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.

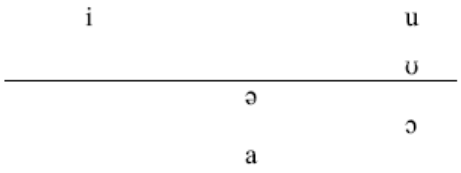
• Outline: §2. Theoretical framework
§3. Middle Korean (MK)[1]
§4. Early Modern Korean (EModK)
§5. Modern Korean (ModK)
§6. Conclusion

2. Theoretical framework: contrastive hierarchy theory

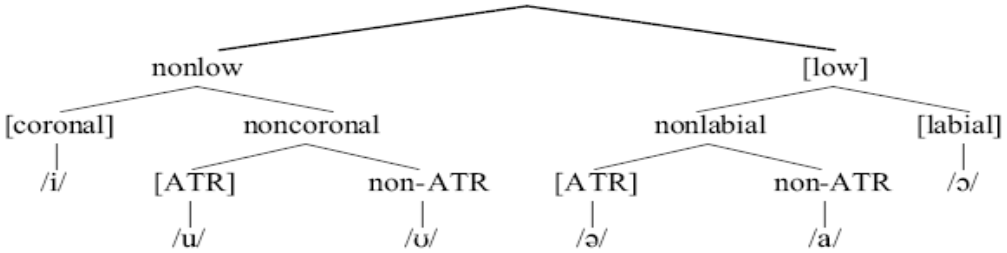
• Contrastive hierarchy:
Contrast should be viewed in terms of the scope or hierarchy of distinctive features.

• Manchu vowel system:

(1) Written Manchu vowel system (Zhang 1996)



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



* 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:

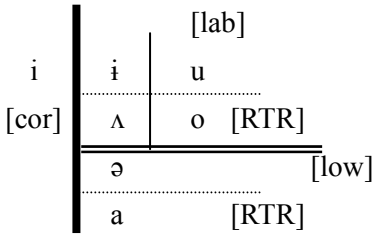
(5) (Late) MK vowel system (K-M Lee 1968:137):

ㅣ i	ㅡ ɨ	ㅜ u
	ㅓ ə	ㅗ o
	ㅏ a	ㆍ ʌ

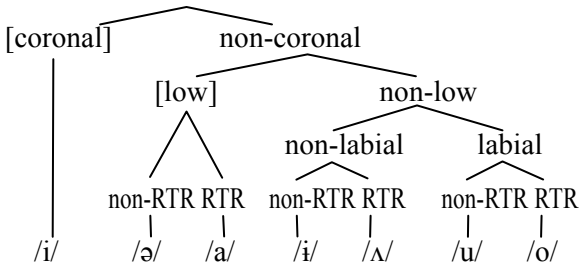
• Contrastive hierarchy (proposal): RTR-based two-height vowel system (cf. J-K Kim 2000)

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

a. vowel system



b. contrastive hierarchy



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 VH[2]

a. Stems with RTR vowels only
salʌm ‘person’, balʌl ‘sea’, kʌlʌm ‘river’, nalah ‘nation’, tasʌs ‘five’, tocʌk ‘thief’
talʌ- ‘different’, pʌla- ‘look at’, kaph- ‘repay’

b. Stems with non-RTR vowels only
jəlɨm ‘fruit’, njəlɨm ‘summer’, kulək ‘mesh bag’, tɨlɨh ‘field’, həmɨl ‘drawback’
ətɨp- ‘dark’, nulɨ- ‘yellow’, pilɨ- ‘call’

(9) VH across morphological boundaries

a. verb/adjective stem + conjunctive suffix ‘-a/-ə’

RTR vowel stem		non-RTR vowel stem	
mak-a	‘block’	mək-ə	‘eat’
kot-a	‘straight’	kut-ə	‘solid’
sʌl-a	‘burn’	sɨl-ə	‘disappear’

b. verb/adjective stem + adnominal suffix ‘-on/-un’

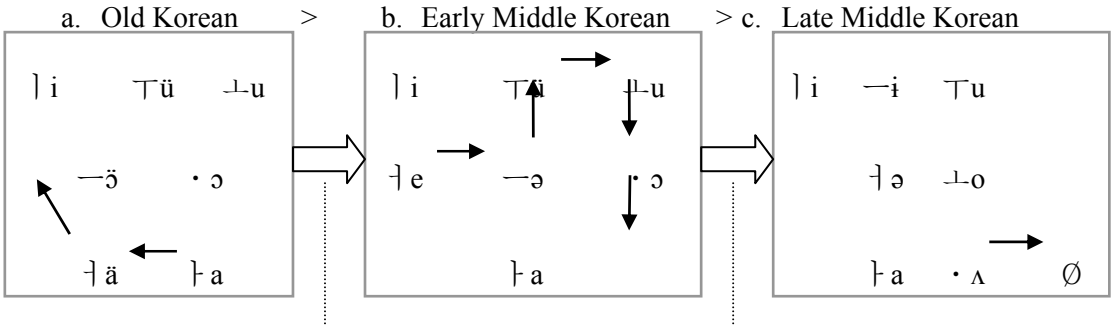
RTR vowel stem		non-RTR vowel stem	
mak-on	‘block’	mək-un	‘eat’
kot-on	‘straight’	kut-un	‘solid’
sʌl-on	‘burn’	sɨl-un	‘disappear’

c. noun + particle (accusative particle ‘-ʌl/-ɨl’ or locative particle ‘-aj/-əj’)

RTR vowel stem		non-RTR vowel stem	
salʌm-ʌl	‘person’	jəlɨm-ɨl	‘fruit’
kʌlʌm-ʌl	‘river’	kulək-ɨl	‘mesh bag’
tocʌk-ʌl	‘thief’	həmɨl-ɨl	‘drawback’
balʌl-aj	‘sea’	njəlɨm-əj	‘summer’
nalah-aj	‘nation’	tɨlɨh-əj	‘field’

• What is the harmonic feature?

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



1st: a drag chain 2nd: a push chain

→ 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:	/ə/	[-high, -low, -RTR]	/ɨ/	[+high, -low, -RTR]	/u/	[+high, -low, -RTR]
RTR:	/a/	[-high, +low,+RTR]	/ʌ/	[-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

Tongue Body	Tongue Root	Acoustic/Phonetic Effects
raising [+high]([-low])	advancement [-RTR]	- additive F1 lowering - an enhanced high vowel
lowering [-high] ([+low])	retraction [+RTR]	- additive F1 raising - an enhanced low vowel

b. Antagonistic Feature Combination

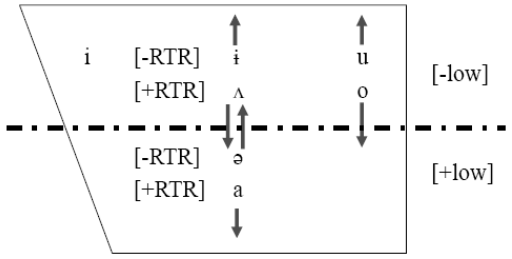
Tongue Body	Tongue Root	Acoustic/Phonetic Effects
raising [+high]([-low]	retraction [+RTR]	- subtracted F1 lowering - a lowered high V or a mid V
lowering [-high] ([+low])	advancement [-RTR]	- subtracted F1 raising - a raised low vowel or a mid vowel

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

a. sympathetic:	/ɨ, u/	[-low, -RTR]	→ additive F1 lowering → canonical high Vs
	/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)



• Evidence for the phonetic overlap between /ʌ/ and /ə/:

(15) Sporadic change of /ʌ/ into /ə/ in Middle Korean
(W.-J. Kim 1978:132, cf. S.-C. Jung 1995 for relevant examples in Modern Jeju Korean)

틱 *thoyk* ~ 턱 *thok*	>	턱 *thek*	'jaw'
볼 *pol*	>	벌 *pel*	'punishment'
일콛- *ilkhot-*	>	일컫- *ilkhet-*	'call'

(The *italic* is transliteration, not transcription.)

(16) */yʌ/ > /ye/ (W.-J. Kim 1963):

여라 *yela* 'several'	여덟 *yetolp* 'eight'
보션 *pwosyen* 'Korean socks'	며ᄂᆞ리 *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. tʌli ‘bridge’, tali ‘leg’, kilʌma ‘packsaddle’
   b. məli ‘head’, tulumi ‘crane’, mɨcikej ‘rainbow’

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

RTR vowel-initial suffix		non-RTR vowel-initial suffix	
isya	<Wel-Chen 135>	*isye*	<Wel-Chen 135>
cihoni	<Sek-Sang 19:32>	*cihuni*	<Sek-Sang 11:24>
pihomye	<Wel-Sek 2:39>	*pihumye*	<Wel-Sek 10>
niconi	<Wel-Chen 77>	*nicuni*	<Sek-Sang 6:19>
nilol	<Sek-Sang 19:10>	*nilul*	<Sek-Sang 11:3>
kilhol	<Wel-Sek 10>	*kilhul*	<Sek-Sang 6:19>
himol	<Wel-Chen 39>	*himul*	<Wel-Sek 10>
ciza	<Wel-Chen 76>	*cize*	<Wel-Chen 98>
nilo-	<Sek-Sang 6:36>	*nilu-*	<Sek-Sang 9:29>

• 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)

ㅣ i	ㅡ ɨ	ㅜ u
ㅓ ə	ㅗ o	
ㅏ a	ㆍ ʌ	

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

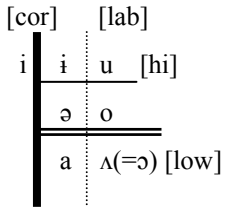
ㅣ i	ㅡ ɨ	ㅜ u
ㅔ e	ㅓ ə	ㅗ o
ㅐ ɛ	ㅏ a	

(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 /əj, aj/ to /e, ɛ/
   c. Collapse of vowel harmony

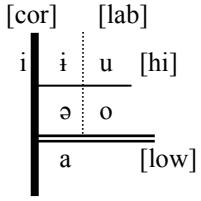
• Contrastive hierarchy (proposal): labial contrast based three-height vowel system

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

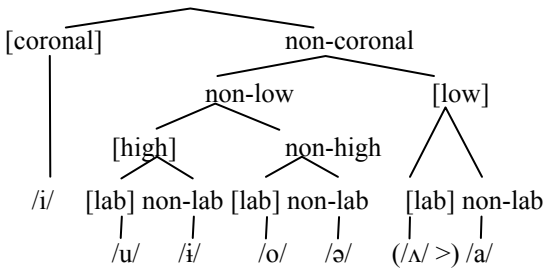
a. initial position



b. non-initial position



c. contrastive hierarchy



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)

hanʌl	≪석보상절(1447)≫	> hanɨl	'sky'
nakʌnaj	≪월인석보(1459)≫	> nakɨne	'wanderer'
tarʌ-	≪용비어천가(1447)≫	> tarɨ-	'different'
kʌrʌcʰi-	≪용비어천가(1447)≫	> karɨcʰi-	'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 /ə/ 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)≫	> param	'wind'
pʰʌri	≪훈민정음(해례본)(1446)≫	> pʰari	'fly'
hʌ-	≪용비어천가(1447)≫	> ha-	'do'
kʌrʌcʰi-	≪용비어천가(1447)≫	> karɨcʰi-	'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
(/ʌ/ becomes /o/ after a labial consonant; /ʌ/ becomes /a/ elsewhere)

(25) 'Mixed' merger in Yukjin and South Jeolla dialect (Lee and Ramsey 2000:318-320):
/ʌ/ becomes /o/ after a labial consonant; /ʌ/ becomes /a/ elsewhere.

a.	*Yukjin*	*Middle Korean*	*Seoul Korean*
'horse'	mol	몰 mʌl	mal 말
'fly'	pʰori	풀 pʰʌl	pʰari 파리
'arm'	pʰol	풀 pʰʌl	pʰal 팔
'redbean'	pʰoʧʰi	풎 pʰʌsk	pʰat 팥
b.	*South Jeolla*	*Middle Korean*	*Seoul Korean*
'village'	mosil	무슬 mʌzʌl	maɨl 마을
'bright'	polkt'a	붉다 pʌlkt'a	palkt'a 밝다
'dry'	mollɨda	무ᄅᆞ다 mʌrʌda	marɨda 마르다
'sell'	pʰolda	풀다 pʰʌlda	pʰalda 팔다

• 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 /əj, aj/ to /e, ɛ/

a. ə i → e i
[-hi,-low] [coronal] → [-hi,-low] [coronal]

b. a i → ɛ i
[-hi,+low] [coronal] → [-hi,+low] [coronal]

(27) Labialization and anti-labialization

a. Labialization: high V /ɨ/ becomes /u/ after a labial consonant.

mɨl	> mul	'water'	misim	> musin	'what kind of'
pɨl	> pul	'fire'	pɨlk-	> pulk-	'red'
$p^hɨl$	> p^hil	'grass'	$p^hɨzəŋkuj$	> $p^husəŋkwi$	'vegetables'

b. Anti-labialization: mid V /o/ to /ə/ in late 18th century (P-G Lee 1970)

moncjə	> məncə	'ahead; first'	moncʌj	> mənci	'dust'
posjən	> pəsən	'Korean socks'	pondoki	> pənteki	'pupa'
posnamo	> pəsnamu	'cherry tree'	spom	> p'jəm	'the span of a hand'

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

ㅣ i	ㅜ u	
ㅖ e	ㅗ ɔ	
ㅐ ɛ	ㅏ a	

b. Southeast Korean: 2‖2-2 system

ㅣ i	ㅡ ɨ	ㅜ u
ㅐ ɛ	ㅏ a	ㅗ o

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

a. 9 vowel system

ㅣ i	ㅡɨ	ㅜu
ㅖ e	ㅓ ə	ㅗo
ㅐ ɛ	ㅏ a	ㆍ ʌ(=ɔ)

b. 7 vowel system

ㅣ i	ㅡɨ	ㅜu
ㅖ e	ㅓ ə	ㅗo
	ㅏ a	

• Contrastive hierarchy (proposal):

(30) Contrastive hierarchies of Modern Korean dialects

a. Northwest dialect: [cor]>[low]>[hi]~~>[lab]~~

[cor]			
i	u	[hi]	
e	o (ɔ)		
ɛ	a	[low]	

b. Southeast dialect: [cor]>[low]>[lab]~~>[hi]~~

[cor]			
i	ɨ	u	[lab]
ɛ	a	o	[low]

c. Jeju dialect: [cor]>[hi]>[lab]>[low]

[cor]				[lab]
i	ɨ	u		[hi]
e	ə	o		
ɛ	a	ɔ		[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

(31) Mid vowel raising in late 19th century (P.-G. Lee 1970, C.-K. Kwak 2003:77-79)

a.

i:	ɨ:	u:
↑	↑	↑
e:	ə:	o:
ɛ:	a:	

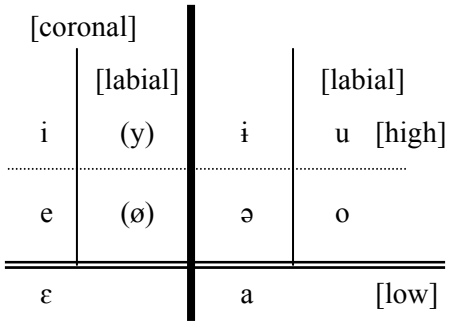
b. examples

e:>i: se:saŋ > si:saŋ ‘world’, ce:sa > ci:sa ‘a religious service’,
kje: > ki: (ci:) ‘credit union; fraternity’

ə:>ɨ: ə:psta > ɨ:psta ‘not exist’, pə:lta > (pɨ:lta) > pu:lta ‘earn’
s’ə:lta > s’ɨ:lta ‘chop; dice’

o:>u: to:n > tu:n ‘money’, oi > ui ‘cucumber’
ho:ɾɛŋi > hu:ɾɛŋi ‘tiger’, cho:ŋgak > chu:ŋgak ‘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)

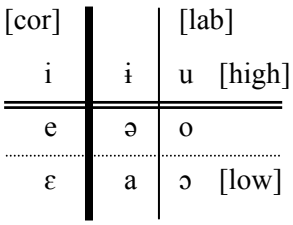
a. 9 vowel system

ㅣ i	ㅡɨ	ㅜu
ㅖ e	ㅓ ə	ㅗo
ㅐ ɛ	ㅏ a	ㆍ ʌ(=ɔ)

b. 7 vowel system

ㅣ i	ㅡɨ	ㅜu
ㅖ e	ㅓ ə	ㅗo
	ㅏ a	

(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

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