Vowel contrast and vowel harmony shift in the Mongolic languages

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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)

  - “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)

Mongolic

Western

Eastern

Monguor

Oirat-Khalkha

Dagur

Oirat-Kalmyk-Darkhat

Khalkha-Buriat

Bonan

Santa (Dongxiang)

Moghul

Kangjia

Kalmyk-Oirat

Darkhat

Mongolian Proper

Buriat

Mongolian Proper

Buriat, Mongolia

Buriat

Dagur, Russia

Dagur

Khalkha

Buriat, China

Mongolian Proper

Buriat

Mongolian Peripheral

Buriat

Mongolian

Khalkha

Buriat

Khalkha

Buriat

Dagur

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Contrastive hierarchy for Khalkha Mongolian

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

```
[coronal]  non-coronal
  /i/  non-low  [low]
     non-RTR  RTR
      /u/  /o/
  non-RTR  RTR
     non-RTR  RTR
   /e/  /a/  /o/  /ɔ/
```

b. Output specifications

```
/i/ = [+cor]  /u/ = [-cor, -low, -RTR]  /o/ = [-cor, -low, +RTR]
/i/ = [-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):

<table>
<thead>
<tr>
<th>Words with non-palatalized Cs</th>
<th>Words with palatalized Cs</th>
</tr>
</thead>
<tbody>
<tr>
<td>pal ‘splash!’</td>
<td>pʲal ‘plate’</td>
</tr>
<tr>
<td>ag ‘tight’</td>
<td>agʲ ‘wormwood’</td>
</tr>
<tr>
<td>ʤam ‘road’</td>
<td>ʤam ‘law’</td>
</tr>
<tr>
<td>sal ‘raft’</td>
<td>ʃal ‘floor’</td>
</tr>
<tr>
<td>ax ‘elder brother’</td>
<td>axʲ ‘to advance’</td>
</tr>
<tr>
<td>am ‘mouth’</td>
<td>amʲ ‘life’</td>
</tr>
</tbody>
</table>

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

```
NOM  INST  ABL  GLOSS
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).
Mongolic vowel contrast and vowel Shift

c. high rounded vowel: no labial harmony
   od    od-ar    od-as         ‘willow’
   ud    ud-er    ud-es         ‘noon, midday’

d. low rounded vowel: labial harmony
   od    od-ɔr    od-ɔs         ‘star; fortune’
   od    od-ɔr    od-ɔs         ‘feathers’

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

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

\[DIRECTPAST \_\_IE/ \quad CAUS-DPST \_\_UI-IE/ \quad GLOSS\]

og-lo og-ul-le (*og-ul-lo) ‘to give’
ɔr-Ɋ-o ɔr-ul-la (*ɔr-ul-Ɋ) ‘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)

\[\text{non-RTR words} \quad \text{RTR words}\]

a. de:l-ig-e ‘gown-ACC-REFL’ ʧa:s-ig-a ‘paper-ACC-REFL’
b. bi:r-ig-e ‘brush-ACC-REFL’
c. su:l-ig-e ‘tail-ACC-REFL’ ڏowr-ig-a ‘cat-ACC-REFL’
d. bo:r-ig-o ‘kidney-ACC-REFL’ ӻo:l-ig-o ‘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

\[/i/ \quad /u, ʊ/\]

a. Mongolic transparent opaque
b. Tungusic opaque opaque

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

a. Mongolic: [cor] > [low] > [lab] > [RTR]
b. 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]
      [coronal]  non-coronal
        |  non-low
        /i/
        non-lab [lab]
        |  non-lab [lab]
        /e/ /u/ /a/ /o/

   b. Output specifications:
      /i/ = [+cor] /e/ = [-cor, -low, -lab] /u/ = [-cor, -low, +lab]
      /a/ = [-cor, +low, -lab] /o/ = [-cor, +low, +lab]

   • 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, *u > /u/ OM *o, *o > /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)

\[ i \quad u \]

\[ \hat{a} \quad \hat{c} \]

(17) Contrastive hierarchy for Dagur

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

- [coronal] non-coronal
  - /i/
    - non-labial
      - non-RTR [RTR]
        - /õ/ /a/ /u/ /ɔ/

b. Output specifications

- /i/ = [+cor] /õ/ = [-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)

<table>
<thead>
<tr>
<th>Palatalized</th>
<th>Non-palatalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>bɔdʲ</td>
<td>‘prairie’</td>
</tr>
<tr>
<td>amʲ</td>
<td>‘life’</td>
</tr>
<tr>
<td>kʲɔr</td>
<td>‘honey’</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Labialized</th>
<th>Non-labialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>mʷɔ:r</td>
<td>‘shaft of a cart’</td>
</tr>
<tr>
<td>tʷa:l</td>
<td>‘to account’</td>
</tr>
<tr>
<td>sʷar</td>
<td>‘flea’</td>
</tr>
</tbody>
</table>

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

a. low round trigger

Dagur Mongolian

mʷɔ:r mõger ‘shaft of a cart; rim’

b. high round trigger

Dagur Mongolian

sʷar sula ‘flea’
tʰa:l togal-a ‘to account’
kʷa:l kula ‘light black’

(21) [RTR] (or [low]): “Lowness” harmony: /a/ vs. /ə, u/ (Chuluu 1996: 12ff)

<table>
<thead>
<tr>
<th>NOM</th>
<th>ALLATIVE</th>
<th>INST</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>xad</td>
<td>xad-a:r</td>
<td>‘cliff’</td>
</tr>
<tr>
<td></td>
<td>nas</td>
<td>nas-a:r</td>
<td>‘age’</td>
</tr>
<tr>
<td>b.</td>
<td>gər</td>
<td>gər-a:r</td>
<td>‘house’</td>
</tr>
<tr>
<td></td>
<td>xukur</td>
<td>xukur-a:r</td>
<td>‘cow’</td>
</tr>
</tbody>
</table>

(22) [cor] > [RTR]: /i/ is neutral to “lowness” harmony

a. magöl-ʃa:r ‘forehead-TERMINATIVE’  bəslə-ʃa:r ‘waist-TERMINATIVE’

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 (=ə) 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’ < *ödüür
c. o < u     d. o < o
   go‘ 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

(Bläning 2003, Svantesson 1985, Svantesson et al. 2005 for Kalmyk; Birtalan 2003 for Oirat)

<table>
<thead>
<tr>
<th>Kalmyk/Oirat</th>
<th>/i/</th>
<th>/e/</th>
<th>/a/</th>
<th>/y/</th>
<th>/u/</th>
<th>/ʊ/</th>
<th>/o/</th>
<th>/ɔ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khalkha</td>
<td>/i/</td>
<td>/e/</td>
<td>/a/</td>
<td>/ʊ/</td>
<td>/o/</td>
<td>/ʊ/</td>
<td>/ɔ/</td>
<td>/ʊ/</td>
</tr>
</tbody>
</table>
Mongolic vowel contrast and vowel Shift

(26) Contrastive hierarchy for Kalmuck/Oirat

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

```
[coronal]  non-coronal
     /i/   non-low [low]
    /y/    non-dorsal [dorsal]
   /u/      non-lab [lab]
```

b. Output specifications

```
/e/ = [-cor, +low, -lab, -dor] /a/ = [-cor, +low, -lab, +dor]
/o/ = [-cor, +low, +lab, -dor] /ø/ = [-cor, +low, +lab, +dor]
```

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

```
Old Mong    Spoken Oirat    Gloss
*kari      xär           ‘alien’
*mori/n    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)

```
Old Mong    Kalmuck    Gloss
*emys      øms         ‘to wear’
*tʰemyr    tʰomr       ‘iron’
```

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

```
ykr-æs ‘cow-ABL’       uul-as ‘mountain-ABL’
ykr-yr ‘cor-DIR’        uul-ur ‘mountain-DIR’
```
Why two distinct features, [coronal] and [dorsal]?

(30) /i/ is neutral to palatal harmony

a. Written Oirat (Birtalan 2003: 213)

\[\begin{array}{ll}
\text{Front} & \text{Back} \\
\text{shikür} & \text{ghuci/n} \quad \text{"umbrella"} & \text{"thirty"} \\
\text{ceriq} & \text{shidar} \quad \text{"army"} & \text{"close"}
\end{array}\]

→ /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)

\[\begin{array}{ll}
\text{jirh-læ:} & \text{"live happily-NarrPast"} \\
\text{bič-læ:} & \text{"write-NarrPast"}
\end{array}\]

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

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

\[\begin{array}{llllll}
\text{Old Mong} & \text{Kalmyk} & \text{Baarin} & \text{Khalkha} & \text{Gloss} \\
\hline
\text{front vowel} & \text{back vowel} & \text{fronted back vowel}\text{³}
\end{array}\]

a. front vowel

*ker | ger-er | kyr-yr | ger-er | "house"
*mør | mør-er | mor-or | mor-ør | "path"
*yke | yg-er | uk-yr | ug-er | "word"

b. back vowel

*aman | am-ar | am-ar | am-ar | "mouth"
*motun | mod-ar | mɔt-ɔr | mɔt-ɔr | "tree"
*sur | sur-la | sur-la | sur-la | "to learn"

c. fronted back vowel³

*amin | em-er | em-ar | am₁-ar | "life"
*morin | mør-er | mør-ar | mɔrl-ɔr | "horse"
*uri | yr-le | yr-la | ur₁-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, +cor, +lab] /u/ = [-low, +lab, -cor]

/o/ = [+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]

/o/ = [+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:

<table>
<thead>
<tr>
<th>Type</th>
<th>Contrastive hierarchy</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>[coronal] &gt; [low] &gt; [labial] &gt; [RTR]</td>
<td>Khalkha</td>
</tr>
<tr>
<td>Type II</td>
<td>[coronal] &gt; [low] &gt; [labial]</td>
<td>Monguor</td>
</tr>
<tr>
<td>Type III</td>
<td>[coronal] &gt; [labial] &gt; [RTR]</td>
<td>Dagur</td>
</tr>
<tr>
<td>Type IV</td>
<td>[coronal] &gt; [low] &gt; [labial] &gt; [dorsal]</td>
<td>Kalmyk-Oirat</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th></th>
<th>MM</th>
<th>i</th>
<th>e</th>
<th>A</th>
<th>ü</th>
<th>ö</th>
<th>u</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK</td>
<td>i</td>
<td>ə</td>
<td>A</td>
<td>u</td>
<td>wə</td>
<td>O</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(35) Comparison between palatal vs. RTR analysis of OM w.r.t. MK vowels

a. RTR analysis

<table>
<thead>
<tr>
<th>OM</th>
<th>MK</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ɨ&gt;</td>
<td>ɨ</td>
</tr>
<tr>
<td>&lt;ə&gt;</td>
<td>ə</td>
</tr>
<tr>
<td>&lt;ə&gt;</td>
<td>ə</td>
</tr>
<tr>
<td>&lt;æ&gt;</td>
<td>æ</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
<tr>
<td>&lt;ɔ&gt;</td>
<td>ɔ</td>
</tr>
<tr>
<td>&lt;ʊ&gt;</td>
<td>ʊ</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
</tbody>
</table>

b. palatal analysis

<table>
<thead>
<tr>
<th>OM</th>
<th>MK</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ɨ&gt;</td>
<td>ɨ</td>
</tr>
<tr>
<td>&lt;ə&gt;</td>
<td>ə</td>
</tr>
<tr>
<td>&lt;ə&gt;</td>
<td>ə</td>
</tr>
<tr>
<td>&lt;æ&gt;</td>
<td>æ</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
<tr>
<td>&lt;ɔ&gt;</td>
<td>ɔ</td>
</tr>
<tr>
<td>&lt;ʊ&gt;</td>
<td>ʊ</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
<tr>
<td>&lt;ø&gt;</td>
<td>ø</td>
</tr>
</tbody>
</table>

cf. Middle Korean (Ko 2009)

<i> i i u</i>

\[ \hat{\alpha} \hat{\theta} \]

<ø> ø ø

(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
   /ɨ/ 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

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

<table>
<thead>
<tr>
<th>Old Mong</th>
<th>*a</th>
<th>*ɔ</th>
<th>*u</th>
<th>*ə</th>
<th>*o</th>
<th>*u</th>
<th>*i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khalkha</td>
<td>a</td>
<td>o</td>
<td>u</td>
<td>e</td>
<td>o</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>Monguor</td>
<td>a</td>
<td>o</td>
<td>u, o</td>
<td>i, e</td>
<td>o</td>
<td>u</td>
<td>u</td>
</tr>
<tr>
<td>Bonan</td>
<td>a</td>
<td>o</td>
<td>u</td>
<td>e</td>
<td>o</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>Santa</td>
<td>a</td>
<td>o</td>
<td>u</td>
<td>ie</td>
<td>e</td>
<td>o</td>
<td>u</td>
</tr>
<tr>
<td>Moghol</td>
<td>a, o</td>
<td>o</td>
<td>u</td>
<td>e</td>
<td>o</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>Buriat</td>
<td>a</td>
<td>ɔ</td>
<td>u</td>
<td>e</td>
<td>u</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>Kamnigan</td>
<td>a</td>
<td>ɔ</td>
<td>o</td>
<td>e</td>
<td>u</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td>Dagur</td>
<td>a</td>
<td>ɔ</td>
<td>ɔ</td>
<td>wa</td>
<td>e</td>
<td>o</td>
<td>u</td>
</tr>
<tr>
<td>Kalmyk</td>
<td>a</td>
<td>o</td>
<td>u</td>
<td>e</td>
<td>ɔ</td>
<td>y</td>
<td>i</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Old Mongolian</th>
<th>&gt;</th>
<th>Khalkha</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>u</td>
<td>i</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>o</td>
<td>e</td>
</tr>
<tr>
<td>a</td>
<td>ɔ</td>
<td>a</td>
</tr>
</tbody>
</table>

- 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).

<table>
<thead>
<tr>
<th>Old Mongolian</th>
<th>&gt;</th>
<th>Monguor</th>
<th>(RTR neutralization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>u</td>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>u</td>
<td>u</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>o</td>
<td>e</td>
<td>o</td>
</tr>
<tr>
<td>a</td>
<td>ɔ</td>
<td>a</td>
<td>ɔ</td>
</tr>
</tbody>
</table>
• Type III (Dagur) languages receive explanation in terms of height neutralization.

(41) Old Mongolian \( > \) Dagur (height neutralization)

\[
\begin{array}{c|c|c|c|c}
\text{W. Buriat} & \text{E. Buriat} & \text{Kamnigan} & \text{Dagur} \\
\hline
i & u & i & u & i & u \\
\hline
\hline
\text{[o]} & \text{[o]} & \text{[o]} & \text{[o]} & \text{[e]} & \text{[a]} \\
\end{array}
\]

This height neutralization is also found in Buriat and Kamnigan.

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

\[
\begin{array}{c|c|c|c|c}
\text{W. Buriat} & \text{E. Buriat} & \text{Kamnigan} & \text{Dagur} \\
\hline
i & u & i & u & i & u \\
\hline
\hline
\text{[o]} & \text{[o]} & \text{[o]} & \text{[o]} & \text{[e]} & \text{[a]} \\
\end{array}
\]

• 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.

(43) Demotion and loss of [low]:

Halh: [coronal] > [low] > [labial] > [RTR]

Buriat, Kamnigan: [coronal] > [labial] > [RTR] > [low]

Dagur: [coronal] > [labial] > [RTR] > [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)

\[
\begin{array}{c|c|c|c|c}
\text{Old Mongolian} & \text{Kalmyk-Oirat} \\
\hline
i & u & i & y & u \\
\hline
\hline
\text{[o]} & \text{[e]} & \text{[ø]} & \text{[ø]} & \text{[a]} \\
\end{array}
\]
- A reinterpretation of the harmonic feature:
  - \([\alpha \text{ RTR}] \rightarrow [\alpha \text{ back}]\) (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 (Kögjiltü 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:

<table>
<thead>
<tr>
<th>Type</th>
<th>Languages</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td><strong>Khalkha type (or RTR harmony) languages</strong></td>
<td>Mongolian Proper</td>
</tr>
<tr>
<td></td>
<td>[coronal] &gt; [low] &gt; [labial] &gt; [RTR]</td>
<td></td>
</tr>
<tr>
<td>Type II</td>
<td><strong>Monguor type (or RTR neutralization) languages</strong></td>
<td>Santa, Bonan, Monguor, Moghol, Shira Yugur, Kangjia</td>
</tr>
<tr>
<td></td>
<td>[coronal] &gt; [low] &gt; [labial] &gt; [RTR]</td>
<td></td>
</tr>
<tr>
<td>Type III</td>
<td><strong>Dagur type (or height neutralization) languages</strong></td>
<td>Dagur, Buriat, Kamnigan</td>
</tr>
<tr>
<td></td>
<td>[coronal] &gt; [labial] &gt; [RTR] &gt; [low]</td>
<td></td>
</tr>
<tr>
<td>Type IV</td>
<td><strong>Oirat type (or palatal harmony) languages</strong></td>
<td>Kalmyk-Oirat</td>
</tr>
<tr>
<td></td>
<td>[coronal] &gt; [low] &gt; [labial] &gt; [dorsal]</td>
<td></td>
</tr>
</tbody>
</table>
References

Engkebatu, Merton. 1988. *Düüg isgyi he Mänggii* [Dagur and Mongolian] (MTKASC 004)

Mongolic vowel contrast and vowel Shift 16
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
      
      ![Diagram](image1)

   b. Mongolian type: Mongolian, Buriat, Kamnigan, Shira Yugur, Kangjia
      
      ![Diagram](image2)

   c. Dagur type: Dagur
      
      ![Diagram](image3)

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, Lousiana English; also explains Southwest Turkic consonant voicing well.