Consonant-Glide Sequences and the Syllable Contact Asymmetry in Korean

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Abstract

Although onset clusters are generally not allowed in Korean, glides /j/ and /w/ may follow an onset consonant. Regarding the status of these consonant-glide sequences in Korean, three competing theories can be considered: the Nucleus Hypothesis (the glide is part of the nucleus), the Simple Onset Hypothesis (the glide occurs as a secondary articulation for the preceding single onset consonant), and the Complex Onset Hypothesis (the glide is a second element in an onset cluster). In their analysis of the syllable contact asymmetry in Korean, Baertsch and Davis (2008) assume the Nucleus Hypothesis and view glides in consonant-onset sequences as part of the nucleus of the syllable. In this paper, I examine how each of the hypotheses fits into the framework of the Split Margin Analysis of the syllable contact phenomenon in Korean. The split margin hypothesis postulates that the second element of an onset cluster and the last element of a coda are governed by a shared class of positional constraints, and accounts for the prohibition of syllable contact sequences with increasing sonority as one of its consequences. I argue that while analyses based on the first two hypotheses are fairly similar and thus require none to minimal change to Baertsch and Davis 's analysis, the Complex Onset Hypothesis requires adjusting the relative ranking of FAITH with respect to the relevant conjoined constraints, and doing so is not directly possible under the original Split Margin Hierarchy.

1 Introduction

In Korean, there is an asymmetrical pattern when a syllable contact induces sound change. That is, when the (preceding coda consonant).(following onset consonant) sequence has a rising sonority contour, changes occur to enforce equal or falling sonority. On the other hand, equal or falling sonority contours are allowed. Baertsch and Davis study this phenomenon through the framework of the Split Margin Hierarchy, which postulates that the second element of an onset cluster and the last element of a coda are governed by a shared class of positional constraints, and accounts for the prohibition of syllable contact sequences with increasing sonority as one of its consequences (Baertsch and Davis 2008).

A key assumption in Baertsch and Davis' split margin analysis is that glides in consonant-onset sequences are part of the nucleus of the syllable (the Nucleus Hypothesis). This assumption accounts for the fact that although onset clusters are generally not allowed in Korean, glides /j/ and /w/ may follow an onset consonant. However, two other theories regarding the membership of the glides, the Simple Onset Hypothesis (the glide is a co-articulation with the written consonant) and the Complex Onset Hypothesis (the glide is a second element in a two consonant onset), can be considered, and it is not immediately clear how the split margin analysis can be accommodated to the structure of a syllable as proposed by them.

In this paper, I examine how each of the hypotheses fits into the framework of the Split Margin Analysis of the syllable contact phenomenon in Korean. Section 2 provides an overview of the asymmetric patterning of syllable contact sequences in Korean. Then, Section 3 reviews the analysis of syllable contact asymmetry in Korean, as presented by Baertsch and Davis using the framework of the Split Margin Hierarchy. Finally, in Section 4, I introduce three different analyses for analyzing glides /j/ and /w/ within the Korean syllable structure and argue that the NH and the SOH are similar in viewing the glides as being out of scope for M_2 constrains, while the COH does not. In order to accommodate the COH with the original Split Margin Hierarchy, it is necessary to re-rank FAITH with respect to the conjoined constraints with glides in the M_2 position, and this is not immediately possible under the current framework of the Split Margin Analysis.

2 Syllable Contact Asymmetry In Korean

In Korean, there is an asymmetrical pattern when a syllable contact induces sound change. When the (preceding syllable's coda consonant).(following syllable's onset consonant) sequence is rising in sonority level, changes occur to enforce equal or falling sonority, as shown in examples (1)-a to (1)-d. On the other hand, equal or falling sonority contour is allowed.

(1) Syllable Contact Patterning In Korean

	Input	Output	Contact Sequence Sonority	Gloss
a.	/sak-mak˥/	[saŋ.mak˥]	k → m: Rising	*'deserted, barren'*
b.	/t͡ɕʰən-li/	[t͡ɕʰəl.li]	n → l: Rising	*'thousand miles'*
c.	/pak-li/	[paŋ.ni]	k → l: Rising	*'little profit margin'*
d.	/t͡ɕʰim-lje/	[t͡ɕʰim.nje]	m → l: Rising	*'baptism'*
e.	/kam-mi/	[kam.mi]	m → m: Equal	*sweet flavor*
f.	/t͡ɕʰam-sal/	[t͡ɕʰam.sal]	m → s: Falling	*'slaughter or behead'*

Changes in the contact segments can occur in either one or both. That is, when a single change at either the coda or the nucleus cannot level the sonority contour, the coda will increase its sonority while the onset does the opposite, so that the resulting sonority contour is maintained at an allowed level, as illustrated in (1)-c. To account for this phenomenon, Baertsch and Davis utilizes the Split Margin Analysis.

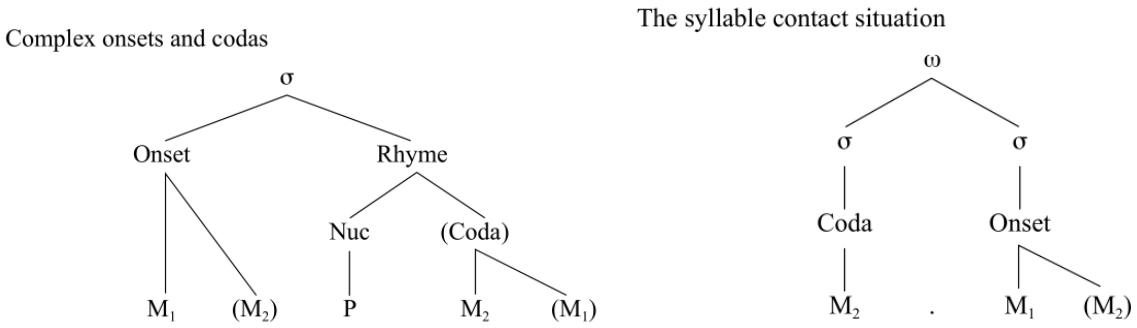
3 The Split Margin Analysis

The Split Margin Hierarchy decomposes the outer margins (i.e. onset and coda segments) of a syllable into two classes, namely M_1 and M_2 margins. As proposed first by Prince & Smolensky, the M_1 position corresponds to the syllable-initial onset consonant. By introducing a hierarchy of constraints that assign violation marks based on the sonority level of the consonant, the M_1 hierarchy encodes the tendency of a syllable initial onset consonant to have low sonority. Baertsch and Davis augment this proposal by introducing a hierarchy of constraints governing the M_2 position.

The M_2 position includes a second member of an onset cluster and a coda consonant (the classification of the two elements into the same class is justified by the fact that empirically the two positions seems closely linked in multiple linguistic phenomena). Because M_2 constraints are ranked in the opposite manner as M_1 constraints, the hierarchy encodes a preference for high sonority in coda. The classification of the second element of an onset cluster and a single coda

consonant is motivated by several empirical accounts such as case studies of parallel development and disappearance of onset clusters and coda in Campidanian Sardinian and Bamana and an explanation of Dorsey's law of epenthesis in Winnebago.

(2) The Syllable Margins and the Syllable Contact Situation



According to the Split Margin hypothesis, the positions of FAITH and NOCODA or ONSET within a language's constraint hierarchy determine which onsets and codas are allowed in the language. Since the M_1 and M_2 hierarchies are designed such that they reflect the sonority preference of onsets and codas, this is not very surprising.

(3) M_1 Hierarchy encodes preference for low sonority segments in onset position.

- ONSET's ranking relative to FAITH.
- $*M_1/[+lo] >> *M_1/[+hi] >> *M_1/[r] >> *M_1/[l] >> *M_1/[Nas] >> *M_1/[Obs]$

(4) M_2 Hierarchy encodes preference for high sonority segments in coda position.

- NOCODA's ranking relative to FAITH
- $*M_2/[Obs] >> *M_2/[Nas] >> *M_2/[l] >> *M_2/[r] >> *M_2/[+hi] >> *M_2/[+lo]$

Furthermore, the *local conjunction* of the M_1 and M_2 hierarchies provides a mechanism through which different constraints combine *locally*. The resulting conjoined constraints have a naturally induced hierarchy, such that $[*X_1X_2] >>> [*Y_1Y_2]$ if $*X_1 >>> *Y_1$ and $X_2 = Y_2$ or . if $*X_2 >>> *Y_2$ and $X_1 = Y_1$. In addition, the conjoined constraints can range over different domains such as syllable, prosodic word, and phrase, and constraints in the smaller domain dominates those in the larger domains.

(5)

- **Conjunction of M_1 and M_2** hierarchy: By conjoining the constraints in M_1 and M_2, we can induce a combined hierarchy.
- **Locality Ranking**: "*A phonological word-level process and the local domain relevant for syllable contact is correspondingly the phonological word.*" Also, the conjunction constraints in the smaller domain dominate the same constraints in a larger domain.

Now the asymmetry of sound patterning in syllable contact situations in Korean can be accounted for by the relative ranking of COMPLEX and ID[MANNER] with respect to the conjoined hierarchies. It is also worth noting that the Split Margin Analysis does not come with a universal analysis of syllable, in the sense that the constraints proposed by Baertsch and Davis does not seem to provide its own syllable structure analysis. Instead, they independently assume the view that glides are part of the nucleus. Thus, we obtain the following analysis of a word in Korean. Because

Faith is dominated by all conjoined constrains in Korean, we can summarize this by having a *Complex(Onset) constraint. Now, the analysis proceeds by having Id[Manner] ranked above the conjoined constraints disprefer ban equal or rising sonorities, while placing below the falling sonority constraints. In this way, changes in contact segments are only allowed if the sequence is falling in sonority.

(6) /p^{h}an-lo/ → [p^{h}al.lo]

Input: /p^{h}an-lo/ *'sales outlet'*	*Complex	[*r$_1$n$_2$]Wd	Id[manner]	[*r$_1$r$_2$]Wd	[*n$_1$r$_2$]Wd
a. p^{h}a.n$_1$l$_2$o	*!				*
b. p^{h}an$_2$.l$_1$o		*!			
c. ☞ p^{h}al$_2$.l$_1$o			*	*	

4 Consonant-Glide Sequences and the Syllable Contact Asymmetry Korean

Korean syllables are relatively simple in that CGVC is the maximal syllable possible. However, the status and behavior of glides /j/ and /w/ when they appear as G are not clearly determined yet, and there are various competing theories, most of them viewing the glides as either part of the adjacent nucleus or coda.

In their analysis of Korean, Baertsch and Davis make an important, yet not thoroughly justified assumption. That is, glides /j/ and /w/ following an onset consonant are actually not part of the onset, but the nucleus. This saves them from having to 'cut through' the conjoined constraints (*"... all of the M_1M_2 constraints in the syllable domain dominate* Faith.*"*), thus allowing them to use *Complex, while allowing for words like [kwal$_2$.l$_1$ok˺]. In the following OT tableaux, *Complex assigns a violation mark only for candidate (a), as /w/ does not constitute an onset cluster with the preceding /k/. Instead, it is viewed as a member the nucleus along with the following vowel /a/.

(7) /kwan-lok˺/ → [kwal.lok˺]

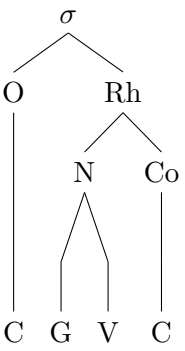
Input: /kwan-lok˺/	*Complex	[*r$_1$n$_2$]Wd	Id[manner]	[*r$_1$r$_2$]Wd	[*n$_1$r$_2$]Wd
a. kwa.n$_1$l$_2$ok˺	*!				*
b. kwan$_2$.l$_1$ok˺		*!			
c. ☞ kwal$_2$.l$_1$ok˺			*	*	

In order to justify their assumption, Baertsch and Davis argue that because there is no co-occurrence restriction for glides and onset consonant while the same is not true for glides and nucleus, glides must be more closely related to the latter. Still, cases like (7) make it clear that Baertsch and Davis is relying on an analysis of Korean syllable structure not inherent to the Split Margin Analysis. In this section, I present three different hypotheses regarding the structure of Korean syllables and how each of them affects the analysis of syllable contact asymmetry in Korean. However, I do not provide a detailed discussion or evaluation of the arguments and evidence in support of each hypothesis, as doing so is out of the paper's scope.

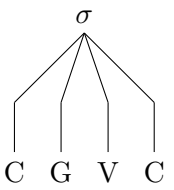
4.1 The Nucleus Hypothesis

Analyses of Korean syllables that view glides which follow an onset consonant belong to a class of theories which may be called the Nucleus Hypothesis. In general, theories in the Nucleus Hypothesis analyze glides as underlying semi-vowels that constitute the nucleus of a syllable with a main vowel. While it is possible to model the behavior of glides as semi-vowels only with a 'flat' structure as in Option 2, Option 1 presents a representative version of the NH.

(8) Option 1

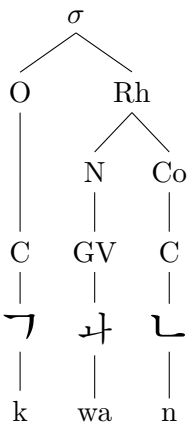


Option 2



One note of interest is that Option 1 is certainly the view that most closely aligns with the intuition of native speakers of Korean, considering Hangul, the standard orthography for Korean. Hangul letters are organized into a block consisting of three positions, "onset", "nucleus", and "coda", and glides /j/ and /w/ are included as part of "nucleus" or "vowel" letters. For instance, consider the following analysis of /kwan/ (관 = ㄱ + ㅘ + ㄴ).

(9)

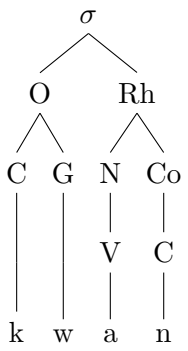


As explained previously, the NH is the basis of Baertsch and Davis 's analysis of consonant-glide sequences in Korean. Thus, no change from the original analysis is required if the NH is used to analyze syllables in Korean.

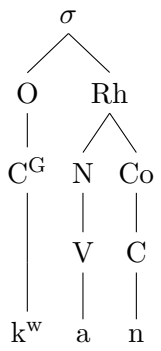
4.2 The Two Onset Hypotheses

An alternative possibility for glides /j/ and /w/ in Korean is that they are part of the preceding onset, not the following coda. This leads to a natural counterpart to the Nucleus Hypothesis, the Onset Hypothesis. However, even within the class of the OH, models differ in allowing glides as a stand-alone unit or not. Analyses of glides as a single consonant will necessitate viewing glides as a second member of an onset cluster (the Complex Onset hypothesis). On the other hand, glides may be considered as a secondary articulation of the preceding single onset consonant (the Simple Onset Hypothesis). The differences in these views are illustrated in the following syllable diagrams.

(10) COH



SOH



Now, comparing this to the syllable margin positions illustrated in (2), it is clear that the COH places the glide in the M_2 position, the second member of an onset cluster. Thus, if the COH is to be used as the basis for analyzing Korean syllable structure, it is necessary to explain why consonant-glide clusters are the only allowed onset clusters. It requires adjusting the relative ranking of FAITH with respect to the relevant conjoined constraints. In the original analysis, all conjoined constraints dominated FAITH, as illustrated in (11) (figure in the Appendix). Now FAITH has to dominate conjoined constraints of form $*C_1I_2$ where $C \neq A, I$. However, It seems that a line that cuts such constraints will result in a ranking that dominates some clusters that aren't allowed in Korean, for instance X_1A_2 with $X \in \{R, N, T\}$, i.e. the constraints between the (red) line and the dotted line that are not consonant-glide constraints.

In contrast, in the syllable structure given by the SOH, the only segment belonging to the M_2 position is the coda. Thus, as in Baertsch and Davis 's original analysis with the NH, FAITH can remain dominated by all conjoined constraints, as syllable initial consonant-glide sequences are not onset clusters.

5 Conclusion and Future Work

In summary, I have examined how different analyses of consonant-glide sequences as syllable onsets in Korean can be integrated into the Split Margin Analysis of the syllable contact asymmetry in Korean. Viewing glides as part of the nucleus (the Nucleus hypothesis) or analyzing consonant-glide onsets as a simple segment (the Simple Onset hypothesis) exempts glides from being constrained by the M_2 hierarchy. However, the Complex Onset hypothesis states that glides /j/ and /w/ after an onset consonant constitute a complex onset cluster, thus placing them under the scope of the M_2 positional constraints. This led to the result that while the NH and the SOH can be accommodated to the original theory, the COH, without any revision to the original sonority hierarchy-constraint correspondence proposed by Baertsch and Davis , leads to a theory of Korean that does not explicitly ban onset clusters that are not in surface forms.

Nevertheless, the above result does not immediately discredit the COH either as an independent theory of Korean syllables or as a module of the Split Margin Hypothesis that provides a structural analysis. First, in this paper I have not examined the merits of arguments for each hypothesis, and if there is strong phonological, phonetic, or acoustic evidence for the COH, the cause of its failure to successfully interface with the Split Margin Analysis may not be inherent in the COH. Although the topic is not fully investigated here, it may be possible to work with the sonority hierarchy in Korean by making the contact constraints directly refer to the difference in sonority, rather than each constraint explicit referring to a cluster. Another possibility may be to introduce a more detailed subdivision within the sonority scale, so that the glides in question are not lumped with high vowels.

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A Appendix

(11) Ranking of conjoined constraints for Korean onset clusters (Baertsch and Davis 2008), with an additional line representing FAITH's ranking for the COH