

A PHONOLOGICAL/THEORETICAL EVALUATION OF THE KOREAN ALPHABET

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1.0 Introduction

The Korean Alphabet (*Han'gŭl*) has been described as "perhaps the most scientific system of writing in general use in any country" (Reischauer and Fairbank 1960:435), or as "the world's best alphabet" (Vos 1964:31). Indeed, Sampson (1985:144) goes so far as to say that it "must unquestionably rank as one of the great intellectual achievements of humankind"!¹ *Han'gŭl* has a systematic internal structure that appears to specify the phonetic/phonological-feature composition of segments within a syllabic 'block' framework. Recent attempts have been made to parallel the constituents of *Han'gŭl* with the distinctive features of Jakobson's acoustically based system (Kim 1997). In more traditional analyses, beginning with the *Hunmin chŏng'ŭm* (Sejong 1946 [1446]), the vowel-classes have been interpreted as being associated with Oriental metaphysical terms such as *yin* and *yang*, representing the female and male principles respectively, further correlated with the two First Elements—Earth and Heaven—in relation to which Man stands in some 'neutral' function (Kim-Renaud 1997). This paper concentrates on the representation of the so-called vocalic components of the modern version of the *Han'gŭl* syllabic 'blocks' and examines the internal structure of the graphic representation. What emerges is an interpretation in terms of an arithmetic that generates a particular representational geometry reflecting a linear hierarchy of vocalic aperture/resonance properties within the basic 'CV(C)' structure. Such an interpretation shows clearly that underlying *Han'gŭl* is an extremely sophisticated phonetic/phonological theory.

Die ersten Phonetiker waren die Erfinder der Schrift, die Westsemiten im Gebiete des heutigen Syrien, welche um das Jahr 1500 v. Chr. die Konsonantenschrift erfanden, ...

—M. Schubiger (1970:5)

1.1 An example of writing analysis of the English abecedarium

That writing systems are interpretable as evidence of theorising, is well known. As Schubiger suggests, some intrinsic phonetic/phonological structure may be assumed, which, when extrapolated, is then available for theoretical analysis. We *cannot* take the following (Crystal 1987:177) as establishing some universal principle:

First it is emphasised that writing and speech are different and equal manifestations of language. Writing should not be seen as merely 'transcribed speech', because its formal characteristics, and its strategies of production and comprehension, are quite unlike those encountered in speech.

There is no *a priori* reason to assume that any writing system (in any sense) is not, in some sense, 'transcribed speech', and therefore different in nature. Furthermore, *contra* Sampson (1985:20), we are, as linguists, as much interested in the physical appearance of writing systems as in their structure, for there is no clear reason to assume their non-unified relationship. We again make no *a priori* assumption that a system of writing is not, in some sense and to some degree, through the role of time and space, 'visible speech', and that the connection between the graphic representation and the speech represented is arbitrary. Finally, it does *not* follow that any traditional way of describing any writing system *necessarily* reflects the phonetic/phonological structure, or linguistic theory, underlying the writing system under consideration.

¹ This should imply that *Han'gŭl* is demonstrably equivalent intellectually to, for instance, Mendel's Ratio, Mendeleyev's Periodic Table, Einstein's Specific and/or General Theory of Relativity, Bohr's discovery of the structure of the atom, or Gellman's theory of quarks. No such equivalence has been demonstrated. Even showing that Sejong's *Han'gŭl* is 'equivalent' to Jakobson's distinctive feature system (e.g., Kim 1997) would not achieve such a result!

It is important to distinguish initially between an alphabet and an abecedarium (ABC). The latter is a *recitation* of the elements (letters or glyphs) of the alphabet (the *system* of writing). In Korean, the abecedarium has the sequence of syllables *ka - na - ta - ra - ma - pa - sa - a -*, etc. While an examination of this does reveal a pattern of phonetic/phonological classification, this is not the focus of this paper, which concentrates rather on the *graphic* form of the Korean alphabet (*Han'gŭl*), and on the phonetic/phonological theoretic and descriptive principles underlying that graphic form. Both alphabets and abecedaria, however, can reflect the sound patterns of a language, but in different ways. At first sight, the ABC of the English alphabet appears to be a completely arbitrary mnemonic device, with no phonetic/phonological significance. However, a simple examination of the linear order of the 26 letters reveals a consonant (C)–vowel (V) pattern worthy of further examination, as revealed in Table 1 (Roberts 1964).

Alphabetic Symbol	Phonetic Description	V	C
a	low vowel	1	
b	voiced bilabial stop		3
c	voiceless velar stop, alveolar fricative		
d	voiced alveolar stop		
e	front mid (palatal) vowel	1	
f	voiceless labial fricative		3
g	voiced velar stop		
h	voiceless glottal fricative		
i	front high (palatal) vowel	1	
j	voiced palatal affricate		5
k	voiceless velar stop		
l	alveolar lateral approximate		
m	bilabial nasal		
n	alveolar nasal		
o	back mid (velar) vowel	1	
p	voiceless bilabial stop		5
q	voiceless velar stop		
r	alveolar rhotic approximate		
s	voiceless alveolar fricative		
t	voiceless alveolar stop		
u	back high (velar) vowel	1	
v	voiced labiodental fricative		5
w	bilabial approximate		
x	voiceless velar stop + alveolar fricative		
y	palatal approximate		
z	voiced alveolar fricative		

TABLE 1. English alphabet C–V patterns

From Table 1, it can be seen that the distribution of the vowel letters in the above list is: a, (3 Cs,) e, (3 Cs,) i, (5 Cs,) o, (5 Cs,) u, (5 Cs,) i.e., vowels appear in the series at odd numbered places, 1 (a), 5 (e), 9 (i), 15 (o), 21 (u), separated/followed respectively by 3, 3, 5, 5, and 5 consonants. The order of the vowels progresses sequentially as follows: most open, mid, high front, mid back (lowest), high back. If we classify a as mid-open, e and i as *front* mid and close respectively, and o and u as *back* mid and close respectively, we can deduce various vowel diagrams and internal relations such as the following possibilities in Figure 1 (a–d):

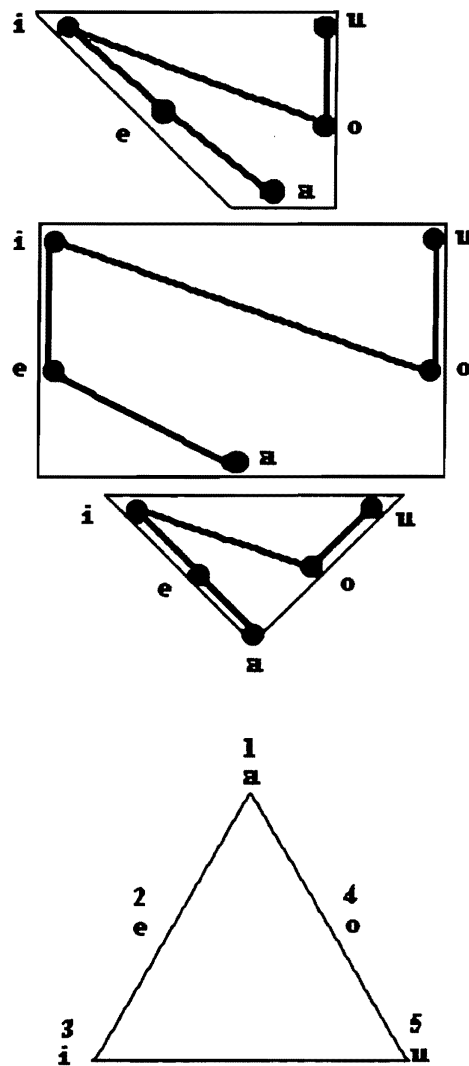


FIGURE 1 (a-d). Placement of vowel letters on four forms of a simple vowel diagram

The English abecedarium can also reflect a vowel parameter or linear scale such as in Figure 2:

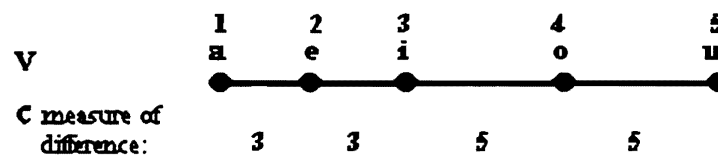


FIGURE 2. Placement of vowel letters on a linear scale

As far as the consonants are concerned, there is also plenty of evidence to suggest that place and manner of articulation are reflected in the ABC, generally in the order bilabial, velar, dental. These are listed in Table 2. On the various obvious 'gaps', see Miller (1994).

Group	I	II	III	IV	V	VI	VII
	Labial ₁	Palatal	Velar	Dental ₁	Glottal	Labial ₂	Dental ₂
i.	b		c	d			
ii.	f		g		h		
iii.		j	k	l		m	n
iv.	p		q	r			s, t
v.	v, w		x	y			z

TABLE 2. Degree of consonantal organisation in English ABC

Since the English-Roman alphabet/abecedarium is not the focus of this paper, let it suffice to refer to the brilliant work of Watt (1987, 1989, 1994), Faber (1992) and Miller (1994) for demonstrations of the phonetic/phonological system and ancient tradition of linguistic theory underlying the semitic, roman, futhark, and other abecedaria.

2.0 The *Han'gŭl*

For the rest of this paper, we focus on the Korean alphabet, and in particular on the so-called vocalic sections of the syllabic 'blocks'. History records that the *Han'gŭl* was invented by King Sejong (1397–1450) in 1443. Its form and principles were written up with the help of scholars of the Chiphyŏjŏn (Academy of Worthies), and was promulgated in 1446 in a two-part text called the *Hunmin chŏng'ŭm* ('*The correct sounds for the instruction of the people*'). The principles of pronunciation were explained in the *Hunmin chŏng'ŭm haerye* ('*Explanation and examples of the correct sounds for the instruction of the people*') and those used in the design of the letters of the *Han'gŭl* in the *Hunmin chŏng'ŭm chejahae* ('*Explanation of the designing of the letters*'). We have already mentioned accolades accorded the *Han'gŭl* as a most unique linguistic script. Certainly the *Hunmin chŏng'ŭm* does not, however, call for such exalted opinions. (See also editions of Kang [1974] and Yi [1975].) This treatise on the *Han'gŭl* is probably best compared to the so-called *Cours de linguistique générale* of Ferdinand de Saussure. This book was compiled by students (particularly Charles Bally and Albert Sechehaye) from notes taken by other students at Saussure's lectures. A comparison of the *Cours* with Saussure's own *Mémoire* shows such a huge difference in brilliance and clarity of exposition between the former and the latter that it would be very easy to conclude that Saussure had nothing at all to do with the *Cours*! It is perfectly possible that this same academic trick was played on Sejong ("inventor of the *Han'gŭl*") by the state officials and advisors, who, much influenced by Chinese tradition and philosophy, probably wrote the *Hunmin chŏng'ŭm* themselves.

Typologically, *Han'gŭl* (in its modern form and use) is an alphabet of twenty-four basic and sixteen compound letters representing nineteen consonants and twenty-one vocalic elements. The system looks somewhat complex because, instead of the letters organised serially (linearly), they are grouped into syllables of the form CV(C), shaped like blocks. There is absolutely no doubt that the *Han'gŭl* has a systematic internal structure, one which not only provides principled bases of sound representation but also reflects a highly revealing and sophisticated degree of linguistic theoropoesis. The physical shapes of the elements or letter components in the C part of the block clearly reflect in various ways the articulation of speech elements, i.e., they are phonopictograms, partially stylised face-diagrams of articulations. The V parts of the block, on the other hand, consist solely of horizontal and vertical lines, together with, according to traditional analyses, a dot (or little circle). In modern *Han'gŭl*, a short vertical or horizontal line substitutes for this dot. It is on these vocalic parts of the block that we will concentrate the rest of this paper. We are interested in understanding the phonetic/phonological, descriptive and theoretic functions of the forms —, |, and • as graphic elements.

While we are aware that sound-change can cause various degrees of 'mismatch' between sound patterns and their graphic representation, we operate on the assumption that general regularity of sound change will maintain the relative relation between sound and graphic to a sufficient degree for the principles of the relationship to be extrapolated at any time. The theoretical principles involved are the absolutes of unificationism and universalism. Thus the general, naïve preoccupation of linguists with redundancy (which we equate with the adoption of relativism) is avoided. We therefore make no appeal to the sound changes that have taken place in Korean since the middle of the 15th century, and operate with the *Han'gŭl* as a representation of modern Korean.

3.0 The *Han'gŭl* vowel representation

Traditionally, the *Han'gŭl* system consists of three basic vowel graphic components, as in Table 3 (Kim-Renaud 1997:172–3, Kim 1997:147).

Basic letters		Explanation of Shape
	i	Man; standing
—	i	Earth; level
•	Λ	Heaven; round

TABLE 3. Basic three letters of the *Hunmin chŏng'ŭm*

These schematic signs were combined to produce a variety of symbols, as shown in Table 4. Each of these is made up of a horizontal or vertical line to which is added in four cases a distinguishing mark—originally a dot close to the line. The *Han'gŭl* system provides seven basic vowel graphs.

Consider the following statements from the *Hunmin chŏng'ŭm haerye*, as listed in Table 4:

- <Λ> depicts the (round) heaven: the tongue is retracted, and its voice is deep.
- <i> depicts the (flat) earth: the tongue is slightly retracted, and its voice is neither deep nor shallow.
- | <i> depicts a (standing) man: the tongue is not retracted, and its voice is shallow.
- | <o> is the same as •, but the mouth is contracted/rounded.
- | <a> is the same as •, but the mouth is stretched/spread.
- — <u> is the same as —, but the mouth is contracted/rounded.
- — <ə> is the same as —, but the mouth is stretched/spread.

TABLE 4. Description of seven basic vowels (*Humin chŏng'ŭm haerye*)

On the basis of this, Kim (1997) classifies *Han'gŭl* vowels as using five phonetic distinctive features: [back], [front], [grave], [acute], and [round].

The vowel system of Modern Korean can be described in terms of eight segments.

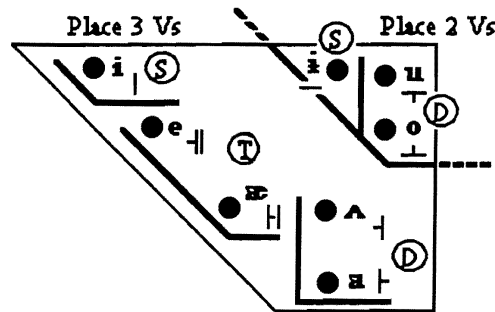
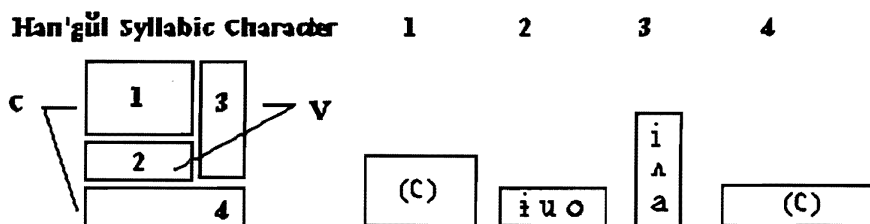


FIGURE 3. Eight *Han'gŭl* vowels currently in use—
 (S): Singlets (D): Doublets (T): Triplets

4.0 The analysis of *Han'gŭl* vowels

4.1 The structure of the Korean syllable.

The syllabic block consists of three syllabic parts ordered in four places, reflecting a recursion of the basic phonological elements, or particles. We see this clearly in Figure 4.

FIGURE 4. *Han'gŭl* syllable structure as an ordered series of places

We interpret the vowel representation as essentially based on a simple binary opposition within the vocalic parts of the *Han'gŭl* syllabic block.

GRAPHIC:



PHONOLOGICAL VALUE:

i



i

TABLE 5. Identification of the primary binary opposition

4.2 The close front and back vowels

These are general phonetic/phonological properties which, when they occur as singlets, have the following two possible features:

- (1) is positioned **to the right of** Place 1 in the structure of the *Han'gŭl* character, i.e. occupying Place 3. By itself, it is phonetically equivalent to [i]—front, high, high/close, and 'shallow'.
- (2) is positioned **under** Place 1 in the structure of the *Han'gŭl* character, i.e. occupying Place 2. By itself, it is phonetically equivalent to [i]—back, low, high/close, and 'deep'.

Note that the property *front* is equivalent to 'high and close'—the more front the sound, the relatively higher and closer in the vocal tract it is. It also correlates with rounding/lip protrusion, since this is also a fronting gesture. The property *back*, on the other hand, is equivalent to 'low and open'—the more back the sound, the lower and more relatively open in the vocal tract it is. This should be clear from the fact that the articulatory vocal tract is not and does not behave like an orthogonal structure, but rather like a hinge—the jamb being the maxilla, and the swivel the mandible, as in Figure 5.

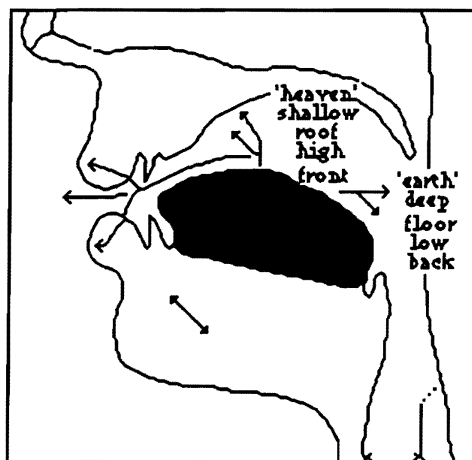


FIGURE 5. The articulatory tract as a non-orthogonal structure

4.3 The back close and mid vowels

Looking at Place 2, given the — vs. ┆ contrast, we may dispense with the $\bullet$ graphic and interpret — ([o]) in Place 2, as the vertical line (the basic graphic in Place 3) placed above the horizontal line (the basic graphic in Place 2)—that is, as [i] + [i]. This is interpreted as follows: (a) ┆ is front/high/close; it has the effect of rounding [i]; (b) — as [i], lowers ┆ ([i]). The combined effect in general phonetic terms results in a back, rounded, mid vowel [o]. When ┆ occurs below — , the two effects are the rounding of [i] and the raising or rather maintaining of the height of ┆ ([i]). The combined effect now results in a back, rounded, high vowel ┆ , [u]. This analysis gives a consistent graphic-to-sound analysis of the (modern) Korean vowels [i i u o].

4.4 The central/low vowels

The central and low vowels are [ʌ] and [a] in Place 3, ┆ and ┆ respectively. These are graphic doublets in *Han'gŭl*, consisting of two strokes, — and ┆ . They are to be interpreted as follows. — is back/low/open. Here, it has the effect of backing and lowering ┆ [i]. By virtue of — being to the left of ┆ , the effect is one of — lowering ┆ . The combined effect is a back, rounded, mid central vowel [ʌ]. When — occurs to the right of ┆ , the effect is that of lowering [i] still further. The combined effect is a central-to-back, low, unrounded [a]. Thus, placement of — to the left of ┆ in Place 3 has an effect equivalent to the placement of ┆ below — in Place 2 (relatively high vowel); the placement of — to the right of ┆ in Place 3 has an effect equivalent to the placement of ┆ above — or Place 2, viz. relatively lowering the vowel. This analysis now gives a consistent graphic-to-sound analysis of the (modern) Korean vowels [i i u o ʌ a].

4.5 The front mid vowels

The front mid (higher) and mid (lower) vowels are [e] and [æ] in Place 3, ┆ and ┆ respectively. It is assumed in this paper that there is still a phonological distinction between these two vowels. The vowels [e] and [æ] are graphic triplets in *Han'gŭl*, consisting of three strokes, one — and two ┆ in different sequences. As *Han'gŭl* triplets, they consist of a doublet and a singlet. [e] is the equivalent of [ʌ] ┆ + [i] ([ʌi]), while [æ] is the equivalent of [a] ┆ + [i] ([ai]). The addition of ┆ to the right of the doublets has the effect of fronting the vowels. This analysis is consistent with the historically and morphophonemically well-attested relation between non-high mid vowels and diphthongs. We now give a consistent graphic-to-sound analysis of the set of (modern) monophthongal Korean vowels [i i u o ʌ a e æ] in Table 6:

Place 2	Singlets	Doublets	Triplets	
	i	u	yu	
		o	yo	etc.
Place 3	Singlets	Doublets	Triplets	
	i	ʌ	e ye	
		a	æ yæ	

TABLE 6. (Modern) Korean monophthongal vowels

4.6 The Korean diphthongs

In Korean there are the following diphthongs: [ye yæ yu yo ya yʌ] respectively / ┆ , ┆ , ┆ , ┆ , ┆ , ┆ / in *Han'gŭl*. They are clearly graphic triplets in *Han'gŭl*, involving a doubling of the 'modifier' lines — or ┆ . Thus, adding another — to [e] parallel with the one already there for [e] adds a y-glide—i.e., a raising—before it, creating the rising diphthong [ye]; similarly for [yæ yu yo ya yʌ]. There is a clear, consistent correlation between the patterning of the graphics and the variant context-determined phonetic properties of — and ┆ .

5.0 Conclusion.

Clearly, the Korean vowel system (including the diphthongs) can be very elegantly explained in terms of the recursive application of two properties ($i \mid$ and $i _$) whose phonetic correlates, or exponents, vary in a principled manner with regard to Place, and with order within a Place. Equally clearly, the i alphabetic structure is both based on and reflective of such an elegantly simple and phonologically economical theory, applied in the description and representation of the Korean language. It is also clear that the distinction between $_$ and $\mid$ represents a reduction of the C:V dichotomy, which is redundant in *Han'gŭl*. It then follows as a consequence that our interpretation can be applied to an accounting of the consonants and their *Han'gŭl* representations (which are graphically stylised from $_$ and $\mid$ into specific articulatory glyphs), as well as to the /wV/ diphthongs, [wi we wæ wa w_Λ], respectively /ㄱ, ㄴ, ㄷ, ㄹ, ㅂ, ㅅ, ㅈ, ㅊ, ㅋ, ㆁ/, and the /ii/ diphthong,² [üi], or /ㅡ/ in *Han'gŭl*.

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² No offglide diphthong exists in Modern Korean except in the /ii/ sequence (doublet).