A contrastivist view of the evolution of the Korean vowel system*

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1. Introduction

• Goal: This paper aims to provide a unified formal analysis of the historical development of the vowel system from Middle Korean through Early Modern Korean to modern varieties

• Framework: (A version of) the contrastive hierarchy theory (Dresher 2003)

• My claim: Major changes in the Korean vowel system are best accounted for in terms of changes of the contrastive hierarchy established on the independent basis of major phonological activities of the particular stage.

• Outline: §2. Theoretical framework
  §3. Middle Korean (MK)
  §4. Early Modern Korean (EModK)
  §5. Modern Korean (ModK)
  §6. Conclusion

2. Theoretical framework: contrastive hierarchy theory

• Contrastive hierarchy:
  Contrast should be viewed in terms of the scope or hierarchy of distinctive features.

• Manchu vowel system:

  (1) Written Manchu vowel system (Zhang 1996)
      
      \[
      \begin{array}{c}
      \text{i} \\
      \text{u} \\
      \text{a} \\
      \text{o} \\
      \end{array}
      \]

  (2) Written Manchu contrastive hierarchy: [low]>[cor]>[lab]>[ATR] (D&Z 2005:65)


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* I would like to thank John Whitman, Draga Zec, Michael Wagner, and Juwon Kim.

1 Periodization for Korean (K-M Lee 1972):

- Old Korean: Before 10th century
- Early Middle Korean: 10th-14th centuries (918-1392)
- Late Middle Korean: 15th-16th centuries (1392-1592)
- Early Modern Korean: 17th-19th centuries
- Modern Korean: 20th century
• Contrast in Manchu vowel system:
  - asymmetry in vowel inventory: /i/ - the only front vowel  cf. Middle Korean
  - phonological insensitivities to the phonetic details:
    - /i/ (neutral vowel): phonetically [ATR], but does not trigger ATR harmony
    - /u/ (and /ʊ/): phonetically [labial], but does not trigger round harmony

(3) Contrast and phonological activity (Dresher 2007:7)
Only contrastive features are active in the (lexical) phonology.
Redundant features are phonologically inert.

• Successive Division Algorithm (SDA):
  i. a restriction on feature specifications  ii. an acquisition algorithm

(4) Successive Division Algorithm (SDA) (Dresher and Zhang 2004)
  a. In the initial state, all sounds are assumed to be variants of a single phoneme.
  b. If the set is found to have more than one phoneme, a binary distinction is made on the basis of one of the universal set of distinctive features: this cut divides the inventory into a marked set and an unmarked set. The selected feature is contrastive for all members of these sets.
  c. Repeat step (b) in each set with the next feature in the hierarchy, dividing each remaining set until all distinctive sounds have been differentiated.
  d. If a feature has not been designated as contrastive for a phoneme, then it is redundant for that phoneme.

3. A contrastivist analysis 1: Middle Korean

• Vowel system:

(5) (Late) MK vowel system (K-M Lee 1968:137):

<table>
<thead>
<tr>
<th></th>
<th>i \i/</th>
<th>i \ɨ/</th>
<th>u \ʊ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>a \ʌ/</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


(6) Contrastive hierarchy of Middle Korean: **Coronal>Low>Labial>RTR**

a. vowel system

<table>
<thead>
<tr>
<th>[cor]</th>
<th>[lab]</th>
</tr>
</thead>
<tbody>
<tr>
<td>i \i/</td>
<td>i \ɨ/</td>
</tr>
<tr>
<td>ʌ \ʌ/</td>
<td>o \o/</td>
</tr>
<tr>
<td>a \ʌ/</td>
<td></td>
</tr>
</tbody>
</table>

b. contrastive hierarchy

```
      [coronal]       non-coronal
      /\                   /\                   /\      
    [low]               [non-low]
                        /\               /\       /\      
      non-RTR RTR       non-RTR RTR       non-RTR RTR
                        /\               /\       /\      
      non-labial        labial           
```

3.1. Vowel harmony in Middle Korean

• Vowel harmony:

(7) Three harmonic sets in Middle Korean
  a. *Yang* vowels: /ʌ, o, a/
  b. *Um* vowels: /ɨ, u, ə/
  c. a neutral vowel: /i/
(8) Stem-internal VH²
a. Stems with RTR vowels only
talʌ ‘different’, pʌla- ‘look at’, kʌpha ‘repay’
b. Stems with non-RTR vowels only
jʌlim ‘fruit’, njʌlim ‘summer’, kulʌk ‘mesh bag’, tilih ‘field’, hʌmil ‘drawback’
atʌip ‘dark’, nul- ‘yellow’, pil- ‘call’

(9) VH across morphological boundaries
a. verb/adjective stem + conjunctive suffix ‘-a/-ǝ’
   RTR vowel stem       non-RTR vowel stem
   mak-ǝ ‘block’        moko- ‘eat’
   kot-ǝ ‘straight’     kut-ǝ ‘solid’
   sal-ǝ ‘burn’         sil-ǝ ‘disappear’
b. verb/adjective stem + adnominal suffix ‘-on/-un’
   RTR vowel stem       non-RTR vowel stem
   mak-ǝn ‘block’       moko-un ‘eat’
   kot-ǝn ‘straight’    kut-ǝn ‘solid’
   sal-ǝn ‘burn’        sil-ǝn ‘disappear’
c. noun + particle (accusative particle ‘-ʌl/-il’ or locative particle ‘-aj/-ǝj’)
   RTR vowel stem       non-RTR vowel stem
   salʌm-ǝl ‘person’     jolim-il ‘fruit’
   kalʌm-ǝl ‘river’      kulo-il ‘mesh bag’
   tocʌk-ǝl ‘thief’      hulo-il ‘drawback’
   balʌl-aj ‘sea’        njolim-aj ‘summer’
   nalah-aj ‘nation’     tilih-aj ‘field’

• What is the harmonic feature?

(10) Palatal harmony?: Great Vowel Shift Hypothesis (K.-M. Lee 1968, 1972)

<table>
<thead>
<tr>
<th>1st: a drag chain</th>
<th>2nd: a push chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>i ü u</td>
<td>i ü u</td>
</tr>
<tr>
<td>å · ø</td>
<td>e · ø</td>
</tr>
<tr>
<td>a</td>
<td>a · ø</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

→ No, it’s RTR harmony. (Juwon Kim 1988, 1993; J.-K. Kim 2000 among others)

• However, there seems to be too many features.

(11) Three-height distinction with RTR: problematic

| non-RTR: /a/ [-high, -low, -RTR] | /i/ [+high, -low, -RTR] | /o/ [+high, -low, -RTR] |
| RTR:    /a/ [-high, +low, +RTR]  | /i/ [-high, -low, +RTR]  | /o/ [-high, -low, +RTR] |

² The vowel harmony data presented in (13-14) are mostly from Song (1999:138-139) and Lee and Ramsey (2000:287-288) and reorganized by the author.
• A contrastivist solution: phonetically three-height distinction, but phonologically just two-height distinction ⇒ only one height feature is contrast, the other is redundant. (cf. J.-K. Kim 2000)

• What is behind this?

(12) Feature Combination and Acoustic Effects
(J.-K. Kim 2000:188, with a slight modification)

a. Sympathetic Feature Combination

<table>
<thead>
<tr>
<th>Phonetic Features</th>
<th>Acoustic Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>tongue body</td>
<td>tongue root</td>
</tr>
<tr>
<td>raising <a href="%5B-low">+high</a>]</td>
<td>advancement [-RTR]</td>
</tr>
<tr>
<td>lowering <a href="%5B+low%5D">-high</a></td>
<td>retraction [+RTR]</td>
</tr>
</tbody>
</table>

b. Antagonistic Feature Combination

<table>
<thead>
<tr>
<th>Phonetic Features</th>
<th>Acoustic Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>tongue body</td>
<td>tongue root</td>
</tr>
<tr>
<td>raising <a href="%5B-low">+high</a>]</td>
<td>retraction [+RTR]</td>
</tr>
<tr>
<td>lowering <a href="%5B+low%5D">-high</a></td>
<td>advancement [-RTR]</td>
</tr>
</tbody>
</table>

(13) sympathetic/antagonistic feature combination and the phonetic realization of MK vowels

a. sympathetic: /ɨ, u/ [-low, -RTR] ⇒ additive F1 lowering ⇒ canonical high V
   /a/ [±low, +RTR] ⇒ additive F1 raising ⇒ canonical low V
b. antagonistic: /ʌ, o/ [-low, +RTR] ⇒ subtracted F1 lowering ⇒ lowered high V (=mid V)
   /ə/ [±low, -RTR] ⇒ subtracted F1 raising ⇒ raised low V (=mid V)

• The interdependency between [RTR] and [low] results in a three-height phonetic vowel system with the phonetic overlap between /ʌ/ and /ə/.

(14) Phonetic overlap between /ʌ/ and /ə/ of the MK vowel system (J-K. Kim 2000:189)

(15) Sporadic change of /ʌ/ into /ə/ in Middle Korean

*thok ~ thoyk > thek ‘jaw’
불 pel > 볼 pol ‘punishment’
일흔 ilkhot- > 일 обо ilkhet- ‘call’
(The italic is transliteration, not transcription.)

(16) */yʌ/ > /ye/ (W.-J. Kim 1963):
여러 yela ‘several’
보선 pwosyen ‘Korean socks’
여덟 yetolp ‘eight’
며느리 myenoli ‘daughter-in-law’
3.2. **Neutral vowel /i/**

(17) The neutral vowel /i/ can co-occur either RTR vowels or non-RTR vowels.

a. txli ‘bridge’, tali ‘leg’, kilama ‘packsaddle’

b. moli ‘head’, tulumi ‘crane’, micikej ‘rainbow’

(18) Neutral stem: either RTR or non-RTR vowel suffix is attested. (J.-H. Park 1994:150)

<table>
<thead>
<tr>
<th>RTR vowel-initial suffix</th>
<th>non-RTR vowel-initial suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>isya &lt;Wel-Chen 135&gt;</td>
<td>isye &lt;Wel-Chen 135&gt;</td>
</tr>
<tr>
<td>cihoni &lt;Sek-Sang 19:32&gt;</td>
<td>cihuni &lt;Sek-Sang 11:24&gt;</td>
</tr>
<tr>
<td>pihomye &lt;Wel-Sek 2:39&gt;</td>
<td>pihumye &lt;Wel-Sek 10&gt;</td>
</tr>
<tr>
<td>niconi &lt;Wel-Chen 77&gt;</td>
<td>nicuni &lt;Sek-Sang 6:19&gt;</td>
</tr>
<tr>
<td>nilol &lt;Sek-Sang 19:10&gt;</td>
<td>nilul &lt;Sek-Sang 11:3&gt;</td>
</tr>
<tr>
<td>kilhol &lt;Wel-Sek 10&gt;</td>
<td>kilhal &lt;Sek-Sang 6:19&gt;</td>
</tr>
<tr>
<td>himol &lt;Wel-Chen 39&gt;</td>
<td>himul &lt;Wel-Sek 10&gt;</td>
</tr>
<tr>
<td>ciza &lt;Wel-Chen 76&gt;</td>
<td>cize &lt;Wel-Chen 98&gt;</td>
</tr>
<tr>
<td>nilo- &lt;Sek-Sang 6:36&gt;</td>
<td>nilu- &lt;Sek-Sang 9:29&gt;</td>
</tr>
</tbody>
</table>

- A contrastivist solution:
  The only contrastive feature specification for /i/ is [cor].
  ➔ /i/ is phonetically non-RTR, but RTR specification for /i/ is redundant, given the contrastive hierarchy in (11b).

4. **A contrastivist analysis 2: Early Modern Korean**

- EModK vowel system

(19) a. Late Middle Korean  
(K-M Lee 1968:137)  

<table>
<thead>
<tr>
<th>i</th>
<th>i</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>e</td>
<td>o</td>
</tr>
<tr>
<td>a</td>
<td>A</td>
<td>(=)</td>
</tr>
</tbody>
</table>

b. Early Modern Korean in 19th century  
(K-M Lee 1968:202)

<table>
<thead>
<tr>
<th>i</th>
<th>i</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>e</td>
<td>o</td>
</tr>
<tr>
<td>a</td>
<td>L</td>
<td>(=)</td>
</tr>
</tbody>
</table>

(20) Characteristics of the EModK vowel system in comparison with the MK vowel system

a. Loss of /ʌ/ by the so-called two-step merger
b. Creation of new non-high coronal vowels: monophthongization of /aj, aj/ to /e, ɛ/
c. Collapse of vowel harmony

- Contrastive hierarchy (proposal): labial contrast based three-height vowel system

(21) Contrastive hierarchy of Early Modern Korean: **Coronal>Low>High>Labial**

a. initial position  
b. non-initial position  
c. contrastive hierarchy

<table>
<thead>
<tr>
<th>[cor]</th>
<th>[lab]</th>
<th>[cor]</th>
<th>[lab]</th>
<th>[cor]</th>
<th>[lab]</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>i</td>
<td>u</td>
<td>i</td>
<td>u</td>
<td>[hi]</td>
</tr>
<tr>
<td>o</td>
<td>e</td>
<td>o</td>
<td>a</td>
<td>Ł(=ɔ)</td>
<td>[low]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[coronal]</th>
<th>non-coronal</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-low</td>
<td>non-high</td>
</tr>
<tr>
<td>/i/</td>
<td>/l/ non-lab /l/ non-lab /l/ non-lab [lab] non-lab /l/ non-lab /l/ non-lab [lab] non-lab [lab] non-lab [lab] non-lab</td>
</tr>
<tr>
<td>/u/</td>
<td>/i/  /o/  /a/  /Ł(=ɔ)/  /a/</td>
</tr>
</tbody>
</table>
4.1. The first merger of /ʌ/

• The first merger of /ʌ/:

(22) The first merger of /ʌ/ with /ɨ/ in non-initial syllables in 15th-16th century (MK)

hanʌnaj ≪석보상절(1447)≫ > hanɨl ‘sky’
nakʌnalj ≪월인석보(1459)≫ > nakne ‘wanderer’
tarʌ- ≪용비어천가(1447)≫ > tarɨ- ‘different’
kʌɾʌʰi- ≪용비어천가(1447)≫ > kʌɾɨʰi- ‘to teach’

• A contrastivist analysis:
  - Positional RTR neutralization under the MK contrastive hierarchy Cor>Low>Labial>RTR
  - Why is the merger with /ɨ/?
    (Not with /ǝ/ despite the ‘phonetic overlap’ (14) nor with /a/ or /o/ as in the later stages)
  ➔ Given the contrastive hierarchy in (6),
    the RTR counterpart /ɨ/ is the only phoneme that /ʌ/ contrasts with.

• Consequences of the first merger:
  - Collapse of vowel harmony (cf. Y.-K. Han 1990)
  - Loss of RTR contrast and introduction of a new feature High
  - Change of contrastive hierarchy:
    RTR-based 2-height system ➔ labial-based 3-height system
  - Reinterpretation of /ʌ/:
    (hypothetically) rounded low back vowel (cf. Jeju Korean)
    maybe the only actual change in the phonetic value of vowel descendants from MK

4.2. The second merger of /ʌ/

(23) The second merger of /ʌ/ with /a/ in initial syllables in 18th century (EModK)

pʌram ≪용비어천가(1447)≫ > parəm ‘wind’
pʰʌri ≪훈민정음(해례본)(1446)≫ > pʰari ‘fly’
ha- ≪용비어천가(1447)≫ > ha- ‘do’
kʌɾɛʰi- ≪용비어천가(1447)≫ > kʌɾɛʰi- ‘to teach’

(24) Three types of the second merger of /ʌ/

Type 1. /ʌ/ to /a/ merger: most dialects including Central dialect
Type 2. /ʌ/ to /o/ merger: modern Jeju dialect
Type 3. mixed merger: South Jeolla and Yukjin dialect


/a/ becomes /o/ after a labial consonant; /ʌ/ becomes /a/ elsewhere.

<table>
<thead>
<tr>
<th></th>
<th>Yukjin</th>
<th>Middle Korean</th>
<th>Seoul Korean</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘horse’</td>
<td>mol</td>
<td>دول말</td>
<td>말</td>
</tr>
<tr>
<td>‘fly’</td>
<td>pʰori</td>
<td>폴 pʰ알</td>
<td>pʰ라리 파리</td>
</tr>
<tr>
<td>‘arm’</td>
<td>pʰol</td>
<td>폴 pʰ알</td>
<td>pʰ알 팔</td>
</tr>
<tr>
<td>‘redbean’</td>
<td>pʰolʰi</td>
<td>폴 pʰ알스</td>
<td>pʰ알따 마르따</td>
</tr>
<tr>
<td></td>
<td>South Jeolla</td>
<td>Middle Korean</td>
<td>Seoul Korean</td>
</tr>
<tr>
<td>‘village’</td>
<td>mosil</td>
<td>모솔 마자alsy</td>
<td>마을</td>
</tr>
<tr>
<td>‘bright’</td>
<td>polkt’a</td>
<td>볼다 p алк따</td>
<td>polkt’a 밝다</td>
</tr>
<tr>
<td>‘dry’</td>
<td>mollida</td>
<td>오크다 마라따</td>
<td>marida 마르다</td>
</tr>
<tr>
<td>‘sell’</td>
<td>pʰolda</td>
<td>올다 pʰ알따</td>
<td>pʰ알따 따다</td>
</tr>
</tbody>
</table>
• A contrastivist analysis:
  - labial neutralization under the new contrastive hierarchy Cor>Low>Hi>Labial in EModK
  - marks the completion of the development of labial contrast-based three-height system

• Evidence for the three-height distinction and the labial contrast in EModK:

(26) Monophthongization of /ɔj/ to /e, ɛ/:

a. | i  |   | e  |
  [-hi,-low] [coronal] [-hi,-low] [coronal]

b. | a  | i  | e  |
  [-hi,+low] [coronal] [-hi,+low] [coronal]

(27) Labialization and anti-labialization

a. Labialization: high V /ɨ/ becomes /u/ after a labial consonant.
  - mil > mul ‘water’
  - pil > pul ‘fire’
  - pʰil > pʰul ‘grass’

b. Anti-labialization: mid V /o/ to /ǝ/ in late 18th century (P-G Lee 1970)
  - mončo > monč ‘ahead; first’
  - posan  > pondoki ‘Korean socks’
  - posnamo > pondoki ‘cherry tree’

5. A contrastivist analysis 3: Modern Korean dialects

• Modern vowel systems:

(28) The two directions in the development of modern dialects (C.-K. Kwak 2003)

a. Northwest dialect: 3|3 system  
b. Southeast Korean: 2|2 system

(29) The ongoing change of vowel system in Jeju (S.-C. Jung 1994: 15)

a. 9 vowel system  
b. 7 vowel system

• Contrastive hierarchy (proposal):

(30) Contrastive hierarchies of Modern Korean dialects

a. Northwest dialect:  
b. Southeast dialect:  
c. Jeju dialect:

[cor]>[low]>[hi]>[lab]  
[cor]>[low]>[lab]>[hi]  
[cor]>[hi]>[lab]>[low]
North Korean dialect: loss of labial contrast from the EModK hierarchy Cor>Low>Hi>Lab
- Northwest, Northeast, and Yukjin dialect retain the relative hierarchy Hi>Lab of EModK.
- The most advanced case of the loss of labial contrast is NW dialect. (Kwak 2003:63-67)
- The redundancy of [labial]: [labial] is redundant for /u/ and /o/, although they are phonetically rounded. This is supported by the existence of non-labial allophones of /u/ and /o/. (Kwak 2003:66)

South Korean dialect: loss of three-way height contrast
- Flux in the relative hierarchy between [hi] and [lab] in late 19th century: Hi>Lab ➔ Lab>Hi

   a. i: i: u:
      ↑ ↑ ↑
   e: ø: o:
   ε: a:
   b. examples
      kje: > ki: (ci:) ‘credit union; fraternity’
      s:olta > s:i:ta ‘chop; dice’
   o:u: to:n > tu:n ‘money’, oi > ui ‘cucumber’
   ho:renj > hur:renj ‘tiger’, cho:ŋak > chu:ŋak ‘bachelor’

(32) Modern Central Korean in early 20th century: Cor>Low>Lab>Hi

- The most extreme case in this direction is Southeast dialect.

Jeju Korean: ongoing merger (including the second merger Type 2)

(33) The ongoing change of vowel system in Jeju (S.-C. Jung 1994: 15)
   a. 9 vowel system
   b. 7 vowel system

(34) The contrastive hierarchy of Jeju Korean: Cor>Hi>Lab>Low
6. Conclusion

• This paper provided a contrastivist account (Dresher 2003) of the historical development of the vowel system in Korean, covering issues like
  - so-called discrepancy between the vowel system and the vowel harmony pattern in MK
  - the two-step loss of /ʌ/ in MK through EMod Korean
  - the two conspicuous directions in the bifurcation of the vowel systems into modern dialects (C.-K. Kwak 2003)

• I have shown that the major changes in the Korean vowel system are well accounted for in terms of changes in the contrastive hierarchy of distinctive features, which are substantiated with corroborative empirical evidence.
  - No Great Vowel Shift (contra K.-M. Lee 1972), no discrepancy
  - MK vowel system as an RTR-based two-height system rather than a three-height system
  - EModK vowel system as a labial contrast-based three-height system
  - An illuminating account of the development of the vowel systems in ModK dialects

• Dispersion Theory (Liljencrants and Lindblom 1972 and Flemming 1995) as an alternative?
  - It cannot give full account of the asymmetrical vowel systems found in Middle Korean and other Altaic languages such as Manchu, because it believes that a vowel inventory maximizes distinctness through explicit comparisons among vowel phonemes resulting in vowels being dispersed as remotely from each other as possible.
  - Cf. ‘pattern evaluation’ of Dispersion-based Optimality Theory proposed in S.-C. Ahn 2002

• Remaining Issues:
  - Early Modern Korean as the common predecessor of all modern dialects?
  - Empirical evidence in each dialect that supports the proposed contrastive hierarchies
  - Comparative study from both genealogical and areal perspectives: Other tongue root vowel harmony systems in Altaic languages, especially Manchu-Tungusic and Mongolian languages
  - Theoretical elaboration of the theory of contrastive hierarchy

Selected References


Han, Yeong-Kyun. 1990. Mounmohwaey pwungkoywa ‘alay a’-uy iltankyey pyenhwa (The collapse of vowel harmony and the first-step change of the so-called ‘alay a’). Kwukehak 20: 113-136.


