A Note on Vowel Harmony in Middle Korean*

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Various proposals for the vowel system in Middle Korean (henceforth MK) of the 15th century have been offered, and included in these are various explanations of vowel harmony. Some postulate forced vowel systems to obtain simple vowel harmony rules, and others vowel systems which would require a diacritic feature for vowel harmony. Many of proposed MK vowel systems have been posited on the basis of Altaic patterns.

In this paper, the author proposes a vowel system which in itself is a natural one, and attempts to treat the process of vowel harmony without recourse to any diacritic feature. In setting up this vowel system the author has not been influenced by "altaic" preconceptions, but rather has considered the problem only in relation to Middle Korean.

1. Introduction

Written documents in MK distinguish the seven vowels [ieiuoth]. The [e] is assumed to be a little centralized and often represented by [ə] or [a]. Its modern reflexes are [o] in Seoul and [ə] in other dialects. The [i] is assumed to have been high back unround. Its modern reflex is usually [w]. The [a] is assumed to have been non-high back unround. It has later merged into [a] on an initial syllable and into [i] on a non-initial syllable. Only the dialect of Jeju island distinguishes [ɔ], the modern reflex of [a], from [a].

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and [i]. S. Hattori in a lecture on Korean vowel harmony has stated that the phonetic value of MK A is [Λ] on an initial syllable and [v] on a non-initial syllable. It is generally admitted that in vowel harmony the [i] is a neutral vowel and the other six vowels are harmonizing vowels. The harmonizing vowels can be divided into two distinct sets: the feminine vowels [e i u] and the masculine vowels [a Λ o]. The feminine and masculine vowels are grouped into three harmonic pairs as in (1):

\[
\begin{array}{c|c|c|c}
\text{feminine} & \text{e} & \text{i} & \text{u} \\
\hline
\text{masculine} & \text{a} & \Lambda & \text{o}
\end{array}
\]

S. N. Lee (1947, 1954) gives a diagram of the presumed MK vowels. The vowel system of his diagram appears something like (2):

\[
\begin{array}{cc}
\text{i} & \text{i} \quad \text{u} \\
\hline
\text{neutral} & \text{e} \\
\hline
& \Lambda \quad \text{o} \\
\hline
& \text{a}
\end{array}
\]

feminine

masculine

It seems that four out of seven vowels are non-back, non-front and non-round. Such a vowel system would seem to be highly unnatural. K.-M. Lee (1972) assumes the following vowel system of the 15th century:

\[
\begin{array}{cc}
\text{i} & \text{i} \quad \text{u} \\
\hline
\text{neutral} & \text{e} \\
\hline
& \Lambda \quad \text{o} \\
\hline
& \text{a}
\end{array}
\]

feminine

masculine

---

1) "On Korean Vowel Harmony" given by Shirô Hattori at the meeting of the Japan Linguistic Society, Osaka, October 12, 1974.
In (3), if [ʌ] is unround, the feature *front* is necessary in addition to *back*. It will be difficult to distinguish the low central [a] from the low back [ʌ]. Even if [ʌ] is round like [ɔ], the harmonic pair [i]–[ə] in this system is peculiar in comparison with the other two pairs, [ə]–[a] and [u]–[o].

W. Kim (1971) postulates the following vowel system:

\[
\begin{array}{|c|c|c|}
\hline
\text{neutral} & \text{feminine} & \text{masculine} \\
\hline
i & u & o \\
 & i & ʌ \\
 & e & a \\
\hline
\end{array}
\]

He gives the corresponding phonetic values as in (5):

\[
\begin{array}{|c|c|c|}
\hline
i & u & u \\
 & ə & ʌ \\
 & ɔ & a \\
\hline
\end{array}
\]

This interpretation does not seem to have received general support for its assumed phonetic values, although the harmonic pairs are neatly distributed.

U. Ho (1965) gives a distinctive feature system of the vowels except [i] as follows:

\[
\begin{array}{|c|c|c|}
\hline
\text{front} & \text{back} & \text{round} \\
\hline
\text{spread} & ə & i & u \\
\text{low} & a & ʌ & o \\
\hline
\end{array}
\]
One drawback of this system is that it is impossible to know what sort of system would be obtained if [i] were to be included. However, Ho adds a phonetic diagram of the seven vowels, which shows a quite reasonable distribution. From his diagram the following phonetic values could be read:

\[
\begin{array}{llll}
\text{i} & [i] & \text{i} & [i-\mathfrak{u}] \\
\text{e} & [\varepsilon - \mathfrak{e}] & \text{a} & [\varepsilon - \mathfrak{a}]
\end{array}
\]

Hattori supports the following harmonic scheme:

\[
\begin{array}{cccc}
\text{feminine} & 3 & \text{i} & \text{u} \\
\text{masculine} & \text{a} & \text{a} & \text{o}
\end{array}
\]

However, he gives no distinctive feature analysis of the system.

2. Vowel System

Consider the following problematical statements of the *Hun-min-jeong-eum* published in 1446:

- [\varepsilon] with the tongue retracted (*chug* 縮) and the voice is deep* (*sim* 深),
- [i] with the tongue somewhat retracted (*so-chug* 小縮) and the voice is neither deep nor shallow (*bul-sim-bul-cheon* 不深不浅),
- [i] with the tongue not retracted (*bul-chug* 不縮) and the voice is shallow* (*cheon* 浅),
- [a] same as [\varepsilon] with the mouth stretched (*jang* 张),
- [e] same as [i] with the mouth stretched (*jang* 张),
- [o] same as [\varepsilon] with the mouth contracted (*chug* 縮),

*These specific terms might need further clarification or context for a complete understanding.
[u] same as [i] with the mouth contracted (chug 業),

† "the voice is deep" is a literal translation of seong sim (声深). Probably it indicates a certain auditory sensation which is, in the author's opinion, evoked by non-high back vowels. The term has no relation to absolute depth of pitch.

* "The voice is shallow" is a literal translation of seong cheon (声浅). Probably it indicates a certain auditory sensation which is, in the author's opinion, evoked by a high front vowel.

Although there are some questions in the interpretation of the terms cheon (浅), sim (深), jang (張), and chug (業), the author proposes that the following vowel system could be deduced from the above statements:

(9)

The following chart indicates the feature specifications of the Hun-min-jeong-eum for the seven vowels:

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>e</th>
<th>i</th>
<th>u</th>
<th>a</th>
<th>ᆠ</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>cheon (shallow)</td>
<td>+</td>
<td>.</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>(−)</td>
<td>(−)</td>
</tr>
<tr>
<td>sim (deep)</td>
<td>(−)</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
This system would seem to describe the synchronic vowel system of MK fairly well. From the anatomical point of view the system seems to be reasonable and it explains the vowel harmony without difficulty. In non-shallow vowels deep vowels are masculine and non-deep vowels are feminine. The harmonic vowel changes take place in the single phonological feature, deepness. Yet the system contains some difficulties in being compatible with the framework of universal phonetics. The "diagonal feature" system itself is not translatable into the "horizontal-vertical" system of universal phonetics presently accepted. Of course one cannot deny a priori that the Hun-min-jeong-eum system is part of universal phonetics. The problem is that the Hun-min-jeong-eum four-feature vowel system in (9) distinguishes fewer vowels than the usual four-feature vowel system does as in (10):

(10)

![Vowel Harmony Diagram]

It seems that stretched and contracted segments are mutually incompatible in the Hun-min-jeong-eum system. Even if it is assumed that they are mutually compatible, the resultant vowel system (11) cannot contain [æ] nor [ɔ], and the two boxes [+shallow, -stretched, ±contracted] appear to be empty.
For these reasons, the “diagonal feature” system cannot be considered valid in terms of universal phonetics.

In consideration of the above problems, the author proposes the following ordinary vowel system for underlying representation of MK:

\[
\begin{array}{ccc}
\text{nonback} & \text{back} & \text{back} \\
\text{unround} & \text{unround} & \text{round} \\
\hline
\text{high} & i & \Lambda & u \\
\text{mid} & e & \Lambda & o \\
\text{low} & a & & \\
\end{array}
\]

The following chart indicates the feature specifications for the seven vowels:

\[
\begin{array}{cccccccc}
i & e & i & u & a & \Lambda & o \\
\hline
\text{high} & + & - & + & + & - & - & - \\
\text{low} & - & - & - & - & + & - & - \\
\text{back} & - & - & + & + & + & + & + \\
\text{round} & - & - & - & + & - & - & + \\
\end{array}
\]
In this system the feminine set \[e i u\] is characterized as \([\alpha \text{ high, } \alpha \text{ back}]\) and the masculine set \([a \Delta o]\) as \([-\text{ high, } +\text{ back}]\), the neutral vowel \([i]\) is \([+\text{ high, } -\text{ back}]\).

Based on this underlying vowel system various phonological phenomena, including vowel harmony, can be explained. Historically, as mentioned above, the \([\Delta]\) has merged into \([i]\) in a non-initial syllable and into \([a]\) in an initial syllable. The proposed vowel system explains this historical change easily. \([\Delta] \rightarrow [i]\) is the change of the feature \([-\text{ high}]\) to \([+\text{ high}]\), and \([\Delta] \rightarrow [a]\) is the change of the feature \([-\text{ low}]\) to \([+\text{ low}]\):

\[
\begin{align*}
[-\text{ high}] \\
-\text{low} \\
[+\text{ back}] \\
-\text{round}
\end{align*}
\rightarrow \begin{cases} [+\text{ high}] \text{ in a non-initial syllable} \\ [+\text{ low}] \text{ in an initial syllable} \end{cases}
\]

3. Vowel Harmony

As mentioned above, the vowels of MK fall into three classes, feminine \([e i u]\), masculine \([a \Delta o]\) and neutral \([i]\). Inside morphemes of MK, as a rule, feminine and masculine vowels cannot co-occur. Examples:

<table>
<thead>
<tr>
<th>Feminine (and Neutral)</th>
<th>Masculine (and Neutral)</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>mijigey 'rainbow'</td>
<td>saram 'man'</td>
<td>miri 'beforehand'</td>
</tr>
<tr>
<td>siri 'rice steamer'</td>
<td>gamagoy 'crow'</td>
<td>igi- 'win'</td>
</tr>
<tr>
<td>yezi 'fox'</td>
<td>gaji 'branch'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>disay 'tile'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>namo 'tree'</td>
<td></td>
</tr>
</tbody>
</table>

Compound words, where each element is a morpheme, and Sino-Korean words, where each Chinese character can be a morpheme, can contain feminine and masculine vowels together, e.g., \(jug + sari\)
death and life’, rog+du ‘green bean’, nyer'-bban ‘Nirvana’. Even in Sino-Korean words, colloquial words may be devoid of morpheme boundary as in do+jeg > dojeg > dojag ‘robber’

W. Kim (1971) gives the following exceptions of native Korean words where feminine and masculine vowels co-occur inside a morpheme:

\[\begin{array}{ll}
\text{a)} & \text{b)} \\
\text{byero} & \text{emanim} \\
\text{bosyen} & \text{buhwa} \\
\text{barsye} & \text{ma’emah} \\
\end{array}\]

He explains the exceptions in group a) as the historical change: ya or ya > yo. If we admit “absolute neutralization” which Kiparsky (1973) rejects, the underlying forms in group a) would be byyro, bosyen, barsye, etc., for C0 ya is a possible sequence. After the application of vowel harmony rules, ya would be unconditionally fronted to ye. Historically this process may be correct, but, if we reject the absolute neutralization, synchronically the words in a) and b), as well as words like nyer'-bban, are equally exceptions.

It may be a morpheme structure condition that limits the co-

2) Why did dojeg change into dojag rather than into *dojag, *dojog or *dujeg? The fact that the form *dujeg was not produced means that assimilation goes from left to right. Even though harmonic alternations of suffixes take place between [e] and [a], [i] and [A], [u] and [o], dojeg did not become dojag. The author believes that this is because [A] is the most similar masculine vowel to [e]. This fact supports the author’s postulation that both [e] and [A] are mid vowels, i.e., [−high, −low] and it also supports the proposition that vowel harmony within a morpheme and vowel harmony between a stem and a suffix are of a different nature.

3) “For any feature complex X, the symbol \(X_m\) stands for a string of no less than \(m\) and no more than \(n\) occurrences of \(X\).... The symbol \(X_m\) stands for a string of no less than \(m\) \(X\)’s.” (Chomsky–Halle 1968: 61–62) Thus \(C_0\) stands for a string of zero or more occurrences of \(C\) (consonant).
occurrence of vowels inside MK morphemes, as Kiparsky says concern- ing Finnish. If this is the case, is there any true vowel harmony rule in MK which is a phonological rule rather than a morpheme structure condition? The following vowel assimilations permit the formulation of a precise phonological rule of vowel harmony. When the stem-final syllable contains one of the vowels [i e i u], then the initial non-neutral vowel of the following suffix takes one of the feminine vowels [e], [i] or [u], and when the stem-final syllable contains one of the vowels [a o], then the initial non-neutral vowel of the following suffix takes one of the masculine vowels [a], [a] or [o]. Note that the [i] belongs to the feminine group. If the follow- ing suffix begins with an underlying consonant, including glides, or with a neutral vowel [i], then the vowel of the suffix remains unchanged, e.g.:

mir + gwa —> mir'wa ‘water and’
([a] of [wa] does not change into [e]).

It is assumed that the underlying forms of Topic suffix nin-nm, in- mn and Accusative suffix rir-rnr, ir-rnr are forms without initial conso- nants and that the initial consonants are inserted by a later rule after the application of vowel harmony rules.

Examples:

abi+Vn -> abi+in -> abi+nin ‘father+TOPIC’
tyenhha+Vr -> tyenhha+ar -> tyenhha+rər ‘the world+ACC.’

The forms Vn and Vr in the above examples are tentative representa- tions. The underlying vowels of the suffix-initial syllables are specified neither as masculine nor as feminine, whereas with those in stems, there is a distinction between masculine and feminine. Thus, the problem lies in deciding which vowels appear in the initial po- sition of the underlying forms of suffixes.
a) If one tries to make archiphonemes the basis for the initial vowel of suffixes, it is impossible to group each harmonic pair merely by specifying common feature(s). Pairs [i] - [ʌ] and [u] - [o] can be specified as [+back, -low, -round] and [+round] respectively, but the pair [e] - [a] is specified as [-high, -round] which is not distinct from [ʌ]. There is a difference in the values of backness and lowness between [e] and [a]. Therefore the archiphoneme solution must be rejected.

b) If the masculine set is taken as the basis for the initial vowel of suffixes, the process of vowel harmony can be accounted for by the following rule:

\[
(14) \quad \left[ +\text{back}\right] \quad \alpha \text{low} \quad \rightarrow \quad \left[ -\alpha \text{high}\right] \quad -\alpha \text{back} \quad \left/ \{\text{[+high]}\} \right. \quad C_0 +
\]

\[
\left[ -\text{low}\right] \quad \{\text{[-back]}\}
\]

c) If the feminine set is taken as basic for the initial vowel of suffixes, the whole process of vowel harmony can be accounted for by the single rule:

\[
(15) \quad \left[ \text{[α high]}\right] \quad \alpha \text{back} \quad \rightarrow \quad \left[ -\text{high}\right] \quad +\text{back} \quad \left/ \{-\text{high}\} \right. \quad C_0 +
\]

\[
\left[ -\alpha \text{low}\right] \quad \{+\text{back}\}
\]

This rule says that if the stem-final syllable nucleus is a masculine vowel ([a], [ʌ] or [o]), then suffix-initial feminine vowel ([e], [i] or [u]) changes into the corresponding masculine vowel ([a], [ʌ] or [o]) and that if the stem-final syllable nucleus is

4) Using the alpha notation, the pair [e] - [a] could be specified as [-high, \alpha back, \alpha low].
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A feminine one ([e], [i], or [u]) or a neutral one ([i]), there occurs no change. Examples:

\[ \text{abi} + \text{ir} \rightarrow (\text{unchanged}) \rightarrow \text{abi} + \text{rir} \] 'father + ACC.'

\[ \text{narah} + \text{ir} \rightarrow \text{narah} + \text{ar} \] 'country + ACC.'

The solutions b) and c) are same in the number of features used, but the author feels that solution c) is a little better than b) as solution b) uses conjunctive braces, i.e., b) consists of two conjunctive rules. In addition, modern dialects, which have almost lost the vowel harmony process, have suffixes commencing with a feminine vowel.

A suffix may be followed by another suffix, and in this case they are both subject to the vowel harmony rule. This means the vowel harmony rule applies cyclically, e.g.:

'front' LOC. TOPIC

\[ \text{[arp + iy] + in} \]

(1st cycle) \[ \text{arp + iy} \]

VOWEL HARMONY

(2nd cycle) \[ \text{arp + ay + in} \]

VOWEL HARMONY

EPENTHESIS \[ \text{arp + ay + nan} \]

4. Conclusion

The harmonic alternations in MK can be expressed as follows:

(16)

\[ i \quad i \quad u \]

\[ e \quad a \]

\[ \Lambda \quad o \]

This kind of vowel harmony could be called, in Kiparsky's terms (1973), \textit{diagonal harmony}, in contrast with other kinds of harmony as, in
Jakobson's terms, *vertical harmony* (front-back alternations) and *horizontal harmony* (high-low alternations). According to Kiparsky (1973), Proto-Sahaptian spoken in the Northwestern United States (shown in (17)) and Chukchi-Kamchadal spoken in the Northeastern Soviet Union show diagonal harmony.

(17)

In addition, according to Kiparsky, the Germanic umlaut also exhibits a kind of diagonal harmony going in the opposite direction:

(18)

Phenomena concerning the vowel system and vowel harmony in MK were treated perfunctorily in the author's previous paper (Hayata 1974). With the present paper the author has attempted a more detailed discussion of the topic and proposed a tentative underlying vowel system. However, there remain many problems left unexplained in the synchronic vowel system of MK. Exceptions to vowel harmony rules are especially important for inquiring into harmonic phenomena. In this regard W. Kim (1971) has made considerable contributions, but more data will be necessary to fully explain the essential nature of vowel harmony in MK. It will be necessary to conduct researches into the
distribution of each vowel to understand the underlying vowel system of MK. Written documents, indeed, distinguish seven vowels, but it is questionable whether the underlying vowels of MK are truly these seven. C.-W. Kim (1968) argues that all modern Korean vowels are derivable from the four vowels [i e a o]. Morpheme structure conditions are also important. According to the author’s preliminary research, the sequences oĊ1o and uĊ1e in MK show statistically significant high frequencies in initial two syllables starting in [o–] and [u–]. This bears a strong resemblance to Mongolian labial harmony where the roundness of mid round vowels [o ů] on initial syllables does propagate but that of high round vowels [u ü] does not. Detailed and separate researches are required into the intra- and inter-morphemic distributions of vowels.

REFERENCES


중기조선어母音調和ノート

早田輝洋

中기조선어의母音系과母音調和についてはその時代の記述——調音正音解例——の解釈自体に様々な意見が出されている。筆者は調音正音解例の記述の示す四つの弁別的特徴（浅，深，張，弛）体系に一つの解釈を提出し，その体系が普遍的音声学にそぐわないことを示し，新たに四つの弁別的特徴（高，低，後，元）による母音体系を提案する。これによって母音体系としても無理のないものになり，また母音調和も diacritic feature を用いることなく音韻特徴で記述することが可能になる。筆者の体系によれば，中基朝鮮語の母音調和は，P. Kiparsky が原始Sahaptian や Chukchi-Kamchadal について言うが如き「対角線調和」の母音調和である。 （原稿受理日 昭和50年9月1日）