing 2003: 232)

<i>ykr-æs</i> 'cow-ABL'	<i>uul-as</i> 'mountain-ABL'
<i>ykr-yr</i> 'cor-DIR'	<i>uul-ur</i> 'mountain-DIR'

Why two distinct features, [coronal] and [dorsal]?:

(30) /i/ is neutral to palatal harmony

a. Written Oirat (Birtalan 2003: 213)

<i>Front</i>		<i>Back</i>	
shikür	'umbrella'	ghuci/n	'thirty'
ceriq	'army'	shidar	'close'

→ /i/ should NOT be specified for the harmonic feature.

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

jirh-læ:	'live happily-NarrPast'	ir-læ:	'come-NarrPast'
bič-læ:	'write-NarrPast'	ičr-æ:s	'shame-Abl'

→ Front is unmarked value in palatal harmony; back is marked.

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

	<i>Old Mong</i>	<i>Kalmyk</i>	<i>Baarin</i>	<i>Khalkha</i>	<i>Gloss</i>
a. front vowel					
*ker	ger-er	kʏr-ʏr	ger-er	'house'	
*mør	mør-er	mor-or	mor-or	'path'	
*yke	yg-er	uk-ʏr	ug-er	'word'	
b. back vowel					
*aman	am-ar	am-ar	am-ar	'mouth'	
*motun	mod-ar	mət-ɔr	mət-ɔr	'tree'	
*sur	sur-la	sur-la	sur-la	'to learn'	
c. fronted back vowel ³					
*amin	em-er	em-ar	am ^j -ar	'life'	
*morin	mør-er	mœr-ɔr	mør ^j -ɔr	'horse'	
*uri	yr-lɛ	ʏr-la	ur ^j -la	'invite'	

→ /i/ should be specified for the umlaut feature.

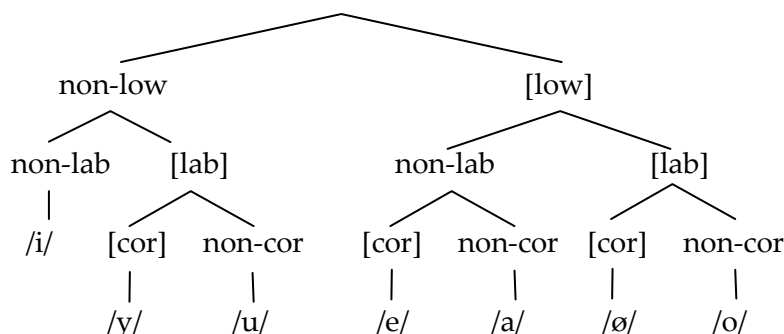
³ 'Violation' of vowel harmony (Birtalan 2003: 213): "In Spoken Oirat, exceptions are also conditioned by palatal umlaut, which has introduced front vowels into originally back-vocalic words. Harmonizing suffixes follow the original harmonic class of the stem, e.g., SO ääl 'camp': instr. ääl-ar < *a(y)il-aar, SO öört- 'to come closer': caus. öört.ul-."

What if we choose one of these two, say [coronal], and attempt a contrastive hierarchy with three features ([cor], [low], [lab])?:

→ All possible hierarchies have a problem (32) & (33).

(32) Alternative analysis with only three features (I)

a. SDA: [low] > [labial] > [coronal]



b. Output specifications

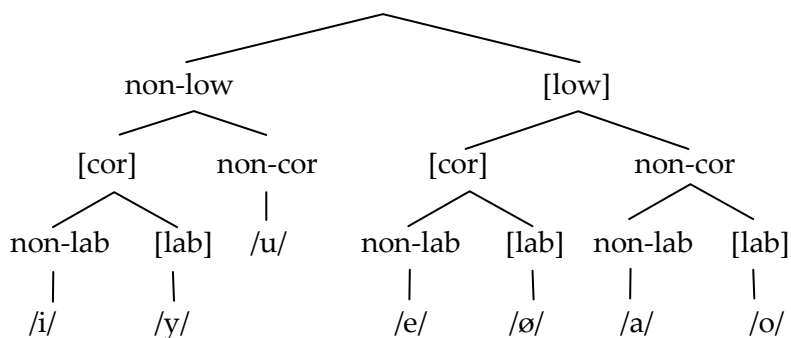
/i/ = [-low, -lab] /y/ = [-low, +lab, +cor] /u/ = [-low, +lab, -cor]
 /ø/ = [+low, +lab, +cor] /o/ = [+low, +lab, -cor]
 /e/ = [+low, -lab, +cor] /a/ = [+low, -lab, -cor]

→ No marked umlaut feature for /i/: fails to explain the vowel umlaut

→ [lab] > [low] > [cor] also has the same problem

(33) Alternative analysis with only three features (II)

a. SDA: [low] > [coronal] > [labial]



b. Output specifications

/i/ = [-low, +cor, -lab] /y/ = [-low, +cor, +lab] /u/ = [-low, -cor]
 /e/ = [+low, +cor, -lab] /a/ = [+low, -cor, -lab]
 /ø/ = [+low, +cor, +lab] /o/ = [+low, -cor, +lab]

→ /y/ and /u/ do not form a harmonic pair.

→ [cor] > [low] > [lab], [cor] > [lab] > [low], and [lab] > [cor] > [low] also have a problem of the same sort.

Interim summary:

<i>Type</i>	<i>Contrastive hierarchy</i>	<i>Language</i>
Type I	[coronal] > [low] > [labial] > [RTR]	Khalkha
Type II	[coronal] > [low] > [labial]	Monguor
Type III	[coronal] > [labial] > [RTR]	Dagur
Type IV	[coronal] > [low] > [labial] > [dorsal]	Kalmyk-Oirat

3. The Mongolic Vowel Shifts

3.1. Old Mongolian: an RTR harmony system

- A long held view: OM had a palatal system
 - An assumption based on the palatal analysis of modern languages
 - The palatal analysis of modern languages turned out to be wrong by Svantesson’s (1985) acoustic study (except for Kalmyk-Oirat).
 - Then, how about OM?
- Svantesson’s (1985) claim: a shift from OM palatal system to modern Mongolic RTR system (*Mongolic vowel (harmony) shift harmony*, see Appendix for detail)
- My claim: No, the direction of the shift (if any) is the opposite!
 - OM had a RTR system as many modern Mongolic languages do. Thus, the shift was not so great.
 - Modern palatal system (e.g., Kalmyk-Oirat) has undergone a shift from RTR to palatal system.
- Evidence comes from the Middle Korean transcription for 13~14th century Mongolian loanwords (34) (Lee 1963)
 - Middle Mongol rounded vowels (transliterated into *ü, u, ö, o*) all correspond to Middle Korean back vowels.
 - This correspondence holds between modern Mongolian and modern Korean (Kim’s (1993) perception test)

(34) Correspondence between Middle Mongolian and Middle Korean vowel letters (Lee 1963)

MM	i	e	A	ü	ö	u	O
MK	i	ə	A	u	wə	O	

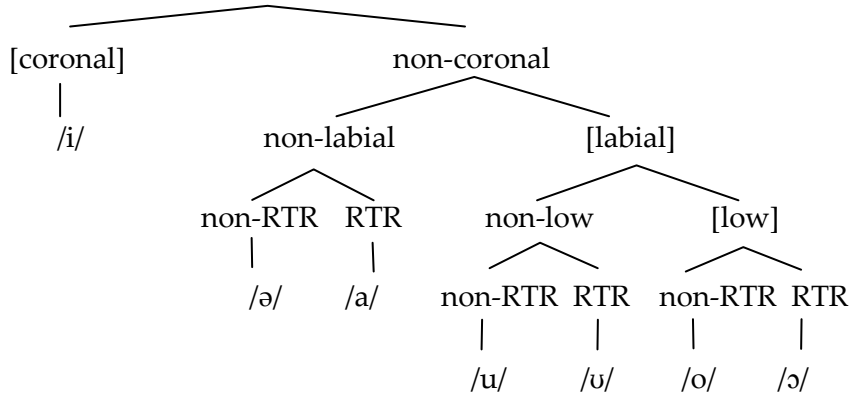
(35) Comparison between palatal vs. RTR analysis of OM w.r.t. MK vowels

a. RTR analysis			b. palatal analysis		
OM		MK	OM		MK
<i>	i	i	<i>	i	i
<e>	ə	ə	<e>	e	ə
<a>	a	a	<a>	a	a
<ü>	u	u	<ü>	y	u
<ö>	o	wə	<ö>	ø	wə
<u>	u	o	<u>	u	o
<o>	ɔ	o	<o>	o	o

cf. Middle Korean (Ko 2009)

i	ɨ	u
	ʌ	o
<hr/>		
	ə	
	a	

(36) Old Mongolian contrastive hierarchy: [coronal] > [labial] > [low] > [RTR]



(37) Phonologically active features in Old Mongolian

Features Phonological patterns

- a. [coronal] palatalization; umlaut pervasive all Mongolic languages
- b. [RTR] RTR harmony
/i/ is neutral to vowel harmony
- c. [labial] 'labial attraction' ('round licensing' Walker 2001)
- d. [low] labial attraction is restricted to low vowels

3.2. Mongolic vowel shifts

(38) Main reflexes of short Vs in initial syllables (adapted from Svantesson et al. 2005: 180)

Old Mong	*a	*ɔ	*ʊ	*ə	*o	*u	*i	
Khalkha	a	ɔ	ʊ	e	o	u	i	Type I
Monguor	a	o	u, o	i, e	o, u	u	i	Type II
Bonan	a	o	u	e	o	u	i	
Santa	a	o	u	ie, e	o	u	i	
Moghol	a, o	o	u	e	o	u	i	Type III
Buriat	a	ɔ	ʊ	e	u	u	i	
Kamnigan	a	ɔ	ʊ	e	u	u	i	
Dagur	a	ɔ	ɔ, wa	ə	u	u	i	Type IV
Kalmyk	a	o	u	e	ø	y	i	

- Type I (Khalkha) languages simply retain the OM contrastive hierarchy [coronal] > [low] > [labial] > [RTR].

(39) Old Mongolian > Khalkha

i	u	i	u
	ʊ		ʊ
e	o	e	o
a	ɔ	a	ɔ

- Type II (Monguor) languages, which underwent vowel mergers between harmonic pairs, are explained in terms of *RTR neutralization* (under the same contrastive hierarchy as Type I (Khalkha), [coronal] > [low] > [labial] > [RTR]). This analysis conforms to the merger patterns found in other Altaic languages such as Written Manchu (Dresher and Zhang 2005) and Middle Korean (Ko 2009)

(40) Old Mongolian > Monguor (RTR neutralization)

i	u	i	u
	ʊ		ʊ
e	o	e	o
a	ɔ	a	

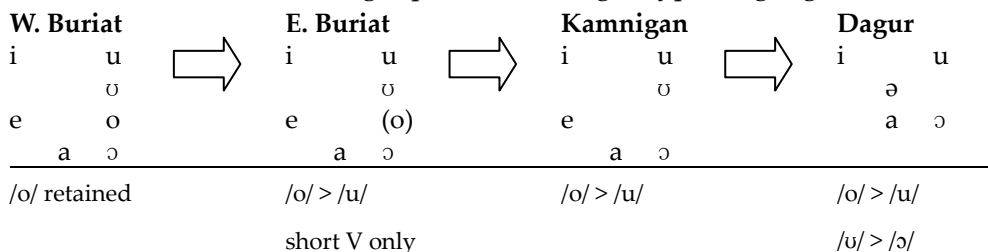
- Type III (Dagur) languages receive explanation in terms of height neutralization.

(41) Old Mongolian > Dagur (height neutralization)

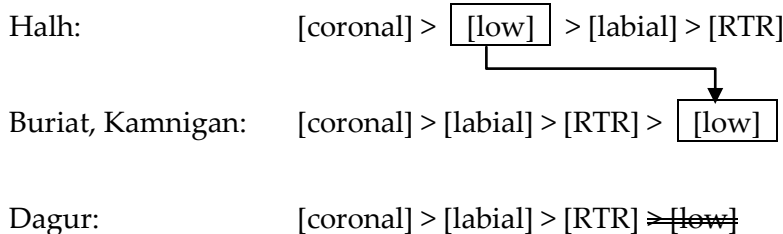


- This height neutralization is also found in Buriat and Kamnigan.

(42) Continuum of vowel merger patterns in Dagur type languages:

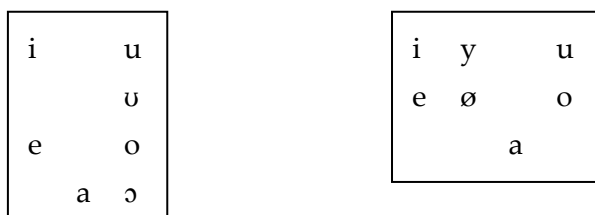


(43) Demotion and loss of [low]:



- Type IV (Oirat) languages underwent a shift of the basis of vowel harmony: RTR to palatal system. Thus, Kalmyk/Oirat palatal system is treated as an innovation rather than the retention of the archaic vowel system.

Old Mongolian > Kalmyk-Oirat (vowel harmony shift)



- A reinterpretation of the harmonic feature:
 - [α RTR] → [α back] (cf. Vaux 2009)
- A phonetically grounded development:
 - Tongue body movement is concomitant with tongue root movement (Archangeli and Pulleyblank 1994)
- The shift might be due to Turkic influence (Köçgiltü 1982)
 - Geographical distribution:
 - The residential areas of Oirats are populated largely by Turkic people, the Uyghurs and the Kazakhs (Indjieva 2009: 28ff)
 - Kazakh: claimed to have RTR harmony system (Vajda 1994)
 - Turkic languages spoken in the northeast: RTR-like system rather than the typical palatal system (Juwon Kim, p.c.)

4. Conclusion

- The formal analysis I propose for the Mongolic vowel systems based on contrastive hierarchy theory is summarized below:

Mongolic vowel systems:

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

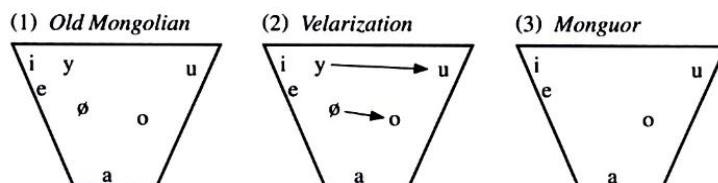
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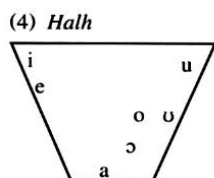
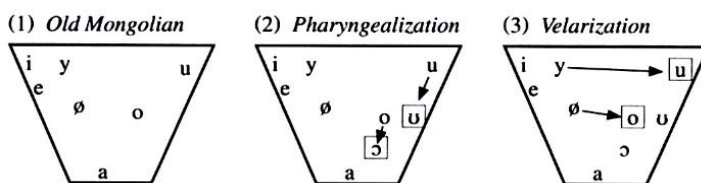
Appendix: An alternative view by Svantesson (1985)

1. The Mongolic vowel shifts (from Svantesson et al. 2005:181)

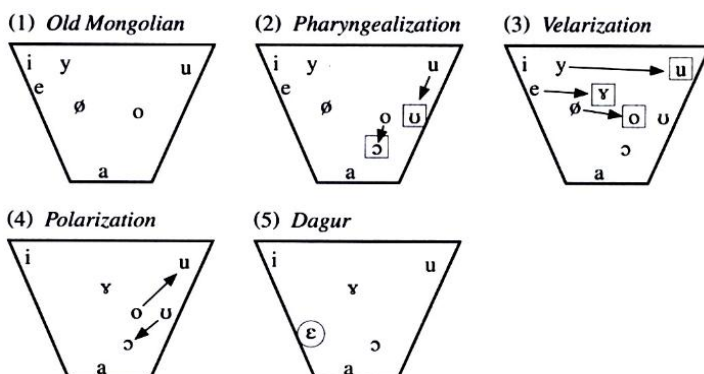
- a. Monguor type: Monguor, Santa, Bonan, Moghol



- b. Mongolian type: Mongolian, Buriat, Kamnigan, Shira Yugur, Kangjia



- c. Dagur type: Dagur



2. Vaux's (2009) argument against MVS:

- The proposed shift from palatal to RTR harmony (MVS) lacks phonetic grounds; has not been attested in world languages; cannot explain Southwest Turkic consonant voicing (see Vaux for the data and discussion).
- The reversed shift from RTR to palatal harmony would be phonetically grounded (Archangeli & Pulleyblank 1994) because tongue root retraction entails tongue body movement; attested by, e.g., Somali, Louisiana English; also explains Southwest Turkic consonant voicing well.