**n-Insertion as y-Devocalization in Korean***

Yongsung Lee** · Minkyung Lee***

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Lee Yongsung, Lee Minkyung. 2006. *n-Insertion as y-devocalization in Korean*. *Korean Journal of Linguistics*, 31-3, 413-440. This paper reinvestigates and reanalyzes the so-called *n*-insertion phenomenon found in Seoul Korean under Optimality Theoretic framework. Given previous approaches, *n*-insertion in *-C.y- sequence comprises two parts; *n/ is inserted before /y/ and /ny/ is coalesced to produce a palatal nasal [ɲ]. This approach, however, has two problems: *n*-insertion assumes that /n/ is the most unmarked consonant in Korean and the change itself does not improve markedness, since complex onsets are more marked than single onsets. Noting these problems, this paper makes a new proposal that /y/ is devocalized and becomes consonantal under the requirement of Syllable Contact constraint, which militates against rising sonority over a syllable boundary. Interestingly, Korean shows disparity between Pure-Korean and Sino-Korean words in the distribution of *n*-insertion. It will be shown that the difference can be accounted for with the adoption of different alignment constraints. As such, this paper obviates unwanted assumption on *n*-unmarkedness and complicated rule-like constraints, and still offers comprehensive and systematic analysis of *n*-insertion. (Pusan University of Foreign Studies and Daegu University)

Key words: Korean phonology, *n*-insertion, syllable contact, devocalization, consonantization, alignment constraints, sonority balance, C-onsetting, optimality theory

1. Introduction

This paper offers new perspective to investigate *n*-insertion phenomenon found in Seoul Korean. When two consonants are concatenated over a syllable boundary, that is, in *-C.y- sequence ( means a syllable

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boundary and C is a consonant), /n/ is inserted to the onset of the second syllable, presumably to obey the syllable preference laws in Vennemann (1988). The basic assumption says that the sonority should rise between two consonants over a syllable boundary. But since no consonants are more sonorous than the following /y/, there must be some repair process in order to keep the sonority balance over the syllable boundary.

One implementation of these observations in the Optimality Theory (=OT) is found in Hong (2002, 2003, 2005) based on Han (1994), Cho (1995) and others. Excluding n-insertion before /i/ vowel, he proposed that the ranking, Dep-C >> *n[y] >> Dep-C on, (where "w" means the beginning of a word) can account for n-insertion before word-initial /y/. Informally, it means that consonants are generally not inserted but, in the configuration Cw[y], the most unmarked consonant (represented as Cun in Hong 2005) is inserted to avoid the unfavored configuration.

Putting aside the controversy over the validity of the constraint, *n[y], we find it very difficult to accept that the most unmarked consonant in Korean is a nasal. Were it the most unmarked, we would expect n-insertion in many cases other than before /y/. Further, we wonder why the specific configuration is disfavored, i.e. we would like to focus on the real cause of change.

In this paper, y-devocalization, not n-insertion, is proposed based on syllable contact constraint (Bat-El 1996, Schmidt 1995, Vennemann 1988, Davis & Shin 1999). In -Cy-sequence, the onset /y/ should not be more sonorous than the preceding coda consonant to obey the syllable contact constraint. In case sonority rises over the syllable boundary, some phonological repair should be invoked. One way is to resyllabify the coda consonant as the onset of the following syllable to produce -.Cy-configuration. But if there are other restrictions on C-resyllabification to the onset (henceforth C-onsetting), then a more radical change is required. Here we propose that /y/ loses its [vocalic] feature and becomes a palatal nasal, resulting in sonority decrease.

This approach explains the cause and the result of the observed change. The cause of change comes from the syllable contact constraint and the result is not n-insertion but y-devocalization. With the proposal made in this paper, we may dispense with unattested assumption that /n/ is the most unmarked consonant in Korean and with unrealistic rule-like constraints as in Cho (1995) or Hong (2005).
To this end, section 2 makes a proposal on y-devocalization. The data and previous OT approach are briefly discussed and their problems are revealed. It is shown that y-devocalization steers clear of the potential problems that the previous approach has. Section 3 deals with asymmetries in n-insertion. First, the difference of n-insertion before a glide and before a high front vowel will be discussed to narrow down our analysis to n-insertion before /y/. We will show that n-insertions before /i/ and /y/ are categorically different and therefore that they cannot be grouped together. Further, we see that there is clear difference between Pure Seoul Korean (= PureK) and Sino Seoul Korean (= SinoK). In PureK, y-devocalization takes place between a prefix and a morphological word (= Mwd) and also between two morphological words in a compound. In SinoK, y-devocalization is observed between an Mwd and a suffixal root, or between two SinoK words that make a compound. The asymmetry results from different alignment constraints in different morphological groups of words. In section 4, constraints motivated in previous sections are put together to show their interaction to account for the asymmetric presence or absence of y-devocalization between PureK and SinoK in a consistent and comprehensive way. For both Koreans, we see that syllable contact and alignment constraints play a vital role in inducing y-devocalization. Section 5 summarizes the discussion and concludes that y-devocalization analysis provides a different and perhaps a better perspective to n-insertion phenomenon.

2. Review and proposal

In this section, we will discuss the nature of problems in previous OT analysis of n-insertion, notably in Hong (2003, 2005). Note that the n-insertion data found in Korean are so complicated and so stained with exceptions that some researchers, as in Shin & Cha (2004: 303), claim that any attempt to formalize n-insertion rule is "meaningless." This, however, does not mean that n-insertion should remain an inexplicable mystery in Korean phonology. Careful examination of relevant data suggests that there be certain regularities in classical n-insertion. Let’s first examine the relevant data on y-devocalization.
(1) y-devocalization data (Data excerpted from Han 1994, Park 2005, and Hong 2005 with adjustment)\(^1\)

a. Between two PureK Mwds

<table>
<thead>
<tr>
<th>PureK Mwd</th>
<th>SinoK Mwd</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[kʰoŋ][yəs]</td>
<td>kʰoŋ[n]ət</td>
<td>(bean candy)</td>
</tr>
<tr>
<td>[pam][yuc(^7)]</td>
<td>pam[n]ut</td>
<td>(small yuc(^b) (playing sticks))</td>
</tr>
<tr>
<td>[səlɪn][yəsəs]</td>
<td>səlɪn[n]əsət</td>
<td>(thirty six)</td>
</tr>
<tr>
<td>[iəs][yalis]</td>
<td>iəs[n]əlɪt</td>
<td>(queer)</td>
</tr>
<tr>
<td>[pul][yəu]</td>
<td>pul[λ]əu</td>
<td>(vixen)</td>
</tr>
</tbody>
</table>

b. Between two SinoK Mwds\(^2\)

<table>
<thead>
<tr>
<th>SinoK Mwd</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[hankuk][yu-yak]</td>
<td>haŋgu[n]uyak</td>
</tr>
<tr>
<td>[hwɑŋ-kim][yok-sil]</td>
<td>hwɑŋgim[n]oksil</td>
</tr>
<tr>
<td>[te-çon][y-sk]</td>
<td>teŋ[n]-sk</td>
</tr>
<tr>
<td>[sɑŋ][yəpʰi]</td>
<td>sɑŋ[n]əpʰi</td>
</tr>
<tr>
<td>[cei[l]-yətan]</td>
<td>cei[l]ədan</td>
</tr>
</tbody>
</table>

c. Between a prefix and a PureK word

<table>
<thead>
<tr>
<th>PureK Mwd</th>
<th>SinoK Mwd</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nɨc-[yəlɪm]</td>
<td>nin[n]əlim</td>
<td>(late summer)</td>
</tr>
<tr>
<td>hax-[yəlɪm]</td>
<td>hax[n]əlɪm</td>
<td>(mid summer)</td>
</tr>
<tr>
<td>cʰəs-[yəlɪm]</td>
<td>cʰən[n]əlmə</td>
<td>(first fruit)</td>
</tr>
<tr>
<td>am[h]-[yəmsə]</td>
<td>am[n]əmsə</td>
<td>(nanny goat)</td>
</tr>
<tr>
<td>sal-[yəu]</td>
<td>sal[λ]əul</td>
<td>(small creek)</td>
</tr>
</tbody>
</table>

d. Between a SinoK Mwd and a suffixal root

<table>
<thead>
<tr>
<th>SinoK Mwd</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[tok-ɔm]-yok</td>
<td>tokˈɔm[n]ok</td>
</tr>
<tr>
<td>[sikiŋ]-yəu</td>
<td>sikiŋ[n]u</td>
</tr>
<tr>
<td>[hyap-hək]-yəl</td>
<td>hyap[n]əl</td>
</tr>
<tr>
<td>[yəŋ-əp]-yəŋ</td>
<td>yəŋ[n]əŋ</td>
</tr>
<tr>
<td>[sanlim]-yək</td>
<td>sanlim[n]ək</td>
</tr>
</tbody>
</table>

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\(^1\) Please refer to (10) to see further difference between SinoK and PureK words. Readers are advised to consider [n] as a shortened form of [ny] in (1). We use [n] for reasons soon to be clarified. Throughout the paper, we use brackets ([ and ]) to represent Mwd boundaries. [A][B] means both are Mwds, A[B] means [B] is an Mwd, and [A]B means [A] is an Mwd.

\(^2\) There are marginal cases in the judgement. One of the reviewers observes that a word like [samsəŋ][yəs-p] (Samsung Ceramic) does not undergo y-devocalization (contra Hong 2005). One possible explanation can be made by referring to English stress pattern. Comparing Kinnamoniáro with Halicarnäsus (cf. Halle & Vergnaud 1987: 233), we see that the second word has stress clash which the former word does not. The latter may be a lexical exception or the result of careful (syllable) pronunciation of unfamiliar words. And we guess the same explanation can be given to the marginal cases. Any further discussion on the unfamiliarity effect or on such marginal cases is open for further research.
As observed in (1a) and (1b), /y/ in the initial syllable of the second member of a compound is obligatorily realized as \( [ɲ] \) on the surface both in PureK and in SinoK, if the first member of the compound ends with a consonant. In more detail, as shown in (1a) and (1b), /y/ becomes devocalized between an Mwd ending in a consonant and the following Mwd starting with /y/, both in PureK and SinoK. But asymmetry is observed in Mwd-affix sequences in (1c) and (1d). (1c) shows that the same process takes place between a prefix and an Mwd in PureK, while (1d) says that even the suffixal root-initial /y/ can be devocalized in SinoK Mwds.

Traditionally, the \( n \)-insertion process is analyzed as having two parts: /n/ is inserted before /y/ and then they are coalesced to become a palatal nasal. This is graphically represented in (2):

\[
\text{(2) } n\text{-insertion process} \quad \text{\( y \)-devocalization} \quad \text{n-insertion coalescence} \\
\begin{array}{c}
\text{\( y \)} \\
\text{n-}\quad \text{ny} \\
\text{n-insertion coalescence} \\
\text{(cf. Han 1994)} \quad \text{(cf. Ahn 1988)}
\end{array}
\]

A nasal /n/ is inserted before a glide /y/ in certain morphological and phonological environments to make /ny/ cluster. This cluster is subject to post-lexical palatalization and is merged to become a palatal nasal /\( ɲ \)/. The second process, coalescence, does not need any further elaboration. But the first process, \( n \)-insertion, lacks clear phonological motivation. Consider the following questionable uncertainties.

(3) Mysteries of traditional \( n \)-insertion
a. Why a consonant is inserted after a consonant?  
b. Why a consonant is inserted before a glide?  
c. Why the inserted consonant is a nasal?

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3 Ahn (1988) was not very specific whether coalescence is a one-step operation or it actually is palatalization followed by deletion of the palatal glide. We acknowledge that it may be a two step process of palatalization and deletion, incorporating the observation that \( n \)-insertion is closely connected to \( n \)-palatalization in Korean. In any case, the proposal in this paper is not crucially dependent on how the coalescence is analyzed.
Given in (3) are three mysteries involving \( n \)-insertion in Korean. (3a) and (3b) are questions about the environment of \( n \)-insertion. As for (3a), no other case of consonant insertion after a consonant is reported in the literature.\(^4\) McCarthy (2006: 14) generalizes that sound changes are to achieve harmonic improvement, i.e. to improve markedness. Since consonant insertion after a consonant can, by no means, improve markedness, it is predicted that such insertion is not witnessed in languages unless it is motivated by a highly specific constraint that overrides the constraints that penalize consonant insertion.

The "before a glide" clause in (3b) is also problematic. If, following Y. Lee (1993), the glide is an onset segment, then the change actually results in a more marked structure. A complex onset is more marked than a single onset.\(^5\) In this line of thought, consonant insertion either after a consonant or before a glide is problematic and the combination of the two results in the worst scenario.

Some may go against \( n \)-insertion and argue that there is underlying /\( n \)/ and the segment is deleted elsewhere to result in pseudo \( n \)-insertion as in Sung (1995). While it is true that certain words have underlying /\( n \)/ historically, the analysis cannot be expanded to cover all the instances of \( n \)-insertion as noted in Park (2005).

Granted we need an insertion, still the mystery in (3c), the phonetic property of the inserted sound, remains unexplained. Hong (2003, 2005), by brute force, makes an assumption that /\( n \)/ is the most unmarked consonant in Korean, which, however, awaits serious reconsideration.

Having considered the various problems that the traditional \( n \)-insertion suffers from, we are making a new proposal that there is no \( n \)-insertion, but a glide /\( y \)/ becomes a consonant, either [\( \mathfrak{n} \)] or [\( \lambda \)].\(^6\) The process

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\(^4\) A reviewer shows that insertion of Bindungs-s (sai-sios) is an example of consonant insertion between two consonants. But the insertion of Bindungs-s is different from inserted /\( n \)/ in that it does not create a three consonant sequence on the surface. In other words, it does not create a complex onset. It is realized either as unmarked /\( t \)/ (in post-vowel position) or as tensification of the following consonant (in post-consonant position).

\(^5\) This does not mean that Korean does not allow /\( ny \)/ sequence in the input. What we are pointing at here is, when there is insertion, there must be certain morphological or phonological conditions that override the marked nature of onset clusters. As for underlying /\( ny \)/ sequence, a faithfulness constraint, Max, is the overriding constraint.

\(^6\) In some frameworks, including Chomsky & Halle (1968, hereafter SPE), where
itself has nothing to do with consonant insertion, therefore the proposal is free from all the problems related to consonant insertion.

Further, we argue that the change is caused by syllable preference law, which bans increasing sonority over the syllable boundary. The preference law can be directly translated into OT-type constraint, SyllCon as in (4):

(4) Syllable Contact constraint (=SyllCon)
Avoid rising sonority over a syllable boundary.

SyllCon governs the proper sonority relationship between a coda consonant and an onset consonant in the following syllable. SyllCon has already been employed in Davis & Shin (1999) to explain consonantal change in Korean. Importing SyllCon to explain n-insertion helps us clearly see the motivation of change. If the preceding syllable ends in a vowel, then SyllCon does not say anything, i.e. it is vacuously satisfied. But, if the preceding syllable ends with a consonant, then the sequence violates SyllCon since no consonant is more sonorous than /y/ according to the sonority scale in Kenstowicz (1994: 254). In such case, something must be done to keep the sonority balance between two consonants. In general, C-onsetting is a preferred solution, but if the option is, somehow, not allowed in certain morphological environments, then we decrease the sonority of the onset glide to turn it into a less sonorous palatal consonant in order to meet the requirement of SyllCon. Consider the following sonority downscaling:

(5) Sonority and features of palatal sounds
a. \[ y > \lambda > n > c \]
   \[ \begin{array}{c|c|c}
   \text{vocalic} & \text{consonantal} \\
   \text{palatal} & \text{palatal} \\
   \text{son} & \text{son} \\
   \text{lateral} & \text{nasal} & \text{stop}
   \end{array} \]

[±vocalic] (or its equivalent, [±consonantal]) is considered to be part of the major class features which cannot be changed, the \( y \rightarrow n \) change cannot be allowed, since it involves changes in the major class features. This, however, is repudiated by Kaisse (1992) where \( y \rightarrow k \) changes are reported in Cypriot Greek and Ratko-Romansh. Kaisse (1992) described the change as \( y \)-consonantization, equivalent to \( y \)-devocalization in this paper. Interestingly \( y \)-consonantization takes place in these languages only after a consonant just like in the case of Korean \( n \)-insertion.
(5a) shows four different sonority level found in palatal sounds. Among the palatal sounds, /y/ is highest in sonority. If it decreases in sonority without changing places, it becomes /ʎ/. If the decrease is not enough to obey SyllCon, it will further change into /ɲ/. (5b) shows their feature combination. Notice that we are not committed to any specific feature theory. We are using unary feature system here to simplify the description and to use Max/Dep constraints for features. Now consider the violations each of the following changes incurs:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>y → ʎ</td>
<td>b.</td>
<td>y → ɲ</td>
<td>c.</td>
</tr>
<tr>
<td>&quot;MaxF(vocalic)&quot;</td>
<td>&quot;MaxF(vocalic)&quot;</td>
<td>&quot;MaxF(vocalic)&quot;</td>
<td>&quot;MaxF(vocalic)&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;DepF(cons)&quot;</td>
<td>&quot;DepF(cons)&quot;</td>
<td>&quot;MaxF(son)&quot;</td>
<td>&quot;MaxF(son)&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;DepF(lateral)&quot;</td>
<td>&quot;DepF(nasal)&quot;</td>
<td>&quot;DepF(cons)&quot;</td>
<td>&quot;MaxF(palatal)&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;DepF(stop)&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

y-devocalization is a process of decreasing sonority by violating MaxF(vocalic) or DepF(cons). Since these two constraints do the same thing in this paper, we will ignore the role of DepF(cons) in this paper. The crucial constraints are underlined. The underlined constraints are enough for our present discussion.

Here, one may argue that y-devocalization proposal makes a wrong prediction by saying that -k.y- sequence can theoretically become -k.c- sequence (though the actual change is to be -k.ɲ-). Others may say that the deletion instead of y-devocalization can satisfy SyllCon. These questions can be answered by the ranking of relevant constraints. Notice

7 We use [vocalic] for vowels and glides and [cons] for all the consonants. It is true that glides are represented as [-vocalic] in SPE. But we incorporate further developments in feature representation to group vowels and glides together, notably in Clement (1991) and in Hayes (1989) where he treats glides as non-moraic vowels. Readers who work on SPE-type of feature specification may want to put DepF(cons) instead of MaxF(vocalic) for convenience.

8 We follow standard interpretation of MaxF(x)/DepF(x): the input/output feature [x] must be present in the output/input. Devocalization involves MaxF(vocalic) violation. If we focus on DepF(cons) violation, we may say that the process is consonantalization. These two terms are used interchangeably in this paper. Note that we adopt the following definition given by Trask (1996: 109):

**Devocalization**: any phonological process in which a vowel or a glide is converted into a consonant: one form of fortition.
that both \( y \rightarrow c \) and \( y \rightarrow \emptyset \) changes incur \( MaxF(son) \) violation, as given in (6c) and (6d). Other changes in (6a) and (6b) do not result in \( Max(son) \) violation. By placing \( MaxF(son) \) high in the rank, we can prevent the unattested changes in Korean.

With \( Max(son) \) high among faithfulness constraints, we see that /y/ changes into \([\lambda]\) or maximally to \([\ɲ]\) by the pressure of SyllCon. The glide changes alone, however, cannot account for all the data given in (1). If the preceding consonant is an obstruent, the change still fails to satisfy SyllCon. Something further has to be done. Here we follow the analysis of Davis & Shin (1999) to explain the changes that take place in the preceding coda consonant. Their analysis shows that obstruents are increased in sonority to become nasals before another nasal to obey SyllCon. We see that this process involves the violations of \( DepF(son) \) and \( DepF(nasal) \).

Again, the change from an obstruent to a lateral or a glide should be prevented by putting \( DepF(lateral) \) and \( DepF(vocalic) \) high in the consonant hierarchy. Now an underlying obstruent can go up to nasal but not any higher, and an underlying glide can go down to nasal but not any lower. In such case, \(-Cy-\) sequence is optimally converted into \(-N.N-\) sequence to stay out of SyllCon violation.

So far we have laid out the basic proposal on y-devocalization. There is no insertion process involved here. /y/ becomes \([\lambda]\) or \([\ɲ]\), violating \( MaxF(vocalic) \) (and \( DepF(lateral) \) or \( DepF(nasal) \)), to obey SyllCon. If the change is not enough, the coda obstruent becomes a nasal, which increases sonority, again to comply with SyllCon. In the discussion that follows, we will focus on y-devocalization part, and will take for granted any changes in the coda consonant before /y/, fully adopting the analysis.

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9 There is controversy whether features are checked with \( Max/Dep \) constraints or with \( Ident \) constraints. The proposal in Correspondence Theory is to use featural identity constraints (McCarthy & Prince 1995: 261). But Lombardi (1998) convincingly shows the necessity of Max-feature constraint in her study of Japanese phonology. The present discussion finds problems with \( IdentF(son) \) constraint, because it may even block nasalization of obstruent consonants. A nasal does not turn into an obstruent (the change would violate \( MaxF(son) \)), though an obstruent can be a nasal (no \( MaxF(son) \) violation is involved). But, under \( IdentF \) analysis, both of them violate \( IdentF(son) \). See also M. Lee (1998) for the use of Max-feature to explain consonant cluster reduction in Korean.

10 If we are concerned with \( nl \rightarrow ll \), or \( ln \rightarrow ll \) changes, found outside of y-devocalization in Korean phonology, we may posit a conjoined constraint, \([DepF(lateral) \& DepF(son)]_{AC} \) instead of simple \( DepF(lateral) \).
on the preceding coda in Davis & Shin (1999).

3. Asymmetries in \(n\)-insertion

On the basis of the proposal made in section 2, we are now ready to tackle with \(n\)-insertion before a high front vowel /\(i\)/, which is fairly well documented in the literature. \(y\)-devocalization, apparently, is in trouble in dealing with \(n\)-insertion before /\(i\)/. We will discuss the difference of \(n\)-insertion before /\(y\)/ and before /\(i\)/, and suggest possible explanation for \(n\)-insertion before /\(i\)/. Then, we talk about the difference of \(n\)-insertion between PureK and SinoK to specify the difference of the morphological environments.

3.1. Asymmetry of \(n\)-insertion before /\(y\)/ and before /\(i\)/

Traditionally, it has been recognized that \(n\)-insertion takes place between a consonant and a glide or a high front vowel. It is, however, virtually impossible to come up with a comprehensive analysis of these two types of \(n\)-insertion, since they are quite different from each other in quality. Readers can easily see that the proposal made in this paper fails to deal with \(n\)-insertion before /\(i\)/, since \(y\)-devocalization cannot take place without underlying /\(y\)/. This, however, is viewed as an expected result. The failure simply shows that the two processes cannot be uniformly treated. Park (2005: 334) has to admit that \(n\)-insertion before a vowel needs serious further research.

This paper argues that \(n\)-insertion before a glide is clearly separate from that before a high vowel. The data given in (1) show that \(y\)-devocalization is an obligatory process found both in PureK and SinoK. Compared to this, the so-called \(n\)-insertion before a high vowel has the following characteristics:

(7) Characteristics of \(n\)-insertion before /\(i\)/ (cf. Han 1994)

a. It is generally optional in PureK.

\[
\begin{array}{ll}
\text{[pam][il]} & \text{pam[n]il, pamil} \quad \text{(night work)} \\
\text{[pa\textsuperscript{b}][imca]} & \text{pan[n]imja, padimja} \quad \text{(owner of a field)} \\
\text{ap[ima]} & \text{am[n]ima, abima} \quad \text{(forehead)} \\
\text{ho\textsuperscript{b}[ipul]} & \text{hon[n]ibul, hodibul} \quad \text{(single layer quilt)}
\end{array}
\]
b. It is never found in SinoK words.

<table>
<thead>
<tr>
<th>Word</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[simca][i][sik]</td>
<td>*simja[y][n][sik]</td>
<td>heart transplant</td>
</tr>
<tr>
<td>[munha][i][lon]</td>
<td>*munha[y][n][lon]</td>
<td>literature theory</td>
</tr>
<tr>
<td>[cisik][in]</td>
<td>*cis[i][y][n][in]</td>
<td>(an intellectual)</td>
</tr>
<tr>
<td>[anlon][in]</td>
<td>*anlon[y][n][in]</td>
<td>(journalist)</td>
</tr>
</tbody>
</table>

c. It is not allowed in some PureK words.

<table>
<thead>
<tr>
<th>Word</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[acsi][i][si][il]</td>
<td>*acsi[y][n][si][il]</td>
<td>(morning dew)</td>
</tr>
<tr>
<td>[ci][i][i][il][im]</td>
<td>*ci[y][n][i][il][im]</td>
<td>(book title)</td>
</tr>
</tbody>
</table>

d. It is obligatory in some PureK words.

<table>
<thead>
<tr>
<th>Word</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[o][i][i][i][im]</td>
<td>*o[y][n][i][i][im]</td>
<td>(molar)</td>
</tr>
<tr>
<td>[k'o][i][i][i][ip]</td>
<td>k'o[y][n][i][i][ip]</td>
<td>(flower-petal)</td>
</tr>
</tbody>
</table>

Consider (7a) and (7b) first. n-insertion before /i/ is optional in PureK and it is not found in SinoK words. On the other hand, n-insertion before /y/ is obligatory and also found in SinoK words.\(^{11}\) Given the radical difference, we may not be able to integrate these two sets of data together to present a unified analysis. The problem has already noticed in Hong (2003: 409-411), where he posits different constraints for PureK and SinoK, but still fails to account for the optionality of n-insertion before /i/.

The next logical question, then, is how we can explain the apparent n-insertion effect before /i/. We believe that the data in (7c) and (7d) give us a clue. First consider (7d), the case of obligatory n-insertion. We dispute n-insertion analysis for these data and follow Sung (1995) and Oh (2002) to posit underlying /n/ for these words. Historical survey of Korean language based on Sung (1995) shows that the second members of compounds in (7d) have a word-initial underlying /n/ as in nip (leaf) and ni (teeth), which is persistently carried over to synchronic phonology. What actually happens here is that the word-initial /n/ is deleted in the initial position of a prosodic word, but they are retained elsewhere. In this line of thought, what we see in (7d) is not n-insertion but faithful

---

\(^{11}\) Han (1994: 78) cites that nic-[y][i][im] (late summer) shows optionality in n-insertion allowing two surface forms, nip[y][i][i][im] and nity[i][im]. Granted that this observation is correct (the latter form, however, is not used in the speech of the first author), it does not mean that the optionality persists throughout the y-devocalization data since the similar word han-[y][i][im] is not realized as *han[y][i][i][im]. We think that the optionality in y-devocalization, if any, may be the result of boundary difference, since the alleged optionality is found only between a prefix and a stem, but not between two morphological words like pom[y][i][im] (spring summer) which is realized as pom[y][i][i][im] and never as *pon[y][i][i][im].
correspondence between inputs and outputs.

The observation we made in (7d) helps to explain the lack of n-insertion in (7c). The second members of the compound do not have word-initial /n/ in the input. There is no underlying /n/ to correspond and there is no underlying /y/ to obey SyllCon. That is all there is to it. To the best of our knowledge, all the previous approaches of n-insertion stand at odds with the data in (7c).

Finally, we argue that the optionality in (7a) comes from allomorphic variations. Some i-initial words in the second member of the compounds, like ibul (blanket) and inu (forehead), came from Middle Korean n-initial words like the words in (7d). For (7d), the historical fact still holds true in the contemporary phonology, but words in (7a) show transitional period. It partially affects the underlying representation, leading to multiple allomorphs. In short, the i-initial forms and n-initial forms co-exist. For example, the input of [ii] in (7a) is either /iI/ or /nil/ (or both). The input shape persists in the second member of the compounds, this is why we have surface optionality in these cases.

All in all, we claim that n-insertion before /i/ is not actually an insertion but a faithful correspondence. We may call this pseudo-n-insertion. Such pseudo-n-insertion is also found in y-initial words. Consider the following data:12

(8) Pseudo-n-insertion before /y/ (cf. Park 2005: 324)

a. sin-[y\vaseq\]  sin[n\vaseq\], *siny\vaseq\] (modern woman)  
cf. mi-ny\vaseq\ (pretty girl), su-ny\vaseq\ (num)

b. ko-[y\vaseq\mpul]  ko[n\vaseq\mbul], *ko\vaseq\mbul (empty prayer)  
cf. i-ny\vaseq\ (ideology), ki-ny\vaseq\ (commemoration)

The data in (8) seem to illustrate another case of so-called n-insertion. With a closer look, however, we see that there is no n-insertion involved.13 The underlined Sino-K root in (8) has underlying /n/ as illustrated in mi-ny\vaseq\.

\[\text{12 We may posit another type of pseudo-n-insertion which may be analyzed not as n-deletion but as l-deletion. Note that /l/ cannot come in the initial position of a prosodic word regardless of the type of vowels that follow as shown in $\text{nak-w\vaseq\ (paradise)}$ vs. $\text{o-lak (amusement)}$. /l/ in initial position becomes [n] and an initial [n], underlying or derived, is deleted before a high vowel. This change is responsible for n\vaseq\ø alternation as in $\text{y\vaseq\ka (love song)}$ vs. $\text{pi-h\vaseq\ (tragic love)}$ and pseudo-n-insertion in $\text{y\vaseq\-ip (practice)}$ vs. $\text{do\vaseq\-ny\vaseq\-ip (general rehearsal)}$ (cf. ta-h\vaseq\ (drill fight)) or in $\text{y\vaseq\-o\vaseq\ (inflammation)}$ vs. $\text{ca\vaseq\-ny\vaseq\ (enteritis)}$ (cf. $\text{p\vaseq\-ye\vaseq\ (pneumonia)}$).} \]
and su-nyə or i-nyəm and ki-nyəm. If we assume n-insertion for the data in (8), we have to expand the n-insertion between two vowels, which is unsustainable in Korean phonology. These SinoK roots simply have underlying /n/, and the underlying form appears in a connected form, but in prosodic word-initial positions, they are deleted due to general avoidance of a sonorant consonant followed by a high vocoid.

So far, we have separated out pseudo-n-insertion from the true case of y-devocalization that takes place under the pressure of SyllCon. The discussion shows that not all the surface n-ø or l-n-ø alternations are the result of n-insertion. There are true cases of n-deletion and sifting out n-deletion cases from n-insertion data is a very important step toward a meaningful generalization on y-devocalization.

3.2. Asymmetry between Pure-Korean and Sino-Korean

Having cleared away some of the apparent exceptions for y-devocalization proposal, we now turn to the difference found between PureK and SinoK. Remind again that y-devocalization process comes from two constraints: one constraint forces to keep sonority balance and the other bans C-onsetting. We have already discussed the former and introduced SyllCon. Now we turn to the second one. The first approximation is the alignment type of constraints that force the wellformed edge alignment between Mwds and syllables as shown in (9):

(9) Alignment between syllables and Mwds (cf. Kim 2005: 638-9)
   a. Align (Mwd, L, σ, L) (=Align-Mwd-L)
      The left edge of an Mwd should be aligned to the left edge of a syllable.
   b. Align (Mwd, R, σ, R) (=Align-Mwd-R)
      The right edge of an Mwd should be aligned to the right edge of a syllable.

The alignment constraints given in (9) virtually say that there should not be any insertion in the beginning of an Mwd (9a) and that the

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13 As we will see later in 3.2, if the data in (8) are cases of n-insertion, it poses serious problems to the proposal made in this paper, since n-insertion is not supposed to take place between prefixal root and SinoK stem.
Mwd-final consonant should remain in the same syllable with the preceding vowel (9b). "Mwd" here is a cover term to denote any lexical word, to which affixes may be added or which constitutes a subpart of compounds. We have already seen in (1c) and (1d) that PureK and SinoK show asymmetry in the environments of \( y \)-devocalization. The following examples that show the lack of \( y \)-devocalization confirm the observed asymmetry:14

(10) Lack of \( y \)-devocalization

a. No \( y \)-devocalization in SinoK in the configuration A[BC]
   mol[y\(\text{-}\amc\)] moly\(\amc\), *mol[\(\text{\text{-}}\amc\)\(\text{-}\)i] (impudence)
   ky\(\text{-}\amc[y]\)\(\text{-}\)sik ky\(\text{-}\amc[y]\)\(\text{-}\)sik, *ky\(\text{-}\amc[y]\)\(\text{-}\)sik (Light western food)
   my\(\text{-}\)y\(\text{-}\)ngi my\(\text{-}\)y\(\text{-}\)ngi, *my\(\text{-}\)y\(\text{-}\)ngi (good acting)

b. No \( y \)-devocalization in PureK in the configuration [AB]\(\text{-}\)C15
   [\(\text{\text{-}}\)y\(\text{-}\)incip]-i-yo \(\text{\text{-}}\)y\(\text{-}\)incibyo, \(\text{\text{-}}\)y\(\text{-}\)incim[n]o (large house Q-marker)
   [\(\text{\text{-}}\)lin]-e-yo \(\text{\text{-}}\)linyio, \(\text{\text{-}}\)lin[n]o (Adult Q-marker)

The data given in (10a) and (10b) along with those in (1c) and (1d) seem to suggest that Align-Mwd-L works for PureK while Align-Mwd-R is obeyed by SinoK. For PureK, C-onsetting takes place across the right edge of an Mwd (10b), but it is not allowed across the left edge of Mwd (1c). SinoK shows the opposite: C-onsetting is allowed across left edge of an Mwd as in (10d), but not across its right edge as in (1d). The observation so far necessitates further division of the alignment constraints as in (11):

(11) Refining Alignments to explain PureK and SinoK asymmetry

a. Align (PureK-Mwd, L, \(\sigma\), L) (=Align-PureK-L)
   The left edge of a PureK Mwd should be aligned to the left edge of a syllable.

---

14 Note that the wrong forms in (10) are the actual outputs in Kyungsang Korean, which shows profuse use of \( y \)-devocalization in SinoK root compounds. Please refer to M. Lee (2006) for detailed analysis of \( y \)-devocalization in Kyungsang Korean.

15 These examples from Hong (2005) may not be relevant to the present discussion. We reserve the data judgement for these examples. For some, the dubious forms marked by "?" may sound more natural. That could be true. If so, we have to look elsewhere to find the explanation. See footnote (19) for further explanation on this matter. Other than (10b), there is no reported \( y \)-initial suffix found in the configuration given in (10b). In this connection, it should be noted that, in the Kyungsang dialect, the dubious forms appear as the actual outputs, which requires that further refinements along with reranking be introduced as in M. Lee (2006).
b. Align (SinoK-Mwd, L, $\sigma$, L) (\textasciitilde Align-SinoK-L)
   The left edge of a SinoK Mwd should be aligned to the left edge of a syllable.

c. Align (PureK-Mwd, R, $\sigma$, L) (\textasciitilde Align-PureK-R)
   The right edge of a PureK Mwd should be aligned to the right edge of a syllable.

d. Align (SinoK-Mwd, R, $\sigma$, L) (\textasciitilde Align-SinoK-R)
   The right edge of a SinoK Mwd should be aligned to the right edge of a syllable.

e. Ranking
   Align-PureK-L, Align-SinoK-R >>...>>Align-PureK-R Align-SinoK-L

We have made a refined division of alignment constraints based on the difference in the morphological information. The ranking in (11e) shows that PureK Mwd needs left alignment, while SinoK demands right alignment with respect to the syllable edge. The right edge of PureK words and the left edge of SinoK words are simply ignored, which is represented as their place far down the ranking hierarchy.

What we have done so far is to identify the alignment requirement with the loci for y-devocalization. The argument is that the alignment constraints disallow C-onsetting, SyllCon compels sonority balance and they work together to devocalize the onset glide. Compare the presence and absence of y-devocalization with those of syllable alignment:

(12) Loci of y-devocalization and alignment (cf. (1))
   a. PureK compounds: Mwd [ ∙ Mwd
   b. SinoK compounds: Mwd [ ] Mwd
   c. PureK prefix-Mwd: Prefix [ ∙ Mwd
   d. SinoK Mwd-suffix: Mwd [ ] ∙ suffix

The alignment is represented with outlined brackets: "[" represents left alignment and "]" denotes right alignment. And " ∙ " pinpoints the locus of y-devocalization. (12) clearly demonstrates that the locus of alignment requirement and y-devocalization match with each other. Compare this with lack of y-devocalization given in (13):

(13) Lack of y-devocalization and alignment (cf. (10))
   a. PureK Mwd-suffix : [ Mwd ∙ suffix
   b. SinoK prefix-Mwd : prefix ∙ Mwd ]
"ο" is a potential site for y-devocalization. But we can see that there is no motivation for y-devocalization, because there is no alignment requirement involved here. In these cases, C-onsetting rather than y-devocalization takes place (except when the preceding Mwd ends in /ŋ/). As such, the mismatch between the locus of alignment and that of y-devocalization can explain the lack of y-devocalization in the configurations given in (13). Note further that the alignment constraints can also account for the lack of y-devocalization within Mwd in SinoK. The relevant examples are given in (14):

(14) No y-devocalization between roots in SinoK16
a. Between an obstruent and /y/
   naŋ-yə † nayŋə, *naŋ[ŋ]ə (fallen leaf)
   kiŋ-yə † kigŋə, *kiŋ[ŋ]ə (smoking)
   kip-yə † kibŋə, *kim[ŋ]ə (payment)
b. Between a sonorant and /y/
   kwon-yə † kwonŋə, *kwon[ŋ]ə (involvement)
   kim-yə † kimŋə, *kim[ŋ]ə (no smoking)
   hwon-yə † hwnŋə, *hwn[ŋ]ə (welcome)

In SinoK root compounds, each root is not an independent word and there is no Mwd boundary between the two roots. Therefore there is no motivation for y-devocalization here.

Before closing the discussion, remarks are in order about special compounds made from the combination of SinoK and PureK. These hybrid forms are exemplified in (15):

(15) Hybrid forms and y-devocalization
a. PureK Mwd and SinoK Mwd
   [a][l][yak]       [a][l][ak]       (a medicine pill)

16 We did not bother to change /ny/ to [ŋ] in the examples given here. This is to differentiate the palatal nasal derived by coalescence and by y-devocalization. Here we have to note that the words in (14b), but not those in (14a), show y-devocalization in Kyungsang Korean. We attribute this to the high ranking nature of Align-Root (Align (SinoK Root, R, a, R)) in Kyungsang Korean, though they are ranked low in Seoul Korean. Please refer to M. Lee (2006) for Kyungsang Korean y-devocalization. Shin & Cha (2004: 306) and Park (2005: 324) observe that n-insertion optionally takes place in examples like (14b) citing kanyeol-kanyeol for kan-yol (censorship) and ki myun-kinjum for kim-ju (finance). But we believe that they reflect dialectal variation, found in Kyungsang Korean, but not attested in Seoul Korean.
n-Insertion as y-Devocalization in Korean

[pak’t][ya’pan] pak’an[n]a[ban] (husband)
[nun][yoki] nun[n]ogi (seeing pleasure)

b. SinoK Mwd and PureK Mwd
[inhan][y]almə khu[han][n]almə (ginkgo nut)
[cuŋkuk][ŋau] cuŋku[n]o au (Chinese fox)

c. PureK prefix and SinoK Mwd
[ɕʰɔ[ɕ]]al[ɕɔ]’a k’al[yuli] (first train)
[ɕʰɔ[ɕ]]an[n]al[ɕɔ]’a k’al[ŋ]uli (bottom glass)

d. SinoK prefix and PureK Mwd
[pei-][ŋau] peŋ[n]ŋau (white fox)
[sæŋ-][uju] sæŋ[n]ut (new yu^3 carrier)

e. SinoK Mwd and PureK suffix
[inhan]-[i]-yo inhan’yo (Ginkgo nut Q-marker)
[ulsan]-[i]-yo ulsan’yo (Ulsan Q-marker)

Generalizing what appears to be very complicated variation given in (15), we see that y-devocalization takes place between two Mwds, between a prefix and an Mwd, but not between an Mwd and a suffix. In other words, they pattern like PureK words. We simply treat all hybrid words as PureK. This means that Align-SinoK-R applies only for the words that contain only the SinoK morphemes. Any other types are not subject to Align-SinoK-R, but to Align-PureK-L, instead. This is a tentative assumption open to further research.

17 The only known exception of this generalization is hik[ŋ]auso (black goat) that might belong to (15d) type. We get hig[ŋ]auso instead of the expected form hig[ŋ]auso. We have no explanation for this word other than that it might be treated as a single morpheme. Interestingly this word is not listed in internet Korean dictionaries provided by Yahoo, Empas, The National Academy of Korean Languages, and Encyber. This strongly suggests that the word is a newly concocted one with radical spread through mass-media for commercial advertisement, which prescriptively decided its pronunciation.

18 One may suggest that we do not need the tentative assumption made here and go strictly by the alignment proposal in (11). But this stance causes a problem in words like (15a) and (15c), which show the combination of a PureK-SinoK sequence. We might expect [PureK prefix/Mwd + SinoK Mwd], in which the actual y-devocalization site represented by “.” cannot be licensed here. We may even propose that Korean prefixes are actually a prosodic word like Class II prefixes in English. And Selkirk’s (1986) end-based approach actually confirms that, with left edge alignment, the prefix may end up being a prosodic word. But this idea is not entertained here.
4. OT analysis for y-devocalization and residual problems

So far we have laid out basic assumptions about the proposal on y-devocalization made in this paper. In this section, we will go into the detailed ranking arguments to show the actual analysis of Korean y-devocalization. This section is divided into two subsections. In the first, we will deal with the data that show presence of y-devocalization. Then we will discuss the lack of y-devocalization to see how the present proposal can explain the absence and the presence of y-devocalization.

4.1. Presence of y-devocalization

The constraints so far introduced are enough to explain the presence of y-devocalization in Korean. Summing up the discussion so far gives us the following ranking:

(16) Partial ranking for y-devocalization
    Align-PureK-L, Align-SinoK-R, SyllCon, MaxF(son) >> MaxF(vocalic),

The alignment constraint along with SyllCon forces to turn a glide into a nasal to lower its sonority. In this process MaxF(vocalic) and DepF(nasal) are violated. But further change into an obstruent results in the additional violation of MaxF(son). The ranking given so far can explain the presence of y-devocalization discussed in the previous section. Consider the following tableau:

(17) y-devocalization in PureK compounds
    a. evaluation of [kʰ on][yəs]

<table>
<thead>
<tr>
<th></th>
<th>Align-PureK-L</th>
<th>Align-SinoK-R</th>
<th>SyllCon</th>
<th>MaxF(son)</th>
<th>MaxF(vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>[kʰ on].ɲət</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>[kʰ on].yat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>[kʰ on].yət</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td>[kʰ on].cət</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v.</td>
<td>[kʰ on].øət</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
b. Evaluation of [k'æ][yəs]

<table>
<thead>
<tr>
<th></th>
<th>Align-PureK-L</th>
<th>Align-SinoK-R</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>[k'æːyət]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>[k'æːɲət]</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>[k'æːcot]</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>iv.</td>
<td>[k'æːɲət]</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

Tableau (17) contrasts kʰɔŋ-yəs (bean candy) with k'æ-yəs (sesame candy). For k'æ-yəs, there is no need to do anything, because the first word does not have a final consonant. y-devocalization in (17bii) is an unwanted hyper-change that violates faithfulness of a word without improving its markedness. (17biii) and (17biv) are even worse than the loser in (17bii). This explains the mystery of n-insertion after a consonant. kʰɔŋ-yəs, having final consonant in the preceding Mwd, is subject to SyllCon and C-onsetting as in (17aiii) does not help, because it results in the violation of alignment constraint and /ŋ/ is not allowed in the syllable-initial position. (17aiv) and (17av) are both suboptimal, crucially violating MaxF(son). The minimal change to remedy the situation, therefore, is to apply y-devocalization.

(18) y-devocalization in SinoK compounds

<table>
<thead>
<tr>
<th></th>
<th>Align-PureK-L</th>
<th>Align-SinoK-R</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>han.gun.[ju.yak]</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>han.gun.[yu.yak]</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>han.gu.g[yu].yak</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

The explanation is virtually the same as in (17), except that this time Align-SinoK-R is at work. Comparing (17) with (18), we see that the PureK compounds have the configuration [Mwd Mwd, while the SinoK words in (18) have Mwd Mwd] configuration. What is common between the two is that there is an alignment locus between two Mwds. As such, in compounds, there is no distinction between PureK and SinoK because either Align-PureK-L or Align-SinoK-R puts the alignment locus between two Mwds.

Now consider the rest of the tableaux that show y-devocalization in prefix and Mwd sequence in PureK and Mwd and suffix sequence in SinoK.
(19) $y$-devocalization in affixed forms

a. Between prefix and PureK Mwd

<table>
<thead>
<tr>
<th></th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c^{b}_{\text{as}}-[\text{yolme}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>i. $c^{b}_{\text{as}}[\text{yolme}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ii. $c^{b}_{\text{as}}[\text{yolme}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>iii. $c^{b}_{\text{as}}[\text{yolme}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

b. Between SinoK Mwd and suffixal root

<table>
<thead>
<tr>
<th></th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$[\text{tokc}^{\text{am}}]-\text{yok}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>i. $\text{tokc}^{\text{am}}[\text{niok]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ii. $\text{tokc}^{\text{am}}[\text{yok}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>iii. $\text{tokc}^{\text{am}}[\text{yok}]$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Again with the interaction of Align and SyllCon, we see that the optimal forms undergo $y$-devocalization. The crucial observation in (19a) and (19b) is that they are morphologically different and therefore are subject to different alignment constraints. $c^{b}_{\text{as}}-[\text{yolme}]$ in (19a), being PureK word, is subject to Align-PureK-L, while the word in (19b), being SinoK word, should obey Align-SinoK-R. Other than that, the tableaux show that the evaluation correctly picks out optimal forms.

### 4.2 Absence of $y$-devocalization

Now let’s turn to the absence of $y$-devocalization and see how the present proposal deals with it. Consider the following tableaux that explain the lack of $y$-devocalization between Sino-prefixal roots and SinoK Mwds and between PureK Mwds and suffixes and also within SinoK Mwds:

(20) Absence of $y$-devocalization

a. Between a SinoK prefixal root and a SinoK Mwd

<table>
<thead>
<tr>
<th></th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{mol[\text{yom}^{e}]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>i. $\text{mol[\text{yom}^{e}]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ii. $\text{mol[\text{yom}^{e}]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>iii. $\text{mol[\text{yom}^{e}]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>iv. $\text{mol[\text{yom}^{e}]}$</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
n-Insertion as y-Devocalization in Korean

b. Between a Pure K Mwd and a suffix

<table>
<thead>
<tr>
<th></th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[kʰincip]-yo</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>[kʰin.ji.byo]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>[kʰin.jip.yo]</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>[kʰin.jim.nyο]</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

c. Within a Sino K Mwd

<table>
<thead>
<tr>
<th></th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>nak-ŋap</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>nak.ŋap</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>nan.ŋap</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

The common feature among (20a), (20b) and (20c) is that these words have nothing to do with alignment constraints. Since the involvement of alignment constraints is the decisive factor in causing y-devocalization, y-devocalization in these cases unnecessarily violates faithfulness with no resultant improvement in the sequential harmony.

The remaining examples in (10a) (cf. (20a)) pose a serious problem in our analysis. In case the prefix ends in a velar nasal /ŋ/, our proposal fails to produce correct output as illustrated in (21):

(21) Wrong evaluation of kyŋŋ[ŋan.sik]

a. With constraint so far introduced

<table>
<thead>
<tr>
<th>kyŋŋ[ŋan.sik]</th>
<th>Align</th>
<th>SyllCon</th>
<th>MaxF (son)</th>
<th>MaxF (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ i. kyŋŋ.ŋan.sik</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ ii. kyŋŋ.ŋan.sik</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. kyŋŋ.ŋan.sik</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

19 As noted in footnote (15), some might say that (20b)ii (kʰin.jim.nyο) should be the actual output form. We, however, argue that such judgment does not invalidate the proposal made here. Rather it requires that we take into consideration another constraint, Align-Pwd (The right edge of a prosodic word coincides with the right edge of a syllable) introduced in Y. Lee (2001) to explain noun-verb asymmetry in Korean phonology. We place Align-Pwd over SyllCon. (Y. Lee 2001 shows that Align-Pwd is higher than Onset, and this paper argues that Onset is higher than SyllCon as shown in (25). Therefore, by transitivity, we see that Align-Pwd should be higher than SyllCon.) Then we see that (20b) violates Align-Pwd, while (20b)ii does not. This would resolve the conflict. And for those who favors (20b) (kʰin.ji.byο), we argue that the suffix form may be [iyo]. If the suffix is vowel-initial, we can explain the lack of y-devocalization in a straight manner, with the ranking Align-Pwd >> Onset >> SyllCon. (cf. (25))
b. With 

\[ *\alpha \tau \] as an undominated constraint

<table>
<thead>
<tr>
<th></th>
<th>ky(\alpha ) y(\alpha ) s(k)</th>
<th>*(\alpha \tau )</th>
<th>(\text{Align} )</th>
<th>(\text{SyllCon} )</th>
<th>(\text{MaxF} ) (son)</th>
<th>(\text{MaxF} ) (vocalic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. ky(\alpha ) ny(\alpha ) s(k)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ ii. ky(\alpha ) y(\alpha ) s(k)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ iii. ky(\alpha ) ny(\alpha ) s(k)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

With strict banning of /\(\alpha \tau /\) in Korean phonology, the surface form in (21ai) is not readily acceptable. The actual attested form is (21aii) marked by "→" in the tableau. But putting 

\[ *\alpha \tau \] (No \(\alpha \tau \) in a syllable-initial position) does not help to get the right result as shown in (21b). This time, the unwanted form in (21bii) shows up as optimal. In any case with the ranking, \(\text{SyllCon} \gg \text{MaxF} \) (vocalic), the actual output form in (21aii) (=21bii) cannot be optimal.

As we go back and see that all the \(\text{SyllCon} \) violations in tableaux (17), (18) and (19), we find that the affected glide is located right behind the alignment boundary. It seems to be an important observation that \(\gamma\)-devocalization takes place across the alignment boundary. We suggest that the \(\text{SyllCon} \) should be relativized taking into consideration that certain boundary may enforce stronger condition for \(\text{SyllCon} \). We propose two different versions of \(\text{SyllCon} \) as in (22):

(22) Relativized \(\text{SyllCon} \)

a. General version \(\text{(SyllCon-G)} (=4)\)

Avoid rising sonority over a syllable boundary.

b. Specific version \(\text{(SyllCon-S)}\)

Avoid rising sonority over a syllable boundary and across a specified boundary.

The specified boundary in (22b) may be any morphological and/or phonological boundary. And for the present purpose, we use the alignment boundary given in (11). With this refinement, we find that, in tableaux (17), (18) and (19), we see that \(\text{SyllCon} \) violations on these tableaux involve the violations of both the general version and the specific version of \(\text{SyllCon} \) as given in (22). In the meantime, all candidates in tableaux (20) that show violation of \(\text{SyllCon} \) actually violate \(\text{SyllCon-G} \) but not \(\text{SyllCon-S} \). Based on Pa\(\gamma\)nini’s Theorem of constraint ranking as in Prince & Smolensky (1993: 88-89), we rank \(\text{SyllCon-S} \) over
SyllCon-G. We replace SyllCon with SyllCon-S in the tableaux (17), (18) and (19), and put SyllCon-G anywhere below MaxF(vocalic). Now consider the evaluation in the following tableau:

(23) Evaluation of *kyəŋ[yaŋsik]

<table>
<thead>
<tr>
<th></th>
<th>*[u]</th>
<th>Align</th>
<th>SyllCon-S</th>
<th>MaxF(son)</th>
<th>MaxF(vocalic)</th>
<th>SyllCon-G</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kyəŋ.ˌyaŋ.ˌsik</td>
<td><img src="image1" alt="image" /></td>
<td><img src="image2" alt="image" /></td>
<td><img src="image3" alt="image" /></td>
<td><img src="image4" alt="image" /></td>
<td><img src="image5" alt="image" /></td>
<td><img src="image6" alt="image" /></td>
</tr>
<tr>
<td>✓ b. kyəŋ.ˌyaŋ.ˌsik</td>
<td><img src="image7" alt="image" /></td>
<td><img src="image8" alt="image" /></td>
<td><img src="image9" alt="image" /></td>
<td><img src="image10" alt="image" /></td>
<td><img src="image11" alt="image" /></td>
<td><img src="image12" alt="image" /></td>
</tr>
<tr>
<td>c. kyəŋ.ˌnaŋ.ˌsik</td>
<td><img src="image13" alt="image" /></td>
<td><img src="image14" alt="image" /></td>
<td><img src="image15" alt="image" /></td>
<td><img src="image16" alt="image" /></td>
<td><img src="image17" alt="image" /></td>
<td><img src="image18" alt="image" /></td>
</tr>
</tbody>
</table>

Now, we get the desired result. The crucial observation here is that SyllCon-G violation is tolerated between two consonants if there is no intervening alignment boundary.

Let’s turn to the lack of *-devocalization before a vowel. In (17b), we have already seen that the final segment of a first word in a compound is a vowel then it is not subject to SyllCon, which governs the sonority balance between two consonants over a syllable boundary. And the same effect should be observed, if the first segment of the second word in a compound begins with a vowel. Consider the following data:

(24) Absence of *-devocalization before a vowel (cf. (7c))

a. [kɪlim][i̱ki]   ki.li.mˈil.gi    (picture diary)
b. [nun][insa]     nu.nˈin.sa   (greet with nodding)
c. [sou̱l][ai]      sa.u.rˈai    (kid from Seoul)

In (24) we can see that the alignment constraint is violated and still there is no *-insertion. This shows that a vowel attracts a consonant to satisfy Onset. This is a crucial difference between *-initial words and i-initial words. *-initial words have onsets while i-initial words do not. But this does not mean that a consonant can freely inserted before a vowel, which may be captured by ranking Dep-C higher than Onset. The observation necessitates to put Dep-C >> Onset over *-devocalization related constraints such as Align(-Mwd) and SyllCon. Consider the following tableau:
Yongsung Lee & Minkyung Lee

(25) Evaluation of [kɨlim][ilki]

<table>
<thead>
<tr>
<th></th>
<th>Dep-C</th>
<th>Onset</th>
<th>Align</th>
<th>SyllCon</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [kɨlim][ilgi]</td>
<td>✓</td>
<td></td>
<td>*PureK-L</td>
<td></td>
</tr>
<tr>
<td>b. [kɨlim][i:gi]</td>
<td></td>
<td></td>
<td>*ǔ</td>
<td></td>
</tr>
<tr>
<td>c. [kɨlim][i:li:gi]</td>
<td></td>
<td></td>
<td>*ǔ</td>
<td></td>
</tr>
</tbody>
</table>

[kɨlim][ilki], a hybrid compound with PureK Mwd and Sino-K Mword, is subject to Align-PureK-L. Since there is no /y/, to change into a nasal, y-devocalization has nothing to do with these data. As predicted, the tableau in (25) has no problem in explaining that there is no n-insertion before a vowel.20

Before we conclude, we now dig up another potential problem of y-devocalization, which has been lurking behind from the very beginning. If alignment constraints and SyllCon compel the change from a glide to a nasal, then we might expect that another glide /w/ would undergo the same process of devocalization.

Take a SinoK word, [nihæŋ][wən] (bank clerk), for example. It does not surface as *ɨnhæŋ. In traditional n-insertion analysis, it does not become *niŋæŋ.næŋ, either. This reflects another asymmetry between a palatal glide /y/ and a labial glide /w/.

We argue that the y→ɲ change and w→m change are different in quality. Consider the following violations incurred in these changes:

(26) Faithfulness violations and feature make-up

a. Violations involved in devocalization
   i. y→ɲ: *MaxF(vocalic) (*DepF(nasal))
   ii. w→m: *MaxF(vocalic) *MaxF(round) (*DepF(nasal))

b. Feature composition of /w/ and /m/21
   i. w: [vocalic, son, labial, round (dorsal)]
   ii. m: [(cons,) son, labial, nasal]

20 Again, readers are reminded that the pseudo-n-insertion shown in (7a) and (7d) comes from the underlying /n/ as discussed earlier.

21 Again we are not committed to any specific version of feature specification theory other than treating high vowels and glides as having the same feature set. We thank one of the reviewers who points out that /w/, being a complex segment with two place features, [labial] and [dorsal], defies an easy change. This observation can be naturally incorporated into the present analysis by substituting MaxF(dorsal) for MaxF(round) in the conjoined constraint in (27a).
We see that $w$-devocalization process invites violations for $MaxF(vocalic)$ and $MaxF(round)$. Taking this into consideration, we may posit local constraint conjunction, in line with Smolensky (1995) and Alderete (1997), to prevent the radical change given in (26aii):

(27) Locally conjoined constraints and evaluation
a. $[MaxF(vocalic), MaxF(round)]_{SEG} (=LCC)$
   No combined violation of $MaxF(vocalic)$ and $MaxF(round)$ in
   a segment.

b. Ranking argument
   Given the lack of $w$-devocalization in Korean phonology, $LCC$
   should be ranked very high. (Practically, it should be higher than
   $SyllCon$ to get the right result in evaluation.)

c. Evaluation tableau

<table>
<thead>
<tr>
<th></th>
<th>*$_{D_0}$</th>
<th>LCC</th>
<th>Dep-C</th>
<th>Onset</th>
<th>Align</th>
<th>SyllCon</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ i. in.hea., w ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>ii. in.hea., m ON</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. in.hea., mwan ON</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. in.hea., won</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*SinoK-R</td>
</tr>
</tbody>
</table>

By putting $LCC$ anywhere above $SyllCon(-S)$ in the hierarchy, we now can explain the lack of $w$-devocalization in Korean. As shown in (27cii), $w$-devocalization results in $LCC$ violation. /ŋ/ disallows C-onsetting due to the constraint, *$_{D_0}$, as shown in (27civ). We see that conjoined constraint can successfully prevent $w$-devocalization.

5. Conclusion

This paper has targeted on the Korean data showing the $n$-insertion in -C.y- sequence across a syllable boundary. Observing theoretical defects that the previous OT analyses have, we have proposed that the phenomenon can be reanalyzed as $y$-devocalization.

This paper examined the asymmetries found between $n$-insertion before /y/ and before /i/ to screen out $n$-insertion before /i/ from $y$-devocalization, claiming that the so-called $n$-insertion before a high front vowel /i/ is actually the retention of underlying /I/ or /n/. This paper also examined the difference between PureK and SinoK, which
is embodied in different alignment constraints. The alignment loci are the right edge of an MWD for SinoK and the left edge of an MWD for PureK. This provides a useful tool to avoid analytic problems of previous research and to present a comprehensive analysis of traditional n-insertion.

SyllCon disallows rising sonority over a boundary. However, Align dictates how SyllCon is satisfied. No consonant can move over the alignment loci due to alignment requirement, which is placed high in the ranking hierarchy. The alignment constraints also do not allow consonant insertion. The only way out from the pressure of SyllCon and Align is to demote the sonority of /y/ to turn it into [ɬ] or into [ŋ].

We showed the need to divide SyllCon into two different versions: SyllCon-S and SyllCon-G. SyllCon is enforced in a stronger manner, if there is an intervening alignment boundary.

The proposal made in this paper can deal with apparent exceptions in traditional n-insertion analyses. The absence of y-devocalization in word-internal position is attributed to the absence of alignment requirement within a word. The optional nature of classical n-insertion before a high front vowel /i/ comes from underlying multiple allomorphs. The absence of w-devocalization was explained with the locally conjoined constraint that bars the change from a labial glide to a labial nasal. The proposal, as such, gives new perspective on looking at n-insertion phenomenon and presents consistent and comprehensive analysis.

References


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