

Are Morpheme-Specific Constraints Necessary?

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1. Vowel Harmony in Korean

1.1 Overview

The problems with previous analyses of Korean vowel harmony can be solved when harmony is treated as a consequence of a morphological alternation rather than a purely phonological process. This morphological alternation is best accounted for using morpheme-specific correspondence constraints.

1.2 Why Korean VH is a Morphological Process

- Vowel harmony occurs only in ideophones (onomatopoeia, mimetic, sound-symbolic words) (verbal harmony will not be discussed here)

Korean ideophones alternate between LIGHT and DARK.

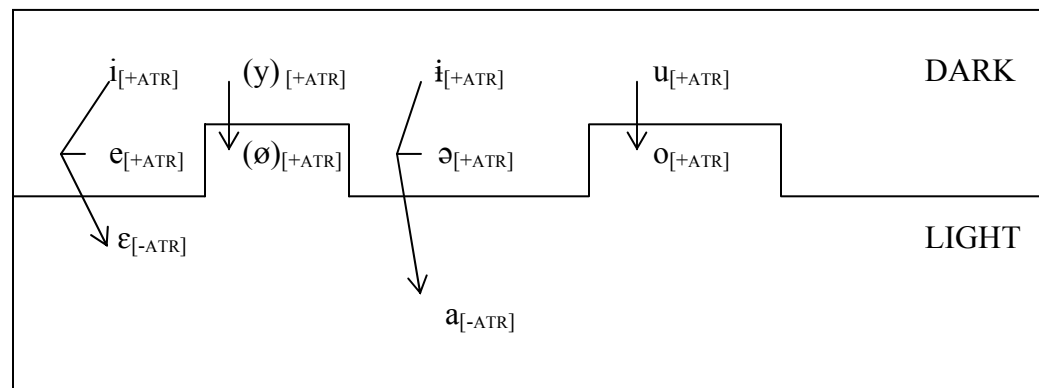
- LIGHT has a fast/strong connotation
- DARK has a slow/weak connotation
- All ideophones must be either LIGHT or DARK (with only one or two exceptions, not dealt with today)
- (Ideophones exhibit full reduplication, not analyzed here)

(1)	DARK	LIGHT
	[səbək] ‘slow crunching’	[sabak] ‘fast crunching’
	[hidʒək] ‘slow/weak grinning’	[hedʒak] ‘fast/strong grinning’

1.3 Korean Vowel Inventory: LIGHT vs. DARK vowels

The above alternations are systematic such that all the vowels in semantically DARK forms are phonologically ‘dark’ and all vowels in semantically LIGHT forms are phonologically ‘light’

(2)



Alternations from DARK to LIGHT involve relative lowering without any change in the [back] or [round] feature, so [i] → [ɛ], [ə] → [a], etc. (Note, arrows are drawn from DARK to LIGHT for clarity only. Alternations can go both ways)

1.4 No Harmonic Feature?

The most controversial aspect of Korean vowel harmony is the harmonic feature. This is because there is no one proper way to distinguish between ‘light’ and ‘dark’ vowels using one distinct natural class.

(3) Some alternations involve change in [ATR] only:

[ə] → [a]

[e] → [ɛ]

(4) Some alternations involve change in [HIGH] only:

[y] → [ø]

[u] → [o]

(5) Some alternations involve changes in both [ATR] and [HIGH]:

[i] → [ɛ]

[i̠] → [a]

1.4.1 Solutions of the Past: Pick One Harmonic Feature

ATR? (Chung 2000; Kim 2000)

- captures the fact that only LIGHT forms contain [-ATR] vowels
- historical evidence that Middle Korean Vowel Harmony had [ATR] as the harmonic feature (Kim 2000)
- But no evidence that [o] and [ø] are [-ATR]

High/Low? (McCarthy 1983; Sohn 1987)

- Captures the relative lowering in alternations from DARK to LIGHT
- ‘light’ vowels tend to be lower than ‘dark’ vowels
- But not systematically
 - o No phonetic evidence that ‘dark’ vowel are [+low]
 - o Vowels of same height have different values:
 - [o], [ø] are ‘light’ but [ə] is ‘dark’

1.5 What is Going on

1.4.1 Alternation from DARK to LIGHT

- If the formation of DARK vs. LIGHT forms is treated as a morphological process whereby DARK and LIGHT are treated as morphemes bearing

- phonological features, it is possible to capture the phonological alternations. DARK and LIGHT are treated as morphemes bearing phonological features.
- The alternation of DARK/LIGHT is thus a process whereby the vowels in a form must be in correspondence with the associated features.
 - The feature associated with DARK is [+ATR] while the features associated with LIGHT are [-ATR] and [-HIGH].
 - Using both [HIGH] and [ATR] captures the fact that the phonological alternations result in changes in one or both features.

2. Morpheme-Specific Constraints vs. Cophonologies

Two main methods used to account for lexical exceptions and morphologically conditioned phonology.

2.1 Morpheme-Specific Constraints

- Morphemes (in addition to lexical categories and lexical items) are associated with specific constraints
- Form one invariant ranking (Fukazawa, Kitahara et al. 1998)
- Ideally restricted to faithfulness constraints (Ito and Mester 1995; Ito and Mester 1999) to restrict the number of ‘cloned’ constraints
- work well for capturing difference between exceptional and regular forms (Pater 2000)

2.2 Cophonologies

- Separate ranking for each exceptional pattern
- Partial orders to prevent ‘proliferation of cophonologies’ (Anttila 2000)

2.3 What’s the Difference?

- There has been little argumentation for either approach (but see (Anttila 2000))
- There may be a difference in phonological processes that are entirely morphological, a notion that I will explore in this talk.

3. Morpheme-Specific Constraint Analysis

3.1 Overview

The presence of a DARK or LIGHT morpheme triggers morpheme-specific correspondence constraints which restrict the occurrence of vowels in the output.

Standard (non-ideophonic) lexical items are distinguished from ideophones through stratum-specific identity constraints, ranked above the relative markedness. This is to ensure the less-restrictive status of standard lexical items compared to ideophones.

3.2 The LIGHT Morpheme: [-HIGH] and [-ATR]

3.2.0 [-ATR]

The LIGHT morpheme is associated with [-ATR], as can be seen from the following alternations:

(6)	DARK	LIGHT	GLOSS
	[tɛŋgəŋ]	[tɛŋgaŋ]	‘chopping’
	[kʰidək]	[kʰadək]	‘in clusters’
	[ədʒəŋ]	[adʒaŋ]	‘toddling steps’

Thus, [-ATR] is in correspondence with all vowels in the LIGHT form to create the appearance of harmony. This can be represented by the following constraints (which incur gradient violations) (McCarthy and Prince 1995), all ranked above IDENT[ATR]:

- (7) L, R-ANCHOR- IDEO [α ATR]: The feature of an IDEO morpheme must be in correspondence with the right/leftmost vowel (which therefore must be [α ATR])
 O-CONTIGUITY-IDEO-[- α ATR]: The output vowels in correspondence with an IDEO morpheme must form a string of contiguous vowels

(I assume here that the correspondence between an input feature [α F] and an output segment x is made available by Gen only when x bears the feature [α F]. The [-ATR] feature of the LIGHT morpheme is at both the left and right edge of the morpheme.)

3.2.1 [-HIGH]

The LIGHT morpheme is also associated with the feature [-HIGH]. This can be seen in alternations from /u/ to [o] in which only the [HIGH] feature changes.

(8)	DARK	LIGHT	GLOSS
	[hu _[+] lləŋ]	[ho _[-] llaŋ]	‘take off clothes’
	[tʰu _[+] ŋəɭ]	[tʰo _[-] ŋal]	‘muttering’

This can be expressed using correspondence constraints parallel to (7):

- (9) R, L-ANCHOR- IDEO [-HIGH]
 O-CONTIGUITY-IDEO-[-HIGH]

High vowels only seem to be in correspondence with the [-HIGH] feature in initial position. This can be seen in (10) whereby high vowels do not alternate after the first syllable.

(10)	DARK	LIGHT	GLOSS
	[hinɪl]	[hanɪl]	‘in an airy manner’
	[umullək]	[omullak]	‘chewing’
	[pəŋsil]	[paŋsil]	‘smiling’

Thus, the [-HIGH] feature is only in correspondence with the first syllable (the left edge). This can be accounted for by ranking L-ANCHOR- IDEO[HIGH] above IDENT[HIGH]. (R-ANCHOR- IDEO[ATR] and CONTIGUITY- IDEO -[ATR] are low ranked)

3.2.2 The Ranking/Tableau

Because of the high ranking of faithfulness to the features round and back (not shown), alternations will always result in a change in height and/or [ATR].

(There is a one-to-one I-O correspondence between the stem and the output (in addition to correspondence with the ideophone features))

(11)

INPUT /kʰubudʒəŋ/ ‘bented’ IDEO [-HIGH] ₁ [-ATR] ₂	ANCHOR- IDEO-L [HIGH] ₁	IDENT IDEO [HIGH]	ANCHOR- IDEO-R [HIGH] ₁	CONTIG IDEO [HIGH] ₁	ANCHOR L, R, IDEO [ATR] ₂	CONTIG IDEO [ATR] ₂	IDENT IDEO [ATR]
kʰubudʒəŋ	*!			*	***, ***		
kʰo ₁ bo ₁ dʒa ₁₂ ŋ		**!			, **		*
kʰo ₁ budʒəŋ		*		*	***!, ***		
☞kʰo ₁ budʒa ₁₂ ŋ		*		*	** ,		*

3.3 The DARK morpheme

The DARK morpheme is associated with the feature [+ATR], given that all DARK forms only contain vowels that are [+ATR].

The status of [o] as a ‘light’ vowel even though it is [+ATR] can be accounted for by the fact that mid-round vowels are marked in Korean. Evidence comes from the fact that [o] is sometimes pronounced as [ə] in some dialects and [ø] is pronounced as [we].

Since the markedness constraint against mid-round vowels is ranked above IDENT[HIGH], [o] will never surface in DARK forms

3.4 Ranking/Tableau

(12)

INPUT /k ^ʔ obudʒaŋ/ 'bented' IDEO [+ATR] ₂	*[RND, -HIGH]	IDENT IDEO [HIGH]	ANCHOR L IDEO [ATR] ₂	ANCHOR R IDEO [ATR] ₂	CONTIG IDEO [ATR] ₂	IDENT IDEO [ATR]
☞ k ^ʔ u ₂ bu ₂ dʒə ₂ ŋ		*				*
k ^ʔ u ₂ bu ₂ dʒaŋ		*		*!		
k ^ʔ o ₂ bo ₂ dʒaŋ	*!*	*		*		
k ^ʔ o ₂ bu ₂ dʒə ₂ ŋ	*!					*

3.5 Non-Neutral [u]

In some LIGHT forms, [o] surfaces after the first syllable, as seen in (9):

(13)	DARK	LIGHT	GLOSS
	[pulluk]	[pollok]	'burging'
	[uduk]	[odok]	'crunching'

This is not predicted by the current ranking containing *[RND, -HIGH]:

(14)

INPUT /pollok/ [-HIGH] ₁ [-ATR] ₂	ANCHOR- IDEO-L [HIGH] ₁	IDENT [ROUND] [BACK]	*[RND, -HIGH]	IDENT IDEO [HIGH]
po ₁ llo ₁ k			**!	
☞ po ₁ lluk			*	

If we assume that the underlying form for these 'exceptions' is the mid-round vowel, then it is possible to account for these using the following local conjunction ranked above the constraint against mid-round vowels:

(15) L-ANCHOR-IDEO-[ATR] & IDENT-[HIGH]

(16)

INPUT /pollo ₁ k/ IDEO [-HIGH] ₁ [-ATR] ₂	ANCHOR- IDEO-L [HIGH] ₁	IDENT [ROUND] [BACK]	L-ANCHOR- IDEO - [ATR] & IDENT- [HIGH] ₂	*[RND, -HIGH]	IDENT IDEO [HIGH]
☞ po ₁ llo ₁ k				**	
po ₁ llu ₁ k			*!	*	*

3.5 Pros and Cons

- Captures the morphological nature of the harmony by using features as morphemes with correspondences between the morphemes
- Only requires one, invariant ranking
- Requires complex machinery in order to account for the correspondence from morpheme to the output forms.

4. A Cophonology Account

4.1 Overview

Rather than thinking about the phonological alternation between LIGHT and DARK as a correspondence between phonological features attached to a morpheme, it might be simpler to think of the alternation between LIGHT and DARK as simply a change in ranking.

- Alternations between LIGHT and DARK must be captured through changes in relative markedness. What is marked in LIGHT forms is unmarked in DARK forms and vice versa.
- Since LIGHT is associated with the features [-ATR] and [-HIGH], there must be high ranked markedness against these features giving the ranking:

(17) *[+ATR] >> IDENT[ATR]
 *[+HIGH] >> IDENT[HIGH]

Since [-HIGH] only seems to apply in the first syllable, *[+HIGH] must be revised to account for this, giving:

(18) *[+HIGH [#__]]- No high vowels in initial syllables

- Since DARK is associated with the feature [+ATR], *[-ATR] must be ranked above IDENT[ATR].
- In order to achieve the proper ranking for DARK and LIGHT respectively, a ‘switching’ of markedness must occur. Since LIGHT and DARK have

opposing markedness constraints ranked above IDENT[ATR], the relative markedness can be achieved by switching these two constraints:

$$(19) \quad *[-ATR] \quad \leftrightarrow \quad *[+ATR]$$

- It is possible to capture the fact that DARK forms do not permit mid-round vowels but LIGHT forms do by reranking *[+RND, -HIGH] below IDENT[HIGH] for LIGHT forms. Since DARK forms allow all high vowels, *[+HIGH [#_]] must be ranked below IDENT[HIGH] which causes a second switch:

$$(20) \quad *[+HIGH \ [#_]] \quad \leftrightarrow \quad *[+RND, -HIGH]$$

- These two switches give the following ranking for DARK, LIGHT and standard:

(21) DARK Ranking:

*[+RND, -HI] >> ID[HIGH] >> *[-ATR] >> ID[ATR] >> *[+HI][#_] >> *[+ATR]

(22) LIGHT Ranking:

*[+HI][#_] >> ID[HIGH] >> *[+ATR] >> ID[ATR] >> *[+RND, -HI] >> *[-ATR]

(23) Standard Ranking

In order to capture the standard ranking, faithfulness constraints must be ranked higher than the relevant markedness constraints because the standard vocabulary is less restrictive than ideophones. The relative ranking of markedness does not make a difference for standard vocab.

ID[HIGH] >> *[+HI][#_] >> ID[ATR] >> *[+ATR] >> *[+RND, -HIGH] >> *[-ATR]

4.1 Tableau

(24) DARK Ranking:

INPUT /k ^ʔ obudʒaŋ/ 'bend' DARK	*[RND, -HIGH]	IDENT [HIGH]	* [-ATR]	IDENT [ATR]	* [+HI [#_]]	* [+ATR]
☞ k ^ʔ ubudʒaŋ		*		*	*	***
k ^ʔ ubudʒaŋ		*	*!		*	**
k ^ʔ obodʒaŋ	*!*		*			**
k ^ʔ obudʒaŋ	*!			*		***

(25) LIGHT Ranking

INPUT /k ^ʰ ubudʒəŋ/ 'bend' LIGHT	* [+HIGH [#_]]	IDENT [HIGH]	* [+ATR]	ID [ATR]	*[RND, -HIGH]	* [-ATR]
k ^ʰ ubudʒəŋ	*!		***			***
k ^ʰ ubudʒaŋ	*!		**	*		**
k ^ʰ obodʒaŋ		**!	**	*	**	**
☞ k ^ʰ obodʒaŋ		*	**	*	*	**

(26) Standard Ranking:

INPUT /məg/ 'eat' (stand.)	ID [HIGH]	*[RND, -HIGH]	ID [ATR]	* [-ATR]	* [+HIGH [#_]]	*[+ATR]
☞ məg						*
mag	*!			*		

4.2 Pros and Cons

- Captures relationship between LIGHT and DARK as changes in markedness
- Forces a positional markedness constraint in order to account for transparency of high vowels after the first syllable, which is relatively unattested universally
- 'Switching of constraints' constraints creates a nice relationship of DARK and LIGHT as relative markedness, but the constraints that are switched are not always related (a constraint against midround vowels is not in parallel to a constraint against word-initial high vowels).
- There is no way to constrain the reranking, resulting in potential proliferation of cophonologies (Inkelas, Orgun et al. 1997; Orgun 1997). Constraining reranking to markedness is inconsistent with previous analyses (Ito and Mester 1995; Orgun 1997; Anttila 2000) and cannot apply to the standard ranking.

Conclusions

- The apparent lack of a harmonic feature in Korean vowel harmony can be accounted for with a morphological approach
- While both a morpheme-specific account and a cophonology account are possible approaches, the morpheme-specific approach provides a

significantly better alternative, clearly stating the features involved and avoiding the cophonology proliferation problem.

- A morpheme-specific account predicts that phonological processes strictly controlled by morphology as in Korean vowel harmony (see also Montanes Spanish (McCarthy 1984); Quechua (Finch 1988)) are controlled by specific features rather than full agreement. (To my knowledge, there exists no such case whereby a morphologically-controlled process induces general agreement)

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