

# Rhythm in Korean verse, *sico*

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## ABSTRACT

Although rhythm in language and speech is elusive, the prosodic pattern in verse and the way language is aligned to music can reveal cross-linguistic differences in rhythm. This paper presents an analysis of the temporal patterning in the Korean verse *sico* /sitɕo/ and its sung performance. The conclusion is that the *sico* rhythm does not exclusively suggest that Korean is syllable-based as claimed in psycholinguistic literature. Although the syllable can be a useful unit for segmenting speech, the primary building block for temporal organisation of *sico* is the word-sized prosodic unit resembling the Accentual Phrase.

**Keywords:** Korean, rhythm, timing, prosody, verse

## 1. INTRODUCTION

While there is little empirical support for the traditional rhythm typology of languages, recent research approaches rhythm from multidisciplinary perspectives [e.g. 13]. For example, examining the verse rhythm would be fruitful in finding the prosodic properties manipulated in achieving rhythmic effects in the given language. Another potential area for investigation is the tune-text association which refers to the way language is arranged to the metrical prominence or regularity in timing in songs [e.g. 12, 13, 17].

Rhythm in Seoul Korean (the standard dialect, henceforth Korean) has been a controversial topic; Korean has been classified to be stress-timed, syllable-timed, mora-timed or phoneme-timed [1, 4, 7, 18, 19]. Korean does not have lexical stress and acoustic prominence is realised at the edges of the Accentual Phrase which is a prosodic unit demarcated by acoustic disjuncture, the pitch contour being the primary marker [see 5 and references therein]. The psycholinguistic studies on speech segmentation [4] and similarity judgements [18] converge on the claim that Korean is syllable-based and the syllabic rhythm in the most representative verse form in Korean, *sico* /sitɕo/, is cited as supporting evidence. However, the results of the prosodic analysis of written *sico* [10, 11, 15] and

the present study are not in accordance with this claim.

## 2. KOREAN PROSODY

### 2.1. The syllable and the mora

Together with the lack of lexical stress, the simple syllable structure of (C)(S)V(C) makes Korean a good candidate as a syllable-based language. Furthermore, native Korean speakers using *hankul* (the Korean alphabet) are accustomed to the syllabic representation; *hankul* is written in syllabic blocks and there is no ambiguity regarding the syllable boundary in written Korean. Therefore native Korean speakers would have relatively good intuition in finding syllables in speech. [18] showed that when judging similarity between words, native Korean speakers actively made use of the syllable as a unit, whilst the judgement tends to be based on the phoneme level in English. In [4], native Korean speakers did syllabic speech segmentation, showing a similarity to native speakers of French, which is considered a typical syllable-timed language.

On the other hand, the mora tends not to be considered in the prosodic analysis [e.g. 5], probably because the mora is not known to be a domain of any phonological phenomena in contemporary Korean. In [1] in which Korean was not discriminated from mora-timed Japanese, the simple syllable structure, the absence of vowel reduction, and the similar sentence length shared between Korean and Japanese materials in the experiment are likely to have led to the results.

### 2.2. The Accentual Phrase

The Accentual Phrase (AP) ([5] and references therein) is the prosodic unit which typically consists of a content word and the following particle(s). The AP is primarily demarcated by the pitch contour shape. Although the AP boundary is not always predictable, it tends to correspond to the major syntactic boundary. The flexibility in the AP formation in speech is reflected in the spacing convention of written Korean. Although the National Institute of the Korean Language prescribe spacing rules, flexibility is allowed in reality, and where to put spacing is often a challenge to *hankul* users. Korean is an agglutinating language and native

speakers' intuition on whether consecutive constituents need to be separated in writing is not always clear.<sup>1</sup> [9, pp.18-19] describes that the spacing convention reflects the degrees of potential pause between constituents (rather than that there is a dichotomy between potential pause vs. no potential pause).

### 2.3. Verse rhythm and tune-text association

In stress-based languages, the placement of lexical stress contributes to creating rhythm in verse or songs. For example, in English poetry, the location of the stressed syllables in each line is controlled for rhythmic effects. When the text is aligned to melody, the stressed syllables tend to be associated with metrically strong notes to achieve well-formed rhythm, and writers or composers may deliberately misalign stressed syllables and metrically prominent notes to create different rhythmic feels [12, 13 and references therein].

Then in Korean, how would rhythmic effects be created in verse and in tune-text alignment? *Sico* is an interesting target for investigation. It is written, recited and also sung, and it is considered the most representative form of rhythmic verse in Korean.

### 3. SICO: TRADITIONAL VERSE

The origin of *sico* is not clear but its forms seem to have been established around the 10<sup>th</sup> century [15]. Although the *sico* was traditionally composed for sung performance, it is considered and appreciated as independent literary work.<sup>2</sup> One piece of *sico* consists of three lines, and each line generally comprises four groups which have from three to five syllables each. The standard description on *sico* rhythm is that each line is composed of fourteen or fifteen syllables and the syllable count is the primary structural feature of *sico* [e.g. 16].

On the contrary, [10, 11, 15] suggest that the *sico* rhythm is accentual than syllabic; the syllable count varies across *sico* and the groups within the line are accentual units. The four groups generally correspond to syntactic slots but their boundaries do not always coincide with the syntactic boundaries. Although the definition on the accent in [10, 11, 15] is intuitive (and the authors are native English speakers who may be more sensitive to syllable prominence than native Korean speakers), their descriptions on the four groups as rhythm units are similar to those on the AP; [10, 11] also point out the importance of the pitch movement within the group and that the rhythm unit serves as a natural rhythmic basis of Korean speech.

When the *sico* is sung, one melody can be used for all *sico* pieces, and it is usually accompanied by

a drum and wind instruments. The sung *sico* reflects the structure of the written version in that the three lines are placed into three major sections separated by instrumental transition. Upon a casual listen, listeners hear extremely lengthened syllables, and it would seem impossible to follow any underlying beats or identify whether the text is aligned to any specific points in melody. Beats are used in the musical transcription of the *sico*, but Korean musicologists suggest that they are not equidistant and the interval between beats is subjective, and the alignment between the drum beats and singing entirely depends on the rapport between the performers [8].

In addition to the rhythm unit in written *sico*, [10, 11] identify the musical segment (MS). [10, 11] suggest that in the sung performance, the first two lines are divided into five MSs (the last rhythm unit is divided into two MSs) and the final line into three MSs.

## 4. DATA ANALYSIS

Four pieces of *sico* (*tongchangi*, *welchengmyeng*, *chongsanli* and *napiya*) sung by trained singers between the 1960s and 2007 were selected on the on-line video viewing site. For each *sico*, data from two singers were analysed (6 females and 1 male, one singer sung both *tongchani* and *napiya*). The boundaries of the syllable, the pause unit (PU, not discussed in literature but identified in acoustic analysis), the musical segment (MS), the rhythm unit (RU) and the line were annotated and their duration was measured with Praat.

### 4. 1 Syllable count and duration

A syllable is longer than 5s on average (Table 1) and the duration goes over the known psychological present (2-3s, [2]). Therefore even if there is systematic temporal patterning of syllables, listeners would not be able to follow it.

Fig. 1 shows that the durational patterns are similar across singers for *welchenmyeng* and *chongsanli*; on the other hand, the two singers' patterns are different in *napiya* and in lines 2 and 3 in *tongchangi*. That is, the same syllables in text can be sung with different durational patterns; singing is not under the constraint that certain syllables within a word should be lengthened. However, some shared stylised timing properties are observed; all singers employed the short-long-short pattern for the first three syllables in Line 1 and they end Line 3 abruptly with a short syllable, probably to signal the beginning and the end of the *sico*.

In addition, the majority of the rhythm units (77%) begin with the short-long sequence (cf. a

similar bias in Japanese [3]). This may seem counter-intuitive, since the first note is considered the strong beat [10, 11, 15]. In stereotypical Western music, an association between the strong beat and a long syllable would be preferred.

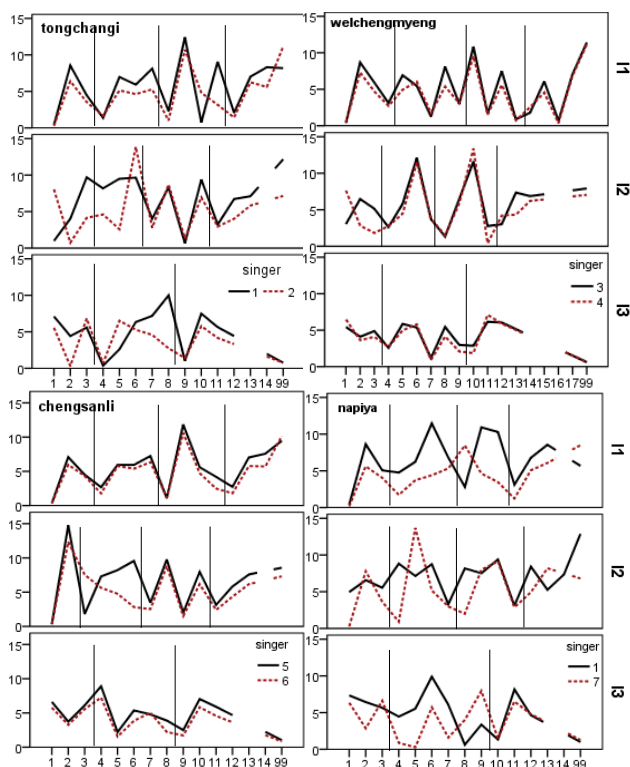
**Table 1:** Duration (s) of syllable (N = 339), PU (N = 169), MS (N = 104), RU (N = 88), and line (N = 24)

	syllable	PU	MS	RU	line
mean	5.14	10.21	17.09	20.21	75.81
sd	3.10	3.64	5.87	5.60	17.77
min.	0.18	2.74	5.67	9.85	46.03
max.	14.76	20	30.75	34.22	113.53

**Table 2:** The range of syllable count in each RU. RU4 in Line 3 is omitted in sung performance.

	RU1	RU2	RU3	RU4
line 1	3	4-5	3-4	4-6
line 2	2-3	4	4	4
line 3	3	5-6	3-4	(omitted)

**Figure 1:** Syllable duration (s) in each *sico*. RU boundary is marked with a vertical line. The line-final syllable is annotated as 99 on the x-axis.

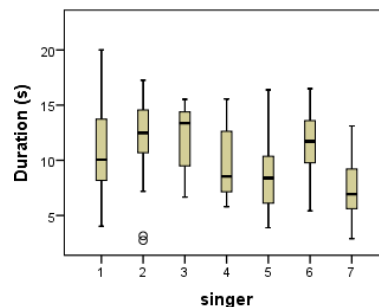


#### 4.2 Pause unit (PU) duration

Although a breath pause is considered one of the markers of RU in literature, in the data, it seemed to demarcate a prosodic group independent from RU or

MS. The PU tends to be shorter than the RU (Table 1). The number of PUs and their duration in each *sico* differ across singers (Fig. 2). While the boundaries of RUs and MSs are prescribed in text, it seems the singer deliberately mismatches boundaries of different prosodic units by manipulating the PU boundary locations to give the effect similar to syncopation (e.g. Fig.3).

**Figure 2:** Pause unit duration (s), singers 1 (N = 45, two *sico* pieces), 2 (N = 16), 3 (N=19), 4 (N=21), 5 (N=26), 6 (N = 17), 7 (N=25)



**Figure 3:** Unit boundaries in Line 2, *tongchangi* ('though your way runs swiftly down to the sea, there is no such easy return'), Singer 1. The first line shows phonemic transcriptions and syntactic boundaries.

[il. to. tɛ<sup>h</sup>aj. he.] [ha. mjan.] [ta. si. o. ki.] [a. lja. wa. la]  
 RU [ ] [ ] [ ] [ ]  
 MS [ ] [ ] [ ] [ ] [ ] [ ]  
 PU [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

#### 4.3 The musical segment (MS)

The MS duration (Fig. 4) reveals consistent short-long alternations across singers and *sico*. There are clear peaks at MS2/3, MS7/8 and MS12 which correspond to the second or third RU in each line. The valleys at MS5 and MS10 correspond to the final syllable in Lines 1 and 2, respectively.

#### 4.4 The rhythm unit (RU)

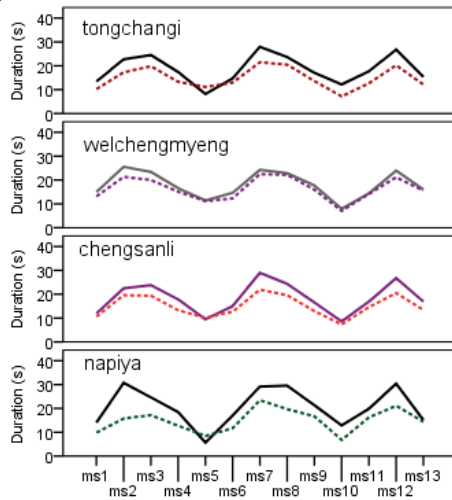
Although RUs (Fig. 5) do not show clear temporal alternations as in Fig. 4, the patterns across singers are more consistent than those in Fig.1. The first RU in each line is realised as the valleys at RU1, RU5 and RU9. [15] notes that the alternation between short and long rhythm units is one of the means to achieve the rhythmic charm in *sico*; that may be true but in sung performance, the alternation is more obvious with MS than with RU.

#### 4.5 The line

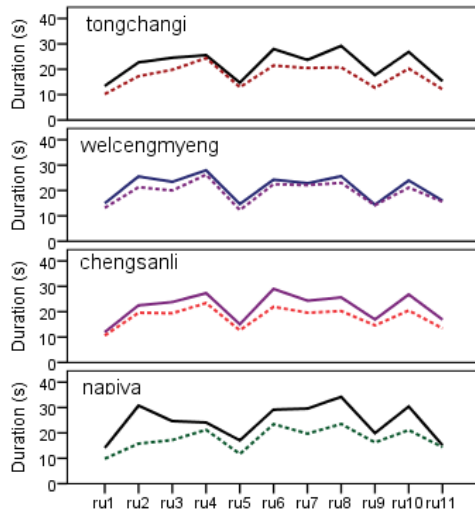
When the duration is averaged across singers, the duration of the first two lines is similar (Line 1, M = 83.86, SD = 3.44; Line 2, M = 85.63, SD = 3.87)

although Line 3 is shorter ( $M = 54.41$ ,  $SD = 2.58$ ), due to the omission of the final RU in performance.

**Figure 4:** MS duration (s). Each line represents a singer.



**Figure 5:** RU duration (s). Each line represents a singer.



## 5. DISCUSSION

The results of durational measurements show that there is no strict temporal template imposed on the realisation of the syllable in *sico* performance. The variations related the syllable are common in both writing (i.e. variable syllable counts across *sico*) and singing (i.e. variable durational patterns across singers for the same *sico* and also across *sico*). However, some stylised temporal properties are noted and this implies that the treatment of syllable duration is not entirely up to each performer. For example, the rhythm unit tends to begin with a sequence of short-long syllables, and the syllable shortening occurs at the beginning of lines across *sico* and singers. That is, there are systematic durational markers signalling the grouping structure.

Relatively consistent durational patterns across *sico* and singers emerge when duration of the rhythm unit or the musical segment is plotted. The number and the location of the rhythm unit or musical segment boundaries are prescribed within each *sico* and largely predictable. As discussed in [15], the rhythmic effect that authors and readers appreciate may arise from the alternation of the rhythm units with different length in text. In the musical setting, the musical segment, which is a unit derived from the rhythm unit, seems to take up the rhythmic role. Thus, the temporal building block of *sico* is the rhythm unit, which is similar to the AP<sup>3</sup>, or the musical segment in musical performance.

Despite the variability shown in the syllable duration measurements, singers' treatments of duration are consistent for larger units, and the first two lines show similar duration when averaged. The training for the *sico* performance seems to involve realising the temporal contour (e.g. Fig. 4) beyond the psychological present. In addition, singers create the individual style by manipulating the pause unit boundary location whilst faithfully realising the prescribed musical segments.

The syllable seems to be a salient linguistic unit to native Korean speakers. Their clear intuition about the syllable boundary would be advantageous in comprehending speech, since the majority of Korean sentences can be segmented into a sequence of monosyllabic or disyllabic morphemes. Also the syllable can play a role in creating regular rhythm. For instance, having the same number of syllables in the consecutive rhythm units would give the sense of repetitive rhythm. However, it is not the regularity which is pursued by *sico* writers, performers or listeners. The verse rhythm is the effect arising from the way syllables with different properties are arranged and grouped together, not from the properties of the syllables *per se*.

## 6. CONCLUSIONS

In *sico* sung performance, variations across *sico* and singers are observed for the syllable duration and the formation of the pause unit. However, the prescribed rhythm units which generally correspond to syntactic units in text are faithfully realised, and their duration varies systematically to signal the line structure and to create rhythmic effects. The central temporal unit in *sico* is not the syllable, but the word-sized elastic prosodic unit resembling the AP in writing, and the musical segment in singing which is derived from the rhythm unit. This finding does not support the proposal that there may be a direct link between the unit of speech segmentation and the primary rhythm unit in Korean verse.

## 7. REFERENCES

- [1] Cho, M.-H. 2004. Rhythmic typology of Korean speech. *Cognitive Processing* 5, 249-253.
- [2] Fraisse, P. 1984. Perception and estimation of time. *Annual Review of Psychology* 35, 1-36.
- [3] Iversen, J. R., Patel, A. D., Ohgushi, K. 2008. Perception of rhythmic grouping depends on auditory experience. *Journal of the Acoustical Society of America* 124, 2263-2271.
- [4] Kim, J., Davis, C., Cutler, A. 2008. Perceptual tests of rhythmic similarity: II. Syllable rhythm. *Language and Speech* 51, 343-359.
- [5] Jun, S.-A. 2005. Korean intonational phonology and prosodic transcription. In: Jun, S.-A. (ed.), *Prosodic Typology*, Oxford University Press, 201-229.
- [6] Jun, S.-A. 2014. Prosodic typology: by prominence type, word prosody, and macro-rhythm. In: Jun, S.-A. (ed.), *Prosodic Typology II: The Phonology of Intonation and Phrasing*, Oxford University Press, 520-540.
- [7] Lee, H.-b., Jin, N.-t., Seong, C.-j., Jung, I.-j., Lee, S.-m. 1994. An experimental phonetic study of speech rhythm in standard Korean. In the *Proceedings of the ICSLP*, 1091-1094.
- [8] Lee, K.-S. 1975. Providing Korean rhythmic experiences in the classroom. *Korea Journal* 15, 25-30.
- [9] Martin, S. E. 1992. *A Reference Grammar of Korean*, Tuttle Publishing: Singapore.
- [10] McCann, D. R. 1976. The structure of Korean sijo. *Harvard Journal of Asiatic Studies* 36, 114-134.
- [11] McCann, D. R. 1988. *Form and Freedom in Korean Poetry*. Brill.
- [12] Nolan, F., Jeon, H.-S. 2014. Speech rhythm: a metaphor? *Philosophical Transactions of Royal Society B: Biological Sciences* 369.
- [13] Patel, A. D. 2008. *Music, Language and the Brain*. Oxford University Press.
- [14] Ramsey, S. R. 1978. *Accent and Morphology in Korean Dialects: A Descriptive and Historical Study*. Top publication.
- [15] Rutt, R. 1958. An Introduction to the sijo: A form of short Korean poem. *Transactions of the Korea Branch of the Royal Asiatic Society* 34, 1-88.
- [16] Sohn, H.-M., Lee, P. H. 2003. Language, forms, prosody and themes. In: Lee, P. H. (ed.) *A History of Korean Literature*. Cambridge University Press, 15-51.
- [17] Temperley, N., Temperley, D. 2013. Stress-meter alignment in French vocal music. *Journal of the Acoustical Society of America* 134, 520-527.
- [18] Yoon, Y. B. 1994. Syllable saliency in Korean: Evidence from sound similarity judgment task. *Papers in Experimental and Theoretical Linguistics* 2, 76-87. University of Alberta.
- [19] Yun, I. 1998. *A Study of Timing in Korean Speech*. PhD thesis. University of Reading.
- <sup>1</sup>Enquiries about spacing are often posted to the National Institute of the Korean Language (Twitter @urimal365).
- <sup>2</sup>There are three standard types of *sico*, *phyengsico* /p<sup>h</sup>jaŋsitɕo/, *essico* /ʌtsitɕo/ and *saselsico* /sasʌsitɕo/, which differ in their length and style. The focus of this paper is *phyengsico* only.
- <sup>3</sup>Examining the sound change since the Middle Korean period (10<sup>th</sup>-16<sup>th</sup> centuries) brings an insight into why the AP-like elastic prosodic unit plays a role as the rhythmic basis in speech and verse. The majority of, or all Middle Korean dialects seem to have been pitch-accented, and the pitch accent is maintained in some dialects such as Kyongsang Korean [cf. 14]. Seoul Korean has undergone rapid prosodic changes, lost the pitch accent, but probably it maintains the accent-related grouping since it reflects to the morpho-syntactic structure.