Coronals in epenthesis in loanwords with comparison to velars

Kyumin Kim
University of Toronto

This paper examines cross-linguistic differences in consonant and vowel (CV) interactions in epenthesis in loanwords. In particular, the pattern of coronals is compared to that of velars in three languages, Shona, Sesotho, and Korean. In Shona and Sesotho, a coronal consonant shares its place feature with an epenthetic vowel, but a velar does not share its place feature with the vowel. In Korean, however, only a palatal coronal shares its place feature with an epenthetic vowel, but a plain coronal does not. A velar in Korean also shows a different pattern, sharing its place feature with the vowel. I argue that the differences found among the languages are due to a different feature specification in each language. I also present a new empirical finding on the interaction between a Korean velar and an epenthetic vowel in order to support the claim that velars contribute a feature in Korean.

1. Introduction

This paper examines cross-linguistic consonant-vowel (CV) interactions in epenthesis in loanwords. It has been observed that some consonantal places of articulation share their place features with epenthetic vowels but others do not (Uffmann 2004, 2006; Rose and Demuth 2006). This is exemplified with English loanwords in Shona (1a), and English and Afrikaans loanwords in Sesotho (1b).

* Thanks to Keren Rice for supervising this work and providing guidance and support on the development of the research. I also thank Yoonjung Kang for her valuable comments and criticism on this material. I wish to thank Alexei Kochetov for his valuable comments and for help with the phonetic analysis in the paper. Special thanks also go to Becky Roeder, Ron Smyth, Manami Hirayama for their help with the phonetic experiment and analysis included in this work. I am also grateful to the participants of my study and to my husband for helping me with the recordings. I also thank to the members of Coronal Club at the University of Toronto for their insightful comments and discussion on the past versions of this work. All errors are my own.

1 Shona examples to be provided in this paper are in Shona spelling, not in phonetic transcription, as presented in Uffmann (2004, 2006).
(1) a. Shona (Uffman 2004)

<table>
<thead>
<tr>
<th>Coronal</th>
<th>Velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>aizi ’ice’</td>
<td>checki ’check’</td>
</tr>
<tr>
<td>bhushi ’bush’</td>
<td>koko ‘cork’</td>
</tr>
</tbody>
</table>

b. Sesotho (Rose and Demuth 2006)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[teraeafa] ‘driver’</td>
<td>[ktrimpi] ‘crib/manger’</td>
</tr>
<tr>
<td>[jiirimpi] ‘shrimp’</td>
<td>[konoopa] ‘button’</td>
</tr>
</tbody>
</table>

As illustrated in (1), coronal consonants in both languages contribute their place features to the epenthetic vowels: the epenthetic vowels are front vowels. In contrast, velars in these languages do not contribute their place features to the vowels: either a default insertion as in Shona (1a) or a vowel copy as in Sesotho (1b) occurs.

A similar but somewhat different pattern is found in Korean. A palatal coronal shares its place feature with the vowel, yielding a front vowel, but plain coronals do not contribute their places and a central vowel results:

(2) Palatal Plain coronal

| [kʰocʰi] ‘coach’ | [hih] ‘hit’ |
| [purəj] ‘brush’  | [sɪtʰɪritʰi] ‘street’ |

Interestingly, as will be shown in the paper, Korean also shows a difference in the pattern of a velar from Shona and Sesotho: a velar does contributes its place feature to an epenthetic vowel in Korean as opposed to the velars in Shona and Sesotho.

Given the differences found in the cross-linguistic CV interactions, this paper tries to answer the following question: How can the differences found in the CV interaction in epenthesis in loanwords be accounted for in a formal model of phonology? In other words, what are the differences among the languages due to? As a solution to this question, I propose that the differences are due to a different feature specification in consonants in each language. Assuming contrastive specification (Rice and Avery 1993, 2004), it will be shown that a consonant cannot contribute its feature to the vowel if it does not have a feature specified in its representation, but it can if it is specified for the feature.

Another contribution of this paper is a new empirical finding on the interaction between a Korean velar and an epenthetic vowel. It has been reported that an epenthetic vowel next to a vel and a plain coronal is the same in terms of a place (e.g., Oh 1992; H.M. Sohn 1999). As will be shown in the paper, however, a phonetic study reveals that the place of an epenthetic vowel next to a velar and a plain coronal is not the same.

The paper is organized as follows. Section 2 reviews what the literature reports about the CV interaction in Korean, Shona, and Sesotho, and summarizes the pattern of the cross-linguistic CV interaction. Section 3 discusses a new finding on Korean velars with respect to epenthetic vowels. Section 4 provides theoretical foundations that underlie the proposal. Section 5 argues that the differences found in the CV interactions are due to different feature specifications in consonants of the languages. Section 6 details the proposal by analyzing the different cross-linguistic CV interactions. Section 7 provides a summary and a conclusion.
2. Cross-linguistic CV interactions

2.1 Korean

Korean has (C)(G)V(:)(C) syllable structure (H.M. Sohn 1999) that does not allow consonant clusters. A vowel is inserted to break up such illegal clusters in loanwords. Another environment where epenthesis occurs is after a single consonant coda (Ahn 1991; Oh 1992, 2002; Kang 2003).

In both environments, it is reported that the high central vowel /i/ is inserted as a default epenthetic vowel (H.S. Sohn 1985, 1987; Ahn 1991; Oh 1992, 2004):

(3) a. [sitʰirajkʰi] ‘strike’
   b. [sitʰiritʰi] ‘street’

It is also noted that the epenthetic vowel can be affected by adjacent consonants: consonantal places of articulation share their features with the vowel (Ahn 1991; Oh 1992, 2004), as exemplified below:

(4) Labial       (5) Palatal
   a. [puɾaʊsʰi] ‘blouse’    a. [peneʰi] ‘bench’
   b. [kolpʰu] ‘golf’        b. [purʲi] ‘brush’

After a labial consonant, as in (4), the epenthetic vowel is the high back round vowel [u], and after a palatal, in (5), the epenthetic vowel is [i].

However, not all consonantal places of articulation are reported to share their place features with the vowel: after plain coronals and velars, the epenthetic vowel is reported to be the default, [i], as illustrated in (6) and (7):

(6) [sipʰ ʰi] ‘watch’
(7) [sipʰ ʰi] ‘brush’

---

2 I wish to thank Dr. Mira Oh for her kindness in sharing her works on Korean epenthesis.

3 It is not the case that there is always epenthesis after a single consonant coda. There are phonological contexts where epenthesis is more likely to occur. For example, epenthesis is more likely to occur if the preceding vowel of a single coda is tense or long (Kang 2003).

4 Due to a phonetic nature of English syllable initial palatals (see Oh 1992 for details), the paper concerns only palatals that appear in syllable final position.

5 A note on palatals is in order. Korean has palatal stops phonemically and a palatal fricative phonetically. Nevertheless, all the palatals share their place features with an epenthetic vowel, resulting in [i]. Although [j] is not a phoneme in Korean, it is an allophone of /s/ (H.M. Sohn 1999): /s/ is palatalized to [j] before the high front vowel [i] (e.g., /si-ke/ [jige] ‘watch’). The pattern of [j]-[i] in ‘brush’ in (5b) is interesting when it is compared to the pattern [c]-[i] in [sipʰ ʰi] ‘sports’. In this word, an epenthetic vowel is not [i] but the default one [i] even though the word final consonant is a palatal coronal. In this case, the original consonant before the default vowel is [ts], as also noted in H.M. Sohn (1999), which can be treated as a plain coronal like /h/, differing only in terms of stridency; hence, there is no feature sharing between the consonant and the epenthetic vowel. Hence, [ts] is similar to [j] in ‘brush’ in that it is not a phoneme in Korean; however, it is different from [j] in that it is not realized on the surface but [c] appears instead. Considering the fact that [j] is an allophone in Korean, it is hard to tell what factors are involved in phonetic realization of each sound. For example, as for the case of [j], it might be merely a surface constraint that requires [j]-[i] together. I will leave this issue for a future research.
2.2 Shona

The discussion on Shona in this section is based on Uffmann (2004, 2006). Shona has a strict CV syllable structure, disallowing codas; vowels are epenthesized to avoid such coda consonants. Like Korean, an epenthetic vowel in Shona can be affected by an adjacent consonant:

(8) a. aizi ‘ice’ c. bhushi ‘bush’
   b. naironi ‘nylon’ d. chechi ‘church’

(9) a. aitemu ‘item’ c. kirabh ‘club’
   b. kondomu ‘condom’ d. chubhu ‘tube’

As shown in (8) and (9) respectively, a coronal consonant and a labial consonant share their place features with an epenthetic vowel. The epenthetic vowel after coronals is the high front vowel [i], as in (8) and after labials it is the high back round vowel [u], as in (9).

Interestingly, however, a velar in Shona does not share its place feature with epenthetic vowels, unlike a velar in Korean. Instead, a copy vowel (10a-b) or a default insertion (10c-d) occurs:

(10) a. kokó ‘cork’ c. magi ‘mug’
    b. kuruku ‘crook’ d. kiraki ‘clerk’

2.3 Sesotho

The following discussion of Sesotho loanwords is mainly based on Rose and Demuth (2006) and partly on Doke and Mofokeng (1985), and the loanwords to be presented are English and Afrikaans loanwords. Most Sesotho syllables exhibit basic CV structure. Vowel epenthesis to break up syllable clusters is the primary strategy in loanwords Sesotho.

However, the quality of the epenthetic vowel is determined by the position of the vowel in the word. In word initial position (11), like Korean and Shona, the general pattern is consonantal assimilation (11a-b). However, after velars, no assimilation takes place; instead right-to-left vowel copy occurs (11c).

---

6 I am deeply grateful to Dr. Christian Uffmann for valuable comments on Shona and for his willingness to share the Shona data incorporated in this work.

7 Uffmann (2004) also studies onset clusters in Shona. In onset cluster environments, the strategy of vowel epenthesis depends on the types of clusters. Due to the variation in strategies, Shona data to be discussed in the paper only concerns coda clusters.

8 For the purpose of the paper, the data to be presented is limited to word initial position where an epenthesis strategy is consonantal assimilation.

9 The example ‘shrimp’ is from Dr. Katherine Demuth and her colleague, Malillo Machobane. I thank them deeply for the data and their valuable comments on epenthesis in Sesotho loanwords. It should be
CORONALS IN EPENTHESIS IN LOANWORDS WITH COMPARISON TO VELARS

(11) **source word**   **adapted loanword**
    a. driver [drəvə] [tərəɛʃə] ‘driver’
    b. shrimp [ʃrɪmp] [ʃɪrimpi] ‘shrimp’
    c. krip [krɪp] [krɪpi] ‘crib/manger’

The cross-linguistic differences in CV interactions can be summarized as follows. In Shona and Sesotho, both types of coronals share their place features with the epenthetic vowels while velars do not share their place features with the vowels. In contrast, in Korean, palatal coronals share their place features with the epenthetic vowel but plain coronals and velars do not. As will be shown below, however, Korean velars are found to be different from plain coronals with respect to the epenthetic vowel.

3. New empirical findings on the Korean CV interaction

The CV interaction with respect to velars discussed earlier is unexpected when the facts about consonantal place specifications in Korean are considered. In the phonology of Korean, it is noted that coronal consonants assimilate to velar consonants; however, velars do not assimilate to coronals (Iverson and Kim 1987; Cho and Iverson 1997). In Cho and Iverson (1997), for example, the asymmetric pattern found in consonantal place assimilation is interpreted as showing that velar consonants have a place feature but coronals do not. Since both labials and palata ls, both of which have place features in a Cho and Iverson type model, share their places of articulation with an epenthetic vowel, it is predicted that velars should share their place features with an epenthetic vowel, contrary to the reports discussed in the previous section. The following sections present the result of a phonetic experiment whose main goal is to test the prediction discussed with respect to velars. As will be demonstrated below, velar does share its place feature with an epenthetic vowel.

3.1 Method

Three females participated in the recording, using a cardioid condenser microphone with a frequency response of 50 Hz~20,000 Hz. Target and non-target words were written in English in order to avoid bias but the sentences were written in Korean in order to have natural speech, as exemplified in (12):

(12) ‘Jae needs a lot of cakes.’

Filler sentences including non-target words were also distributed together with the sentences that include the target words. The subjects read each sentence at normal speed mentioned here that in fact the word ‘shrimp’ is not borrowed into Sesotho; however, if it were, it would be adapted as presented in (11b). That is, the epenthetic vowel is assimilated to the palatal coronal.

10 All speakers are from Kyungsang province of Korea, and they have lived in Canada for approximately 11 years. The ages of speakers vary: speaker 1 is 38 years old, speaker 2 is 52 years old, and speaker 3 is 30 years old. In the Kyungsang dialect, it is reported that there is no height contrast between /i/ and /a/. However, there seems to be speaker variation. Importantly, for the participants in the experiment, the vowels are contrastive.
three times. Using Praat (Boersma and Weenink 2005), a speech analysis package for Windows, formant values were obtained. Specifically, the steady portion of the first two formants (F1 and F2) was taken, and a measurement of F1 and F2 was made at the midpoint of the steady portion of the vowel. The formant values for each word were averaged over the three tokens and the resulting means were plotted.

My concern in the target words is the word-final epenthetic vowels, since vowels are more clearly audible in this position than in word-internal positions. In addition, the quality of an epenthetic vowel after palatals in word-initial position (e.g. *shrimp*) is different from that in the word-final position (e.g. *fish*) (Oh 1992).

### 3.2 Results and Discussion

Figures 1–3 summarize the results of the experiment separately for each speaker. They plot mean values of F1 and F2 for each word, labeled by place of articulation context:

---

Figure 1: Speaker 1

Figure 2: Speaker 2
Since the purpose of the experiment is to determine whether a consonant shares a place feature with an epenthetic vowel, the discussion to follow is only concerned with the values of F2 and its difference among the different consonants. The interpretation of F2 values is based on a general correspondence between vowel backness and formants frequencies of F2 (see Johnson 2003). The second formant, F2, roughly corresponds to vowel backness/frontness where front vowels have relatively high F2 frequencies while back vowels have relatively low F2 frequencies.

The F2 values of velars and coronals, for all speakers, are between those of labials and palatals, being higher than those of labials but lower than those of palatals. This fact indicates that the vowel inserted next to velars and coronals are farther to the front than the one next to labials but farther to the back than the one next to palatals. Likewise, the comparison between F2 values of velars and coronals in Figures 1–3 suggests that the epenthetic vowels next to velars are farther to the back than the ones next to coronals (by an average 299 Hz), since the F2 values of vowels adjacent to velars are lower than those of vowels adjacent to coronals. Importantly, for all speakers, there is hardly any overlap of F2 values between velars and coronals, indicating that the vowel inserted next to each consonant is not the same in terms of place.

Statistical results support these observations: the results showed a significant effect of place of articulation context for F2 for each of the three speakers (p < .001) (for more details, see Kim 2007). Both Figures 1–3 and the statistical results strongly suggest that an epenthetic vowel next to a velar and the epenthetic vowel next to a coronal are not the same in terms of place, as opposed to what has been reported in literature.

This new empirical finding on Korean shows that the place of epenthetic vowels in velar contexts is different from the places of the vowel in plain coronal contexts, being

---

11 For F1, the values after palatals are quite different, being much lower than in the other contexts (for Korean vowels, see Yang 1996). These differences are found to be statistically significant (for details, see Kim 2007).
farther back than next to plain coronals. In order to distinguish the vowels in each context, I adopt the symbol /u/ for the vowel in the velar contexts. Thus, the Korean CV interaction can be represented, as shown in (13):

<table>
<thead>
<tr>
<th>Consonants</th>
<th>Vowel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labial</td>
<td>u</td>
</tr>
<tr>
<td>Palatal</td>
<td>i</td>
</tr>
<tr>
<td>Coronal</td>
<td>i</td>
</tr>
<tr>
<td>Velar</td>
<td>u</td>
</tr>
</tbody>
</table>

Note that the epenthetic vowels in the context of coronal and velar consonants are different in contrast to what has been reported in literature (cf. section 2.1).

4. Theoretical Framework

4.1 Place features in consonants: Peripheral structure

I assume a ‘Peripheral’ node in the feature geometry subordinate to a Place node (Avery and Rice 1989; Rice 1994). The Peripheral node further divides into Dorsal and Labial, and Coronal is dominated by the Place node:

(14) Place
  Peripheral     Coronal
   Dorsal  Labial

As will become clear later, depending on language specific contrasts, the representation of the same place of articulation can differ from language to language (Rice and Avery 2004). In particular, either Coronal or Peripheral can be unmarked and thus absent in the underlying representation. For example, either a Peripheral-nonPeripheral contrast, as in Korean, or Coronal-nonCoronal contrast, as in Shona and Sesotho, can be developed.

4.2 Two-Place model

The analysis in this paper assumes a two-place model for a vowel feature system, as proposed in Rice (1995, 2002). In a description of phonological vowel places, Rice

---

12 The findings in this study are consistent with those of Yang (1996), with the value for [i] in this study very close to Yang’s [i], while [u] is distinct. This supports the finding that the epenthetic vowel after a velar consonant is different from the vowel after a coronal consonant, being more back.

13 I assume that the epenthetic vowel after the velar is colored by the consonant while that after the coronal is not, see section 4.2 for discussion. Further note that the results presented in the section are preliminary, and research controlling for additional factors is required.

14 This paper assumes that assimilation results from feature spreading in which a feature targets some segments so that both the target and the trigger share the feature. This type of feature spreading is subject to the conditions as in Avery and Rice (1989); Cho and Inkelas (1993).
(1995, 2002) proposes a vowel place model which makes use of two features, namely, Coronal and Peripheral, as in (15).

(15)  

\[
\text{V-Place} \\
\text{Coronal} \quad \text{Peripheral}
\]

Under this model, Coronal marks palatality and Peripheral marks non-centrality. Labial and Dorsal are not phonological features of vowels. Instead, they can be encoded in vowels phonetically, in which case they serve to enhance the perceptual saliency of a contrast. For example, for the back vowels, the two-place model requires only a single phonological feature, Peripheral; hence, the spreading of Peripheral results in back vowels. Between the back vowels, unround and round ones are phonetically distinguished by a feature enhancement, Dorsal and Labial respectively.

Following the spirit of Clements and Hume (1995), I assume that consonants and vowels share a set of place features. However, as in the two-place model, Dorsal and Labial are not phonological features of vowels, but only Coronal and Peripheral are. Thus, phonologically, consonants and vowels can share the place features in terms of Coronal and Peripheral but not in terms of Labial or Dorsal. With respect to Coronal, front vowels are assumed to pattern with coronal consonants, while back vowels are assumed to pattern with peripheral consonants with respect to Peripheral. As will become clear later, under this assumption, the pattern between a velar consonant and an epenthetic vowel in Korean is due to a feature spreading of the velar consonant to the vowel. In contrast, the pattern between a plain coronal and an epenthetic vowel is not due to feature spreading from the plain coronal, since the vowel is a central vowel, which has no place feature. If the plain coronal were to spread its feature to the vowel, a front vowel is expected to be inserted, contrary to the fact. Hence, I assume that a velar, but not a plain coronal, spreads a relevant place feature to the epenthetic vowel.

5. Proposal: Contrastive Specification

As observed in section 2, some consonantal places of articulation in some languages share a relevant feature with epenthetic vowels, while the same consonantal places of articulation in other languages do not.\(^{16}\) I argue that these contrasts can be accounted for by adopting the notion of contrastive specification (Rice and Avery 1993, 2004).

In constraining segmental representations, Rice and Avery (1993, 2004) proposed that features must be incorporated into segmental representations only if they serve to mark a contrast in the language. Under this theory, features enter representations to mark contrasts in the system. These are motivated by language-specific phonological patterns

---

\(^{15}\) The vowel system in Shona is proposed to make use of three place features, namely coronal, labial, and dorsal (Uffmann 2004). However, following Frigeni and Hall (2003) and Kim (2007), I assume that the two-place model suffices to capture the vowel harmony facts both in Shona native and loanword phonology.

\(^{16}\) As argued in Kim (2007), this difference among the languages is unexpected under a featural markedness approach (e.g., Uffmann 2004), which predicts the same type of CV interactions across languages.
and the structure of the inventory. There are several phonological diagnostics that can tell whether a feature within a class is marked and thus is present in the system to mark a contrast (see Rice 2003 for details). For instance, consider consonantal place of articulation. If Peripheral behaves asymmetrically with respect to Coronal in assimilation, being a trigger but never a target, then Peripheral is marked and must be present (i.e., specified) in the underlying representation. If Coronal is a target and not a trigger, then Coronal is unmarked and thus is not present in the representation. A feature can also enter into a representation based on language specific inventory facts, which can be expressed in term of the Node Activation Condition (Avery and Rice 1988, 1989). This condition states that a node dominating a feature must be present for contrasting sounds if the feature is distinctive for a class of segments. The consonant inventory of Shona which will be shown later, for instance, has a place contrast among coronals but not among velars. This type of inventory fact suggests that Coronal must be specified underlyingly for a coronal place contrast. Consequently, velars are not specified for a place feature in this language, lacking a relevant feature in their underlying representations.

Assuming contrastive specification, I argue that the differences found in the cross-linguistic CV interactions in epenthesis in loanwords are due to a different language-specific place feature specification in consonants. In the sections to follow, I detail the analysis by explaining the cross-linguistic differences found in the CV patterns.

6. The Analysis of the cross linguistic CV interactions
6.1 Marking contrast

6.1.1 Korean: based on language-specific segmental patterns

Let us begin by examining what phonological processes in Korean suggest about consonant feature make-up. As briefly mentioned earlier, there is language-internal evidence suggesting that the place feature of velars and labials are specified in Korean but the place feature of plain coronals is absent: velar to coronals but not vice versa (Iverson and Kim 1987; Cho and Iverson 1997). Following Avery and Rice (1989) and Rice (1994), Cho and Iverson (1997) proposed that the node ‘Peripheral’ is subordinate to Place in the feature geometry. Under this proposal, plain coronals lack a Place node while labials are specified for a Peripheral node, and velars are marked for a Peripheral node with a subordinate Dorsal. As for palatal consonants, there is independent evidence that they have a place feature. For instance, based on the pattern of umlaut in which only palatals, but not other places of articulation of consonants, block this process, Hume (1990) proposed that palatal consonants are specified for a secondary vocalic feature Coronal. There is also historical evidence supporting this point. According to Lee (1978) and Huh (1964), coronals in Middle Korean underwent palatalization (e.g. /t/ → /tf/) before a front vowel in late Middle Korean. The historical palatalization process suggests that palatals

---

17 A similar type of a proposal is made in Rose and Demuth (2006) for the vowel epenthesis pattern in Sesotho in which a language-specific phonological process is central to vowel epenthesis in loanword adaptation.

18 Due to space concerns, I do not discuss vowel feature specifications in the three languages. I refer the reader to Kim (2007).
and a front vowel pattern together that can be interpreted in the same way as in Hume (1990). Thus, I assume the following consonant place feature specification in Korean:

(16)   Velar      Labial      Coronal      Palatal
       C-Place       C-Place       C-Place       C-Place
       Peripheral   Peripheral   V-Place       
       Dorsal       Coronal

6.1.2 Shona and Sesotho: based on the consonant inventory

There is no clear language-specific evidence to determine how consonantal place of articulation is specified in Shona and Sesotho. Here, I discuss evidence drawn from consonant inventory of Shona, given in Table 1 (Uffmann 2004) and Sesotho, given in Table 2 (from Rose and Demuth 2006), which appears to indicate that velars are placeless:

Table 1: Consonant inventory of Shona

<table>
<thead>
<tr>
<th></th>
<th>p</th>
<th>b</th>
<th>t</th>
<th>d</th>
<th>k</th>
<th>ĝ</th>
</tr>
</thead>
<tbody>
<tr>
<td>pf</td>
<td>b'</td>
<td>t'</td>
<td>d'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mb</td>
<td>mb</td>
<td>nd</td>
<td>nd</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mv</td>
<td>f</td>
<td>s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>w</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Consonant inventory of Sesotho

<table>
<thead>
<tr>
<th></th>
<th>pʰ</th>
<th>tʰ</th>
<th>kʰ</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>s</td>
<td>ỹ</td>
<td></td>
</tr>
<tr>
<td>p'</td>
<td>pʰ</td>
<td>t'</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>w</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: segments in parentheses is found in loanwords only
As shown in Tables 1 and 2, Shona and Sesotho have rich coronal segments in different places while velars do not show such place differences. Assuming the Node Activation Condition introduced earlier, the Coronal node must be present in underlying representation since a coronal place contrast exists in the language. Consequently, velars are not specified for a place feature. It should be noted here that the Node Activation Condition is significant when there is more than one primary coronal. While Korean has both a plain coronal (e.g., /t/) and a palatal coronal (e.g., /c/), they are treated as differing by V-Place feature as shown earlier (Hume 1990). For Shona and Sesotho, I assume that these are primary place differences following previous studies (Uffmann 2004 for Shona; Rose and Demuth 2006 for Sesotho). Any consonantal feature, be it V-Place or C-Place, is shared with the epenthetic vowel.

Thus, based on the inventory facts shown in Tables 1 and 2, I assume the place specification of consonants in Shona and Sesotho, as illustrated in (17):

\[
\begin{array}{ccc}
\text{Coronal} & \text{Labial} & \text{Velar} \\
\text{C-Place} & \text{C-Place} & \text{C-Place} \\
\text{Coronal} & \text{Peripheral} & \\
\end{array}
\]

6.2 Analysis: highlighting the cross-linguistic differences

With the consonant feature place specifications in the previous section, I now turn to an account for the different patterns of the CV interactions in the three languages.

As the representation of Korean consonants in (16) indicates, plain coronals do not have a place feature to give, so there is no spreading; therefore, the default vowel results, as illustrated in (18):

\[
\begin{array}{ccc}
\text{Coronal} & /i/ & \rightarrow \text{[i]} \\
\text{C-Place} & \text{V-Place} & \text{V-Place} \\
\end{array}
\]

On the other hand, palatals are marked for Coronal which spreads to the vowel resulting in the coronal vowel [i]:

---

19 In Rose and Demuth (2006), based on the pattern of liquids in word medial position, liquids are suggested not to have a specified place feature, as opposed to other coronals. It is not clear, however, due to the lack of data, whether in word initial position liquids patterns in the same way. If they do, liquids should be represented without a place specification, but as mentioned in Rose and Demuth it can be distinguished from a velar by the presence of the feature [lateral] (e.g. Rice and Avery 1993). As will be shown in the analysis later, I treat liquids the same way as other coronals in its specification due to a lack of the data.

20 As shown previously, labials in the three languages exhibit the same pattern with respect to an epenthetic vowel: they share their feature with the vowel resulting in a back vowel. Importantly, as indicated in the previous section, labials in the languages are specified for the feature Peripheral which accounts for the interaction between labials and the vowel.
(19) Palatal /i/ \[i\]  
C-Place V-Place V-Place  
|  
V-Place Coronal  
|  
Coronal

In contrast, in Shona and Sesotho, both types of coronals are specified for a place feature, namely Coronal (cf. (17)). Thus there is a spreading of the feature to a vowel after both types of coronals, resulting in a high vowel (e.g., [i]):

(20) Coronal V \[i\]  
C-Place V-Place V-Place  
|  
Coronal Coronal

The languages under discussion also exhibit a contrast in velars with respect to an epenthetic vowel. Velars in Korean share their feature with the vowel but the ones in Shona and Sesotho do not. This contrast can also be attributed to a different feature specification in each language. Velars in Korean, as represented in (16), and reproduced in (21), have a place feature specified, resulting in the epenthetic vowel [uu]:

(21) Velar /i/ [uu]  
C-Place V-Place V-Place  
|  
Peripheral Peripheral  
|  
Dorsal Dorsal

In (21), Peripheral spreads to the vowel. Importantly, note that velars are marked for Dorsal under Peripheral. When Peripheral spreads to the vowel, Dorsal is carried together to the vowel as assumed in this paper; as a result, the epenthetic vowel is phonetically realized as unrounded [uu].

In contrast to Korean velars, after velars in Shona and Sesotho, no specific pattern is observed. Assuming the feature specification of consonants in (17), the pattern can be accounted for as illustrated below:

(22) Velar V no pattern  
C-Place V-Place

Because velars do not have a feature specified, there is no specific assimilation pattern in (22).

This section shows that the empirical findings in the CV interactions in the three languages are explainable in terms of contrastive specification.
7. Summary and conclusion

I proposed that, assuming contrastive feature specification, the differences found in the cross-linguistic CV interactions in epenthesis in loanwords are due to the different feature specifications in the consonant systems of the different language.

Another interesting contribution of the paper is the new empirical finding on the interaction between a velar and an epenthetic vowel in Korean. As the phonetic analysis demonstrates, the epenthetic vowels next to velars are not the same as the ones next to plain coronals in terms of place, contrary to what has been reported in the literature.

The proposal made in the paper raises many questions for further research. For one, the proposal implies that in a language where vowels assimilate to consonantal place, vowel places will reflect consonant places subject to any constraints there might be on vowels with respect to, for instance, complex coronals. It will be interesting to see if there are any small differences in vowel quality following different coronal places of articulation in languages such as Shona and Sesotho. In addition, I have assumed that a velar, not a coronal, gives its feature in Korean, and this is worthy of a more detailed investigation.

References

CORONALS IN EPENTHESIS IN LOANWORDS WITH COMPARISON TO VELARS


