

# SYLLABIFICATION PHENOMENA IN KOREAN\*

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1. In Korean there are two types of phonological phenomenon that take place at utterance final position, i.e., at pause and at preconsonantal position. One type involves the change of obstruents to unreleased nontense stops as illustrated in (1).<sup>1</sup>

(1) a.	/cəs+i/	‘milk Nom(inative)’	[cəʃi]
	/cəs/	‘milk’	[cət]
	/cəs+kwa/	‘milk and’	[cətʰkʰwa]
b.	/kʰocʰ+il/	‘flower Acc(usative)’	[kʰocʰil]
	/kʰocʰ/	‘flower’	[kʰot]
	/kʰocʰ+kwa/	‘flower and’	[kʰotʰkʰwa]
c.	/nac+e/	‘in the daytime’	[naje]
	/nac/	‘daytime’	[nat]
	/nac+kwa/	‘daytime and’	[natʰkʰwa]
d.	/apʰ+i/	‘front Nom’	[apʰi]
	/apʰ/	‘front’	[ap]
	/apʰ+to/	‘front also’	[apʰtʰo]

The underlying fricative *s* of /cəs/ ‘milk’, for example, is realized as *t* when the form is pronounced in utterance final position or in combination with another morpheme that begins with a consonant. The other type of phenomenon, illustrated in (2), has to do with consonant cluster simplification.

(2) a.	/kaps+i/	‘price Nom’	[kapʃʰi]
	/kaps/	‘price’	[kap]
	/kaps+kwa/	‘price and’	[kapkʰwa]
b.	/nəks+il/	‘spirit Acc’	[nekʃʰil]
	/nəks/	‘spirit’	[nək]
	/nəks+to/	‘spirit also’	[nəkʰto]

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<sup>1</sup> Besides the change under consideration, some additional rules are involved in the examples. That is, tensing of an obstruent after a stop (e.g., the third examples of (1a, b, c, and d)), voicing of a plosive between voiced segments (e.g., the first example of (1c)), and palatalization of *s* before *i* (e.g., (1a)). *kʰ* and *tʰ* represent tense *k* and *t* respectively.

c, /tols+i/	'anniversary Nom'	[tolš'i]
/tols/	'anniversary'	[tol]
/tols+kwa/	'anniversary and'	[tolgwa]

The final consonant cluster *ps* of /kaps/ 'price', for example, is simplified to *p* in both utterance final and pre-consonantal position, the same environment in which obstruents become unreleased stops.

Within the framework of standard generative phonology (cf. Chomsky & Halle 1968), the above phenomena are handled by the following two rules (cf. C.-W. Kim 1972):

- (3) a. 
$$[-\text{sonorant}] \rightarrow \left. \begin{array}{l} -\text{release} \\ -\text{tense} \\ -\text{continuant} \\ -\text{strident} \end{array} \right\} / \text{_____} \left\{ \begin{array}{l} \# \\ C \end{array} \right\}$$
- b. 
$$C \rightarrow \phi / C \text{_____} \left\{ \begin{array}{l} \# \\ C \end{array} \right\}^2$$

One basic problem in this analysis is that the phenomena are described to take place at two unrelated environments; one word finally and the other before a consonant. That is, the description offers no explanation as to why the phenomena occur in those dissimilar environments, and it leaves unanswered questions such as why the phenomena take place before a consonant instead of before a vowel, etc. Furthermore, the entire phenomena under consideration require a far more abstract account than the notions involved in the rules given in (3). In addition to the cases in (1) and (2) there are cases where an obstruent is changed to an unreleased stop even before a vowel, as shown in (4).

- (4) a. /cəs+əmi/ 'wet nurse' [cədəmi]  
 b. /k'oc<sup>h</sup>+wi/ 'top of the flower' [k'odwi]  
 c. /ap<sup>h</sup>+untɔŋcaŋ/ 'front playground' [abundoŋjaŋ]  
 d. /məs+əps+ta/ 'without style' [mədəpt'a]

Similarly, there are cases, as illustrated in (5), where consonant cluster simplification takes place even before a vowel.

- (5) a. /nəks+əps+ta/ 'without spirit' [nəgəpt'a]<sup>3</sup>  
 b. /kaps+əps+ta/ 'without reward' [kabəpt'a]  
 c. /tols+aki/ 'one year old baby' [toragi]

In both cases the segments in question occur neither in utterance final position nor in pre-consonantal position, yet the phenomena take place. The phenomena, in other words, cannot be accounted for by rules such as the ones in (3) that merely refer to segment sequences.

Superficially, the phenomena of consonant cluster simplification and the change of

<sup>2</sup> Rule (3b) says that the second consonant of a consonant cluster is deleted. However, in some cases the first consonant is deleted. Cf. C.-W. Kim (1972) for the principle of determining the deleted consonant.

<sup>3</sup> A phrase of this type occurs in an utterance like *ki sarami nəgəpt'a* 'He is absent-minded.'

obstruents to unreleased stops thus appear to occur at diversified and unrelated environments. A most natural solution for these phenomena calls for a concept that is not integrated in the standard theory of generative phonology, namely the concept of syllables. In Korean a syllable boundary falls before a consonant followed by a vowel as well as in utterance initial and utterance final positions, i.e., the environments of the rules in (3) represent the place of a syllable boundary. Re-examination of the data in (1) and (2) with the notion of syllables in mind reveals the reason why the phenomena take place in utterance final position and before another consonant, but not before a vowel; while the two former environments involve a place of syllable boundary, the last environment does not.

2. Korean allows the following types of syllable at the phonetic level:

- |           |        |         |
|-----------|--------|---------|
| (6) a. CV | b. CGV | c. GV   |
| d. V      | e. CVC | f. CGVC |
| g. GVC    | h. VC  |         |

Korean, in other words, has the following surface phonetic constraint on the syllable structure: S (C) (G) V (C) S.<sup>4</sup> Among these eight permissible syllable types, CV is the most preferred type. The manner of syllabification by native speakers of Korean reveals the presence of the above syllable types and the preference of the CV type. In dealing with a nonsense string of segments or by paying no attention to morpheme boundaries, a native speaker syllabifies a string of segments such as CVCVCGV as CVSCVSCGV rather than CVCSVSCGV or any other way. A rule that assigns syllable boundaries in appropriate places in Korean can be given as in (7).

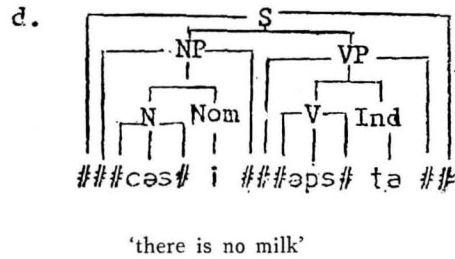
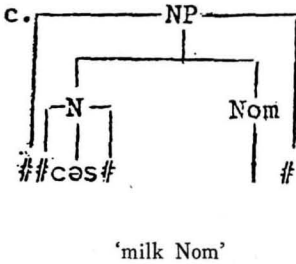
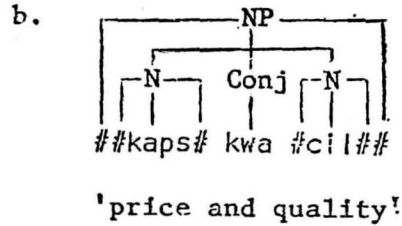
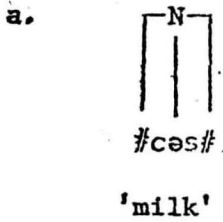
(7) Segment Syllabification Rule

$$\phi \longrightarrow S / \text{---} (C) (G) V$$

In addition to syllabification dealing specifically with segment sequences, there is another type of syllabification involved. The second type of syllabification is associated with grammatical information. Major constituent breaks such as that between a noun phrase and a verb phrase, as well as utterance initial and utterance final positions are grammatically determined places for potential pause, and syllable boundaries are associated with them. Assuming that a node that directly or indirectly dominates a major lexical category (e.g. noun, verb) carries a boundary symbol on both sides, a major constituent break can be defined as a place where two or more #-boundary symbols occur. The following diagrams illustrate the boundary assignment to phrases with different constituent structures.

<sup>4</sup> Cf. Shibatani (1973) for the role of surface phonetic constraints in phonology.

(8)



Rules that assign syllable boundaries to utterance initial and utterance final positions and major constituent breaks can be given in the following form:

(9) Constituent Syllabification Rule

$$\phi \rightarrow S / \left\{ \begin{array}{l} \# \\ \#2 \end{array} \right\}$$

(where # is an utterance initial or final position.)

The Constituent Syllabification Rule assigns syllable boundaries to a string like #cæs# 'milk' uttered in isolation as ScæsS, and to a string like ##cæs#i##æps#tə## 'there is no milk' as ScæsiSəpstəS.

The essential difference between the Constituent Syllabification Rule and the Segment Syllabification Rule is that while the former assigns syllable boundaries to a phonological phrase, the latter assigns syllable boundaries within a phonological phrase. The output of the Constituent Syllabification Rule ScæsiSəpstəS is further syllabified by the Segment Syllabification Rule to become ScæSsiSəpsStəS.

The cases in (1) and (2) can now be viewed as phenomena having to do with the syllabification processes of the language. The string /cæs+i/ 'milk Nom' in isolation is syllabified as ScæSsiS, while the string /cæs/ 'milk' and /cæs+kwa/ 'milk and' in isolation are syllabified as ScæsS and ScæsSkwaS, where the obstruent s occurs at a syllable boundary. Similarly, the string /kaps+i/ 'price Nom' is syllabified as SkapsSiS, while the strings /kaps/ 'price' and /kaps+kwa/ 'price and' in isolation are syllabified as SkapsS and SkapsSkwaS, where the consonant cluster ps occurs at a syllable boundary.

Thus, if the concept of syllables is adopted, a more general and revealing account can be given for the phenomena observed in (1) and (2). The rules accounting for the

data can now be stated as in (10).

(10) Syllable-Ending Adjustment Rules

- a.  $[-\text{sonorant}] \rightarrow \left( \begin{array}{l} -\text{release} \\ -\text{tense} \\ -\text{continuant} \\ -\text{strident} \end{array} \right) / \text{ \_\_\_\_\_\_ } S$
- b.  $C \rightarrow \phi / C \text{ \_\_\_\_\_\_ } S$

Once the syllabification rules and the relevant rules are reformulated appropriately, the function of the rules involved becomes clear. As outputs of the syllabification rules such as SkapsS and SkapsSkwaS involve the syllable SCVCCS, unpermitted phonetically in the language, there is a need to modify it. The function of (10b) precisely to modify unpermitted syllable structures.<sup>5</sup> In the case of the sequence SkapSsiS, no ill-formed syllable is involved, and no rule needs to apply. Similarly, the function of (10a) is to modify phonetically ill-formed syllable final segments such as -sS, -c<sup>h</sup>S to permissible ones. For ease of exposition the rules in (10) are henceforth referred to as the syllable-ending adjustment rules.

Not only is it the case that the rules in (10) together with the two types of syllabification rule provide a far more revealing account for the phenomena observed in (1) and (2), but it is also the case that a unified account for these phenomena and those seen in (4) and (5) seems possible only if the rules are given as in (10). Examination of the data in (4) and (5) in the light of the above reformulated rules reveal an intricate interplay of the two types of syllabification rules and the syllable-ending adjustment rules. First, the forms in (4) are nominal compounds (except(4d)) involving the constituent structure of the forms given in (11).<sup>6</sup>

- (11) a.  $\begin{array}{c} N \\ | \\ \begin{array}{cc} | & | \\ N & N \\ | & | \\ c\acute{e}s & \acute{e}mi \\ \hline [c\acute{e}d\acute{e}mi] \end{array} \end{array}$
- b.  $\begin{array}{c} N \\ | \\ \begin{array}{cc} | & | \\ N & N \\ | & | \\ k'oc^h & wi \\ \hline [k'odwi] \end{array} \end{array}$

It is the form of the above constituent structure type that ultimately triggers one of the syllable-ending adjustment rules. Since each node dominating a major lexical category involves a word boundary, #, the constituent structures in (11) entail the following boundary configurations:

- (12) a. # #c\acute{e}s# #\acute{e}mi# #      b. # #k'oc<sup>h</sup># #wi##

In other words, at the abstract level nominal compounds by the boundary convention contain between the two nominal elements a boundary configuration having a characteristic of a major constituent break, though at the phonetic level this break is obliterated by

<sup>5</sup> Cf. Shibatani (1973) for discussion of the interaction of phonological rules and surface phonetic constraints.

<sup>6</sup> See below for the constituent structure involved in (4d).

the subsequent application of the Segment Syllabification Rule.

By the application of the Constituent Syllabification Rule, the two nominal compounds result in the following syllable structures at the abstract level:

- (13) a. ScəsSəmiS                          b. Sk'oc<sup>h</sup>SwiS

What occurs at this stage of derivation is the application of the syllable-ending adjustment rule (10a), which yields the following outputs:

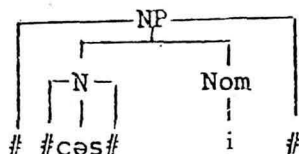
- (14) a. ScətSəmiS                          b. Sk'otSwiS

After the application of the Segment Syllabification Rule and other relevant rules, the phonetic forms emerge as below:

- |            |           |                              |
|------------|-----------|------------------------------|
| (15) a.    | b.        |                              |
| ScəStəsMiS | Sk'oStwiS | Segment Syllabification Rule |
| [cədəmi]   | [k'odwi]  | Other relevant rules         |

Comparison of the above derivation with that of forms such as /cəs+i/ [cəši] clearly points out a phonological consequence that a difference in the constituent structure brings about. Unlike nominal compounds, a form like /cəs+i/ has the following constituent structure:

(16)



Since the Nom node does not dominate a major lexical category, there is only one # -boundary between the noun and the nominative particle; as a consequence the Constituent Syllabification Rule does not put a syllable boundary between /cəs/ and /i/. Hence no syllable-ending adjustment rule applies, and the underlying *s* surfaces as it is phonetically.

Another crucial point to be noted here is that the Segment Syllabification Rule must follow the syllable-ending adjustment rules; if the Segment Syllabification Rule were to apply immediately after the Constituent Syllabification Rule, (13) would turn to ScəsSəsMiS and Sk'oSc<sup>h</sup>wiS to which no syllable-ending adjustment rule can apply. Examination of the data in (5), in fact, points out that the interaction of the syllabification rules and the syllable-ending adjustment rules is even more intricate; the Segment Syllabification Rule applies throughout the derivation,<sup>7</sup> but it may do so only after the initial application of the applicable syllable-ending adjustment rules, which may apply before as well as after the Segment Syllabification Rule.

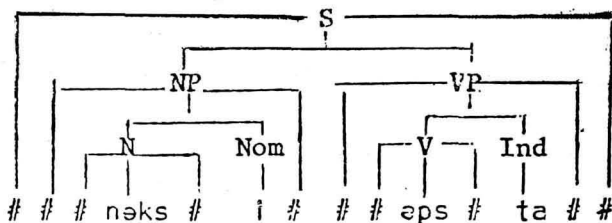
4. Phrases (a) and (b) in (5) are forms that have undergone deletion of the nominative particle /i/; their corresponding full forms are given in (17).

<sup>7</sup> Cf. Hooper (1972) for other cases where a rule comparable to our Segment Syllabification Rule applies throughout the derivation.

- (17) a. /nəks+i+əps+ta/ 'there is no spirit (absent-minded)'  
 [nəkš'iəpt'a]  
 /kaps+i+əps+ta/ 'there is no value'  
 [kapš'iəpt'a]

The constituent structure of (17a) is given in (18).

(18)



For this fuller form, the syllabification rules put syllable boundaries as follows, and no syllable-ending rule affects the cluster *ks* of /nəks/ 'spirit'; only the cluster *ps* of /əps/ 'not exist' is adjusted.

- (19) SnəkSsiSəpsStaS  
 [nəkš'iəpt'a]

However, in the case of the form without the nominative particle, the Constituent Syllabification Rule places a syllable boundary immediately after the subject /nəks/ 'spirit', as shown in (20a).

- (20) # # # nəks # # # # əps # ta # #      Constituent Syllabification Rule  
 a. SnəksSəpstaS                              Rule (10b)  
 b. SnəkSəpstaS                                Segment Syllabification Rule  
 c. SnəkSəpsStaS                                Rule (10b)  
 d. SnəkSəpStaS                                Segment Syllabification Rule  
 e. SnəSkəpStaS  
 f. [nəgəpt'a]                                    Other rules

(20a) is subject to one of the syllable-ending adjustment rules, (10b), and an intermediate form (20b) results. At this stage the Segment Syllabification Rule may apply since one of the syllable-ending adjustments rules has already applied. Form (20c), which results from the Segment Syllabification Rule, is again subject to the syllable-ending adjustment rule (10b). The output of the second application of Rule (10b) is in turn subject to the Segment Syllabification Rule before it turns to the eventual syllable formation of SnəkSkəpStaS.

Repeated applications of the syllable-ending adjustment rules and the Segment Syllabification Rule seem to be highly motivated as these two types of rules affect each other's applicability; the syllable-ending adjustment rules may produce a string that requires resyllabification, and syllabification by the Segment Syllabification Rule may bring about a segment sequence that needs to be adjusted by the syllable-ending adjustment rules. In

other words, both the Segment Syllabification Rule and the syllable-ending adjustment rules keep applying until the emergence of a phonological string that is compatible with surface phonetic constraints that govern the syllable structure and other aspects of the phonetic structure of the language.

Form (5c) is a straightforward case of a nominal compound that has the constituent structure type given in (11). As the Constituent Syllabification Rule places a syllable boundary between the first nominal element /tols/ 'anniversary' and the second element /aki/ 'baby', the syllable-ending adjustment rule (10b) applies yielding the near-phonetic form *tolaki*.

5. Despite the superficial difference in the environments where the phenomena of consonant cluster simplification and the change of obstruents to unreleased stops occur, a deeper analysis of the syllabification phenomena has revealed that the cases in (1), (2), (4), and (5) involve processes that in fact take place at the same environment, namely a syllable boundary. Thus the above study presents a case where integration of the concept of syllables in phonological theory yields a more general and revealing account.

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