The Vowel System and Vowel Harmony in 15th Century Korean Revisited

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Koreans had a long and arduous writing history up until the mid 15th century. Their varied effort using Chinese characters to transcribe their language, which is typologically quite different from Chinese, had never really resulted in a systematic writing system. Therefore, reconstruction of earlier forms of the language appears almost an impossible task today. With King Sejong's invention of a new alphabet, called *Hunmin Jeong'eum* [Correct Sounds for the Instruction of the People, *Jeong'eum* hereinafter], which was suddenly announced in the 12th month of the 25th year of his reign (December 1443/January 1444), the situation would turn 180 degrees.

The Korean alphabet stands out among languages not only because its inventor and time of invention are clearly known, but also because of the existence of a learned text that clarifies the theoretical underpinnings behind its invention. The promulgation document of 1446, also called *Hunmin jeong'eum*, was a handbook for learning the alphabet, as well, with explanatory treatises and examples called *Hunmin jeong'eum haerye* [Explanations and Examples of the Correct Sounds for the Instruction of the People, *Haerye* hereinafter].

The purpose of this paper is to show that a careful reading of the feature specifications presented in *Haerye* helps us to identify the sound values of the vowels correctly. Furthermore, some of the features used in describing various characteristics of vowels were borne out by recent phonological and phonetic research well over 500 years after the *Haerye* authors mentioned them originally. The vowel chart, representing the original description of each basic vowel sound, will also demonstrate that the Vowel Harmony (VH) process was phonetically conditioned in 15th century Korean.

It is thanks to *Haerye* that we can confidently tell the fairly accurate sound value of each letter of the alphabet at the time of its invention. Most unusually, the design principles of all letter shapes, their sound values, and their usage are clearly indicated in the document. In spite of this huge advantage, linguists have not reached an agreement on the 15th century vowel system and as a consequence, on the VH phenomenon which necessarily had to be explained against the vowel system it operated on. Many linguists in fact shared the opinion that vowel forms, in contrast to consonantal ones, represented an abstract level, some of whom claiming they actually represented an earlier system (e.g., Lee Ki-Moon 1972: 133).

Three assumptions, among others, which seem to have adversely affected a great number of linguists' thinking and weakened their analyses are listed in (1):

(1) a. that the phonetic features used in describing various sounds of vowel letters in *Haerye* seem esoteric and may not be universally applicable;
b. that the vowel letters essentially are pronounced the same today as they were in the 15th century;
c. that the disappeared vowel < ㆍ >, called "arae-a," was an unrounded low-mid back vowel [ʌ].

At the time of the invention of the Korean alphabet, VH applied quite systematically within the boundary of a word, unlike in contemporary Korean where VH is limited to sound-symbolic words and some affix-initial vowel alternations. The VH principle and the posited vowel system have received quite divergent analyses, because the dividing line of the two harmonic groups has been hypothesized by different scholars, due to their divergent interpretation of positions of articulation of various vowels (Kim-Renaud 1986, C.-W. Kim 1978, Chung 2000).

Consonantal forms of the Korean alphabet are iconic, or 'motivated' (Haas 1976), as they are either a depiction of articulatory activity, or the symbolic representation of the place of articulation in the case of consonants (C.-W. Kim 1980/88, 1997, Sampson 1985, Kim-Renaud 1997). For example, all apical sounds (sounds pronounced at the tip of the tongue) contain the basic graphic shape ㄴ, representing the image of the tongue touching the alveolar ridge, as can be seen in the letters, ㄴ(n), ㄷ(t), ㅌ(t^h), ㄸ(t'), and ㄹ(r/l).

Once the basic letterforms were designed, related sounds were created expanding on each basic form. A given distinctive feature can be represented in a sound with varying degrees of strength, as noted by Stevens and Keyser (1989: 81),

and the Korean writing system captures this fact elegantly. For example, the principle of *kahoek* 'stroke addition' is used, as explained in *Haerye*. The five basic letters, chosen from the gentlest/softest or unmarked series among the consonants, were expanded with a set of systematically added strokes to create related, but phonologically stronger consonants. *Haerye*'s description and explanation of how this system works, memorably called 'the crown jewel of Sejong's alphabetic theory' by Ledyard (1997: 40), is given in (2).

(2) Explanation of the design of the letters

For the initial consonants there are seventeen letters in all.

The molar sound ㄱ [k] depicts the outline of the root of the tongue blocking the throat.

The lingual sound ㄴ [n] depicts the outline of the tongue touching the upper palate.

The labial sound ㅁ [m] depicts the outline of the mouth.

The incisor sound ㅅ [s] depicts the outline of the incisor.

The laryngeal sound ㅇ [ɦ] depicts the outline of the throat.

The pronunciation of ㅋ [k^h] is a little more severe than that of ㄱ [k], therefore a stroke is added.

ㄴ [n] then ㄷ [t], ㄷ then ㅌ [t^h];

ㅁ [m] then ㅂ [p], ㅂ then ㅍ [p^h];

ㅅ [s] then ㅈ [ts], ㅈ then ㅊ [ts^h];

ㅇ [ɦ] then ㆆ [ʔ], ㆆ then ㅎ [x].

'

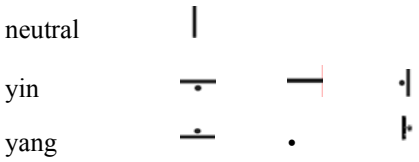
Vowel articulation is not as easy to depict with an iconic figure as is for consonants. The strategy taken, therefore, was to use simple, clearly opposing paired shapes to represent contrasting groups of sounds, rather than depicting how each vowel was pronounced. Here the inventor of the alphabet opted to create vowel letters in such a way that one of the most salient phonological phenomena in Korean, VH, is clearly captured. The best way to do it was by associating contrasting vowel letters to the age-old East Asian philosophical concept of *yin* and *yang*. The crucial strategy in designing vowel letters, just as in the case of consonants, was to devise core symbols out of which various contrasting forms could be developed.

The three basic vowel letters, again extremely simple and clearly distinguishable from consonantal forms, were linked to the concept of *sancai* (三才, Three Powers or Talents—pronounced *samjae* in Korean) in East Asian cosmology,

with which the Koreans of the 15th century were very familiar. These basic forms represented the three vowels that were least phonologically marked. The phonologically neutral front vowel /i/ was schematically depicted with a vertical line (ㅣ) representing Man. This neutral vowel stood between the *yang* back vowel (ㆍ), representing Heaven, and the central yin vowel with the horizontal line (ㅡ), representing Earth. The position of the dot in relation to the horizontal or vertical line would determine the membership of a vowel within one harmonic group or the other.[1]

In Middle Korean, unlike contemporary Korean, VH applied fairly consistently to all word units.[2] Vowels were categorized into three groups: *yin* (Dark, *eum* in Korean), *yang* (Bright), and neutral. The seven basic vowels therefore were categorized as shown in (3).

(3) Three Harmonic Groups of Vowels



Within the same stem, a *yin* vowel occurred with *yin* vowels, and a *yang* vowel occurred with other *yang* vowels. VH also worked between the stem and the suffix. The neutral vowel < ㅣ > could occur with either of the groups, as shown in (4):

(4) Examples of Vowel Harmony

a. yin 구름 ‘cloud’, 꿈을 ‘dream-Obj’, 웃ᄇᆞ- ‘be laughable’, 굴헝 ‘hole’, 브르- ‘call’, 어듭- ‘be dark’, 허믈 ‘fault’, 둥굴- ‘roll’, 두껍- ‘be thick’. 주먹 ‘fist’, 우케 ‘unhulled rice’, 부들업- ‘be soft’

b. yang 사ᄅᆞᆷ ‘person’, 사ᄅᆞᄆᆞᆯ ‘person-Obj’, ᄆᆞᅀᆞᆷ ‘heart/mind’, 맞나- ‘meet’, 다ᄅᆞ- ‘be different’, 나모 ‘tree’, 도ᄌᆞᆨ ‘thief’. 조곰 ‘a little’, 아모 ‘anyone’, 도로 ‘again’, 올창 ‘tadpole’

c. neutral (with yin) 두더쥐 ‘a mole’, 슬긔 ‘wisdom’, 너구리 ‘raccoon’, 두드리- ‘knock’, 어드니 ‘as one receives’

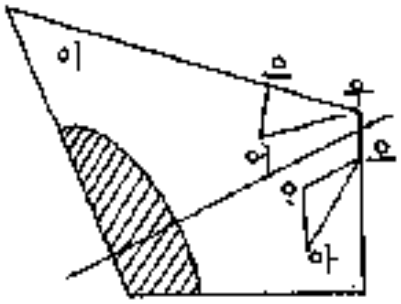
[1] These and the other philosophical concepts used in designing and explaining all the letterforms caused some linguists to see mainly the philosophical basis of the creation of the alphabet (e.g., Yi J. H. 1972, Pak 1988, Yi Seongyeong 2008).

[2] VH did not apply across stems, nor in Chinese loanwords and Sino-Korean based stems.

(with yang) 갈고리 'hook', 아디- 'be broken', 오로디 'solely', 모조리 'all', 바고니 'basket'

Lee Soong-Nyung (1949) was one of the first linguists to observe that in the 15th century the complex vowel combinations such as ㅐ, ㅖ, ㅚ, ㅟ, which are monophthongs in contemporary Korean, actually represented complex vowels. He thus contributed in a major way to freeing researchers from the "contemporary" glasses they were wearing in analyzing Middle Korean sounds. However, he did not hesitate to reconstruct the identity of the lost vowel <ㆍ> as /ʌ/, based on the impressionistic observation of how he thought contemporary Jeju speakers still pronounced it. He then established a seven-vowel system for Middle Korean as shown in (5):

(5) The Middle Korean Vowel System according to Lee Soong-Nyung (1949)[3]

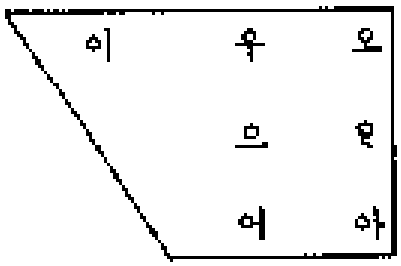


However, this vowel chart does not make VH groupings natural. It is well known that the <ㆍ> vowel became <—> in a non-initial syllable and <ㅏ> in an initial syllable. The chart for the posited vowel system does not show the changes the lost vowel underwent as plausible and natural processes. One of the prevalent views was that the grouping of vowels using VH was according to their relative tongue heights.

In a similar attempt, but staying closer to the descriptions provided in *Haerye*, Kim Wanjin (1963) proposed the vowel chart to be the one shown in (6):

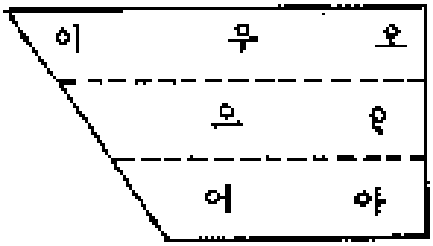
[3] For the sake of clarity an empty circle with zero phonetic value is drawn in where the first consonant of a syllable would have been put—to the left of a vertical stroke and above a horizontal stroke.

(6) The Middle Korean Vowel System according to Wanjin Kim (1963)



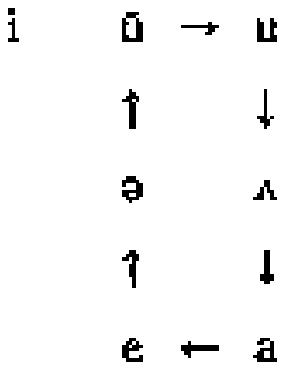
Kim Wanjin hypothesized that the vowel chart given in (6) was an abstract system, and the actual pronunciation would be more like the one shown in (7):

(7) The actual Middle Korean Vowel Space according to Kim Wanjin (1963)



Kim Wanjin (1965) then posited in (8) the following push-chain type of vowel shift occurring between the 17th and 18th centuries.

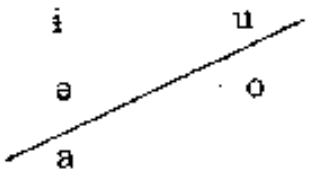
(8) The Great Vowel Shift of the 17th and 18th centuries according to Kim Wanjin (1963)



Regardless of the time period when the hypothesized Great Vowel Shift took place, these are certainly unexpected and incomprehensible vowels in the places indicated, whose push-chain change can hardly be justified. This fact was not obvious when only the Korean vowel symbols were entered in the chart. Although lined up in the same column, the front rounded vowel /ü/, /ə/, and /e/ hardly form a natural class together. A similar problem exists with the grouping of /u/, /ʌ/, and /a/.

Many linguists believe that the Great Vowel Shift had already taken place by the 15th century and that the MK vowels were not much different from today's. Assuming the two vowel systems are very similar to each other, in both systems the line separating the two different harmonic groups would seem diagonal. C.-W. Kim (1978) thus describes Korean VH as diagonal harmony, which is schematically represented in (9):

(9) Diagonal Vowel Harmony



Kim Wanjin (1978) adopts this anlysis, too. However, the diagonal analysis, like the proposal of semantic features in explaining VH by Kim-Renaud (1986), is not phonetically motivated in spite of its appearance. Quite often, the misinterpretation of the vowel positions originates from the persisting preconception that the letters of the Korean alphabet have had the same phonetic values at the time of its promulgation as in their current pronunciation. For example, the seven basic vowels of Middle Korean are commonly posited as shown in (10):

(10) Basic Vowel System in the 15th Century (Huh 1965, Lee K.-M. 1972, Yi Don-ju 1988: 35, Ahn and Iverson 2006)

i	ɨ	u
	ə	o
	a	ʌ

The vowel letters that represent these sounds are the same as those of today except for the lost vowel < ㆍ >, as shown in (11).

(11) Korean Orthographic Representation for the Middle Korean Vowel System of (10)

ㅣ	ㅡ	ㅜ
	ㆍㅣ	ㅗ
	ㅏ	ㆍ

The problem with the orthographic representation given in (11) for the vowel system hypothesized in (9) is that the letter shapes do not match their phonetic description provided in *Haerye*. Furthermore, the dividing line for different harmonic groups is not obvious. One of the most common approaches has been to consider relative tongue height as the force underlying vowel groupings (Ryu 2005: 234). The problem with this kind of analysis is having to accommodate such a long distance relationship as the one between the vowels < ㆍ > and <ㅡ>.

The most common effort to account for VH operating such a vowel system has been with some form of vertical harmony, but researchers have often relied on abstract vowel systems that were reconstructed by various methods in order to explain the thorny issues of VH in late Middle Korean (e.g., Lee Ki-Moon 1972: 141-42, Cho Sung-moon 2002: 280).

In this study I also hypothesize that the Middle Korean vowel system had been something like the one presented in (9). However, the orthographic representation for the Middle Korean vowel system is significantly different from the commonly accepted view that the vowel shapes have essentially continued to maintain their original value today. *Haerye* makes it clear that the Middle Korean vowel symbols did not have the same value as that of contemporary Korean vowels, but in fact they occupied the positions shown in (12):

(12) Korean Orthographic Representation for the Middle Korean Vowel System of (9)

ㅣ	ㅜ	ㅗ
	ㅡ	ㆍ
	ㆍㅣ	ㅏ

This system neatly demonstrates that the VH phenomenon in Middle Korean was indeed phonetically conditioned. The main phonological feature that distinguished one harmonic group from the other was the combined factors of lip rounding [RD] and retracted tongue root [RTR]. The best supporting evidence comes from the specific description of each of the seven basic vowel symbols of the 15th century, along with examples and explanations of vowel groups contained in *Haerye*. Additional evidence comes from comparative work and internal reconstruction. The comparative material and dialectal data give added confirmation for this vowel system with the specific sound value of each vowel symbol.

In *Haerye* the three basic vowels are described with simple, succinct analytic features. The articulatory and perceptual (acoustic) features used sound remarkably modern:

(13) Feature Specifications of the Three Basic Vowels as described in *Haerye*

ㆍ舌縮而聲深, ㅗ與ㆍ同而口蹙, ㅏ與ㆍ同而口張

[ㆍ has retracted tongue, deep sound. ㅗ is like ㆍ but with pursed mouth. ㅏ is like ㆍ but with spread mouth]

ㅡ舌小縮而聲不深不淺, ㅜ與ㅡ同而口蹙, ㅓ與ㅡ同而口張

[ㅡ has partially retracted tongue, neither deep nor acute sound. ㅜ is like ㅡ but with pursed mouth. ㅓ is like ㅡ but with spread mouth]

ㅣ舌不縮而聲淺

[ㅣ has no retracted tongue and sounds shallow]

This study proposes a linguistically significant and plausible reading of the features that *Haerye* expresses with the Chinese character pair "淺" and "深" for front-backness, "縮" and "不縮" for degree of tongue body retraction, "蹙" and "張" for mouth aperture in *Jejahae* (Explanation of the Designing of the Letters) of *Haerye*.

The way the three different angles from which various articulation is described is as follows. The Chinese character pair "淺" and "深" are acoustic features, 'acute' and 'grave' respectively, that are related to perception by the listener. The features acute or grave are of course, directly related to the frontness or backness of the tongue position. The Chinese character pair "縮" and "不縮" express retraction of the tongue felt by the producer of the sound. And finally the rather uncommon character "蹙" can be translated for linguistic purposes as

"closed, but not completely," or rather "pursed," "puckered," etc. In other words the expression "口蹙" could mean "lips tightened in such a manner that the mouth-opening is held tensely as small as possible." Conversely "口張" describes spread lips. The genius of this vowel feature described and employed in *Haerye* is its ability to catch simultaneously both the lip rounding and the jaw height associated with each vowel. Many linguists (e.g., Ledyard 1966: 235, Kim Yeong-song 1988: 95) have opted to interpret this mainly to mean "rounded," although the fact that the lips are "close in but not actually shut" is mentioned by some including Ledyard (ibid.). Kim Wanjin (1963) had a similar analysis of the Middle Korean vowel system and VH as presented in this paper, but his revised analysis (Kim Wanjin 1978) adopted an entirely different vowel system, which is similar to that proposed by Huh Woong (1965: 376).

Another common but crucial misinterpretation has been the articulatory position of two of the basic vowels, <ㆍ> and <ㅡ> in the vowel chart. A great majority of linguists have interpreted their tongue frontness and backness, while not considering their jaw height (or the closedness or openness of the lips). Furthermore, the vowel <ㆍ> was often placed too low on the chart, and the <ㅡ> too high, when they both needed to be placed in the mid position. Once their position has become misplaced, the other related vowel positions could not be identified properly.

Ever since the appearance of the very influential article by Lee Soong-nyung (1949), which claimed the lost vowel <ㆍ> was an unrounded low-mid back vowel [ʌ], this assertion has rarely been questioned. Even Huh (1965), although he himself noticed definite lip-rounding in the pronunciation of the vowel in Jeju dialect and quoted Ogura Simpei (1944) and Yi Geuk-ro who also had observed lip rounding, did not place <ㆍ> in the mid height of the vowel chart.

I should like to propose that the lost vowel <ㆍ> actually was at least phonologically /o/. Although this may sound surprising under the current situation, I am not the first to have proposed this idea. Some time ago, Ogura (1940: 20-22) hypothesized the vowel <ㆍ> to have represented the /o/ vowel after studying the Jeju dialect. He repeatedly said there is definitely lip-rounding. Huh quotes Yi Geuk-ro (1948: 17) who said this vowel was pronounced in the low back area, with slight lip-rounding (Reported in Huh 1965: 315). Even earlier, Ramstedt (1928/39: 27) made a similar observation, with both internal and comparative evidence. In Korean dialect studies, he discovered [o] as a corresponding sound to <ㆍ>. Ramstedt also observed that in loanwords from various Altaic languages including Mongolian, and also in the Japanese transcription of Korean words, the vowel <ㆍ>

systematically corresponded to /o/ (Gwak 1990: 87). For example, the Mongolian word for 'a horse' *mori* is transcribed in Korean as 물 (Lee Ki-Moon 1991: 127).

Then, how would <ㅡ> have been pronounced? There is fairly good evidence this represented a higher vowel, close to [u] in the 15th century, than the letter is pronounced in contemporary Korean. For example, the Mongolian loanword 고ᆞ라 corresponded to *qula* 'a kind of brown horse with red and black hair'. Likewise the loanword 구렁 'hole' came from Mongolian *küreng*, indicating the <ᆞ> vowel was pronounced in a more frontal area than <ㅡ> (Ki-Moon Lee: 1991: 127).

Once the various kinds of circumstantial preconception are overcome, the following chart (14) shows the basic vowels of the Korean alphabet in 1446:

(14) The Middle Korean Vowel System:

Tongue / Mouth	Front/Neutral	Central/Dark	Back/Bright
Close	ㅣ /i/	ㅡ /ɨ/	ㅜ /u/
Mid		ㅓ /ə/	ᆞ /o/
Open		ㅏ /ɑ/	ㅗ /ɔ/

This analysis thus proves that Korean VH was a vertical kind, in which the roundness and retracted tongue features divide contrasting groups. This analysis not only helps to explain VH elegantly, but also some other phonological phenomena such as the <ᆞ> vowel changing to <ㅗ> or <ㅡ>, and <ㅕ> being raised to <ㅡ> in certain circumstances, which may additionally find their explanation when this vowel system is established. The generally accepted hypothesis is that the Great Korean Vowel Shift was caused by the merger of ᆞ/o/ with ㅓ /ə/.

Another plausible explanation for various mergers is neutralization of contrast in the weak, non-initial position. Furthermore, this also explains how the vowel ᆞ /o/ took the direction of ㅓ /ə/ or ㅗ /ɔ/, as it lost its own distinct identity: The two vowels are articulatorily very close to the vowel ᆞ /o/. My own hypothesis is that the Korean vowel shift was a push-chain type. The two very closely located low vowels ㆎ /ɑ/ and ㅗ /ɔ/ created an unstable situation, which caused the low

back vowel to take the central position, forcing the low central vowel to raise, and thus starting a chain reaction.

I would also like to propose one possibility that could contribute to our understanding of how, why, and when the so-called Great Vowel Shift occurred. Thanks to the wonderful phonetic writing system, we know there was a great deal of language variation and many forms of on-going change at the time of the invention of the Korean alphabet. So, some variants might have existed from even before the Middle Korean period, and the direction of change could be misunderstood. This means that some of the changes like the demise of <ㆍ> did not occur abruptly but lasted for a longer period than we think. This appears to be the casespecially because of the conservative writing practice.

Linguists have noted that the 15th century was a period in Korea when there were many significant sound changes, and Koreans had the tools to capture the variant linguistic forms. As Inji Jeong so movingly said in his postface to the *Hunminjeong'eum*, "Insofar as the phonology of characters is concerned, There is no usage not provided for, no direction in which they do not extend. Even the sound of the winds, the cry of the crane, the cackle of fowl and the barking of dogs – all may be written." And who is going to complain that we have too much data now!

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