

On Syllabification*

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1. Introduction

Various People have worked on and produced a variety of analyses for the process of syllabification. Some argue for the so-called “rule approach” to the syllable, while others advocate the “template approach.” The former (rule approach) uses syllabification “rules,” which actually “builds” syllables in the phonological derivation, interacting with phonological rules. In this approach, syllabification rules are essentially not different from other phonological rules. On the other hand, the latter (the template approach) uses syllable “templates” and conditions which are not rules but act as constraints on the structure of the syllable, defining the “possible syllable structures” permitted in the language in point.

This paper is an attempt to contribute to the template approach, though different in some important respects from other works within that framework. Basically it maintains that the process of syllabification is not that of “building” a structure called syllable which is non-existing until some sort of phonological syllabification “rules” create it, but that of “specifying” the syllable structure which is left simply “unspecified” until that process takes effect.

What this paper tries to show is to clarify this view in some more detail in ways different from other analyses. In particular, it will show that (1) the process of syllabification is a structurally specifying process, not derivationally generating one, that (2) the specification of the syllable structure is done by language-specific syllable template (with conditions) and universal association conventions, not by rules, that (3) the syllable structure is meaningful (and appealing to our intuition) only at the phonetic or surface level, not at the phonological or underlying level, (4) so the deletion of unsyllabified segments takes place only after lexical derivation, and finally, that (5) the specification is

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done anytime at any point in phonological derivation when the application of a phonological process requires the information about the syllable structure of the phonological string to which it is going to apply, so there is no distinction between initial syllabification and re-syllabification.

The Korean language is perhaps the best example to illustrate these points. In the following sections, I will show what the process of syllabification look like in Korean, hoping to exemplify a language in which syllabification process is simply a process of specification. I will give, first, the Korean data of coda simplification in 2, which will be used to exemplify Korean syllabification process, then present the Korean syllable "template" with conditions attached to it in 3 and show how syllabification takes place with that template and universal conventions and principles in 4. Then in 5 I will discuss the Continuous Syllabification Hypothesis to see if there is any difference between the initial syllabification and resyllabification, and see in 6 how unsyllabified segments are deleted with respect to the notion Structure Preservation. Finally in 7, I will summarize the points of this paper and note their implications for syllabification processes of other languages.

2. The Data

In Korean, consonant clusters in coda position are simplified as shown below:¹⁾

(1) /ks, ps, lt^h, ls, nc/ → [k, p, l, l, n], respectively.

saks 'fee' → sak

kaps 'price' → kap

halt^h- 'lick'-²⁾ → hal-

tols 'anniversary' → tol

anc- 'sit-' → an-

(2) /nh, lh/ → [n, l], respectively.

manh- 'many-' → man-

ilh- 'lose-' → il-

1) These and other reduction processes with which Korean abounds are extensively discussed in Chung (1986).

Only coda cluster reduction is discussed in this paper.

2) Forms with hypens(-) are stems of verbs or adjectives.

(3) /lk, lp, lpʰ, lm/ → [k, p, p, m](Standard), or [l, l, l, m](other dialects), respectively.

talk 'chicken' → tak or tal

palp- 'step on' → pap- or pal-

ilph- 'recite' → ip- or il-

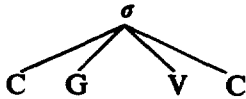
kulm- 'starve' → kum- (*not* *kul, in any dialect)

Chung (1988), with Kim Y. -S. (1985) and Kim J. -M. (1986), viewed these phenomena as a result of syllabification rather than that of other phonological processes, but Chung (1988) did not make clear exactly what the syllabification processes look like. The present paper is to make up for Chung (1988) in this respect, by clarifying the process of syllabification.

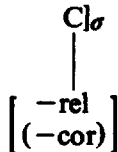
3. Korean Syllable Template

What was posited in Chung (1988) was the Basic Syllable Structure Constraint (Basic SSC), which I now divide in two parts, the 'Syllable Structure' (SS) and the 'Coda Condition' (CC), for expository purposes:

(4) Syllable Structure (SS)³⁾



(5) Coda Condition (CC)



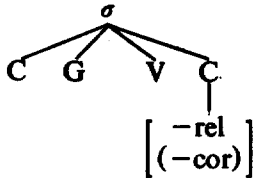
3) The G in the structure below represents 'Glide,' which can alternatively be represented as C, assuming that C represents [-syllabic] while V represents [+syllabic].

[-consonantal]

The SS (in 4) represents the fact that the surface syllable of Korean consists of one vowel, preceded by maximally one consonant and one glide, and followed by maximally one consonant. The CC (in 5) shows that the coda consonant should be [-rel].⁴⁾ The optional [-cor] is necessary to pick up the right consonant in the cluster: what remains after simplification is the [-cor] consonant (which should also be [-rel], of course), if there is one; otherwise it is the left-most consonant in the cluster.

Now the main claim of this paper is that the SS and the CC, formed on the basis of the surface structure of the syllable, constitute the "template" of Korean syllable structure (in terms of the so-called "template-approach") by which syllabification takes place throughout the phonological derivation. We can put the SS and the CC together to make Korean Syllable Template (KST) as in (6):⁵⁾

(6) Korean Syllable Template (KST)



What we need for syllabification is not the language-specific syllabification rules but the syllable template like (6), plus universal principles like those suggested by Ito (1986), which include universal association conventions, and principles of lexical and prosodic phonology such as Structure Preservation, Prosodic Licensing, Extraprosodicity and Stray Erasure. What this claim amounts to is that the only thing we need to stipulate for syllabification of a particular language is the syllable template of that particular language; everything else is taken care of by the universal conventions and principles. I will try to show just this with Korean examples, though I will go a little further and re-define the template approach.

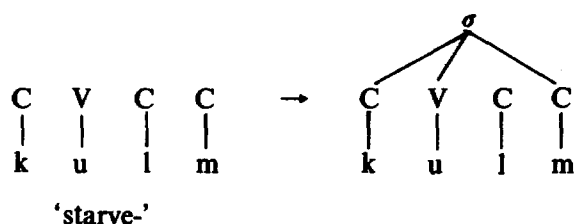
4) [-rel] represents a segment (a consonant) which is [-continuant, -delayed release, -spread glottis, -constricted glottis]. Roughly speaking, (5) means that in coda position, Korean has only those consonants which are not orally (centrally) released, such as [p, t, k, m, n, ŋ, l]. See for further discussion Chung (1988) but this is not important for our main argument.

5) We disregard the dialectal variations in the KST below, which is now in essence the same as Chung's (1988) Basic Syllable Structure Constraint.

4. Syllabification with the Syllable Template

Let us see how the Korean Syllable Template (KST) works (with universal principles) in the syllabification of Korean. First of all, we assume some kind of universal association conventions between the CV-tier and the segments and between the σ -tier and the CV-tier like those in Clements & Keyser (1983). Syllabification takes place in accordance with KST and the conventions as shown below:

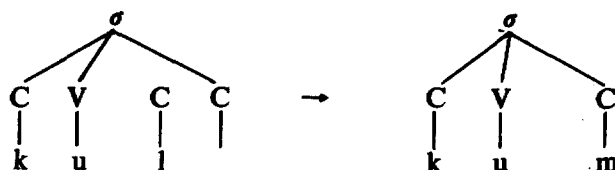
(7)



It is easy to see that (7) is done by KST and association conventions. The reason [l] is not associated is clear: it does not meet the KST (6). More specifically, it does not meet the CC (5), i.e. it is not [-cor]. The whole process of association is ensured by the universal principle of Prosodic Licensing which requires every segment to belong to a syllable (except for the cases of extrasyllabicity).

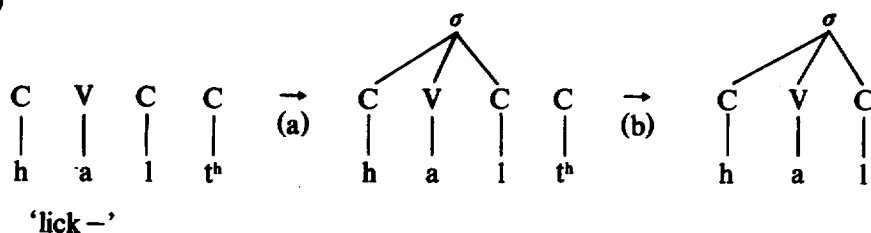
Now the next thing we need is the universal principle of Stray Erasure, which deletes the elements which are not licensed, i.e. left unassociated. In the case of *kulm*, what is unlicensed is [l], which is to be deleted by Stray Erasure, as shown in (8) below:

(8)



Another example of syllabification (and deletion) follows:

(9)



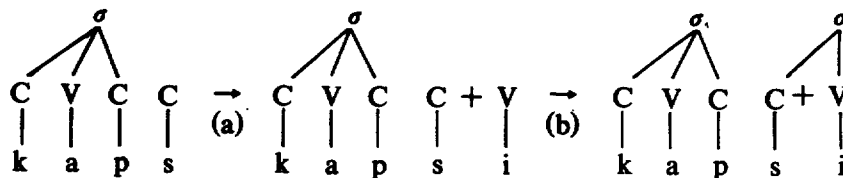
Here, only the [-rel] part of the CC (5) ([-cor] not applied) operated in (a), leaving unassociated the last segment [s]. The reason the last segment is left unassociated is that the universal association convention works from left to right in a one-to-one fashion and the Korean syllable template allows only one consonant in coda. The stray consonant [tʰ] is deleted in (b) by the universal principle of Stray Erasure as in (8) above.

Thus we have seen that syllabification is done with universal conventions and principles with one language-specific stipulation: the syllable template. All other examples in our data (1) through (3) can be quite easily and really simply analyzed with this approach.

5. ‘Resyllabification’ in the Continuous Syllabification Hypothesis

What about the cases where affixation takes place and the unassociated segments are not deleted but syllabified? For instance, /kaps/ ‘price’ becomes [kap], but /kaps+i/ ‘price + Subject Marker’ becomes [kapsi], not [kapi]. All the examples in (1) through (3) show the same phenomena. This could also be explained quite simply as shown in (10) below:

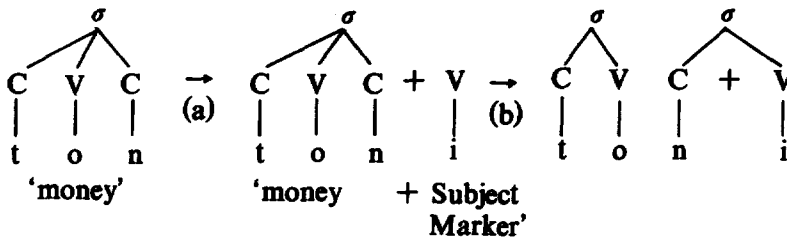
(10)



In (a) affixation of *-i* occurs and in (b) (re-)syllabification takes place. This type of process has been called ‘re-syllabification’ in contrast to the ‘initial syllabification’ which we have seen in (7) through (9). Resyllabification is meaning-

ful especially in the framework of Lexical Phonology where affixation, which is a morphological process, and syllabification, which is of course a phonological process, interact with each other in the course of derivation. Thus the underived items, which can be initially syllabified, can or should be resyllabified differently from the initially syllabified structure, after each affixation. This phenomena can be exemplified typically as in (11) below:

(11)



In (11) above, the suffixation of *-i* (Subject Marker) brings about the change: the [n], which was in the coda of the first syllable, becomes the onset of the second syllable.

In the "template-approach," however, this distinction between the initial syllabification and the resyllabification is meaningless, because in this approach, syllabification is done "continuously (cf. Itô(1986)),²" so whenever we need to know the syllable structure of a given phonological string, all we need to do is to invoke the syllable template and universal principles and do the same association processes, regardless of whether it is a derived string or underived one. In the particular example of (11), it is not the case that the line associating the first σ and the C which dominates [n] is "disassociated" and the same C is "re-associated" with the second σ . When we syllabify the string [toni], we are just looking at [toni], just like we look at [ton] or any other string, syllabifying it, without looking at its previous structure at all. It should be kept in mind that in this approach syllabification processes are not regarded to be ordered with respect to other phonological processes, because the syllable template is not a rule but a wellformedness condition which acts like a filter whenever necessary.

6. Structure Preservation and Stray Erasure

Putting the template approach we have been discussing into the framework of Lexical Phonology, I would like to claim that the KST in (6) apply both lexically and postlexically, but Stray Erasure applies at the end of lexical level (or at the beginning of postlexical level).

The reason I don't want Stray Erasure in the course of lexical derivation is that the syllable template along with coda conditions is after all a surface filter. The syllable templates and coda conditions in general are based on the surface structures and are therefore wellformedness conditions on surface structures, not conditions on underlying structures. It follows then that these templates and conditions cannot be used to constrain or change the underlying structures. Underlying structures are syllabified and some segments are left stray, waiting to be deleted only postlexically. Stray Erasure, which is a process that deletes segments which are not licensed by these surface templates and conditions, should not be allowed to change underlying structures. The principle of Structure Preservation (henceforth SP) should apply to the underlying structures in the lexical derivation, and it should not be based on the surface filters such as the Syllable Template or Coda Condition. It is in these respects that my approach differs sharply from Itô's: Itô applies SP and Stray Erasure in lexical derivations, in accordance with the surface-based syllable template and coda condition, when she analyzes languages such as Diola Fogy, which I think is clearly against the nature of the templates and conditions.

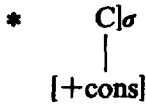
Let us look at how Itô treats these conditions and principles. Itô (1986), presenting the case of cluster simplification in Diola Fogy, a West African language, posits the following syllable template and coda condition for it:⁶⁾

(12) Diola Syllable Template:

C V V C

6) It is not clear to me why there should be two V's in the Syllable Template (13). Also, it is not clear what the final C in (13) does, considering the Coda Condition (13). I suspect that the Syllable Template (12) does not play as much role as the Coda Condition (14) in Itô's analysis. But we will not pursue these questions here.

(13) Diola Coda Condition:

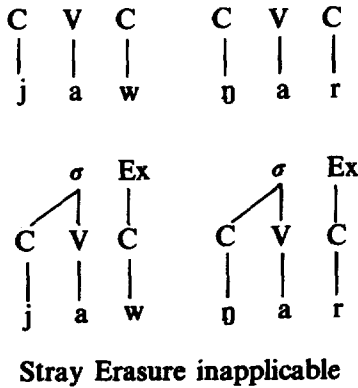


Diola has nasals or liquids in coda (e.g. [kaykan], [ekumbay], [ninenne], [salte], [artil]), but not obstruents (or glides which are assumed to be [+cons] by Itô). in medial syllables.⁷⁾ Since nasal or liquid codas can be derived by Melody Spread from the immediately following consonant, Itô maintains that the condition (13), which disallows syllable final [+consonant] segment, can account for all the data. Part of a typical derivation is shown below:

(14) Derivation of Diola *a-jaw-bu-ɔar* 'voyager' ['Person Marker-Go-Noun Marker-road']

Lexical Derivation

1st cycle

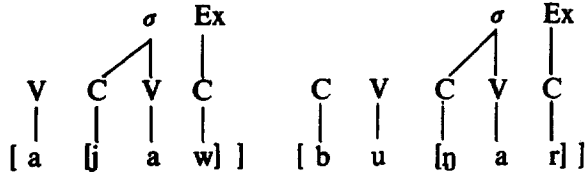


Syllabification/
Extraprosodicity⁸⁾

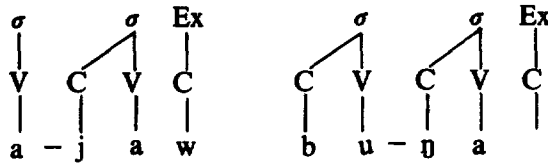
7) Final syllables can have all sorts of consonants in coda, but they can be taken care of by word-final extraprosodicity. So we have only to deal with medial syllables.

8) Word-final consonants are extraprosodic.

2nd cycle

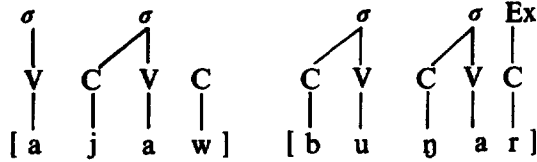


Affixation



Syllabification

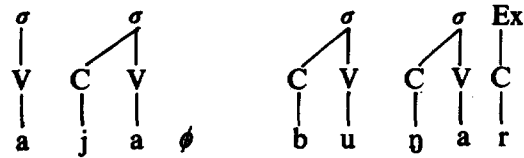
3rd cycle



Compounding

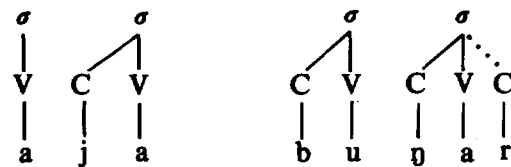
Syllabification blocked by SP

Syllabification



Stray Erasure

Postlexical Derivation



Syllabification

Stray Erasure inapplicable

Stray Erasure

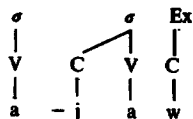
According to Itô, the *w* (of *ajaw*) is not syllabified (after compounding)⁹⁾ because it is [+consonantal] and thus violates the Coda Condition, which should be followed under the principle of Structure Preservation during the lexical derivation. Therefore it is deleted by Stray Erasure. On the other hand, the final *r*, which loses its extraprosodicity in the postlexical strata, is syllabified regardless of the Coda Condition, because the principle of SP no longer holds in the postlexical derivation.

What is strange about Itô's analysis is that the principle of SP applies to keep the *surface structure* of the syllable, not the underlying one. As can be seen clearly even in the above example, Diola syllable has a final consonant underlyingly, which is deleted on the surface. Notice that the syllable template and the coda condition are all *surface* generalizations (surface wellformedness conditions, as she says), not *underlying* ones. To work as filters, the templates and conditions should represent surface forms, and this is not surprising, but once this surface filter is put to work in the lexical derivation, it suffices to use them as tools to specify the segments which have the *potential* to be deleted later on on the surface. It does not seem to make much sense to claim that the lexical structure is preserved under SP by *deleting the underlying segments*.

My proposal is to make Stray Erasure apply only at the word level, that is, at the end of lexical derivation. The principle of SP should rather be invoked to preserve the underlying structure, which can be represented by MSC (Morpheme Structure Conditions) or the like, so no underlying segments could be deleted until the end of lexical derivation. Thus it should only be at the postlexical level where SP is turned off that Stray Erasure applies. Now we have the division of the load: underlying structures by MSC, and surface structures by SS and CC. After all, prosodic licensing has to do with surface string, not with underlying string, and syllabification is a process that defines what is a pronounceable string.

If we apply Stray Erasure only at the end of lexical derivation, all those inter-

9) Before compounding *ajaw* was syllabified like:

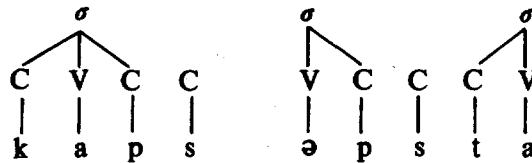
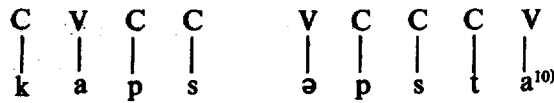


After compounding, the final *w* loses its extraprosodicity because it is now in an internal position.

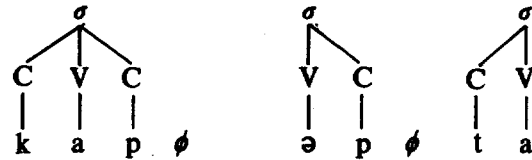
mediate applications of Stray Erasure shown above in the case of Diola, which are vacuous anyway, will be unnecessary. For the case of Korean, we will have following derivation:

(15) Derivation of Korean *kapsəpta* 'valueless' ['value not-exist']

Lexical Derivation

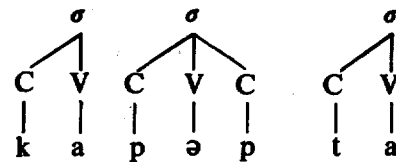


Syllabification¹¹⁾



Stray Erasure

Postlexical Derivation



Syllabification

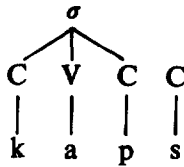
Here, it is shown that Stray Erasure should be applied before postlexical derivation, because otherwise we will have *[kapsəpta] at the postlexical level. The correct form should be [kapəpta] (phonetically [kabəpta] after intervocalic voicing). The following derivation shows that Stray Erasure should be applied at the end of lexical derivation:

10) Affixation of *ta* (sentence ender) to the stem *əps* ('non-existing') is ignored, because it is irrelevant to our argument.

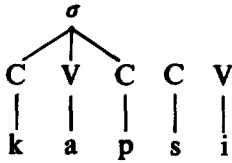
11) Extraprosodicity is ignored in the Korean case.

(16) Derivation of Korean *kaps-i* 'price-Subject Marker'

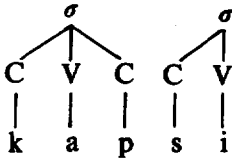
Lexical Derivation



Syllabification



Affixation

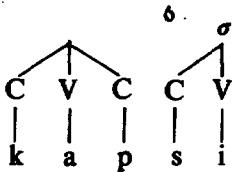


Syllabification

Stray Erasure inapplicable

Stray Erasure

Postlexical Derivation



If Stray Erasure is applied after the first syllabification, we will get the wrong result: *[kapi] (or phonetically *[kabi]. Though of course the erasure of [s] after the first syllabification can be blocked by positing extraprosodicity for it like Itô did, it is better to ensure true that Stray Erasure does not apply there, whether

or not the final consonant is treated as extraprosodic.

7. Summary and Conclusion

Thus far, we have observed two cases of consonant cluster simplification, those of Korean and Diola Fogny, and our findings can be summarized as follows:

(17) Syllabification process: a summary

a. Syllabification can be done with a language-specific syllable template (with conditions) and universal conventions of association and universal principles of Prosodic Licensing and Stray Erasure.

b. The syllable template is a surface-based wellformedness condition, and syllabification is a filtering process with this condition.

c. Syllabification is done continuously and automatically throughout the derivation; no distinction is necessary between the initial syllabification and re-syllabification.

the beginning of postlexical derivation).

e. Structure Preservation does not have anything to do with syllabification and Stray Erasure, but with preserving underlying structures whatever they might be.

Further investigation for these and other languages will be necessary to confirm (or disconfirm) these claims and especially to analyze languages which have very complicated syllabification process such as English.

References

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